

PROCEEDINGS OF THE HEARINGS
on the
COLORADO RIVER DEVELOPMENT,
before
THE COLORADO RIVER COMMISSION

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Phoenix, Arizona, March 15, 16 & 17th,
1922.

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First Session

Wednesday, March 15, 1922

2.00 P.M.

MR. NORVIEL: Ladies and gentlemen, you will please be quiet, now, and we will begin the meeting. Judge Sawtelle has a very hard and fast rule that there shall be no use of tobacco, either chewing or smoking, in this room. We are requested to observe that rule, so kindly bear that in mind.

I have the pleasure of introducing to you, ladies and gentlemen, Mr. Herbert Hoover, Secretary of Commerce. (Applause)

MR. HOOVER: Governor Campbell, members of the Commission and ladies and gentlemen: it is the purpose of the Colorado River Commission to hold hearings here during this afternoon, tomorrow and Friday, and to visit the Imperial Valley on Sunday, if possible, and to reopen the hearings again in Los Angeles on Tuesday morning.

It is the desire of the Commission to give an opportunity to every interested person who can be of assistance to the Commission in its work. The Commission has been established primarily to consider and, if possible, to agree upon a contract between the seven states in the Colorado River Basin, providing for an equitable division of the water supply of the Colorado River and its tributaries amongst these seven states. Such a contract is subject to the ratification by Congress and the legislatures of the different states.

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It has been hoped that by such an agreement there may be a prevention of endless litigation and long delays in the development of the river and the success of the Commission depends in finding some medium that will commend itself to the people of each of the seven states, and contribute to the welfare of millions of people. It is therefore, the desire of the Commission to have as much assistance as it can secure from all of those who are interested in the problem. It is not so simple a matter as may appear on the surface for, while there is possibly ample river water in the river for all purposes, could storage be undertaken, there is not a sufficient supply of water to meet all claims unless there is some definite program of water conservation, and, while the Commission primarily has but ^{the} one problem to solve, that is, the proper and equitable division of the water, yet, its vision must extend to the methods and use of the water in the river, and the Commission can be, I feel, of assistance to all of the seven states in the better education of our eastern brothers as to the importance of the Colorado River basin as to the nation as a whole; that herein lies one of the great national assets of America. In the Colorado River Basin, it is possible that we may add 4,000,000 acres to our arable land. We may add 4,000,000 horse power to the strength of our people. We may add a population of from three to ten million of people to America, and, therefore, we have need to consider this problem broadly and not particularly to any interest alone, or to any particular immediate and personal

interest, for the things we may do to-day will extend not alone to the second generation but to the tenth generation of Americans. It is therefore, a problem of great responsibility, that we should arrive at such conclusions as in the first instance will be just as between the different states, in the second instance that will be the foundation for immediate progress in the utilization of the river; and, in the third instance, that will bear criticism from our children that we have acted rightly.

We have the good fortune to-day to have with us Governor Campbell. There is no one who has contributed more to enlighten the country as a whole to the necessity of action in this matter, and I suggest it would be a great compliment to the Commission if Governor Campbell could be the first to present the case for Arizona. (Applause.)

GOVERNOR CAMPBELL: Mr. Chairman, and members of the Commission: I first want to greet you and extend to you the hospitality of the State of Arizona and the City of Phoenix during the deliberations of this, your second meeting. It is quite fitting, I think, that you should have chosen this particular part of the great Southwest, almost the heart of the great Colorado River Basin, for your labors at this time and it is my hope that by concerted effort of the men and women of this country from the hearts and homes of the pioneers who have created from the desert here just an example of what we might look forward to when the great waters of the Colorado River are intelligently placed

upon desert lands and the mighty power that can be produced there is applied to its transportation and industries, to the end that this whole country both in the lower reaches of the Colorado and in the upper reaches of the River, might have attained a something that your chairman has spoken of, - a home for from three to ten million of contented American people. This has been my dream for years and of others during a more recent period, and I think the labor that I have had the pleasure of performing the last few years as the chief executive of this state has been most profitable, when it has been towards that development for which this Commission has been created.

I think it is fitting also at this time to say just a word or two towards the birth of this Commission. It goes back just a few years, although it has been in the minds of men for a number of years and, as I look at these men before me here, it takes me back to Los Angeles and Salt Lake and Denver, Colorado. The most of them were there then for the purpose of reaching a common point where in due time they could sit at the peace table, backed up by the statutory provisions of their various states, with the cooperation of the Federal Government represented here to-day at the head of this table in the person of Secretary Hoover, to the end that the big problems necessary to be determined on this great river might be accomplished before and not after court procedures. And so, through the efforts of you men
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and others who are not present here to-day, the proper legislation was presented to the various legislatures in the Basin last year and the most wonderful thing in all legislation occurred at that time. Every one of the Basin States passed the necessary legislation to appoint a Commission, giving it certain rights and certain duties to perform, and then these same men and others went to Washington and presented it to the Congress there assembled.

They, too, in a very short time, as national legislation is passed, ratified the actions of these legislators, and appointed a Commissioner, to the end that the development of the Colorado River Basin, from its source to its mouth might be accomplished with justice to all of the States in the Basin, and it is my hope, as it has been my dream for several years past, that each of the States have selected in the person of these Commissioners and our Federal Government in the person of our Chairman, men of sufficient breadth to overlook the selfish interests of any of the States, and yet at the same time protect the interests of each of those States, so that they may have a place in the sun and enjoy the future developments of this wonderful natural resource.

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I know that you men can do it, and I believe that you will, and I would look upon the work of yourself and others who have been interested in this big problem in past years as a broken vase, never to be repaired, if before final adjournment of the deliberations of this Commission either here or in some of our sister states something be not accomplished. Because, you men sitting here around the table as you are, knowing each other as you must, hearing in this state and in the various other states the ambitions and the desires and the hopes of the people therein, if you cannot come to some reasonable agreement and adjustment of the interests of the various states, then, what opportunity has the various legislatures in the various states to come together in the drawing of a compact. If you seven men with your chairman cannot do it, meeting as you do, then again I say, what chance is there to enter into a treaty or compact when presented to the legislatures and the Congress, as it must be, before it becomes law.

It is not my purpose, gentlemen, to take up more of your time. You all know how much this means to me personally, and to me as the Governor of this State, and you all know what the development of this river means to this State of Arizona, and it is my hope and fervent prayer that you will get together upon this occasion, as we have always gotten together heretofore in the last two or three years, where men's minds have met for a common purpose.

I have been living for the past two or three years for this moment, when I might addressor at least be with a Commission of this kind and let me hope again, I say, that you will be able to present to the people in due course of time, a compact and a treaty that can be ratified, with all the rights properly protected, then unloose the purse-strings necessary for the development of this wonderful resource, so that we here in the inter-mountain and the Southwestern country can really make sovereign States of these in which we live. Without such developments as these, we have almost reached the limit of our growth, and, with the proper development of this wonderful resource, there is no limit to our growth.

I leave you with this word; be as reasonable, be as sincere, be as yielding now as those of us, who have carried the former burdens, have been in the past, and I, for one, know that you will reach the proper conclusion, to the end that the work you do ^{here} will go down through the halls of time as a monument to you men, representing your states in one of the greatest works now before the American people. (Applause.)

MR. NORVIEL: Mr. Secretary, upon receiving from you the request by wire of your desires in the matter of this meeting that everyone who desired to be heard be given the opportunity and suggesting that time should be somewhat limited to those who might

address us, and that the burden of the discussion should be centered upon the partition of water or the division of the water of the Colorado stream system, looking to the proper adjudication or allocation of the rights of the several states, we have noticed that request in the papers, and have sent out a few invitations to others whom we knew desired to address us on this occasion. The next man who will address us, if he is present, is Mr. A. G. McGregor. Mr. A. G. McGregor is an engineer of this State, and will now address the Commission. Mr. A. G. McGregor. (Applause)

MR. MCGREGOR: Mr. Chairman, members of the Colorado Commission and ladies and gentlemen: the title of my paper, if it is one, is "An Arizona view of the facts and psychology surrounding the Colorado River Problem, and a plan for its solution." Briefly from an Arizona standpoint, I will try to frankly lay bare a few of the salient facts and some of the psychology surrounding the problem of the Colorado River Development, in the hope that some of the haze at present surrounding Arizona's position may be cleared, and I will venture to propose a plan for the solution of the problem.

At the outset, I wish it clearly understood that I am not accusing the citizens collectively of any of the other states of doing something that our Arizona citizens, under similar circumstances, would not do, nor am I accusing any individual of pursuing a policy that I, as an individual, would not pursue.

We are all human and are naturally alert to our own best interests.

(Mr. McGregor then read the following paper)

"I wish first to consider briefly the individual interests of the seven states of the Colorado basin in the proposed river development.

"As we all know, California has very great need for protection from the floods of the Colorado. California has half a million acres of rich land that can be brought under cultivation from the direct use of the water of the River as soon as its floods can be brought under control and conserved. California has need for more hydro-electric power. It happens that all of these needs can be fully realized by building a high dam in the canyon of the Colorado at a site affording ample storage back of it.

"Arizona also desires to be protected from the floods of the Colorado; her need for this protection is entirely secondary to that of California, however. Arizona has about the same amount of land that can be reclaimed by irrigation directly with the waters of the Colorado as California has, and Arizona is very much interested in this development. Arizona has need for hydro-electric power; she cannot use as much as California eventually, but for the amount that can be used, her needs are more pressing than California's.

"Electric smelting of copper ores was practised in Norway during the War. With their crude beginnings and with power at \$60 per k.w. year, electric smelting successfully competed with furnace smelting and coke at \$20 per ton. It may be possible that power can be developed at a low enough cost to make it attractive for smelting Arizona copper ore. If this happens Arizona can be counted upon to use approximately half a million horsepower.

"So far, California has been much more aggressive in seeking the development of the river than Arizona has, due mainly of course to California's much greater danger from floods. California has raised more than \$100,000 for the use of the Reclamation Service Engineers for investigating the feasibility of constructing a dam and placing the river under ~~constructing a dam and~~ placing the river under control, in the hope that there might be enough new land found available for direct irrigation to practically justify the cost of the dam as a reclamation project.

"The reclamation engineers have been working diligently in their investigations, and they now report that the project is entirely feasible from an engineering standpoint and from a financial standpoint, but that as far as the land that can be reclaimed is concerned, as important as it is, this land will justify only a very small part of the cost of the necessary dam.

"Not long ago the reclamation engineers estimated the new land would stand 5 per cent of the cost, and flood control 10 per cent, the balance of 85 per cent, or the cost of the dam, would be borne by power. Now, I understand the Reclamation Service would assess an even greater ^{pro}portion of the cost of the dam to power.

"In other words, it turns out that the Colorado River project becomes primarily a power project and not a reclamation project. The problem is not reclamation, but is a power problem, and must be so recognized. The solution of the Imperial Valley's flood problem and the solution of the reclamation problem of the lower Colorado, both depend upon the solution of the real problem, the economic problem, which is the power problem. Flood control and equalization of the River flow are paramount to the Imperial Valley. These same considerations are paramount in the comprehensive development of the river for power. The best interest of power in the use of water will quite closely coincide with the best interest of reclamation, however, the power problem must be hampered by reclamation considerations only in so far as they are economical to the best interests of both.

"It is fully realized that the Colorado River Canyon, from the standpoint of power that can be developed, probably constitutes one of the most valuable untouched resources in the world today, and the time has already passed for a beginning in its development.

"It seems as if Nature intended the canyon of the Colorado as a great super-power project. She has been unusually kind indeed, and has placed by far the best storage site at the head of the canyon, the ideal location for it, where it will be of tremendous advantage for power development. With a dam 500 feet high, the reservoir site at the head of the Canyon has a capacity for storing the total flow of the river for three years, which is all that could possibly be desired. Eventually, there will probably be about seven other dams below, none of which, by comparison with the upper development, have much storage capacity. Fortunately also 97 per cent of all the water flowing in the River at the lowest dam site, flows through the upper dam site.

"From this upper reservoir site to the lower Boulder Canyon dam site the river drops a distance of 3,100 feet in elevation. The average flow of the River, with this drop, when the canyon is fully developed as it eventually will be, will yield about 6,000,000 h.p. At \$20 per h.p. year (the present Arizona cost of power is about \$80/h.p. year) this amount of power will be worth \$120,000,000 annually.

"It happens that 80 per cent of the possible power projects in the canyon are entirely within the boundaries of Arizona. The other 20 per cent of the power that can be developed in the canyon is on the Arizona-Nevada boundary line. Half of this would,

therefore, be in Arizona and half in Nevada, so it may be stated that 90 per cent of all the power projects that will eventually be developed in the canyon are in Arizona. None of the Colorado River power projects are in California and the closest one to her border is 70 miles distant.

"Naturally Arizona looks upon this great resource exactly the same as all the other states look upon Nature's resources that happen to lie within their boundaries. Arizona naturally expects to profit from the low cost power to be made available to her industries and by her increased acreage of irrigable lands. Arizona has no notion of grabbing the canyon's power and reserving it to her own future use. Arizona expects California and any of the other states desiring power, to have all they can use and to establish priorities in its use until finally the canyon is fully developed.

"The State of Arizona naturally expects to benefit from the power delivered beyond her boundaries to the extent of an equitable tax on the project furnishing it, the same as other states benefit from the shipment of commodities manufactured within their confines to points outside.

"The development of the Colorado River power project will not add any irrigable land to the other five states, parts of which lie within the Colorado River basin. Also, none of these states are now much interested in the possibility of receiving

power from the project, as they have abundant hydro-electric power from other sources. They are interested, however, in the project for another reason, especially the States of Wyoming, Colorado, Utah, and New Mexico. They have lands which it is physically possible to irrigate by water now flowing down the Colorado River, but which have not yet been cultivated for the reason that their prospective value so far is not sufficient to justify the cost of delivering water to them. Eventually it will prove economic to reclaim some of these lands, at least, by irrigation, if the water is then available.

"Those in the upper states in touch with the situation, fully realize that when the first dam is constructed in the Colorado, much of the land available for irrigation below will be quickly brought under cultivation, due to its fertility and the long growing seasons of the Southwest. They recognize that this earlier use of the water for irrigation and for power constitutes a priority as it should. They realize that eventually when the Canyon is fully developed the water will be more valuable for power in the canyon, alone, than it will be for irrigation on much of the land in the upper states. They realize that when the disputes between states over the use of water, now pending in the courts are finally settled, the right of priority will likely be recognized and in some instances possibly the principle of the economic use may have weight. They realize that Arizona and California will have preference by either county. They realize that possibly when

the time comes that it will be economically feasible to develop some of the lands in the upper states for which there would be abundant water flowing by, they may possibly be restrained from using it on account of the prior and more economic use in Arizona and California below.

"They cannot be blamed for seeking now to gain a right to be exercised later for the use of the water on lands not now ~~exercised later for the use of on lands not now~~ economical of development but which may be later.

"Arizona and California can not be blamed for feeling certain that the doctrine of preference to the prior and more economic use will prevail and for being willing to take chances on the future upholding this apparently just doctrine.

"Nevada is not much concerned about the priorities to be gained by Arizona and California through the development of the Colorado Canyon project, as her additional land that can be reclaimed by waters flowing into the Colorado River is small, only about 2,000 acres according to Director Davis. However, Nevada has another interest in the proposed Colorado project from the fact that 20 per cent of the power to be ultimately developed in the canyon is on the Arizona-Nevada boundary line. Nevada can not be blamed for seeking in every possible way to have the part of the canyon in which she is interested developed first, even if it is decidedly in the wrong end of the canyon for a power development, and even if the foundation difficulties for a dam in this end of the canyon are stupendous and entirely without precedent.

"If the Reclamation Service recommendations are carried out, they would build the Boulder Canyon Dam, turning the power over to private enterprise. The power plant would be on the Nevada side, and Nevada would benefit from all the construction activities and an important increase in her taxable wealth. No one in Nevada can be blamed for seeking in every legitimate way to have the Reclamation Service program carried out.

"It is quite plain that Arizona and California will use practically all the power to be generated by the river development for some time to come, and all the new land to be reclaimed as a result of the river development will be entirely within their borders. Also, it is very plain that Arizona and California will eventually pay all the bills covering the cost of the development, no matter how inefficiently or poorly the project is developed from their standpoint. Is it not evident that Arizona and California alone should be the high contracting parties?

"Any important development undertaken by the Reclamation Service must, of course, be approved by Congress and the Senate. In the Senate all the other states of the basin have equal rights with Arizona and California. With all these other states having their own individual interests to champion, can Arizona and California expect that their very important and paramount interests

will be best safeguarded and expedited by allowing these other states an equal voice with themselves?

"Are not the Reclamation Service recommendations apt to be framed from the standpoint of getting them passed by the Senate, rather than from the standpoint of the very best interests of those ~~those~~ who will finally pay all the bills?

"On account of the conflicting interests of the seven states of the basin, is there much hope that Arizona and California can expect important Federal legislation entirely fair to their best interests in the near future?

"Is there much hope that the Federal Government can be induced to finance a project that is so preponderantly a power project and not a reclamation project?

"Is it not time that California and Arizona were discussing this mutually vital problem between themselves? Can not they by cooperation devise a way of carrying out the project more economically, more expeditiously and more to their mutual best interests than by depending upon the Reclamation Service and the U. S. Senate which, in the very nature of things, are compelled to be influenced by political considerations?

"The Colorado River power project could be turned over to a private corporation to develop and control. I contend that on account of the very involved situation, the entire canyon development is properly a one owner project, in spite of the fact

that there will eventually be about seven or eight power plants of enormous capacity in the canyon.

"The power company putting in the upper dam which will provide the necessary storage and put the River under control will contribute enormous benefits to subsequent developments below in three ways, as follows:

"First: Subsequent dams below will not cost as much to build, as the very expensive means required for taking care of the seasonal floods during the construction will not be needed. The floods will be controlled by the upper dam.

"Second: The subsequent projects can be operated at a uniform maximum head whereas this cannot be done at the upper dam as the effective head there will vary with the amount of water in storage. The same height of dam and flow of water at a dam below will probably have about 60 per cent more power capacity, on the average, than the upper dam.

"Third, and most important of all, the value and capacity of a hydro-electric development is largely determined by the amount of power it can deliver during the low water season. The average flow of the Colorado is about seven times the minimum flow, and the value of a subsequent development below will be increased many fold by virtue of the first dam and the great storage back of it.

"It will thus be seen that the builder of the upper dam is entitled to a very important equity in subsequent developments below. There would probably be difficulty in arriving at a just appraisal of this equity, and it would seem the simpler plan would be to let one corporation handle it all.

"However, as there are several interests seeking rights in the canyon at present, there may be legal difficulty in turning the entire project over to one private corporation for development. Furthermore, if it is legally feasible, the policy of turning over such an enormously valuable natural resource to a private corporation would probably be opposed by the general public, and any legislation aiding a single private corporation to gain entire control of this great natural resource would undoubtedly be impossible of attainment.

"Privately owned public service corporations in these times get very little satisfaction from rendering valuable public service. They are hedged and hampered at every turn and if, in spite of this, they are able to operate at a profit, the cry goes up for the public to take them over.

"If there ever was a resource that the people felt belonged to them in the beginning and one which appeared attractive to them to operate for their own benefit, it is the Colorado River power project and this situation, together with the involved conditions surrounding the comprehensive power development of the canyon by private capital, I believe may as well be recognized now.

as later. Prompt recognition by those interested will better insure the protection of their interests and expedite the development and the great benefits that will accrue to all.

"I believe there is a more expeditious plan of handling this project which will better serve the paramount interests of the prospective users of power in Arizona and California and the taxpayers of these states than turning it over to the Federal Government to handle.

"I believe that the super-power projects now being discussed in certain sections can only be successfully carried out to accomplish the results desired through the cooperative organization of the power users in those districts,--not the power seller.

"If we must have public ownership; I believe that the State of Arizona, on account of her power to condemn, appraise and reimburse for private property within her boundaries, for public use, is the proper instrument, in cooperation with the State of California, to take over the development of the Colorado power project. Their interests in this are mutual.

"For the State of Arizona I would propose suitable legislation for carrying out a plan which I will outline only briefly.

"I would propose the creation of a Colorado River Power Board, representing interests who are important users of power directly or who, as important tax payers of the State, would be vitally interested in the businesslike administration of the project. I would propose that the board be made up of directors representing each of the following important interests: Mining, railroads, power and lighting companies, bankers, merchants, agriculture, the general public and labor. It is my idea that this board would not operate as a salaried commission, but would operate strictly as a board of directors who would be paid by the state on a per diem basis only, provided for in the beginning.

"This board would have the following powers, among others: The power to condemn and reimburse for private property in the State required for the use of this public corporation.

"The power to fix equitable rates for Colorado River power in the State.

"The power to cooperate and organize with a similarly constituted California board of equal number.

"The joint Arizona-California Board would have the following powers:

"The power to organize and elect its necessary officers for the transaction of business.

"Full authority to dictate the entire business policy, the plan of organization, the selection of managers, commissions if necessary, etc., the fixing of salaries and wages, the purchase of any kind of property in any state, etc.

"The power to issue bonds as needed obligating the States of Arizona and California to whatever extent is necessary in the businesslike development of the Colorado River project.

"The power to enter into contracts for the sale of power to consumers in any state.

"Power would likely be sold at cost in the States of Arizona and California as long as there is any power un-developed or unused from the canyon project. By cost I mean all operating costs, interest and redemption charges for bonds, sinking funds, etc., the policy governing the progress in the liquidation of all bonded indebtedness remaining in the hands of the Board.

"As far as the operating charges of the dam and power plant and the overhead charges are concerned, they would be assessed at the switchboard; the users of the respective states would be required to stand their own transmission losses.

"The State of California would be obligated to pay a small premium on the power at the switchboard, in lieu of taxes Arizona would be entitled to each year, on property within her boundaries.

"California's tax for any year could be based on her proportion of the assessed valuation of the dams and power plants, her proportion bearing the same relation to the total assessed valuation that her connected load bears to the total connected load. The rate of taxation and method of arriving at assessed valuation would be the prevailing rate and method for the other similar taxable property in the State of Arizona. It would be arranged so that California would pay no taxes to Arizona until the project is on a proper operating basis.

"As the acts of the board of directors would determine the financial and business policy of this proposed gigantic public corporation, and determine the efficiency and dispatch with which its work is carried out, it would be but right for the protection of the users of power and the public and bondholders that the specifications for a director be so drawn in the beginning that as far as possible only men of proven ability in the direction of large affairs would be eligible for the responsibility.

"As all bonds or other financial obligations would be issued on the basis of the plan of administration provided for in the enabling act, no changes could be made in the method of management without the consent of the bond holders or without the redemption of all the outstanding obligations, so that danger from a change in the method of management by radical legislation would be remote while orderly government endures.

"I believe the cooperative method briefly outlined for handling the Colorado power project to the best interests of the power users in the two states could possibly be worked out so as to be as efficient and businesslike in operation as large privately owned corporations.

"Bonds issued jointly by the States of California and Arizona in the manner described would be fully as well secured as U. S. Government obligations, and to investors of moderate taxable income should prove fully as attractive.

"In a hydro-electric project of the magnitude of the one proposed, the capital and interest charges would constitute more than 90 per cent of the cost of the power delivered. Privately owned public service corporations are being so interfered with in their operations that more risk is felt by careful investors in their securities now than formerly, and their problems of financing are more difficult. Due to this and other disadvantages by comparison under which a private corporation of necessity must operate, I believe it is safe to say that their necessary interest and profit charges for capital would be more than 50 per cent greater than the capital charges of the publicly owned corporation which I propose.

"This means that the cost of Colorado River power delivered by the private corporation would cost considerably more than if delivered by the public corporation.

"Furthermore, a private corporation would necessarily continue to charge a high rate on its invested capital as long as it controlled the project, whereas the States of Arizona and California might decide to liquidate the bonded indebtedness by easy stages, and undoubtedly would eventually. When this time comes, they would be in a position to sell power at cost for a dollar or two per h.p. year at the switchboard, but probably they would sell it at a profit, returning millions to their respective State Treasuries each year.

"Director Davis estimates the first project to cost as follows:

Dam	\$50,000,000
Power Plant	22,000,000
Transmission Lines	<u>18,000,000</u>
Total	\$90,000,000

"For the cooperative plan the annual interest charges would be, say seven per cent, or \$6,300,000. He estimates such a project with a dam 500 feet high and with the variable head obtaining, would develop more than 500,000 H.P. which, with the great storage back of it and with a power plant somewhat larger in capacity than required for the average power, the project could be made to yield a return on this amount of power annually.

"On this basis, when the market is established for this amount of power, it would appear that power could be readily sold at the switchboard for under \$17 per horsepower year, a remarkably low figure. With subsequent developments, power could be sold for less, for reasons explained before.

"It may be asked to whom would the power project belong when all the proposed dams are built and all the available power is being used. The answer to this can well be left to future generations to decide, but my answer now would be that it would belong to Arizona and California in proportion to the power they are then using from it, and could be divided between them on this basis if they wished. The other states using power from it at that time would be entitled forever to the proportionate amount of power from it that they are then using. When the project is fully developed and there is a demand for all the power, this great public corporation may see fit to purchase lands in the upper states that are then making a less profitable use of the water which they are diverting so that the water may be more profitably used below. For this and other reasons, I believe it would always be mutually advantageous for Arizona and California to maintain their partnership in the enterprise.

"If the plan proposed is not feasible, then let Arizona alone consider making the development. If this is not feasible, then let us consider turning it all over to one private corporation to handle. If this seems best, why not assist them in financing and in every way possible? This is something we who will eventually pay all the bills, should get together on promptly. Arizona needs the power now.

"It may be asked, where will the other states of the Colorado River basin get off if Arizona and California go ahead as I propose? Under the plan outlined, I would propose that Arizona and California would sell power to users in any of the states on equitable terms as long as power is available. The upper storage dam would back up water into Utah on land fortunately having practically no commercial value. The value of this land would be appraised and Utah would be properly compensated for it.

"As to Nevada, whenever the Arizona-California power board found that the projects on the Nevada border were the economic ones to develop, the board would enter into negotiations with Nevada.

"What about the future use of additional water by the upper states in the basin? First, as to water for irrigation in Arizona and California, I believe it can be safely stated the time will probably never come when the upper states will be able to economically permanently divert enough water from the River for use in the basin so that there will be an important shortage of water for the Arizona and California lands below when the dam and storage now proposed are constructed. If there is a shortage, it will be many generations hence. The approach of the shortage, if it should ever come, will be gradual and will be apparent for years before it occurs and there need then be no misunderstanding or embarrassment.

"Now, as to the power, it can be safely stated that the comparatively small additional amount of water that the upper states will be able to economically, permanently divert for use in the basin for many years to come, will not noticeably affect the Arizona-California power project. If, during the development of the power project, this diversion by the upper states should become noticeable Arizona and California would undoubtedly have the legal right to restrain such diversions. However, if there is a shortage of power as a consequence of these necessarily comparatively small diversions, it would be a short-sighted policy and manifestly unfair for the power interests of these states to start legal proceedings to regain the small amount of water involved. The power corporation, under this circumstance, would promptly get busy and build another dam and power plant.

"I feel safe in saying that the American sense of proportion and fair play can be depended upon to prevent the California and Arizona power interests from ever seeking to restrain the upper states from diverting water for the irrigation of lands in the basin until after the last feasible dam has been constructed in the canyon and there is a real shortage of water for power. This will be many generations hence.

"While, as just pointed out, there need be no worry about a shortage of water for irrigation or for power in the lower states for generations, it is useless now to ask Arizona and California to specifically waive any rights that they feel ^{now} naturally belong to

their posterity, judged by present standards of justice. They are just as loyal to and thoughtful of their future generations as are the upper states.

"When these contingencies we are discussing arise, if they ever do, conditions may be greatly changed. Great strides will have taken place in chemistry and other sciences. Possibly in that day the people of the upper states will prefer to use the water of the basin for power rather than for irrigation. Why not leave this question that we are gothering about now, and only concerns the future, to the future to solve, which will better understand the conditions then prevailing. Can not their good judgment be depended upon to work out a just solution of the problem, if there is a problem? "Why cross the bridge before we come to it?" What now seems a "mountain" to us, may be only a "mole hill" to them.

"They say "possession is nine points of the law." All the water in question is in the possession of the upper states before it reaches Arizona and California. If Arizona and California are not worrying, why should the upper states worry.

"In other words, the possibility of a shortage of water for irrigation is remote. If it ever happens, let the prior users of the basin as a whole have preference. When the last feasible dam in the canyon is constructed and there is a real shortage of water for power, let those then living determine the extent of the preference that the use for power in the canyon shall have over the

use for irrigation in the upper states.

"Now, a word about the Republic of Mexico, and I am through. It is likely that as a result of the control of the river and its development for power, Mexico will be enabled to reclaim an important amount of new land and profitably cultivate it for many years to come, possibly forever. It should be distinctly understood that the use of the water on these new lands will not constitute a permanent right of priority as against any lands in the United States."

(End of paper)

MR. HOOVER: There are one or two points that I think the Commission would like to have a little more illumination on. I gather your conclusion is that the major emphasis should be given to power rather than irrigation.

MR. MCGREGOR: That is my contention. I think that as long as the land will not justify the cost that power naturally should have first consideration.

MR. HOOVER: You would, therefore, give a priority to power over irrigation in the use of the water?

MR. MCGREGOR: No, that is not what I tried to explain--my idea is that the power-- it would be unfair for power to ever claim a priority over land in the upper states as long as there is water or you might say more dams available for construction in the canyon, that is, as long as more dams can be built for power, why, then, power should not seek to restrain any of the upper states. That would be my idea of a just arrangement.

MR. HOOVER: Well, what nature of a compact would you enter into between the states under your project for the division of water?

MR. MCGREGOR: Frankly, Mr. Secretary, that--I think that I would not enter into any compact.

MR. HOOVER: Well, how would you avoid the probable period of litigation that this must go through before there will be a clarity of title?

MR. MCGREGOR: My idea is that as far as the use by irrigation is concerned, the priority would be recognized through ^{out} the basin, that is, the preference would be given to the first users in the basin whether they are in California, Arizona, Colorado or wherever they might be, as preference would be given to the first users then as far as power is concerned. I would not be in favor of the use of water for irrigation anywhere until after the last dam was built, when the value of the water for power will be more than it will be for irrigation in the upper states. That is my idea; that when the dams are fully developed, or a 3100 foot head is making power, the water for that purpose will be more valuable than it will be for most of the land in the upper states, that is, based on the present way of looking at things now. Of course, things may change and my idea is that when the time comes and the last dam is built, then you could decide what right power has over land, if it has any.

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MR. HOOVER: How are you going to get at the problem now of the sort of a compact you would enter upon at the present time in order to encourage development of the river without litigation?

MR. MCGREGOR: I think that anybody that analyzes the situation--goes into the facts as to what land is already under cultivation and the land that is likely to be under cultivation, why, he will be very well satisfied if the upper states cannot possibly economically divert more water or enough water to make it noticeable to the power interests or detrimental to the power interests.

MR. HOOVER; How would you prevent the upper States from bringing action against the lower states in order to prevent the establishment of priority use of the water?

MR. MCGREGOR: I don't think that they would--they might take that position, but it don't seem to me a reasonable one to take, would it?

MR. HOOVER: I don't say that. I am only inquiring what kind of anaagreement you would provide in order to stave off such an action?

MR. MCGREGOR: Why, I said I don't think we would have any agreement. I might take that back. I might say that as far as use for irrigation is concerned, that priorities in the basin as a whole should govern, and, of course, I think that the upper states should be satisfied if the power users below are not interfering with the use of the water by the upper states, until after there is a real shortage of water for power and that will be so far in the future that--and we know so little about the conditions, that, it is my opinion, we should not try to lay down a rule

that will govern them. This shortage of water will be so far in the future and be approached so gradually that it will be readily seen, and there is no need for any dispute or embarrassment about it when it comes.

MR. HOOVER: Your impression is, rather, that the upper states ought to rest on the confidence that there will be no decision of their water rights, and let it stand at that.

MR. MCGREGOR: I think so. I think it would be safe in that, but I think that if it is necessary we may enter into a compact to guarantee them that right. I think it is reasonable. Of course, I am just speaking as one individual of Arizona. I have no responsibility, and nobody is backing me particularly. I am speaking only as an individual, and what I think may not agree with what people in California think and what people in Arizona think.

MR. HOOVER: I was only trying to get all angles of the matter out. Have any members of the commission any questions to ask?

A COMMISSIONER: The reservoir that you propose will be used for irrigation as well as power, would it not?

MR. MCGREGOR: Yes, sir.

A COMMISSIONER: So that if it could be said that it was already appropriated, the river down here, by those reservoirs, that would be an exclusive appropriation of the entire stream to its source, wouldn't it?

MR. MCGREGOR: Not under the condition that I would make it, I don't think.

A COMMISSIONER: Your condition, as I take it, is this: Your belief is that there is plenty of water in the river, and the lower states would be warranted in assuring the upper states that any development that occurred below should not have a preference on subsequent natural development above?

MR. MCGREGOR: Yes, of course, now, as far as land is concerned-- as far as water is diverted on land, a concern that has diverted the water first would have a priority if there ever came an issue to the rights of water for irrigation.

A COMMISSIONER: In other words, if our friend Colonel Maxwell's scheme should go, you would irrigate half of Arizona, figuratively speaking here-- As a matter of fact, you would make a prior appropriation of the whole river and dry us fellows up entirely, wouldn't you?

MR. MCGREGOR: My idea is that it is not practical to disburse any water that is going to be harmful to the upper states for irrigation. That is my idea. However, I would say that if it did do that, and we diverted the water before you did above, why, I would say that he is entitled--that is, his project is entitled to the water.

A COMMISSIONER: Did I understand you to say that that condition of priority of irrigation would not apply to Old Mexico?

MR. MCGREGOR: That is what I would say, yes, sir.

A COMMISSIONER: Well, why?

MR. MCGREGOR: Because of the development expense being ^{all}borne by the United States. If Mexico would come in and offer to help us build the dams, and so on, why, we might consider that she would have such rights in the future, but my idea is that she would ^{not} have any rights. They would have a right to use the water as it flows by.

A COMMISSIONER: One thing more. The particular site that you have mentioned is commonly known as what?

MR. MCGREGOR: Why, Lee's Ferry, Glen Canyon.

A COMMISSIONER: You say that holds if the gates were closed down tight so that no water would escape to the river and would pour in there, it would take it three years to fill up?

MR. MCGREGOR: Yes, that is about the capacity of the site.

A COMMISSIONER: That is all.

MR. NORVIEL: Lest we forget, I think there will be some changes made in the program of those who will address us tomorrow, and if there are those whose names have not been handed in, who desire to address the Commission on tomorrow, either before or after noon, I wish you would be kind enough to see that the names get into the

hands of the Commission--some one of the members of the Commission, not later than at the close of the meeting today, so that the program may be squared up for tomorrow, and then for the following day it is the desire of the Chairman of this Commission that all of those who have something to offer will kindly give ⁱⁿ his name, whether he can be heard tomorrow or the next day; do so this afternoon on or before the closing of this meeting.

The next speaker,- Governor Boyle, found at the last moment that he would not be able to attend the meeting on account of pressing business, and asked Colonel Scrugham, the State Engineer of Nevada, to represent him. Colonel Scrugham is also a member of this Commission, and will take up the time of Governor Boyle.

MR. SCRUGHAM: Mr. Chairman, under the guise of protecting the rights of the various states in which they live, a very large number of chimerical schemes have been propounded for the solution of the Colorado River problem, by individuals who obviously desire to enact the roll of Moses leading the Children of Israel out of the wilderness. Details of topography and financing have generally received ^{but} scant attention and the constitutional rights of various states have been directly disregarded in most of the plans presented. The air is now filled with raucous cries from the various ballyhoos calling attention to their respective sideshows, and scarcely anyone of them appears to have any conception of the problems of other States and communities. 1

Probably the most difficult task that this Commission has to face will be the dissipation of the smoke screens that are generated by these well-meaning though uninformed individuals.

This Commission has been created by state legislative enactment and by Federal legislation. I fail to see any possible merit in suggestions that an additional commission should be created, representing bankers, labor unions, and so forth, and, if so, why should the farmer be left out, especially as he has an agricultural bloc in the U. S. Senate to look after his interests. The point that I wish to emphasize is that State Rights can be safely left to the properly-constituted authorities in the states. Otherwise, the people have the recourse of the ballot at the next election. It is the desire of the Chairman to confine the subjects to be discussed at this meeting to the claims of acreages for which water allocations are desired in the various states. I will first call upon Mr. Leslie Saunders, Secretary of the Chamber of Commerce of Las Vegas, to make a statement of the acreage that the State of Nevada has available for irrigation and for which we believe that legal appropriations have been made.

MR. SAUNDERS: Mr. Chairman and Gentlemen: As Secretary of the Chamber of Commerce at Las Vegas, I did not come here with the expectation of being heard, but came with the idea of listening. Heretofore we have been well satisfied up there with the status of progress, and felt that the case as it now rested in the hands of the Commission was in the best possible hands in

which it could be placed, and that whatever action they, in their mature deliberations saw fit to advise, would undoubtedly be the best action in the premises. We feel that our case is in competent hands, and I will confine my remarks at this time to only one point. The work of the Reclamation Service as it has proceeded so far has been the most diligent and has spread over a period of time and involved an expenditure of money such as should have enabled those men to have arrived at a thoroughly accurate conclusion. They have selected Boulder Canyon site, Nevada did not select that site. Nevada does not come forward with any particular scheme or plan of its own. Neither have I, as an individual, the presumption to offer a plan to supplement the work of such an able body as the Reclamation Service, or a Commission such as this, composed of engineers whose reputations are already established. It does appear to us, however, that the Reclamation Service has erred in their land estimates, or at least overlooked some of the arable lands in the State of Nevada. In the report of Mr. A. P. Davis, he specifies that there is some 2,000 acres in Nevada which could properly come under the Colorado River project. Now, considering the Colorado River development as a river system, including its tributaries, which we understand is meant when we say the Colorado River project, we have the following acreages which would properly come under that heading. It is not guess work, but these areas have been surveyed at the expense of the State of Nevada,

and are at least approximately determined. We have others which we might set forth if we selfishly saw fit to undertake to raise this water to questionable heights, as some of the other advocates favor in their respective communities. Perhaps we could ultimately irrigate half the State of Nevada, but we come forward with no such plan, and with respect to this present acreage we do not claim, nor expect any lands, of considerable extent in the State of Nevada to be irrigated by gravity water from this Boulder Canyon project. We do not wish to have our future rights of developing the tributary waters of the Colorado impaired by any action of this Commission at this time, which would be the case if the Davis report was literally adopted. The land adjacent and tributary to the Virgin River or land which could be irrigated by a project on the Virgin River, as shown by a survey, is about 35,000 acres, water to be stored at a point close to the Nevada-Arizona line in Arizona. We are not asking Government aid or any other kind of aid for that project. We merely ask to be left to work it out. We do not wish to have our rights impaired in any respect. It will probably become necessary for the completion of that project to issue a large amount of bonds. These bonds could not be advantageously sold, as any financier knows, if our rights were impaired, even though those injuries might be as remote as fifty years from now. In putting out a bond issue, those things are investigated for the full length of the issue.

There is now in the virgin valley in Nevada about three thousand acres under cultivation, supporting some seven hundred and fifty people. I might say in this connection that the Reclamation Service has not heretofore maintained an observation station on the Muddy River. Ordinarily it is a small stream, but in rainy seasons and under flood conditions it reaches large proportions. A rise has been recorded of something like 10,000 second feet flow in the space of only 24 hours, so you can readily see that a dam for conserving its flood waters, irrespective of the normal flow of the Muddy or Virgin Rivers, would afford water for the irrigation of a large acreage of the land. We do not propose partnership with California to the exclusion of any other state, or with Arizona, nor Utah, but we do insist upon our rights. We only want justice. Under the Meadow Valley wash waters there may be 15,000 acres irrigated. This, in addition to the previously-mentioned 35,000 makes a total of 50,000 acres. This is within the State of Nevada. On the Muddy River, 5,000 acres are now under cultivation, supporting about 1,000 people. I might say the development of these two last-mentioned projects, so far as it has already progressed, has been under great handicap, which handicap will be largely removed once power is developed at Boulder Canyon. Now, under the Colorado River proper we want allocated to us, 32,000 acres. The Cottonwood Island Project contains about 12,000 acres. Other states are talking about hundreds of thousands, and

some of them about a half million or a million and a half acres.

Nevada has 12,000 acres which can properly come under gravity water, and, while it is small considered in the light of the whole project, it is still important to Nevada. The land is situated North and East of the town of Searchlight, Nevada, on the Colorado River, the point of diversion to be upstream from the head of the project. In addition water may be secured for about 20,000 acres by pumping directly from the Colorado. One pump is already being used. Due to low land values and high gasoline costs, development has been slow. Nevada claims may be summarized as follows: Virgin River and tributaries, 35,000 acres, Muddy River and tributaries, 15,000 acres; Colorado River, 32,000 acres, making a grand total of 82,000 acres. The grand total is very small when compared to other totals that have been mentioned here and will be mentioned, but it is 80,000 acres more than the surveys of Mr. Davis have allocated to Nevada in his report. We do not think it will be necessary more than to call this to your attention, and I would like to present this map as an exhibit. (See Exhibit A, Appendix Phoenix Hearings)

Mr. Scrugham: I will next call upon Mr. Teasdale, representing the Las Vegas Realty Board.

MR. TEASDALE: Mr. Chairman and Gentlemen of the Commission, and those of you who are more interested in this matter than these men who are going to try to decide them for you, if I may say some few words in the time allotted me, that would ameliorate your feelings and modify your views so that we might leave this matter more

fully to those men whom we have selected to represent us upon this Commission, I would feel that I have said something worth while. The ability of the men on the Colorado River Commission is unquestioned. I understand, if I read correctly, that the Administration is back of their views and their ideas of what is to be done, and ^{if} we might for the time being at least defer any criticism or defer any offering of suggestions on our part until they might come to some conclusion to present to us, I would still feel that I had presented to you the matter in the form that it ought to be presented.

I know that Mr. A. P. Davis has given years and years to the study of this river. His views and those of the Reclamation Service should, to the fullest extent, be heard and followed. I feel that we can allow this Commission to present to us a plan which I believe when presented will enable us to accept it and indorse it. The conservation of the waters of the Colorado River is not a new feature to most of us. The railroad interests have fathered it and the other interests that have felt that it was needed, have given time and money and effort and now if we can only allow Mr. Hoover to present to his Commissioners here and the Commission in their deliberations, such plans as will enable us to get action it will suit our views in Nevada. We want dams constructed and we want water conserved. We do not want to take one bit of power or one bit of water to which we are not entitled.

You must bear in mind in Nevada we have but about 80,000 people today. But Nevada's interests are just as important today as they ever were. The mines are just as rich. The State of Nevada, especially in the Southern part, that will be affected, is unlimited in its natural resources, and I felt with some degree of disappointment the view that was expressed by Mr. McGregor but I know it is not entertained in California. I was glad also that the gentlemen stated it was only his personal view that California and Arizona had rights that Nevada did not have. We do have some certain rights there, that we do want to maintain. We have resources there to develop. Just a little while ago down in Los Angeles a certain gentleman went to a very important bank there regarding the contract that he was going to enter into in Southern Nevada, and he asked the Cashier of that bank what he thought of it, and he said, "All I have to say to you, is that we recently had 45 frozen credits in Southern Nevada, and only within 15 days nine of them have been released, and we have been paid in full." You understand that Nevada is suffering more than any of you from the War reaction and because her mineral resources are tied up on account of the Federal regulations regarding taxes. We can't work the mines if we want to, rich as they are, because it is hard for us to get the money to operate. I thank you.

MR. HOOVER: Mr. Teasdale, I think the Commission feel greatly complimented as to your wishing to help the matter along. I will, however, state that our object here is to get the views of as many as we may. I feel that perhaps Col. Scrugham will agree, that at this moment we might ask Mr. A. P. Davis if he would clear up this question with regard to the 2,000 acres in Nevada.

MR. ARTHUR P. DAVIS of the Reclamation Service: Mr. Chairman and the Commission: There has been at no time any claim made by the Reclamation Service or by myself that the information gathered in regard to the Basin of the Colorado is complete or conclusive, or that the opinions expressed or the facts set forth, are infallible. I have had the pleasure and the honor of attending previous meetings of this Commission in the City of Washington, and of talking with most of its members individually. Practically all of them--all except one, I believe--are acquaintances of long standing, of mine, and we have talked these matters over a great deal, and I think there can be nothing better I can say today than to simply explain the fact concerning the purpose of my report entitled "Report on Problems of Imperial Valley and Vicinity", required by Act of Congress approved May 18, 1920, 41 Stat., 600 (Public No. 208-66th Congress). The purpose of Congress in authorizing and requiring the report that is being discussed, was the solution of the problems concerning the protection and expansion of the Imperial Valley. Naturally, that was the main end at which this

report aimed, and the information nowhere complete in the basin-- complete only as to the general roundout of the facts, are mainly related to that problem as required by congress. To get down more specifically, the Virgin River rises in the State of Utah and gets most of its water from that State, runs through a corner of Arizona, and for a distance through the State of Nevada, finally emptying into the Colorado River above the Boulder Canyon dams site a few miles. Its constant water supply is very small. It is, however, subject to flash floods. There are numerous projects that have been proposed and it so happens that the engineer who studied that basin examined projects for in excess, in acreage of the capability of that stream to water. He found the acreages in Utah that appeared from such examination as he was able to make to be possible of irrigation, and included them and allowed them the use of all the waters of the Virgin River that could be conserved, and used, taking that from the amount that would be available at Boulder Canyon. That was as far as this problem was entered into. The relative rights to that water between Utah and Nevada are not involved in the problem reported upon by this report. It may be one of the problems which will come before this Commission, the adjudication of the rights between those two states, but so far as the problems to which this report referred, the claims made here have no bearing upon them at all. I regret if there was an error in this report, and will be the first to correct it when the facts are permanently established, or satisfactorily established, and I believe that there is a basis for each of the claims that have been made for Nevada in this connection. The acreage

on the Cottonwood-Island has been included and is listed as one of the acreages to be irrigated. Whether that has been attributed to Arizona or Nevada, I have not had an opportunity to check but the acreage already irrigated in the Muddy Valley, and 2,000 acres attributed, was considered the feasible extent of irrigation there. That may be too small. If so, I shall be more than glad to correct it. We have allowed in this list, however, not attributed to any particular project, an acreage of 500,000 acres for extension of present irrigation, not allocated anywhere, but merely a rough estimate of what extensions can be made and the explanation made that this is very largely guess work; that there is no sufficient data on which to base that area, or determine that area, and this development of present irrigated projects by the addition of 500,000 acres means an addition of 33 per cent to the present irrigated area in those Northern states, and if that is not sufficient it can be increased. The effort has been made to make it liberal. If I may be allowed, Mr. Chairman, I wish to state that we have tried to allow for every project that has been brought to the attention of the Reclamation Service, the water that it would consume, and in the case of the Virgin and the Muddy Rivers, we have allowed it all. I might say that in the preparation of this report we endeavored to cooperate with the authorities of all the states. Most of them did cooperate. We asked for the acreages, and the allocation of all the water that was claimed could be used

in each of the states, and I believe in all except Nevada we have had that cooperation and that response. I am not blaming anybody or accusing anybody, but that is the explanation--the largest explanation of any error that may be in the acreage attributed to Nevada.

MR. NORVIEL: Mr. Chairman and Gentlemen of the Commission, the next speaker on the program for this afternoon is Mr. George H. Maxwell, and I desire (applause) to speak a word in behalf of Mr. Maxwell, on this occasion, Mr. Secretary, in this: that in my letter of invitation to him I limited the time to thirty minutes, as I did to everyone else. It appears from his editorial article in the last evening's paper, that he feels quite bitterly towards me for so limiting his time that he would not have time enough to present to this Commission properly the two plans that he seems to desire to present. One of them he calls his American High Line Plan, and the other his Mexican-Asiatic Low Line plan. In his behalf, I ask that his time be extended to double the amount allotted to the other speakers, if your Honor and the other Commissioners will consent.

MR. HOOVER: Sure.

MR. NORVIEL: Mr. George H. Maxwell. (Applause)

MR. MAXWELL: Mr. Chairman and Gentlemen of the Commission: I was accustomed for so many years to speaking to courts that I would like to speak from this point because I can here face the gentlemen to whom I am addressing my remarks.

In order that my friend Mr. Horvick, may be relieved of some bitterness that seems to be in his heart, I want to say that I never heard of the editorial to which he referred until after it was published, and had nothing whatever to do with suggesting the printing of it. I am, however, exceedingly gratified for the extension of time which has been made, and I shall certainly endeavor to use so much of it as may seem advisable for the information of the Commission and the Chairman in such a way that there may be no waste of time.

Of course, I can only surmise to whom the reference on the part of our friend Mr. Scrugham, from Nevada, was directed, but I am entirely willing to accept the entire onus of it in order that no one else should feel hurt by any such remarks, and in accepting that onus I am reminded of the fact that when my mother as a child, lived in the old Log fort at Fort Dearborn, at Chicago, she probably did not expect that within her lifetime Chicago would grow to be a city of 2,000,000 people. I have an idea that when Stanford, Huntington and Crocker, who planned the Central Pacific Railroad across the Sierra Nevada mountains, were called the promoters of the Dutch Flat Swindle, that they accepted it with about the same equanimity of spirit with which everyone-- every man that has ever proposed anything that was both new and big--faces such criticism.

Now, Mr. Chairman, and Gentlemen of the Commission, I interpret the situation before this Commission to be that a few remarks on the subject of flood control on the Colorado River will not be deemed immaterial or irrelevant or infringing upon the time of the Commission. If I am in error in that, I would be very glad to be corrected. I would like to say a few words with reference to flood protection, for both the Arizona and the California side of the Lower Colorado River, and in order that I may perhaps qualify myself, having no attorney to do that for me before this Court, I want to say that for three years I spent the greater part of my time at Pittsburgh, where I was the Executive Director of the Pittsburgh Flood Commission; that I spent nearly all of my time during the years of 1912 and 1913 as the Chairman of the Reclamation Association at New Orleans, those two years being the greatest flood years that have ever occurred in the history of the Mississippi Valley.

In the five years which I devoted exclusively to the study of flood problems I became thoroughly convinced that no works of any local character on the Lower Colorado River can ever be regarded as dependable for the protection of the Imperial Valley. The fact is beyond question, and is not, as I understand it, denied by anyone, that if another break should occur similar to that of 1906--It was closed in 1907-- it would be much more difficult to close it at the present time.

The water, cutting, rapidly back from the artificial channel which was cut out by the original flood, would cut back to the main channel of the Colorado River,-- cut back with incredible rapidity,-until it took out the Yuma siphon, and the railroad bridge at Yuma, and then it would continue to cut back and take out the Laguna Dam. After it got back to the channel of the river it would be almost impossible to check that rapid cutting back. There is a menace to the Imperial Valley greater than any flood menace that ever hung over any community, probably, in the world, because in all other cases where floods have occurred the flood water would at some period of time run off and the country be restored to its natural condition, whereas, if another break should occur and the results which would follow from it should also occur, the whole Imperial Valley would go under water permanently because it is below sea-level. There would be no possibility of draining it off, or recovering the Valley for human use, until the flood waters had slowly disappeared by the slow process of evaporation.

Therefore, a plain, speedy, adequate and dependable plan for the complete protection, not only of the Imperial Valley, but also of the Yuma project,-the siphon, the railroad bridge and the Laguna Dam would certainly seem to be entirely proper to be discussed at this time before this Commission.

The plan that we desire to present for that consummation, Mr Chairman, is that the floods of the Gila, which are a very dangerous factor in the condition of the lower river, should be controlled by the adoption of the Dayton, Ohio, Miami River Plan, and the immediate construction of the Sentinel reservoir as an emergency flood-storage basin, in order that the floods of the Gila River may be stored whenever they become dangerous to the lower valley. In that way the menace of the Gila River would be entirely eliminated so far as either the Yuma project or the Imperial Valley is concerned.

The impounding basin above Dayton is kept empty all of the time, but it is so constructed that the gates can be closed at any time when it is necessary, and any dangerous flood can be held back and controlled until the channel will safely carry it.

Now, that work can be done at the Sentinel Reservoir on the Gila River by the Army engineers, and completed within one year from date. From that time on there will be no further danger at any time in the future to the Imperial Valley from a flood on the Gila River.

On page 216 of the LaRue report, the author calls attention to the fact that if the Bulls Head Reservoir were built, that while it would not protect the Valley by storing the entire flood of the Colorado River, that if this same emergency impounding basin system were adopted and that Bulls Head reservoir also kept

empty, that whenever a break did occur, if it did, local defenses of the lower valley, the dam would be closed and the reservoir would be sufficiently large to hold back water long enough to permit the break to be closed, and then the river could do no more harm.

Those two projects being quickly completed by the Army Engineers, would make the Imperial Valley absolutely safe, pending the construction of a permanent dam on the Colorado River above, either at the Boulder Canyon, or at the Glen Canyon, which would protect the Imperial Valley absolutely for all future time, from floods, and at the same time protect the Yuma project.

It is, of course, a fact that we must all concede, that the construction of the Boulder Canyon Dam, as at present planned, going down 130 feet or more beneath the stream level to bed rock, is an engineering problem of prodigious magnitude and one that must be of slow construction. Last spring the Imperial Valley was fighting a saturated levee for weeks, and it is found that the bed of the river is rising next to the levee at the rate of a foot a year. They have undertaken to protect the Imperial Valley, by building the Pescadero Cut but that is a scheme of very doubtful dependability. It is within the knowledge of every man familiar with the Colorado River that there is nothing more uncertain than the maintenance of a definite channel in the lower delta of the Colorado

River. A great cottonwood tree floating down and lodging in the Pescadero Cut might change the channel to an angle of 45 degrees, and practically destroy the defense of the Pescadero Cut for the protection of the Imperial Valley.

The Sentinel Dam on the Gila River and the Bulls Head project, are merely temporary necessities for flood protection, but they are comparatively inexpensive. They could be built with great expedition, and being built, as other flood control works are built, by the Army engineers, for flood protection, there would be no complication of any kind, with these intricate and complex interstate questions, or international questions, and those questions need cause no delay in construction.

Now, when we come to the question of the permanent protection of the valley by the building of the dam in the Colorado River, I wish to present some data to you and to the Commission. It is not necessary for flood protection that there should be built at Glen Canyon a dam of sufficient height to store two or three years' flow of the Colorado River. That is not necessary, in order to absolutely protect the Imperial Valley from floods, and absolutely standardize the flow of the Colorado River from the Glen Canyon dam during the rest of its course, clear to the Gulf of California. All that is necessary is a rock-fill dam built high enough to store one year's flood of the Colorado River. That will assure to the River an even flow through the year. That, Mr. Chairman and Gentlemen, is a comparatively simple and easy engineering problem, and not an expensive problem, owing to the horse-shoe shape of the channel at Glen Canyon.

Now, with that Glen Canyon dam built high enough to protect or to control the flood of the river, and standardize its flow throughout the canyon for the entire 12 months of the year, we have the entire problem of the standardization of the Colorado River completely solved, and absolutely all that is necessary to do it--all that is necessary to also accomplish the creation of a power resource ten times as large as the power resource of the river in its natural condition, is that a dam be built at Glen Canyon high enough to hold one year's flow of the river, which is about one third of the capacity which I understand the high dam would create which would store nearly three years flow of the river. Now, Mr. Chairman, is not that a matter worthy of consideration by you, representing the Government of the United States and by these gentlemen who are here today, that the building of that dam at Glen Canyon, high enough to store one year's flow of the river, involves no necessity whatever of any settlement of all these complicated interstate and international questions that are involved before this Commission, because, if that Glen Canyon dam were built by the National Government, through the established agency used by the Government up to the present time, and vested with the power of building works for flood control, to wit: the

army engineers, you have lifted this terrible flood menace from the lower delta of the Colorado River. At the same time, you have created a condition under which the flow of the river, instead of being erratic to the extent that it varies from 2,800 second feet to 140,000 second feet, will be completely standardized so that it will flow an even volume of 24,000 second feet throughout the year. If the Government builds that Glen Canyon dam that way, in advance of any effort to settle these complicated questions, no right above is prejudiced, and the rights below are protected, pending the entire determination of this question, which it seems to me, Mr. Chairman, possesses elements of uncertainty that as yet have not been settled to such an extent that this Commission, sitting as a Court, can have before it the facts of the case.

I am reminded, Mr. Chairman, by the condition before this Commission at the present time, of an incident that I heard Thomas B. Reed tell of himself at the Pacific Union Club in San Francisco, late one evening after a political speech which he had made there in that city. He was telling of his admission to practice law at San Jose, California, in the earlier years of his life. He was asked, by the examining judge, "Is the Legal Tender Act constitutional?" and he instantly answered, "Yes, sir." The Court leaned over and conferred with his associates and then said, "You are admitted to practice, Mr. Reed. Any young man who can decide as quickly as that the question of the constitutionality of the Legal Tender Act should be immediately admitted to practice law."

Mr. Chairman, I was gratified in listening to the remarks of the Chairman of this Commission, in/^{opening} these proceedings - I assume two things, First: that you want the fullest information on the subject of these questions now pending before you, and second, that you do not propose to decide the case until you have the facts before you.

Now, as far as the association which I represent is concerned; We desire most earnestly and sincerely to cooperate with this Commission to bring about an absolute and complete agreement between the states, which will permit every state to accept the decision of this Commission as final, and end all possibility of litigation; but, Mr. Chairman, there are legal problems involved which cannot be argued before this Commission in half an hour, nor an hour. There are physical questions existing which have not, as yet been brought before this Commission, and which cannot be brought before it within the time allotted to me or to any person, because the facts are not known yet upon which this Commission can base a judgment. This Commission cannot render a decision on the facts now available any more than a Court could decide a case before the facts had been ascertained and presented and laid before the Court.

P.

Mr. Chairman, I think I can demonstrate that so completely that every member of this Commission will concede that to be true, as far as my statement can go. In the first place, the legal questions involved are such that before any commission or court undertakes to decide them, there should be a vastly more complete opportunity for the argument of those questions than is possible under the present plans of this Commission.

The association which I represent was organized 21 years ago last June, and one of the purposes of its organization was to protect the priority of use in the states of Arizona and California against illegal encroachments upon that priority, either in the upper states above or below the line in Mexico. Those questions of prior rights or riparian rights involved are basic. They are fundamental. The question of whether or not the rights of the United States are at least in a measure protected by the doctrine of riparian rights may largely term upon the interpretation of legal questions which were fought over for years in the State of California, in the great case of Lux against Haggin in which they were finally decided. That case resulted in a decision sustaining the riparian doctrine in California, by a divided Court, and a majority, as I remember it, of only one in favor of the final decision. Now, Mr. Chairman, I want to say this with reference to the doctrine of riparian rights: there are certain basic principles which we might call moral or equitable, which resulted in the old

doctrine of riparian rights, because in the country where those rights were finally recognized to be fundamental, that was the doctrine of law which was to the best interests of the people. There has never been a divergence from it, anywhere unless it was under conditions where it was manifest that the best interests of the whole people were subserved by a modification of that riparian doctrine.

Now, whether or not the rights of the Federal Government and the rights of the State of California and the State of Arizona are protected by the doctrine of riparian rights involves not only a consideration of whether or not that doctrine applies as a legal proposition, but it also involves a consideration of the question whether the facts out of which the original doctrine of riparian rights was evolved as a part of the common law of England do not apply as to the Colorado River, from its source to its mouth, and protect not only the National Government, the greatest proprietor on the river, but also the States of California and Arizona, and every right which has been acquired on the river for water or land that has been irrigated by it as well as the power resource in the Colorado River Canyon in Arizona. I believe, Mr. Chairman, that anyone who will think a little deeply on this question of riparian rights will concede that it ought not to be lightly waived in behalf of any state, and yet I understand that this Commission has either actually passed a recommendation to that effect, or has been asked to pass a recommendation to that effect, declaring that

the doctrine of riparian ownership has no application on the Colorado River. That is a declaration which is absolutely void as against any private right, and whether it is to be valid as against the state or the nation, is a question which this Commission ought to very seriously consider.

MR. HOOVER: I think I might clear your mind right there. This Commission has come to no conclusions whatever.

MR. MAXWELL: Well, Mr. Chairman, my argument on that subject is entirely timely and pertinent. The only thing I am endeavoring to make clear is that for the abolition of riparian rights and priorities which have been made to this Commission by a member of it, should have great consideration before they are adopted by this Commission as a part of the policy to be recommended by it to the States.

that
In/connection, Mr. Chairman, I want to read just a word from an article in the Los Angeles Times of January 24th, 1922, which sets forth in full certain recommendations made to this Commission by the Commissioner from Arizona.

"The many army engineers who have been detailed to examine and report on the navigability of the river and the feasibility of improving the same for navigation, have each recommended against any improvement because of the unworthy character of the stream for navigation, and the lack of necessity for its use at this time. The construction of the Laguna Dam, under the authority of the Government, has impaired the navigability of the river. We recommend that when the Colorado River is controlled, then the Government of the United States immediately proceed to improve the

navigability of the river by dredging a channel in the bed of the stream, from some point below Boulder Canyon to the Gulf of California, to make said river navigable."

Now, Mr. Chairman, the point we make is that this is a question which cannot be adequately argued at this time, but I think ^{that} I voice the sentiment of a very large majority of the people of Arizona when I say that I do not believe the people of Arizona will ever ratify any recommendation of this Commission which practically proceeds upon the theory that the Colorado River is a navigable stream and therefore recognizes the application of the Guadalupe-Hidalgo treaty to problems relating to its beneficial use in the United States for other purposes. Now, another point on this question of priority. We find in this same recommendation this provision as presented to the Commission by Mr. Norviel, "that no state or any of the citizens thereof shall obtain, nor shall any development on the Colorado River in any of the said states create a priority of right as to time or quantity of water, by virtue of the earlier development and use of the waters of the Colorado River, as against any state or the citizens thereof; that all priorities as between said states with respect to the use of the waters of the Colorado River are hereby specifically waived, provided, however, it is understood and agreed that the acreage of land to be cultivated and irrigated in the Colorado River Basin, from the waters of the Colorado River, or the tributaries diverted above the Boulder Canyon damsite and reservoir shall be limited for the period of 20 years to new acreages in the several

states--in addition to the new acreages irrigated and cultivated prior to the year 1921, as follows: Wyoming, 510,000 acres; Colorado, 777,000 acres; Utah, 444,000 acres; New Mexico, 365,000 acres; Arizona, 140,000 acres; Nevada, 15,000 acres. At the end of the period specified, a new adjustment of the acreages may be made as conditions justify."

Now, Mr. Chairman, that is an absolute surrender, I might say --

MR. NORVIEL: I might say, so that you won't waste your time, that that proposition was rejected by the upper states, and is dead, and probably will be worked out on another scheme entirely.

MR. MAXWELL: I am delighted to hear, Mr. Commissioner, that it is your opinion that it is dead.

MR. NORVIEL: Maybe it is alive in your mind.

MR. MAXWELL: It is alive in my mind--very much alive in my mind, Mr. Chairman, and the point that is alive in my mind is that it reflects an opinion of the law and of what this Commission should do, which is a menace to not only Arizona but also to California and to every irrigator in those states, from the Colorado River, and it ought not to be allowed to pass without it being said that, so far as I know, no users on the Colorado River either in Arizona or California will have anything to do with any recommendation of this Commission wiping out existing priority rights. (Applause).

P.

MR. HOOVER: I don't think, Mr. Maxwell, that statement is justified under Mr. Norviel's position. I don't think it is a correct criticism.

MR. MAXWELL: I have read it, Mr. Chairman, exactly as it was submitted to this Commission by Mr. Norviel.

MR. HOOVER: I don't want to interrupt your exposition of the situation, but I think it is only just to Mr. Norviel to say that that is not a complete version of the suggestions made by Mr. Norviel, as you read it, at least, and it does not give the full import of his proposition, and I would like to add to that question that it seemed, in justice to Mr. Norviel, that his proposition was considered too favorable to the people of Arizona and California by the upper states.

MR. MAXWELL: Well, Mr. Chairman, I am not surprised, judging by my twenty years experience with the claims of some of the upper states, that any proposition should have been regarded by them as too beneficial to Arizona. I am a little in the same position, Mr. Chairman, with reference to the claims of one at least of these upper states, as the man who was about to enter upon a fight with a negro. He had two gloves, one on each of his hands, and he said, "I want another glove," and somebody said, "What do you want with another glove? You have two on already." "Well, I want to put it on my head, I have 'fit' with coons before."

Now, Mr. Chairman, I have no desire under any circumstances to be unjust to Mr. Norviel, in any way, shape, manner or form, but I do believe that any plan recommended by this Commission which contemplates the surrender either of existing priorities or of any right of priority based upon subsequent beneficial use, will never be accepted by either of these lower states, and, of course, unless a complete agreement is arrived at in this matter, there is no hope of the work of this Commission giving any satisfaction. It will turn out to be fruitless.

Now, passing that question of priority, and returning to the Glen Canyon Dam, I want to present to the Chairman of this Commission and to every member of the Commission this thought, which cannot be changed by any condition that may be brought out as a theory with reference to the future: that as the flow of the water exists today and has existed for eons of time, there is a flow of water coming through the Grand Canyon in Arizona which, by the construction of the Glen Canyon reservoir, will produce a flow continuously throughout the year, of 24,000 second feet. The figures of Mr. McGregor were a little beyond this, but with such information and data as I have been able to obtain, they are substantially the same. The figure on which I have undertaken to base the argument which I shall endeavor to make now, is that there is a hydro-electric power resource in the Colorado River between the top of the Glen Canyon dam and the toe of the Diamond Creek dam, of 5,000,000 horse power, based ^{up} on the flow of the river, as

regulated and standardized by the Glen Canyon Reservoir being maintained through the future years.

I do not like to stand here and criticise anybody, or any plan, but from such observation as I have been able to make of this reclamation matter, from rather an intimate study of it for more than 30 years, I am convinced of this fact: that although, as Mr. McGregor has suggested, in the natural course of events, the early development will come in Arizona and California and Nevada, and that as the result of that development, both of power and reclamation, there will vest an absolute prior right to the continuance of that flow forever under present laws and conditions, yet that it is an error to assume that an attempted diversion of the river above will not be undertaken within any time in the near future. My own belief is otherwise. My own belief is that the development in the upper states will proceed with a rapidity which makes it advisable, if it can be accomplished, that there should be an adjustment with those states, based upon the maintenance of the condition that there shall be no diminution of the flow at the Northern Line of Arizona.

In other words, our position is this: That we insistently stand upon the legal, constitutional, moral, equitable and physical condition and right that, as the water has been for ages coming through to the North line of Arizona, we are entitled to have

regulated and standardized by the Glen Canyon Reservoir being maintained through the future years.

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In other words, our position is this: That we insistently stand upon the legal, constitutional, moral, equitable and physical condition and right that, as the water has been for ages coming through to the North line of Arizona, we are entitled to have

it continue to come. And, yet, to the utmost extent that it is possible, whatever claim the people of the upper states feel should be recognized as to them, should be more thoroughly investigated than it has been in order that it may be determined whether or not the United States Government, dealing with this question as a unit, from the crest of the Rocky Mountains to the Mexican Line, may not bring about a condition in those upper states that will make it possible to actually obviate in the future any risk of litigation on this subject.

I have here two maps (See Exhibits B & C, Appendix Phoenix Hearings) of which a great many copies have been distributed in the small printed form, which illustrates the idea that is in my mind. That idea is that before this Commission should even contemplate a recommendation back to the States, or to the United States Congress, which recommends a reduction in the aggregate flow of the river into and from the Glen Canyon Reservoir, that the whole, economic industrial condition of those upper states should be investigated, to show whether or not the large development of power which is possible from this Glen Canyon reservoir, and other power opportunities to be developed in the Colorado River Canyon in Arizona, which could be tied into one super zone system, would not be worth more to those upper states than any other use of the waters, before a diminution of the great power plant below by the diversion or extraction permanently of the water above should be recommended.

Now, Mr. Chairman, I want to put this question before you, as a representative of the Government of the United States. Let us suppose for the moment that Uncle Sam were sitting on the crest of the Rocky Mountains, looking down over the basin of this great river as it stands today, constituting the greatest power resource, at least, in the United States, or in either North or South America, and working out a plan for its development. He sees in the Grand Canyon of the Colorado, a power project capable of development to the extent of 5,000,000 horsepower. He sees a claim above to divert water sufficient to irrigate two and one half million acres of land. I say two and one half million acres, because up to the time that this Commission was created, that was the largest amount that anybody had ever heard the upper states claim. Since this Commission has been created, I understand that that contention has been about doubled, which, of course, makes a good basis of relinquishment in order to bring about a compromise, but I think you would find that the compromise would probably claim at least the original two and one half million acres and if that two and one half million acres were irrigated above the Grand Canyon Reservoir, you have cut the power project right in two, in the middle, and you have destroyed it to that extent for all future time. That is what you have done. Therefore Uncle Sam would say: "I will not allow this power resource to be destroyed. Let the water go down and go through the power plants in the Canyon of the Colorado in Arizona and we will use the water below for irrigation."

There are some who claim that there would be a return seepage from that newly reclaimed area above. Mr. Chairman, that is a delusion. Under the more economic, modern methods of irrigation, which are constantly being developed, it is in my judgment an absolute certainty that those upper states will continue to use, on new lands, if necessary, all of the water which they divert from the river, and never permit it to come back to the river.

That is exactly what is happening in this valley, where they are proposing to put in a line of pumps, and take the underground water clear across the Agua Fria River, and reclaim new lands with it west of the Agua Fria, instead of permitting it to return to the River in the form of return seepage. In less than a generation there will be no return seepage in any of the upper states to the Colorado River from any lands which they may in the future irrigate in those states.

But if you study the industrial development of those states, what do you find to be the greatest need of the farmer who is farming the irrigated lands today? It is a market for his products, a market which will enable the farmer to transform his present terribly depressed condition into one of assured prosperity, being relieved of the burden of high transportation costs. There would be new factories, new mines, and new industries starting, as the result of a great power development in all those upper states, if they generously utilize the power from the Colorado Canyon in Arizona - this vast power potentiality of 5,000,000 horse power, if the flow is not diminished. I take it, Mr. Chairman, that you

are familiar with that great report that has been made on a proposed super power zone from Washington to Boston, the Murray Report, wherein they propose, before the year 1930, to develop 31,000,000 kilowatts of which about one-fifth will be hydro-electric.

I assume that you are also familiar with the development which they are carrying out in Sweden, of tying every power project in Sweden to one great central transmission line from one end of the country to the other, so that the power load can be shifted from any factory to another factory, or from any distribution point to another distribution point, if there is a breakdown or a larger demand for power in one place than the other. The whole thing can be handled just exactly as though it were all under the management of one hand. Mr. Chairman, I believe, and I think I am entitled, in view of the quarter of a century that I have devoted to this question, and to the effort to get facts before the people so that their views may be changed in the light of information on the subject, to state to them and to this Commission that in my judgment, beyond any question, it can be demonstrated that such a development of a power zone in the State of Utah, with its full share of power from the Colorado River, aided by the United States Government, in order to make it sure and certain that this power project below should not be destroyed or minimized, would be of infinitely larger benefit to the people of Utah than any diversion of water in that state that would diminish the flow of water through the Arizona power plant.

P.

I am convinced that it is entirely possible to secure the absolute consent of the people of that state to the condition that there should never at any time in the future be any diminution of the flow of the river at the Northern Arizona State Line that would reduce the power resource. Beyond all question that is true of new Mexico and I believe it is also true of all the other upper states, Nevada would certainly be most benefited by power for mining and smelting as well as pumping for irrigation.

It is not a right position to take in reference to this proposition, that the question of the flow of the river is incidental. A good many of the recommendations that have been made here and there seem to disregard the necessity of a fixed and established flow of water as a basis for hydro-electric power development, which is going to cost millions of dollars and result in the creation of industries and homes, which, cannot be perpetuated unless the full flow of the river continues to come to the power plants in Arizona. I believe, Mr. Chairman, that the time is not so far in the future when every single horsepower that can be developed in the Colorado River Canyon in Arizona will be industrially used, - used for the electrification of transportation lines, - used for the establishment of new industries, - used for turning the raw products of this country into finished products, that power will be used to such an extent that it must not be assumed that the diminution of this river flow, which is the measure of the power developed

will be unimportant. It must not be regarded as something so far in the future that it is unnecessary to consider it, in working out a practicable plan for the accomplishment of the purposes of this Commission, which I understand to be an endeavor to bring about an agreement between the states.

I am not at all sure that even within the hour allotted to me I am going to be able to reach the question of the physical conditions which exist, and which, by taking advantage of them, will permit of the highest utilization of the resources of the Colorado, both for irrigation and power. We hear the statement frequently made that there is plenty of water for all, but that is not true unless Arizona is eliminated from the reckoning in making the apportionment of water for reclamation and her rights and needs in that respect ignored. At this point I want to say that two and one-half million acres can be irrigated in the State of Arizona at a cost which is entirely within reach, entirely economic and entirely practicable; and furthermore, that in twenty years' time the annual production of that land will be as high as the annual production ~~as the annual production~~ of any acreage in Southern California is today. A minimum of \$200 an acre, and a maximum of \$1,000 an acre, within twenty years, may be regarded as a reasonable estimate of the future possibility of this land. Therefore, if we irrigate two and one-half million acres in Arizona, at the minimum production of \$200 an acre, we will have an annual gross product of \$500,000,000.

P.

It does not lie in the mouth of any man who has seen the marvelous development of Southern California, and the increase in twenty years in the gross production of that country, to say that within the next twenty years every acre of land in the Colorado River basin below the Canyon that can be irrigated will not produce from two hundred to one thousand dollars per acre of products which cannot be raised with the same success in any other section of the United States.

Take the one product of dates. There is no part of the country--^{no}part of the United States where dates can be raised, except in the Colorado River Valley, and there is absolutely no limit to the market for dates. Dates are not a luxury. They are a food, and a thousand dollars an acre from a mature orchard of dates is not an unreasonable estimate of the value of that product.

May I ask, Mr. Chairman, what balance of time I have left?

MR. HOOVER: I don't think the Commission has any desire to hold this down to any--

MR. EMERSON: Might I interupt? I would like to have you give a presentation to the Commission as to what you actually recommend by way of a compact between these states. Now, the troubles of engineering we know will not be covered for many years, if at all. Our object is to see if we can arrive at a compact.

P.

MR. MAXWELL: I will answer that question, Mr. Emerson. Upon the facts before this Commission, upon the facts now before the people of Arizona and California, it is not possible to formulate any compact which those states could afford to accept, and which the upper states would accept. In other words, we must have further facts investigated--further surveys made--further estimates of costs presented before this court, as the facts before it upon which it can base an adjudication.

A COMMISSIONER: Have you any idea what time would be required under such facts as you think are available?

MR. MAXWELL: I should say one year.

A COMMISSIONER: And there would then be that delay in the redemption of the Imperial Valley?

MR. MAXWELL: No, sir. That is the point that I have undertaken to make clear. There is not the slightest reason why there should be any delay in the building of the Sentinel Dam. There is not the slightest reason why there should be any delay in the building of Bulls Head Dam to serve the purpose recommended on page 216 of the LaRue report. There is not the slightest reason why the Government of the United States, acting through the Army Engineers should delay one instant the building of a rock-fill dam at Glen Canyon high enough to store one year's supply of the Colorado River, and in that way forever remove the menace from the lower river, without effecting in anyway the rights of the upper states. In fact, it seems to me that the Government of the

United States could well afford to proceed with that work with the understanding that nothing which it did up to that point should be interpreted to affect either detrimentally or otherwise, the rights of any state. The Government can go ahead tomorrow and build that construction work, and protect the Imperial Valley, within one year from today, and nobody will be harmed.

MR. HOOVER: Do you think this Commission has a moral right without engineering data with regard to the three projects,-- should recommend them without regard to the other projects?

MR. MAXWELL: Yes, for this reason. Positively, yes, for this reason: That the acceptance of those plans involves no surrender by any state of any of its rights.

MR. HOOVER: But have we any engineering data that warrants us in basing the whole future of the Colorado River upon these projects.

MR. MAXWELL: Yes, you have sufficient data available immediately upon which to base a conclusion absolutely that the building of the Sentinel Reservoir as a flood control reservoir not only will protect the Imperial Valley, but that it can be built immediately and built in such a way as to completely serve that purpose without any further surveys.

MR. HOOVER: Well, so far as this Commission is concerned, it must make its return within 12 months, or less.

MR. MAXWELL: I apprehend, Mr. Chairman, that if this Commission should report to Congress recommending the immediate construction of those three projects, and asking for further time within which to make the necessary investigations, without which it can-

not form a judgment as to which it is possible there should be an agreement of the states, that Congress would instantly grant additional time. Mr. Chairman, we sometimes make progress by not trying to go too fast. The trouble with the condition that this Commission has before it today, is that you are trying to go too fast with reference to these complicated, intricate, complex, legal and physical questions.

A COMMISSIONER: It seems to me it would be pretty speedy work to recommend three engineering works at the--

MR. MAXWELL: We have been twenty years investigating them, Mr. Chairman. These projects are not anything new. I venture that within 30 days the engineers of the Army corps could get all of the necessary data upon which to say to this Commission or to Congress that we are ready to go ahead with this work. There is no necessity for any delay in the building of those three projects. the building of the Glen Canyon Dam for flood control while it would standardize the flow of the river, would not in any way provide for the use of the water either for reclamation or for power.

MR. HOOVER: Well, am I to understand it that your recommendation is that this Commission should make no attempt at a compact for 12 months? Your recommendation is that we should not undertake to do that?

MR. MAXWELL: I would not quite put it that way, Mr. Chairman. My statement is that there are no facts before the Commission at this time which make it possible for the Commission to make a recommendation of which there is the slightest hope that the people of the states will accept and approve.

MR. HOOVER: Well, then, you recommend that the Commission be dissolved?

MR. MAXWELL: I do not. I beg your pardon. I did not intend to make that as positive as possibly I expressed myself. I trust that you will understand that I never intend to be disrespectful.

MR. HOOVER: I was just trying to get what was in your mind as to the duty of the Commission.

MR. MAXWELL: I am anxious to state what I was under the impression that I already had stated. The recommendation that I would make would be that this Commission should immediately report to Congress in favor of the adoption of the plan for building these three structures for the protection of the Imperial Valley, and the Yuma Project, on the lower Colorado, from the terrible menace that hangs over them. The Yuma project is a Government project and the Government should immediately protect it for that reason alone.

You should at the same time suggest the necessity for a fuller investigation as to the facts that must be done before you can determine with any satisfaction to yourself these intricate and complex interstate questions. I believe they can be settled if

time enough is taken to do it, but I believe it will result in a complete blow-up of this whole effort to bring about an agreement if you continue to proceed upon the exceedingly inadequate knowledge which you have today as a basis upon which to ask the people of a sovereign state to surrender rights which are as absolutely necessary to their future welfare as your heart is necessary to the continued existence of your life. (Applause.)

I am not here, Mr. Chairman, asking for the adoption of any plan. When I say that, of course, I mean beyond structures necessary to be built immediately for the protection of the Imperial Valley and Yuma, which do not involve the surrender of any rights by the states. But we are here asking for a definite, specific, exact survey on the ground, of certain facts which as yet have not been surveyed. With reference to those facts the association which I represent has had to go out and solicit personal subscriptions within the last month in order to get some knowledge of certain physical conditions which were absolutely vital to the very existence of this state in the future. Now, that is not right, Mr. Chairman. The Government of the United States in defense of its rights, because the rights of the Government of the United States and the rights of the State of Arizona are identical in this instance--the Government of the United States should put its surveyors in the field and get this information. Every-

body concedes that the Boulder Canyon Reservoir, with a dam built to 650 feet high, as the Governor of Arizona has suggested, would produce a horsepower of 700,000. Granted, but how much effort has ever been made-- I can answer that in advance--None! to ascertain the cost of bring the water of the Colorado River from the Boulder Canyon to the Bill Williams river and drop it there 780 feet and then carry it on down to Ehrenburg and drop it another 220 feet,^{and} with one half the water of the Colorado River develops more horsepower than it is proposed to develop at Boulder Canyon.

Why, Mr. Chairman, on the Canadian side, at Niagara Falls, there has been just completed a great cut 57 feet deep and eight and one half miles long---

MR. HOOVER: I don't think we need to go into the Niagara River. I would like for you to make one matter a little clearer. A little while ago I understood you to say that Arizona must contend for the original flow of the water across her Northern frontier?

MR. MAXWELL: That is necessary, Mr. Chairman, to the preservation throughout the future of this great power project and power resources, and the potential possibility of 5,000,000 horsepower, that you continue for all future time to have that amount of water to develop the five million horsepower.

MR. HOOVER: You say that is not in line with the present decision of the Supreme Court?

MR. MAXWELL: I do not admit that, Mr. Chairman, because as a lawyer I insist that the decisions of the Supreme Court up to the present moment are based upon facts which are not on all fours with the facts existing in reference to the Colorado River.

MR. HOOVER: Well, just one point on that, that is, if that is to be the attitude in respect to this matter, do you think it is at all possible that any compact will be entered into between the states, and as the result this Commission is a nullity and the question then goes to the Supreme Court?

MR. MAXWELL: I am perfectly willing to confess, Mr. Chairman, that in my judgment unless this condition is met to acquire knowledge which we do not have today, that it is not possible to work out a plan that the states-- the seven states of this basin will accept.

MR. HOOVER: It seems all of your plans for the control of the River have to do with the maintenance of this contention that Arizona should maintain the original water flow across her frontier. If you are going to stand on that contention, then there can be no possible agreement that the states would ratify, and therefore this commission is a futility, and that question must go to the United States Supreme Court some years hence, for determination. Now, I am only putting to you the facts of the practical question whether or not in your view it is worth while for this Commission to proceed?

MR. MAXWELL: It is, provided this Commission proceeds to investigate and gather the facts which are necessary to be known, before the rights of the National Government or the States of California or Arizona can be ascertained and fixed--

MR. HOOVER: Well, now, if we knew all of the facts in the world with regard to the river below the Arizona line-- below the Colorado line, would it satisfactorily alter your contention that the full flow of water should come across that line?

MR. MAXWELL: Not the slightest in the world.

MR. HOOVER: Well, then, why should we continue to argue the question?

MR. MAXWELL: Because I stand here, Mr. Chairman, asking you as Chairman of this Commission, to set in motion the forces of investigation which will make it possible to present to the people of the upper states a plan which will bring them around, if you want to express it in that way. I have several--I see that the Chairman smiles--Now, Mr. Chairman, let me tell you something--

MR. HOOVER: I have listened to the other end of this argument that exists in the contention that all the water flowing out of the soil of the upper states is the property of those states and the two of you are as far apart as the North Pole and the South Pole, and if we are to fight years in the United States Supreme Court we should have something more constructing from the states both below and above, than a demand for every possible right and contention.

MR. MAXWELL: But, Mr. Chairman, do you not overlook in that statement the very important and significant fact that I have suggested to you, that the facts should be ascertained as the result of an economic study with reference to a properly balanced development of those upper states as to whether or not the power which they would derive from the maintenance of this water flow in the Colorado River would be worth more to them than the principle of absorbing it to irrigate more land.

Mr. Chairman, if you go into those states, you will find that you can organize the commercial, the manufacturing, the mining interests in favor of power. The man who today in those upper states wants reclamation is probably in nine cases out of ten a man who owns raw land which he hopes to reclaim and sell to somebody, to make a home on, and cultivate more land and raise more products to compete with the farmers in those upper states who are now over crowding their local market.

The question is, Mr. Chairman, whether that diversion shall take place in the upper states where, if it is done, you destroy, pro tanto, this great power resource of water in the Canyon below, whereas, on the other hand, if you will let the water come down through the power plants, and use the same water below for the reclamation of land after the power plant has furnished its full

quote of production. You have used the waste to its highest efficiency for both power and irrigation. Mr. Chairman, it does not do to assume that because of any statement made from an inadequate knowledge of ^{the} facts, that if the facts were fully known to the people they might not completely change their views. I think I might refer you, in proof of that, to the campaign which extended over five years in California--

MR. HOOVER: Well, Mr. Maxwell, let's keep on the track. We are discussing the question here of a compact between certain several states, and it does not seem to me that these questions lie within the field.

MR. MAXWELL: You are proceeding, Mr. Chairman, upon the assumption that further investigation will not develop facts which may make it easier to bring about an agreement between the states. If you do not bring out those facts, the question is whether or not you are going to present a proposition involving the administration of this power resource of 5,000,000 horsepower to the people of these states. It may be better for them to turn the whole proposition down and accept the alternative of rejection, if necessary rather than to surrender something which is primarily and fundamentally necessary to the future welfare of Arizona.

If you cannot maintain the flow of the river at the North line of Arizona, at its present aggregate annual flow, you perhaps cannot justify the construction of the great engineering works necessary to put this two and one-half million acres of

land in Arizona under irrigation, and under those circumstances you, Mr. Chairman, and the members of this Commission, would take the responsibility of dedicating to the desert forever two million acres of the most fertile land in the world, because, ^{if} the proposition is decided that way, there is no possibility of ever using that water to reclaim these desert lands of Arizona.

MR. HOOVER: How much water would it take to irrigate that two million?

MR. MAXWELL: Three acre feet per year, 7,500,000 acre feet, for 2,500,000 acres, which is half of the flow of the Colorado River, as it now flows at the mouth of the Black Canyon.

MR. HOOVER: There would be no return from that?

MR. MAXWELL: I would assume that there would not be, because that necessitates a complete conservation of the water supply, and cement ditches, just as water is used in Southern California.

Now, Mr. Chairman, with reference to this question of power, I want to read a couple of papers which have been prepared for me by a gentleman who is perhaps more familiar--I think I may say safely is more familiar with the possibilities of industrial development from the use of power in Arizona, than any other man in this state. I refer to Mr. Minhinnick, who is the editor of the Verde Copper News, at Jerome, Arizona,--which I received today:

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"Get this thing thoroughly into your head, that organic chemistry is the coming world industry, and that the nation that has such an industry thoroughly established is the sure and certain winner. This statement can hardly be controverted and leads naturally to the next step in the argument, which simply is that an abundant supply of cheap electricity is essential to the chemical industry, including^{the} metallurgical applications of the science. There you have the whole argument in a nutshell. Between you and me, I would far sooner see a power development than an irrigation development in the state, provided we had to choose between the one and the other. As they go hand in hand, we are bound to win double.

"I would like to say a word or two on the possible power consumption. We produce in Arizona, in normal times, not far from 800,000,000 pounds of copper per annum.

"I am advised by authorities in mining and smelting that the electric current required to mine, transport and smelt a pound of copper is one kilowatt hour, this with furnaces using coal or other fuel. If it shall be found profitable to reduce copper ores by means of electric furnaces, as is done largely in the case of iron, this current requirement would be enormously multiplied.

"We have the somewhat paradoxical fact that we mine and smelt our copper in Arizona, ship the raw product--blister copper--across the continent to be refined in New Jersey, move it from the

refineries to the wire and plate mills, and ship the manufactured product back to the West for final consumption. It requires approximately 300 k.w. hours of current to refine a ton of blister copper.

"Given ample supplies of current, we would immediately have at least three refineries in the state, one in the Warren district, another in the Globe-Miami district and a third in the Verde district.

"We have in Arizona vast deposits of iron ore awaiting the advent of cheap power for their extraction and smelting. This is an asset of the state that has hardly been known until very recently. A vast field for power use will be opened as soon as current is available. It is a fact not perhaps generally known that electricity has largely supplanted other methods of steel making, the output of electric furnaces in 1918 being 511,364 tons.

"We have in the state large deposits of aluminum ores completely undeveloped solely because we have not the necessary electric power. I am informed that the reduction of aluminum oxide requires the expenditure of 40,000 k.w. hours per ton of metal.

"We have also large zinc deposits that can be developed and made highly profitable when once we can secure current at reasonable rates.

"One of the drawbacks to the development of the state is the high cost of coal. It is an assured fact that the power development of the Colorado will mean the immediate electrification of

of every railroad in Arizona with consequent conservation of the existing supplies of coal and fuel oil.

"The manufacture of nitrates from atmospheric nitrogen is no longer an experiment. During the war period, Germany used 200,000 tons of nitric acid a year in the production of explosives, all made by nitrogen fixation plants. Germany can now produce 500,000 tons of nitrogen a year--twice the amount needed for internal consumption in the way of fertilizers, nitric acid, ammonia and the like. It is worth noting that it requires a k.w. hour of current to produce three ounces of nitric acid.

"We have in Arizona an abundance of the raw materials required for the production of almost all the products of the electric furnace--calcium, silica, aluminum, tungsten, vanadium, iron and zinc--and we need only the power to develop these manufactures to the same extent as they are developed at Niagara Falls and elsewhere where cheap electricity can be secured.

"The development of the Colorado will not only increase largely the agricultural areas of the state but will also lead to the creation of a great industrial community to do for the West what the Mississippi, the Niagara and the Tennessee are doing for the East and Middle West."

The enormous advantages of industrial development that will come to Arizona from an enlargement of its power resources may just as well be applied to the upper states and guaranteed to them in exchange for their surrender of their threat to sue us if

we undertake to develop Arizona and California without an agreement with them.

It seems to me, Mr. Chairman, that that threat is not a status which should commend itself to the people of any state; that if Arizona and California have certain rights, that they should not be asked to abandon and surrender those rights merely because of a threat that if they don't do it they face an era of litigation. In my judgment, litigation of that nature could have but one issue, and that would be in favor of Arizona or California. Now, Mr. Chairman, I want to make this point clear, beyond any human possibility of question. Arizona stands today with two and one-half million acres lying out in the sun, of hopelessly desert land unless this Arizona High Line Canal and the structures necessary to utilize it be constructed. The increased production of ^{which} power/can be developed at the Williams River instead of at the Boulder Creek Dam, justifies the cost of construction of those works. If we, within the State of Arizona, take half of the water of the Colorado River, and leave the other half to the State of California, and Mexico, it will reclaim two and a half million acres of land in Arizona and as much more in California and Mexico five million acres in all, if the water for California and Mexico is used without wastage, as it is proposed to use the water in ^{if} Arizona, and/Mexico is limited to the acreage already reclaimed.

That may be a matter which it is irksome to listen to a repetition of, but those who are familiar with the 250,000 acres in this valley reclaimed under the Roosevelt Dam, can form an idea of what it means to this state to be asked to surrender 2,500,000 acres of reclaimed land in exchange for a promise not to sue us, because that is all they are offering. That is too much to ask, Mr. Chairman--too much to ask, especially when you have the added fact that if, through the judgment of this Commission, or any other influence that may be set to work, Arizona is deprived of this great reclamation resource, that the water must inevitably go down to lands in old Mexico, owned by American speculators, which are being colonized by Asiatics. That is a fact within the knowledge of all men who are familiar with the conditions in the Southwest. It is a responsibility, Mr. Chairman, which any patriotic citizen of the United States should hesitate to take, to decide that the Colorado River shall be used to create an Asiatic Community in Mexico instead of an American Community in Arizona and that through all the future we shall continue to be menaced by the transplantation of the Asiatic conflict from Asia to Mexico, and in addition to that we are to surrender the possibility of the reclamation of more than two million acres of land in Arizona which can be irrigated with half the water of the Colorado River provided it continues to flow as it has flowed for ages past, and we get nothing in exchange except the promise not to sue us. I thank you Mr. Chairman, for your attention. (Applause.)

MR. HOOVER: Perhaps some of the members of the Commission would like to ask you some questions.

A COMMISSIONER: I would like to ask one question on the plan that you suggested. Now, one was the Sentinel Project and the other was the Bulls Head, and the third one is the immediate construction of the Glen Canyon Dam, of a height sufficient to hold back one year's flow of the Colorado River, without any reference to the possibility of eventually raising the dam for power purposes so that it would hold three year's flow?

MR. NORVIEL: Would the Bulls Head Dam be a power or simply a flood control or would it be also an irrigation project?

MR. MAXWELL: Let me answer that. It would be temporarily a flood control dam, the gates being held upon all of the time, unless there should be a break below into the Imperial Valley similar to the break of 1906. If such a break should occur, you would instantly close the gates at Bulls Head and that would give you a breathing spell long enough to close the gap below while the Bulls Head Reservoir was filling with the flood that came down the river. That ^{plan} is recommended by Mr. La Rue, in his report, on page 216. I would like to say just a little further, answering your questing fully, that this temporary use of the Bulls Head Reservoir would be justified by the fact that it would take some little time, of course, -- perhaps a year or more, to build the Glen Canyon dam up to the heighth that would be necessary to store a full year's supply of the river. When that had been accomplished

then any further use of the Bulls Head Dam, or of the Sentinel Dam, as flood control dams, would be unnecessary and the Sentinel and Bulls Head Dams could be used for power or for regulating dams or for any other use that might be required of them. It might be advisable to perpetuate the use of the Sentinel Reservoir for flood control of the Gila River permanently.

MR. NORVILL: Would the Sentinel Dam be an irrigation dam?

MR. MAXWELL: After it had served this temporary purpose the Sentinel Dam could be used for any purpose that seemed best. My theory is that the construction of the Sentinel Dam is justified even though you should blow it up when the Glen Canyon dam is finished, merely because in the interval of time pending the finishing of the Glen Canyon Dam to this temporary height, you should have an increased protection against the flash floods of the Gila River coming in on top of a flood peak in the Colorado River.

MR. NORVILL: Would you have any objection, Mr. Maxwell, to putting this flood control at the San Carlos?

MR. MAXWELL: It would not serve the purpose.

MR. NORVILL: Why not?

MR. MAXWELL: Because the San Carlos is way above, and the tremendous floods that come in--

MR. NORVILL: All of the records--

MR. MAXWELL: It is only a portion of the floods out of the Gila that comes down the Gila River to San Carlos, comparatively small. The flow of the Gila River into the Colorado^{has} varied from 100,000 acre feet to as high as 3,000,000 acre feet, and you will find---

MR. NORVIEL: What portion of that---

MR. MAXWELL: Oh, I can't give you the exact figures, but if you will measure the water you will see that you have got-- Now, for instance, take the Salt River water. Up at the Roosevelt Dam it has run eleven feet over the spillways for several weeks and you can't store that in the San Carlos.

MR. NORVIEL: If they built the second dam down below at Mormon Flats, that would stop that.

MR. MAXWELL: I am not familiar with the storage capacity of Mormon Flats.

MR. NORVIEL: And the Verde River--What can be stored on the Verde?

MR. MAXWELL: Oh, possibly-- You must appreciate, Mr. Norviel, that the Government can go in and build the Sentinel Dam and complete it within a year. The minute you go into the San Carlos or any of these other dams, you get into complications immediately because the San Carlos dam is proposed as a reclamation dam, and the Sentinel Dam is purely a question of flood control, and not with reference to any--

MR. NORVIEL: And then have it blowup?

MR. MAXWELL: That would not necessarily follow. I think it would be worth all it would cost for an irrigation dam.

MR. NORVIEL: If the San Carlos dam were constructed, wouldn't it stop the flow of the Gila sufficiently to do away with the menace below?

MR. MAXWELL: I doubt it very much. If you had come with me

a year ago last December down and through the Hassayampa Country and across the Agua Fria, and seen those rivers at flood, I think you might agree with me that the best place to attempt to control all of the flood water in the Gila River is at the Sentinel Dam. You can't store the Verde floods at San Carlos.

MR. NORVILL: If you had spent a day with me along the Gila River at Florence in 1916 you would have seen one of the largest floods ever carried by the Gila.

MR. MAXWELL: I have been there when it was as high as that.

MR. NORVILL: I think we will have to admit that the San Carlos Dam would be of considerable benefit for the irrigation.

MR. MAXWELL: Why, it would of some benefit, but then it would not be of equal benefit--

MR. NORVILL: For flood control?

MR. MAXWELL: No, for irrigation.

MR. NORVILL: If your high line canal comes in above that point, you would not need that water conserved?

MR. MAXWELL: Let me make this clear to you: Whenever you have a heavy seasonal demand for water for irrigation you have either got to put a heavy peak load on your high-canal, or you have got to use stored water, which may be stored in the Bulls Head, or it may be stored in the Sentinel, ~~or it may be stored in the Sentinel~~ or it may be stored in a dozen different places higher up on the watershed, to draw on. In other words, one of the most important

things in this whole proposition, which I have not undertaken to explain to this Commission at all, because I do not want to go into these other details, is the adjustment of these problems relating to a seasonal peak load.

The Bill Williams River, across which you would carry this Arizona High Line Canal, would create a large flood control reservoir, and the water from that could be used at any time that there was water there to supply the lands below. It could be diverted into the river and carried on down to the Imperial Valley, and in that way that storage could be used as a regulator, to be filled from the Colorado River at any time when the water could be spared from the High Line Canal. There would be times when your main high line canal would carry more water than you would use or need for reclamation. In other words, your high line canal would be at all times used to carry its full capacity. You could run the water out of the upper storage and drop it into the Bill Williams, and drop it into the Sentinel, and drop it into the Bulls Head--

MR. NORVIEL: Why, then, you are simply of the opinion that the San Carlos Project has no chance?

MR. MAXWELL: Oh, well, I don't say that.

MR. NORVIEL: Here is the question--

MR. MAXWELL: Let me state this, Mr. Norviel: I am still of the opinion that as between the San Carlos and the Sentinel Reservoir, the Sentinel Reservoir is the reservoir that can be built the most quickly, and that will be of the best service for the

protection of the lower Colorado River Valley- the Imperial Valley and Yuma,- because it will catch all of the floods of the Gila River, from all sources, and hold it there until the day of danger has passed, whereas that is not true of the San Carlos,

MR. NORVIEL: Well, the dam at Glen Canyon would hold the average flow of the river.

MR. MAXWELL: That, Mr. Norviel, is one of the facts that I am so earnestly urging this Commission to ascertain before you undertake to ask Arizona or any other state to surrender any of its rights. You don't know, and yet this Commission is sitting here today with the idea of determining these questions when the facts are not before them, just as though a Court were asked or were proposing with no evidence, to decide a case before the facts were before it.

MR. HOOVER: I think that is entirely a wrong remark, and I ^{have to} will/ask you to withdraw it. The Commission is not proposing to undertake to give any consideration, without a proper consideration of the facts.

MR. MAXWELL: Let me say this in reply to the Chairman, in interpretation of what I have said. What I intend to say is ~~this~~: That the facts are not before this Commission on which it can pass an intelligent judgment with reference to the complete solution of this problem. Now, I am not inside of the mind of any member of this Commission, but I infer most certainly that the Chairman of this Commission will not undertake to proceed until the facts of the case are before you.

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MR. NORVILL: One moment: Do I understand that you would drop the water 740 feet for the purpose of making power?

MR. MAXWELL: If you carry the actual flow of the Colorado River to the Box Canyon of the Bill Williams, and drop it all there, you would develop twice the power that you would develop at the Boulder Canyon Dam, with half of the fall. If you take the water down to that point, and drop half of the water there, you would develop all of the power that you would develop at the Boulder Canyon, with half of the water, 800,000 horsepower, and if you take it down to Ehrenburg and drop it again there, you would have another 200,000, which is 1,000,000 horsepower, as against 700,000 at Boulder Canyon, and you have not used one drop of the water which we ask to have dedicated to Arizona for the reclamation of this two and one half million acres of land. In other words, this is a proposition of enormous import, that by bringing that water to the Bill Williams River you can take half of the water and develop more power with it at the Williams River and at Ehrenburg, than you can develop at Boulder Canyon if all the water were used. You can develop more power with half the water and irrigate two and one-half million acres of land with the other half of the water by taking it to the Bill Williams River, than you can if you undertake to take it out at the bottom of the Boulder Canyon dam as proposed.

MR. NORVIEL: Then, if the Boulder Canyon dam was constructed on a half and half proposition between Arizona and Nevada,-- we using half of the water for irrigation, the power would go to Nevada?

MR. MAXWELL: I don't admit for a moment that the power belongs to Arizona or Nevada. I claim that the power belongs to the National Government, to allocate in whatever way it sees fit, but I want to say this: Mr. Chairman, you must not misunderstand my position. I do not for one moment admit that if the water remains at the Boulder Canyon, and is taken out according to the plan, that Arizona can get her share of the water for irrigation. That is the very crux of this whole issue,--the very crux, that if the water is taken out at the base of the Boulder Canyon Dam, you can't by any human possibility irrigate more than 400,000 acres in Arizona and perhaps 800,000 or 1,000,000 acres in California, and the rest of the water goes to Mexico.

MR. NORVIEL: That just calls to my mind another question: You say that half of the water will irrigate two and one-half million acres in Arizona?

MR. MAXWELL: Yes, sir.

MR. NORVIEL: The other half goes to California?

MR. MAXWELL: And Mexico.

MR. NORVIEL: And California says she has one million acres. That would give one and one half million acres to Mexico.

MR. MAXWELL: Well, you don't want to overlook this fact, Mr. Norviel, that under present conditions they will waste fifty per cent of the water that is turned out of the Boulder Canyon Reservoir at Boulder Canyon, and transported to the Laguna Dam, or to the Mexican Line, before they get it to the farmer, because of the conditions under which that water is transported, whereas under the plan that we propose, the water being carried at least as far as Ehrenburg, in cement power Canals, there would be absolutely no wastage and you will have water enough for the irrigation of two and one half millions of acres on the Western side of the river, as well as the same on the Eastern side, but that is not altogether a matter of reclamation by gravity in the Coachella Valley and the Imperial Valley, because there is a project for the reclamation of 214,000 acres of land in the Coachella/^{Valley,} by pumping with an average lift of 282 feet, and if you develop 200,000 horsepower at Ehrenburg, you will have ample power for that pumping project.

MR. HOOVER: I am wondering, Mr. Maxwell, if you would desire to present the Commission with this project which you have laid before us this afternoon, with as much data as you can?

MR. MAXWELL: I shall be very glad to do that, Mr. Chairman. I have the maps here which we have had made with reference to it, but I have not presented them because I did not imagine for a moment that the Commission would take time to look into them. We have a very interesting set of maps here---

MR. HOOVER: I am wondering if you would put it in the form of a brief,--your entire project.

MR. MAXWELL: I shall be most happy to do so.

MR. EMERSON: I understand that after the construction of the reservoir at Glen Canyon, you could blow up your dam at Sentinel?

MR. MAXWELL: That is not what I meant to say. You misunderstood what I said. I said that the cost of the Sentinel Dam, as an immediate relief from the menace of flood control, for the Yuma project and the Imperial Valley, would be justified even though when that time passed and the Glen Canyon Dam was finished, you should blow up the Sentinel Dam. In other words, the whole cost of the Sentinel Dam is justified by two years' protection that it gives to the Imperial Valley and the Yuma Project.

MR. NORVILL: Do you know that there has been a greater flood-- a greater peak flood in the Gila River than there ever has been in the Colorado.

MR. MAXWELL: That is true, a big flood. There is no doubt about it, and for that very reason when you are fighting a saturated levee, as you were last Spring at the Imperial Valley, if a big flood from the Gila River came down on top of the Colorado River flood and rushed over your levee, you would be gone.

MR. EMERSON: Then, as I understand you, the use of the Sentinel Reservoir as a flood control, there would be absolutely no use after the Glen Canyon Dam is built.

MR. MAXWELL: As a flood control--

MR. EMERSON: All right.

MR. MAXWELL: Have you finished--Because a peak flood from the Gila is only dangerous if it comes on top of a high stage of water of the Colorado.

MR. EMERSON: I want you to get my question. Let me put it again. You state, I take it, that the construction or that the reservoir at Sentinel would be absolutely useless as far as flood control after the Glen Canyon Reservoir was Constructed?

MR. MAXWELL: I don't know that I ought to use that word "absolutely".

MR. EMERSON: That is what I understood.

MR. MAXWELL: I think I probably said that, but a man may moderate a statement. What I mean is this-- That the fact which justifies the construction of the Sentinel Reservoir is that it holds 2,200,000 acre feet of water, and that is more than is necessary to be stored to hold back a flash flood in the Gila, and to prevent it from coming in on top of high water in the Colorado River. Now, what I say is that if you have the Glen Canyon Dam completed, that 90 per cent of the floods-- of the water that comes to Yuma and creates the danger, is held back in the Glen Canyon Reservoir. Therefore, the flash flood of the Gila carries with it no menace to the lower delta of the Colorado River. At the same time, it is possible that a condition

might arise there where it would be a convenience to have this tremendous flood held back in the Sentinel Reservoir for a while, at least,--

MR. EMERSON: I just want to say this, Mr. Maxwell, that if I was in the Imperial Valley, and that a flood ever occurred that has occurred in the Gila River after those levees has been there and had time to dry out by reason of your Glen Canyon and another peak flood like we have had in the Gila, I would not want to be on the other side of that dry levee.

MR. MAXWELL: Oh, you are entirely mistaken about that. You are entirely mistaken as to the volume of water which comes down the Gila, and if you will refer to the--

MR. EMERSON: Mr. Maxwell; the fact is there has been a greater flood in the Gila than ever occurred in the Colorado.

MR. MAXWELL: Oh, no, you are mistaken about that. Let me show you what this means--

MR. EMERSON: The peak flow of the largest flood we know of on the Gila River approximates the peak flood of the largest flow we have any knowledge of on the Colorado. As a matter of fact, when I saw the records in the Yuma office, the peak flood of the Gila, at that time, possibly exceeded the Colorado by a few second feet.

MR. MAXWELL: But, Mr. Davis, how long did that peak flood on the Gila run?

MR. EMERSON: Two or three days.

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MR. MAXWELL: How long?

MR. EMERSON: Two or three days.

MR. MAXWELL: But, my dear man, don't you appreciate that if you build the Sentinel Reservoir you haven't got any--

MR. EMERSON: Well, you are so well informed,--

MR. HOOVER: Gentlemen, I think we are getting rather away from the interstate compact. I would like to state that it would be a great help to the Commission if Mr. Maxwell will give us that brief, together with maps and everything, in order that the Commission may-- Perhaps Mr. Davis could let us know whether Mr. Maxwell's project or these recommendations have been considered at any time by the Reclamation Service.

MR. A. P. DAVIS: Something of this nature has. The exact project, as outlined by Mr. Maxwell today, has not been presented to the Reclamation Service until this forenoon. About a year and a half ago, in a conversation with Mr. Maxwell, he was very urgent that the Black Canyon site, below the Boulder Canyon site, be investigated, and I told him if the funds were sufficient, that this would be done, and that is in progress today. The investigation of the Black Canyon site is entirely aside from the project which he now claims is essential to the life of Arizona. It does not include any project for the construction of a dam at Black Canyon. The main feature, however, Mr. Chairman, for which you are asking information of the advisability of a canal from the

Boulder Canyon to the Valley of the Gila, has been brought up by correspondence and personally suggested by Mr. Maxwell, has been considered so far as possible with the available information and one year ago last fall, in company with the chief engineer and other engineers, I went by boat from Boulder Canyon to Needles, and on that trip we went to the top of hills on the opposite side of the river, where we could get a view of the country, as he so aptly expressed it, a horseback opinion of the facts in the case, and upon that opinion concerning the possibility of work of that kind. The straight line distance, from the Black Canyon to the Sentinel Reservoir, was about 200 miles, as the crow flies, from that point to the Sentinel Reservoir. On examination of the topographic maps, so far as they are available, and of the country, by another engineer, -- not myself, and an entirely unbiased man-- we after conferred and estimated the distance which a canal would have to follow before reaching the Sentinel Reservoir, from the Black Canyon, as between four hundred and four hundred and fifty miles, most of which is heavy mountain country, all of the way, crossing the drainage that--with hundreds and hundreds of structures by which this drainage must be crossed, and then there will probably be tunnels for economy sake, and the grade was insufficient to get/^{it}into the Sentinel Reservoir in that distance. I pre-

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sume that is the reason that the elevation of this canal, as then proposed, has been changed by Mr. Maxwell's scheme, from a thousand or nine hundred feet contour, to 1275, and then 75 feet higher up storage above that, making 1350. The great length of this canal, and the character of country through which it was to pass, struck me and all of the other engineers whom I know of who have seen the country, as being so far beyond the realms of possibility as to be a waste of our money and time, and I am still of that opinion. I do not claim to be infallible, but I have driven up the Bill Williams Canyon by a team, 20 years ago. I have been over most of the ground--not the exact location of the canal, because I don't know exactly where it was, but I have been over most of the ground by team between that point and the heavy country to the South. I have been through the valley and in a general way, by examination of maps and personal investigation, I know the country fairly well, and it is my judgment that money spent upon the investigation of that project in the way of surveys, several hundred thousand dollars, would not be wisely expended. However, if such an appropriation were made available, it could be examined and the matter determined more accurately than we now know it. If it were necessary as a precedent to this determination, it might be advisable. The taking of the water out of the top of the Boulder Canyon dam, or near there, and carrying it on high line, however, can be accomplished a thousand years after

the Boulder Canyon Dam is complete, if anybody wants to do it.

MR. MAXWELL: May I say a word there?

MR. HOOVER: I would like to talk with Mr. Davis about this matter of a rock dam at Glen Canyon, as a temporary control reservoir, have you investigated that question?

MR. DAVIS: No, sir. So far as my knowledge goes no one has. I understand that there has been no examinations of foundation at that point at all. The Geological Survey have recently completed a topographic map of a proposed storage reservoir. Outside of that information, that is all I know of, that we have there, except a very brief record of stream flow which has just recently been established.

MR. HOOVER: Would you think that we were warranted in making a recommendation to Congress at once that that should be done without further recommendation?

MR. DAVIS: Not certainly recommend it without further investigation.

MR. MAXWELL: Mr. Davis has just said that the water could be taken out on this High Line Canal, as I understand, at any time, within a thousand years, even though in the interval the water is allowed to run out of the base of Boulder Canyon Dam, for power, and go ^{on} down the river. Mr. Davis overlooks the fact, Mr. Chairman, that the moment the flow of the Colorado River is standardized, every drop of water available for irrigation, in excess of the amount used in Arizona and California on lands which can be irrigated from the low line canal levels, which does not

exceed in all 1,400,000 acres of land, will inevitable be taken across the line and applied to lands in Mexico, and the claim of right to that water will in that way be established, which we could not at any time in the future, in my judgment, get away from. Whether we originally had a right to use that water on that land or not, if we should defer the decision to insist upon this high line canal and should fail to proceed with reasonable diligence to put that project into effect, then Mexico would establish a claim forever to the right to every available drop of water that we need today to irrigate two and one half million acres of land in Arizona, and it is that condition against which I so earnestly protest.

MR. NORVILL: Judge Sloan has asked that his address be continued until tomorrow morning. He was to come on next.

Tomorrow morning at 10:00 o'clock the Commission will visit the Legislature and at 11:00 o'clock will resume the work.

(Thereupon an adjournment was taken).

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Phoenix Arizona Hearings.

Second Session.

Thursday, March 16, 1922.

11.15 A. M.

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(Pursuant to adjournment, the Colorado River Commission met in the Federal Court Rooms at Phoenix, Arizona, at 11.15 o'clock a.m., March 16, 1922, Herbert C. Hoover, Esq., presiding.)

MR. NORVIEL: Mr. Secretary, the first on the program this morning is Honorable Richard E. Sloan, representing the City of Phoenix.

MR. HOOVER: Judge Sloan. (Applause)

RICHARD E. SLOAN: Mr. Chairman, and members of the Commission: As we have been informed, the purpose of this meeting is to accord an opportunity for the presentation of views from interested parties and communities as to the sort of compact that should be entered into between the seven states here represented, as to the allocation of the waters of the Colorado.

Bearing that in mind, I shall adhere strictly to that subject. As I desire also to be well within my time allotted me, I shall refer somewhat strictly to my notes.

It is apparent the broad question to be considered has two aspects, the legal and, what, for a better term, may be called the political. That is to say, the rights of the states inter se se,

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based upon positive law, constitute the one; the proposed agreement or compact between the states under which these legal rights are to be recognized or modified, restricted or enlarged as the case may be, and means found by which such rights as are recognized and agreed upon be safeguarded and enforced, constitute the other.

I doubt if it would be profitable to the Commission at the present stage of the negotiations if there should be any discussion with respect to the rights of the several states or the rights of the Federal Government to the control of the waters of the River or to their disposition further than may be necessary to obtain a full and adequate understanding of what these legal problems may be so that it may be seen whether or not they present any obstacle to an agreement that shall be acceptable to all the states concerned.

The Colorado River Commission is not a tribunal nor does it possess legislative powers. Its proper function, as I take it, is to formulate, for the action of the various states and the Federal Government, a compact that will remove existing difficulties and provide, if possible, a method by which future disputes or differences may be adjusted so that the full development of the River may not be indefinitely postponed with the great benefits, national, state and community, that will follow this development.

Indeed, I take it that one may not advance any opinion with respect to these rights without inviting more or less criticism as to its soundness. There may not even be unanimity of view as to

what are the real questions involved. When I attempt to state them, therefore, I do not mean to imply that there may not be others than those named by me of sufficient importance to be considered.

Broadly speaking, the questions of purely legal nature involved in the determination of the existing rights to the control and use of the waters of the Colorado River that may be raised as between the several states and as between the United States and the several states may be stated as follows:

First: Does a state, by virtue of its sovereignty, possess the sole right to the control of the waters of an interstate stream flowing within its boundaries?

Second: If it possesses such right, may it exercise such control without limitation as respects the effect of such control upon the flow of the river within the boundaries of another state?

Third: Assuming that a state may not exercise its right of control of the waters of an interstate stream flowing within its boundaries without limitation as respects the effect of such control upon the flow of the stream within the boundaries of another state, as between the citizens of the one state and against the citizens of the other state, does priority of use create priority of right?

Fourth: If priority of use of the waters of any such stream as between the citizens of one state and the citizens of another state creates priority of right, by what rule is such right to be measured both as to the nature of use and the quantity of use?

Fifth: Assuming that a legal wrong may be committed by one state as against another state in its use or control of the waters of an interstate stream, what remedy is afforded by existing law and what relief may be granted ?

Sixth: Does the United States by reason of the navigability of the Colorado, or because of any ownership of its waters independent of the question of navigability, possess the right of control?

Seventh: If control of the waters within the Colorado Basin lies in the United States, under existing law, how may such control be exercised?

The only tribunal having jurisdiction to adjudicate these questions is the Supreme Court of the United States, Strangely enough few, if any, of these questions may be said to have been definitely so decided by that Court as to leave no ground for controversy. While this is true, certain principles have been declared by the Supreme Court which I believe in effect amount to a determination of at least two of these questions. I refer particularly to the status of the United States as respects ownership and control of the unappropriated waters of the streams in the arid West, apart from any question of control in relation to navigation, and also to the right of one state to control the waters of an interstate stream within its boundaries without regard to the effect of such control upon the flow of the stream within another state.

Upon the question of the rights of the United States in the navigable waters within the several states in a number of cases, the latest of which is that of Port of Seattle v. Oregon & W. R. Co., the Supreme Court has declared that such rights are limited to control thereof for navigation purposes only and that the state in all other respects possesses the rights of ownership of such waters.

In Kansas V. Colorado, Mr. Justice Brewer declares in effect that the state and not the United States may control the waters of a non-navigable stream.

I am aware that the United States has been permitted to intervene in the pending case of Wyoming V. Colorado and to set up the claim that the Federal Government and not the states is the owner of all of the unappropriated waters of the innavigable streams of the arid West and has never transferred title to such waters except to individual appropriators under the Act of July 26, 1866. The position thus assumed is not sustained, as I believe, by any decision of the Supreme Court, and as it is inconsistent with the practice of the Government since the organization of the territories which preceded the present states in the arid West, it is extremely doubtful if this contention will be sustained by the Court. But assuming in fact, as it is in theory, that the Colorado River is a navigable stream and that, therefore, the United States possesses control, there still remains a "twilight zone" of uncertainty because of the undetermined character and extent of that control.

On the question as to whether state control is limited by the legal or equitable rights possessed by another state to the waters of an interstate stream the Supreme Court in Kansas v. Colorado has recognized that such limitation exists, but has not defined or attempted to define how far such limitation extends and what specific relief may be afforded if such limitation be exceeded. I am not sufficiently familiar with the pleadings or issues made in Wyoming v. Colorado to venture a prediction as to what questions may be expected to be adjudicated in that case. From such information as I possess, it is probable that the respective rights of the United States and of the several states with respect to the control of the waters of an innavigable interstate stream may be determined and that the decision may lay down certain broad principles applicable to the control of the waters of the Colorado. That the decision in that case may go farther than to lay down such general principles is perhaps not to be expected. The final and ultimate settlement of the law appertaining to the various questions suggested is not to be looked for by the ordinary processes of the Courts for many years to come, indeed, if we may judge by the history of similar litigation and the settlement of questions of similar import, the law appertaining to the control and use of the waters of the Colorado River must remain in more or less uncertainty if left to the Courts to decide as occasion may arise in litigated cases, for at least a score of years,

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Meanwhile, must the development of the River await the settlement of these questions by the Courts? As a citizen of one of the states vitally interested, and as to this I think I voice the prevalent view of the men of this state who have given the matter consideration, I am unwilling to postpone development pending such settlement. I believe that a working agreement may be effected between the United States and the several states through the agency of this Commission without such delay that will permit of this development and yet safeguard existing rights and the interests of the several states in the future. To effect such an agreement was the purpose of the creation of the Commission, for in this way only may the principle obstacles that seem to stand in the way of the early and full development of the River be removed. I say this because I think it is generally conceded that there are no engineering difficulties that may not be overcome and that the purely economic problems may be met and satisfactorily solved.

In reaching such an agreement it seems to me that it is unnecessary to attempt to reconcile differences of view with regard to the rights of a state in the control of the waters ^{flowing} within its boundaries, or the rights of the United States to such control, and that such questions may be regarded as purely academic in that their determination is not essential to a practical working agreement which will safeguard and protect the citizens of the various states in such rights as they now possess, and for the future permit of the free and full development of the resources of the vast region included within the Colorado River Basin, without any one section obtaining advantages at the expense of the

legitimate and reasonable development of other sections. In reaching such an agreement it seems to me the first essential is to regard the entire area embraced in the Colorado Basin as a unit in so far as its development is concerned. From this viewpoint the agreement may well rest upon certain general principles appertaining to such development and the uses to which the waters of the Colorado and its tributaries may be put.

I suggest the following as embodying these principles:

First: That no attempt be made to interfere with existing rights of appropriation;

Second: That in the future the diversion of water from the Colorado River and its tributaries be restricted to such uses as are generally regarded in the arid West as beneficial;

Third: That the beneficial uses that shall be recognized shall be, river control; municipal and domestic; agriculture; power development and navigation;

Fourth: That if power development shall be subordinated to agriculture the latter shall then be limited to that which is economically feasible and exclude such as may yield only a meager and unprofitable return;

Fifth: That unnecessary waste and the use of water that may not be reasonably justified as a beneficial use shall be prohibited.

I am unable to see any valid objection that may be urged as against any of the five propositions that I have enumerated, from the standpoint of essential fairness, assuming as we all do, that

an equitable adjustment is desired. These propositions all assume that by proper methods in the application of the waters of the Colorado River and its tributaries to such beneficial uses as I have named, in so far as agriculture is concerned the interests of none of the states involved may seriously be affected. In stating this I have in mind only such estimates as are based upon actual investigation and particularly the estimates made by the Reclamation Service, and is not based upon extravagant estimates based upon guess work. The limitations suggested are limitations which it seems to me might be properly made to apply to an intra-state stream by the state within which it is located.

It may and doubtless will be urged that the propositions I have stated omit any reference to priority of right arising from priority of use, except as to those rights that may exist at the time the compact shall become effective. But my answer to this objection is that with the construction of such storage dams as are contemplated priority of appropriation in so far as agriculture is concerned will be unimportant except at times of prolonged and unusual drouth extending over the upper Colorado Basin. That to attempt to apply the doctrine of priority of appropriation at such times would invoke such complexity of detail and such an extended investigation into facts as to nullify any practical results. Besides that, it seems to me it would be far more practical to recognize parity of right in place of priority of right and provide some means by which in times of scarcity the waters of the River may be equitable apportioned between the states upon the basis of the reasonable needs of the several states, taking into account the extent of the development in each state at the time

of such apportionment. There are practical difficulties in the successful disposition of this question from any standpoint and no ideally perfect solution may be found.

With respect to power development priority of use as between the several users upon the River is unimportant because the use by one will not materially affect the flow of the river available to another user.

It must be admitted, however, that power possibilities may be affected to some extent by other uses, but to secure the maximum power development at the expense of agriculture in the Northern states certainly presents greater difficulties than the question of priority of appropriation in its application to agriculture. Besides being in its nature a political question the subordination of agriculture to power development involves a consideration of relative values that are not to be measured in terms of dollars in as much as social as well as economic values are to be determined and compared.

In this connection I wish to say that as a citizen of Arizona I should be delighted if by any agreement between the states here represented that the flow of the Colorado River at the point where it crosses the line from Utah into Arizona might be permitted to flow undiminished by any use that may be put of its waters in its waters in its upper reaches and that we might always be assured of at least 6,000,000 H.P. when its proper possibilities are developed, and of water for the irrigation of two and one-half million acres of new land in this state. But I trust I may not be charged with

disloyalty to my own state or of a want of faith in the benevolent disposition of the people of our neighboring states when I say that I regard the suggestion made that this result may be attained by means of a campaign of education as to the paramount importance of power development over agriculture as altogether chimerical.

When we consider that this would mean a reversal of a policy recognized by the Constitutions, enforced by the Statutes and firmly entrenched in the customs of these states, I despair that such a reversal may ever be brought about within the lifetime of any member of this Commission, even if we were to send and maintain in the field a thousand missionaries each as eloquent, as persuasive, as able and as zealous as my friend Mr. Maxwell. I even express the doubt that by such means even one of the benighted, ignorant, mentally besotted and selfish farmers of Colorado or Wyoming may be converted to the viewpoint, that he is committing an economic wrong in the use of water in the attempt to grow apples, or potatoes or wheat, or barley when use ^{may be} made of the same water by the farmers of Arizona in the growing of long staple cotton, alfalfa, oranges or dates. As enlightened, philanthropic and unselfish as are the people of my own state, I am sure we would not be willing to concede to Mexico or even to California, as much as we love her, one second foot of water to which we ^{may} have any lawful claim, even should we be convinced that it would result in a better use of that water. The millennium still remains a prophecy. Conditions and not theories must govern the action of this Commission. I am skeptical that

any agreement may be reached as to the allotment of the waters of the River based upon any limitation as to acreage that may be reclaimed that will have any practical effect upon the flow of the river in its lower reaches. Should priority of appropriation be recognized I cannot see any practical advantages to Arizona or California therefrom. Would it not result in a race among the various states and communities in the effort to anticipate the establishment of rights upon this basis? Would it not result in the artificial stimulus through state aid and otherwise, in the reclamation of arid lands without reference to the feasibility of projects, and then, too, it must be remembered that it is much easier to build diversion dams, canals and ditches on the small tributaries of the River than to construct any of the proposed power plants in the Canyon of the Colorado. I am not sure, therefore, that Arizona and California would be the winners in any such race. I submit that the suggestion that I here make that parity of right with the recognition that there shall be an equitable scaling down on some pro rata basis of the use of water by the various states, enforced as may be provided whenever necessity arises due to excessive and prolonged drouth, affords an easier and probably more satisfactory solution of this problem.

This brings me to the consideration of the other phase of the general subject. It is not enough to agree upon general principles that are to govern in the making of the compact without making some provisions for some supervision or control over the erection of works and the diversions of water from the River and its tributaries so as to insure against uses or methods of use in violation of these principles. This does not imply the taking away from any
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state any power it possesses of control that does not assume an interstate character by virtue of its effect upon the rights of the people of another state as may be defined in the compact.

It has been suggested that a Board might be created having both judicial and executive powers to administer the compact that may be made; its judicial powers to be strictly limited to the interpretation of the terms of the compact and the determination of questions of fact arising from time to time with respect to matters appertaining to its enforcement and to make recommendations to the various states based upon such findings. If these recommendations be not acted upon, relief may be sought in the one Court having power to enforce the compact.

The jurisdiction of the Supreme Court to pass upon and enforce compacts or treaties between states was definitely settled in the early history of the country and that jurisdiction has frequently been invoked. It is possible that if such a Board be created, its findings might be made prima facie evidence of the existence of the facts upon which they are made so that in most cases only issues of law arising upon them would remain for the determination of the Court. Just how this Board is to be appointed or of whom it should be composed I have no suggestion to make further than to say that, in my opinion, its members should be appointed by the President of the United States and they should be chosen so as to insure that it shall be composed of men wholly disassociated from local interests.

I have purposely made no referende to the Republic of Mexico and of any participation it shall make in the distribution or use of the waters of the Colorado. Mexico is not represented upon this Commission and the Act creating it does not imply that that country shall become a party to any agreement or compact that may be entered into. Whatever interests it may have will doubtless be taken care of by the national government and be provided for by Congressional act. I see no reason, however, why the principles I suggest may not be made to apply to that part of the basin of the Colorado that lies within the Republic of Mexico.

There is another matter that I think should be considered and provision made for its recognition and enforcement in any compact that may be entered into, and that is the proper allocation of power that may be developed on the River in the event that works built for power may not, because of their ownership in the government, be subject to local taxation. It seems to me only just and right that if such works are to be exempt from local taxation that there should be compensation to the state in way of a free allotment of power based upon what would be the taxable value of such works if subject to assessment. I take it also that the state should be assured that power possibilities within the state shall not be availed of either by the government or by private corporations and the power so developed be disposed of outside of the state so that the proper needs of the people of the state may not be supplied at reasonable cost, in other words, that the people

of the state shall have a preferred right to the purchase of power developed within the state at a reasonable price to the extent of their reasonable needs. (Applause.)

MR. HOOVER: Judge Sloan, in your evidently very deep study of this question, have you formulated any general ideas as to the effect of the Supreme Court decisions on this question, in its general aspect? In other words, to be more concrete, have you considered that the decision which led to the Supreme Court declaration of equitable distribution, is applicable to the Colorado River?

JUDGE SLOAN: That is my personal opinion, Mr. Chairman. Yet, as I say, in my paper, the extent of the relief that may be granted-- the question of relief that may be afforded is yet an undetermined question, but as to the application of the rule to the Colorado Basin, I have not the least doubt.

MR. HOOVER: Now, if that view is correct, all question of dominant state rights is by the board at once. Is that not the case?

JUDGE SLOAN: Pardon me; I didn't quite catch the question.

MR. HOOVER: In the consideration of the state rights over waters of the state, that is nullified at once, if there is to be an equitable distribution among the states.

JUDGE SLOAN: To some extent; and there is just where the question of uncertainty arises. The Supreme Court has recognized the general rule. However, in the discussion of that question, they suggest so many eventualities or conditions that might affect relief, it is ^{im}possible to say at this time what the ultimate con-

clusion of that Court will be; whether it will obtain some practical method by which equitable rights of one state may be enforced as against another state, that is left yet uncertain. Yet, I have not any doubt, as I said before, that the Supreme Court will establish and enforce, to some degree, equitable rights of one state as against unreasonable use, at least, of the waters in another state.

Now, whether that would be based upon the practice in the arid country with reference to priority right, no one knows. I doubt if the Court itself has reached any conclusion with reference to that. I can only say this: I believe the Supreme Court has recognized the general doctrine that unreasonable use of water of a stream by a state in which the stream may originate, will be forbidden and prohibited as against the reasonable needs and requirements of the state lower down upon that stream. Applying it in the case of Wyoming and Colorado and Kansas as against Colorado, was, as I say, one reason why I think this compact should be made without delay and without awaiting the determination of those questions which are uncertain, and the possible length of time that would be consumed before any final adjudication may be made.

MR. DOOLITTLE: Whether the law is settled or unsettled or whatever the law may be determined to be on this point, I am of the opinion that, as the Colorado River runs between several states, this Commission will not go very far in its deliberations until it sees the necessity of getting away entirely in arranging these

matters from what the law is, be it one way or be it the other, and that on account of financial connections and on account of Governmental connections and on account of the differences between the States internally, what the law is to be as to the use of water or the control of water or distribution of water, or anything else, has to be left entirely out of the question, if anything is to be done with the waters of the Colorado.

MR. HOOVER: Thank you very much. Judge Sloan, in your consideration of this question, I gather you came pretty firmly to the conclusion that there should be a precedence of agriculture over power uses: is that correct?

JUDGE SLOAN: I have no personal view to advance, I only say that such is the policy as it seems to me, and has been the policy in the arid West, and to secure a reversal of that policy would be very difficult, because of the fact that it might happen, as in the case of Colorado, that one side of that state be definitely committed to one policy because of its interest, and another side of the state to another policy, even if the people of one part of the state were converted to the idea that power should be entitled to first use of the water.

MR. HOOVER: Have you given any thought as to the factor that would enter into the comparative use as to their special and economic merit?

JUDGE SLOAN: I have. But I doubt if my own personal views are of much value as to that. I can only say homes are regarded as of great importance, the cultivation of lands and the communities that grow up to settlements of that sort, are certainly to be reckoned with in any comparison of values. We have always regarded the cultivation of land as one of our basic industries, and that the cultivation of the--not only the cultivation, but the settlement of the lands should be encouraged, in that it builds up communities and affords homes for our people.

MR. HOOVER: Now, would you do one thing for the Commission? You have made a suggestion as to the nature of the compact. It would materially assist the Commission if you could draft that in the form of a compact.

JUDGE SLOAN: I shall endeavor to do it, at your suggestion, Mr. Chairman, although I hesitate to attempt it, because it is a matter of so great importance and it requires an ability I feel I do not possess. However, I shall attempt to comply with your request.

MR. HOOVER: It makes it easier to consider the principles laid down.

MR. CARPENTER: Judge Sloan, isn't it a fact, as you recall, in the litigation between Kansas and Colorado, the United States of America appeared as intervener for priority, regardless of state lines in the arid West?

JUDGE SLOAN: It is.

MR. CARPENTER: In order to administer them, there must be a third party, which was the Government of the United States?

JUDGE SLOAN: That is true.

MR. CARPENTER: Isn't it also a fact that the Court, in that case, refused to recognize any such doctrine?

JUDGE SLOAN: I think that is also true; that is my understanding of the case.

MR. CARPENTER: And do you not also recall it to be a fact in that case, a large number of prior ditches in interest, in the vicinity of Garden City, has been largely destroyed or at least greatly interfered with by subsequent priorities?

JUDGE SLOAN: That seemed to be stated in the decision.

MR. CARPENTER: And notwithstanding that, the Court decided that Colorado, in view of all the conditions, has not unreasonably exercised her sovereignty?

JUDGE SLOAN: Well, I should say that is the effect of the decision.

MR. CARPENTER: Yes.

JUDGE SLOAN: I cannot say the courts would reach the same conclusion in another case with much the same facts.

MR. CARPENTER: Now, one more question, pardon me: Isn't it a fact, after analyzing that case, you have come somewhat to the conclusion that the question of equitable apportionment of water is largely one of facts?

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JUDGE SLOAN: There is no question about that. In every instance it is a question of facts; I mean, when the matter is judicially considered. It might not be in a compact.

MR. HOOVER: I thank you very much, Judge Sloan.

MR. NORVIEL: The next speaker for the morning is Mr. John C. Hoyt, Hydraulic Engineer in charge Division of surface water, U. S. Geol. Survey. I desire to say that Mr. Hoyt is here as representative of the Geological Survey of the United States. (Applause.)

MR. JOHN C. HOYT: Mr. Chairman and members of the Commission: In the design, construction and operation of works, which depend for their successful operation on the natural resources of the country, it is necessary to have complete and accurate data in regard to those natural resources.

I have the honor to represent a Bureau of the National Government, which, for nearly fifty years, has been engaged in collecting data in regard to the natural resources of the country.

The statement which I will present is based upon the data collected by the bureau. The Geological Survey has been especially interested in the Colorado River drainage basin, because the first explorations of the river were made by Major Powell, about ten years before the creation of the survey. Afterwards, Major Powell was for many years director of the survey.

As stated by the Chairman, there are two phases to the subject first, the division of the water, and, second, the utilization of the water after it is divided.

The statement which I will present refers primarily to the first phase of the subject. As it contains considerable data, I have reduced it to writing, and, with your permission I will read it.

(Mr. Hoyt then read the following statement)

"The Colorado River drainage basin, which includes parts of seven States, has an area of about 250,000 square miles and yields to the river an average annual flow, as measured at Yuma, of 17,300,000 acre-feet."

MR. NORVILL: Does that include the Gila, or exclude it?

MR. HOYT: Measured at Yuma.

MR. NORVILL: Including the Gila?

MR. HOYT: Including the Gila.

(Mr. Hoyt then continued to read as follows)

"Records of the discharge of Green River at Green River, Utah, and of Colorado River (formerly Grand River) at Cisco, Utah, indicate that 77 per cent of this flow, or 13,420,000 acre-feet, comes from the portion of the drainage basin above the mouth of Green River. The San Juan River, which enters the Colorado just above the Utah-Arizona line, contributes 3,000,000 acre-feet of which 2,400,000 acre-feet comes from the State of Colorado. Therefore

about 91 per cent of the flow of Colorado River at Yuma comes from the states of Wyoming, Colorado, and Utah. The average discharge of the tributaries below the San Juan, measured in acre-feet, is about as follows:

Little Colorado River	200,000
Virgin River	Negligible.
Williams River	75,000
Gila River	1,100,000

The following table shows the distribution of the drainage area among the seven states and Mexico and the average annual contribution from each to the total flow of the stream.

STATE	Drainage area		Flow	
	Square miles.	Per cent	Acre-feet	Per cent
Wyoming	18,000	7.2	2,300,000	12.5
Colorado	39,000	15.5	11,800,000	64.1
Utah	40,000	15.9	2,300,000	12.5
New Mexico	23,000	9.2	1,260,000	6.8
Arizona	113,000	45.0	740,000	4.0
Nevada	12,000	4.8	Negligible	
California	4,000	1.6	Negligible	
Mexico	2,000	.8	Negligible	

"All developments in the Colorado River basin are primarily limited by the quantity of water available and its distribution through the year and through the drainage basin. Large storage reservoirs are needed for any considerable extension of the present

use of the river below Boulder Canyon. On account of the magnitude and the diversity of the interests involved, decisions controlling the continued development of the river, either for power or for irrigation, are of national and international as well as local and state importance. All proposed developments must therefore be considered in their relation to the general good as well as to the local or private demand. The potential resources of the Colorado River drainage basin will be developed either by increasing its agricultural production through irrigation or by generating power for use in industry, both within and outside the basin, as well as for use in irrigation and mining.

"The principal power sites in the Colorado River basin are between the mouth of Green River and the lower end of Boulder Canyon. In the utilization of these sites consideration must be given to the effect that future diversions for irrigation may have upon them and also to the present and future market for electric energy.

"A study of the present and probable future agricultural development in the basin indicates that three distinct problems must be considered--one relating to irrigation in Colorado, Wyoming, and Utah, where the head water tributaries of Colorado River contribute more than 90 per cent of the total flow; another relating to power and irrigation in New Mexico, Arizona, and Nevada; and a third relating to irrigation in California.

"There seems to be at present some fear in the States of Colorado, Wyoming, and Utah that injunction suits may be filed to protect priorities in the use of water for generating power in the canyon and for irrigation in Southern California, which may result in temporary or permanent legal limitations of agricultural development in those three states.

"It appears that the maximum irrigation development that is or will probably be economically feasible in Nevada, New Mexico, and Arizona will not deplete the waters of Colorado River or its tributaries sufficiently to work to the detriment of other states or interests in the basin. There is consequently no present need for a rule governing irrigation development in those states, and the present problems in the basin therefore relate to possible conflicts between the use of water for irrigation in Colorado, Wyoming, and Utah, its use for power between the mouth of Green River and the lower end of Boulder Canyon, and its use for irrigation in California.

"Colorado, Wyoming, and Utah must be assured that no development will be undertaken that will create a right to waters that rightly belong to them and that they may eventually need; the interest of California appears to lie in protecting any irrigation development in that State in its right to an adequate water supply; the developers of power in the canyon, although actually well protected by natural limitations on irrigation development above the

canyon, possibly need, as an aid in financing, the assurance that the flow in the canyon will not be so greatly depleted as to ^{en}danger their investment in power plants and transmission lines.

"The present annual diversions from the basin to adjacent basins above the canyon amount to only about 150,000 acre-feet, and all proposed new diversions would increase that quantity by only about 250,000 acre-feet, or to a total of about 400,000 acre-feet. It is therefore believed that all practical diversions to other basins above the canyon would not use more than 500,000 acre-feet.

"The records of the Geological Survey confirm the statement of the Reclamation Service that an average of at least 15,000,000 acre-feet of water is annually flowing to waste in the Colorado River, sufficient to permit unrestricted development in all parts of the basin for many years without danger to any priorities already established.

"Any stipulation as to the use of the water in the Colorado River drainage basin should not only insure protection to the several interests concerned, but should also encourage development by the most economical use. Experience in other regions has shown that a higher economy in the use of water has been attained by an equitable allotment by quantity than in any other way.

"It is believed that all interests will be fully protected by an agreement that at least 65 per cent of the flow shall reach the canyon section of the river and that no rights for power or

irrigation shall be created in or below the canyon that will deprive the States of Colorado, Wyoming, and Utah of a right to consume 35 per cent of the present flow above the canyon. This allotment should apply for 50 years, after which a new agreement should be made.

"On this basis of division Colorado, which contributes 11,800,000 acre-feet to the flow of the river, would retain 4,130,000 acre-feet, which, with an average consumption of $1\frac{1}{2}$ acre-feet per acre, would irrigate 2,753,300 acres. It would release to the lower river 7,670,000 acre-feet. On the same basis Wyoming, which contributes 2,300,000 acre-feet, would retain 805,000 acre-feet, enough to irrigate 536,600 acres, and it would release to the lower river 1,495,000 acre-feet. Utah, which contributes 2,300,000 acre-feet, would retain 805,000 acre-feet, or enough to irrigate 536,600 acre, and would release to the lower river 1,495,000 acre-feet.

"Various estimates have been made of the additional irrigable lands in Colorado, Wyoming, and Utah. These estimates generally come well within the additional acreage, for which water would be available under the plan of division set forth above. Furthermore it is interesting to note that the records of mean annual flow for 18 years at Yuma show a slightly larger average annual flow for the last nine years than for the first nine, indicating that the con-

sumption which has taken place in the drainage basin during the period covered by the records has not, since the records started, been sufficient to show above the cycle variations and the errors of measurement. In making this statement it is of course recognized that irrigation consumes water.

"By this plan 10,660,000 acre-feet would be released above the Utah-Arizona line, or 9,100,000 acre-feet if Colorado and New Mexico are allowed to use the total flow of the San Juan.

"With an average consumption of 3 acre-feet per acre in the lower basin, the quantity of water allowed to pass through the canyon section will be sufficient to irrigate 3,033,000 acres. This area would include, however, the tracts now irrigated in Imperial Valley, as the diversion for that system is made below the gaging station at Yuma. In addition Arizona would have full use of the flow from Little Colorado, Williams, and Gila rivers, aggregating 1,375,000 acre-feet less diversion from the Gila in New Mexico, or enough to irrigate 425,000 additional acres."

(End of statement.)

I thank you. (applause.)

MR. HOYT: I have mimeograph copies of this statement if there are any persons who desire one.

MR. HOOVER: Dr. Hoyt, some of the commissioners wish to ask some questions.

MR. CARPENTER: You allow Arizona to wholly absorb the Gila, the Little Bill Williams and the Little Colorado. Those waters are all tributary to the Imperial Diversion?

MR. HOYT: Yes.

MR. CARPENTER: All tributary to the Government diversion, except the Gila; so you have a total absorption, under your plan, of every river, starting with the San Juan, and concluding with the Gila, on the East, and including diverging streams on the West, a local consumption, Do you think it is wholly possible to absorb those streams?

MR. HOYT: I am giving them the benefit of the doubt.

MR. CARPENTER: There will be a return?

MR. HOYT: Yes.

MR. CARPENTER: You cannot wholly absorb those streams?

MR. HOYT: No.

MR. CARPENTER: It is a fact from the irrigation of practically all the lands of the upper regions there is a return to be expected, a return, in fact?

MR. HOYT: Yes.

MR. CARPENTER: And that return usually increases over the years, until it reaches its final equilibrium, and in the irrigation of the lands of Wyoming, Utah, and here even in Arizona, a return to the stream is to be expected from all lands upon which water is applied?

P.

MR. HOYT: I believe it is.

MR. CARPENTER: In other words, except uses wholly consumptive such as taking out by tunnels or dumping into the Salton Sea, there is no return?

MR. HOYT: In this connection, I have used the term "consumption use", and assumed this to be 1-1/2 acre feet for the upper states and 2-1/2 for the lower states;

MR. CARPENTER: You figure you have included a pretty liberal safety factor?

MR. HOYT: Yes.

THE COMMISSIONER: Especially in the upper regions?

MR. HOYT: Yes.

ANOTHER COMMISSIONER: How do you arrive at the basis 65-35; is that upon any facts?

MR. HOYT: By trial. Several different percentages were tested to see what percentage would give everybody due rights and 65-35 appeared to be a fair percentage.

MR. EMERSON: Well, taking the case of the three upper states, who have the advantage of the 35 per cent, do you note that the acreage that will be allotted for Colorado will exceed even their wildest guess?

MR. HOYT: Yes, I know that.

MR. EMERSON: And in the case of Utah and Wyoming, it is below the estimates submitted by those states?

MR. HOYT: It practically agrees with the estimate submitted by the commissioner from Wyoming. I disregarded the estimate submitted by the Commissioner from Utah as it seemed altogether too high, and I understood that when the estimate was submitted the commissioner said he was not prepared, to make an estimate, so I selected a figure that I considered would cover all possible demands.

MR. CALDWELL: Mr. Chairman: Utah came down here to listen, (laughter) and I would not now be speaking except I have been spoken for; and I think it is only due, as I say, that Utah did not submit an estimate of a million acres for Utah. I have stated this before to the Commission.

MR. HOYT: That is my understanding.

MR. CALDWELL: I did not submit it as a claim, and in submitting it, the only thing was that it was a figure below which I would not under that arrangement be willing to bind the State of Utah, and, with the further statement that I made no promise that I would bind the State of Utah at a million acres. And, also, I have stated before the Commission that I am opposed entirely to any division that calls for the percentages of acres as a basis.

MR. HOYT: I may state that in carrying out the proposed agreement it would be necessary to transfer these percentages into acre-feet.

MR. CALDWELL: Mr. Hoyt, the allocation of 35 per cent to us, of the water we produced within our own territory, while, of course very generous to us, allows the whole absorption in Arizona; nevertheless, the acreage that you mention as that which could be developed with that 35 per cent, is, in addition, as I understand it, to our present acreage?

MR. HOYT: All acreages given are in addition to the present acreage.

MR. CALDWELL: So you are figuring on the net flow after it serves all of the acreages within the drainage?

MR. HOYT: That is right.

MR. CALDWELL: And the net flow being served, after all diversions, Green River Ditch, etc., and other upper diversions--

MR. HOYT: It is based upon the gaging stations now in operation, showing the flow.

MR. CALDWELL: To each state which you allow 35 per cent generously, of their own water, the acreage would be in addition to the present served acreage?

MR. HOYT: That is right.

MR. CALDWELL: That is all.

MR. EMERSON: As I understand this, there is an involved principle involved; that is--

MR. HOYT: Yes, that pact upon the basis of the quantity of water rather than upon acreage so as to encourage the highest beneficial use of the water.

MR. EMERSON: In those states. The idea presented in this paper is to make the apportionment upon quantities of water, and not upon possibilities of the beneficial uses,

MR. HOYT: At this time I believe that it is the logical way to make ^{the} adjustments, because so far as we can predict, there is no possibility that development in fifty years will reach the maximum requirement, after which a new adjustment can be made which can take into account changes in economic and other conditions. There will be changes.

MR. EMERSON: Mr. Hoyt, in view of your statement, could there be any harm to the lower states if the upper states were permitted, for a period of fifty years, to develop agriculturally as fast and as far as they wished?

MR. HOYT: It might affect financing--

MR. EMERSON: Pardon me, will you answer the question? I only want an answer as to the physical facts, regardless of the findings

MR. HOYT: So far as I can see, considering the present development of the science and practice of agriculture and present economic conditions, I don't believe any development which will take place in the States of Utah, Colorado and Wyoming will materially affect the interests below beyond the limit set in this paper.

MR. EMERSON: Beyond the limit set in this paper?

MR. HOYT: Yes, that is, on the 35 per cent.

MR. EMERSON: Pardon me just a minute. If I understood you, you said the 35 per cent would unquestionably take care of all the development that could take place in the upper states for the next 50 years?

MR. HOYT: That is right.

MR. EMERSON: Then would the lower states, in view of that statement, be in any way injured if you simply said to the upper states, "Regardless of percentages, go ahead and develop for the next fifty years, as you choose, and as far as you choose, agriculturally?"

MR. HOYT: I don't think there would be, unless legal matters came in. From an engineering standpoint, I would say "no".

MR. CARPENTER: It is a fact, is it not, as you mentioned, I believe, that notwithstanding you would only allow to Colorado 35 per cent of her supply, and all of Arizona's supply to her, that even then, physically, probably it would be impossible for us to consume that 35 per cent.?

MR. HOYT: Absolutely.

MR. CARPENTER: That nature has so shaped our country, we cannot, if we would, take that 35 per cent in the next half century?

MR. HOYT: Natural and economic conditions will govern.

MR. HOOVER: Mr. Hoyt, have you given any thought to the question of the relative importance of agriculture and power in this determination?

MR. HOYT: It is generally conceded in the order of the highest use for water that municipal supply of water comes first, irrigation second, and power and industrial uses third and fourth.

As was stated by previous speakers, there is a strong sentiment in this country, and well founded, that we should develop homes.

MR. HOOVER: It is your impression, after your study, that agriculture should have priority, and then power?

MR. HOYT: Yes.

MR. HOOVER: That is all.

MR. NORVIEL: The hour for adjournment has arrived. It was stated we were to adjourn to the High School. I presume that will be the order.

MR. HOOVER: We do not seem to be much over-crowded.

MR. NORVIEL: The order has gone out. Then, shall we adjourn until 2:00 o'clock, at the High School Auditorium?

MR. HOOVER: We will now adjourn until 2:00 o'clock this afternoon, at the High School Auditorium.

(Thereupon, at the hour of 12:15 o'clock p.m., March 16, 1922, an adjournment was taken until 2:00 o'clock this afternoon.)

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Phoenix, Arizona, Hearings,

Third Session

Thursday, March 16, 1922

2:00 p.m.

(Thereupon, at the hour of 2:00 o'clock p.m., at the High School Auditorium, Phoenix, Arizona, March 16, 1922, the further hearings in this matter were resumed as follows:)

--

MR. NORVIEL: Mr. Secretary, the first speaker on the program this afternoon will be Professor G.E.P. Smith, Irrigation Engineer of the University of Arizona. Professor Smith.

(Applause)

(Mr. Smith then read the following paper)

MR. G.E.P. SMITH: Mr. Chairman and Members of the Colorado River Commission, Ladies and Gentlemen.

I hesitate to approach the subject of these hearings, because I recognize that you gentlemen, from your travels and widespread contacts, have acquired such a broad viewpoint as must make any statement that we can offer to appear at least provincial.

The conflicting contentions, as between the states of the upper basin of the Colorado River and the lower basin states, as I understand them, are substantially as follows: The upper states are demanding practically a guarantee of unrestricted development in the upper basin before they will lend their support in Congress to any Federal aid in the canyon region. The lower basin states are asking that the upper states limit their programs of development, at least for twenty years.

Now, although irrigation development in the upper basin has progressed at a rate less than 50,000 acres per year during the last twenty years, and the easy projects have been occupied already, and although the Reclamation Service surveys indicate the feasibility of only about 1,500,000 acres additional, yet the upper states are demanding water rights (in advance of appropriation) for 5,000,000 acres of land. Perhaps this was to be expected. Each state engineer is loath to leave out a single acre which has a ghost of a chance to be brought under irrigation at some future day. Of course, into such a jackpot, Arizona will have to throw her High-Line Canal System, although to my mind it is an absurdity, so long as economic conditions continue measurably as they are today.

Should Arizona assent to and guarantee water rights for those 5,000,000 acres? It would take away 60 percent of our potential hydro-electric power. To use a homely illustration, I have a neighbor who has one hundred feet of frontage and a two-story house. I hope he will live to enjoy it forever. But if he asks me for a warranty deed, I shall resent it. Why should the upper states demand of us any guarantees? The upper states have every advantage of location. If they wish to obtain water rights, let them go ahead and obtain the rights in the usual way.

Now, as to the other proposition,--shall the upper states be placed under limitations in their development program,--let me say a few words on behalf of the upper states. If there is

one lone farmer in any part of the drainage basin who can put some of the water to beneficial use, I think he should be allowed to do so. It would be unjust to exclude him or any group of farmers from participating in the benefits to be derived from the great water system.

Can the water supply of the river be parcelled out among seven states and Mexico with any degree of reason or justice? I think it cannot. Possibly it can be in twenty-five years; probably it will be one hundred years before the final adjudication can be properly determined.

Wherein is the necessity for this advance distribution of water rights? Arizona has no need of it. Colorado has no quit-claim from us now; why must she have it tomorrow?

Is it because we propose to build a dam? Suppose we grant that, normally, in the arid region, a storage reservoir automatically appropriates water for the lands to be watered. But,—such right can be waived, by law, or by agreement.

The Boulder Canyon dam can be built with the distinct understanding, expressed in Congressional Act and in Legislative Act, that the building of such dam does not validate or invalidate or affect in any way the water rights of any lands in any state as against the water rights of any lands in any other state, or affect in any way any conflicting rights to the use of water for power with rights to its use for irrigation.

I believe such clause gives ample protection to the

upper states. As a result of the building of the dam, about 750,000 acres in Nevada and California and Arizona will be brought under irrigation, requiring about 20 percent of the water that is now wasted annually into the ocean.

Now, as a last resort, if Colorado cannot be satisfied otherwise, I believe the lower states should waive the right of priority as between states for twenty years, so far as applies to future appropriations, rather than give to the upper states a warranty deed to water for 5,000,000 acres.

As for lands which already have vested or initiated water rights, I believe that no action of this Commission can in any way disturb such rights.

An additional area will be developed in Mexico--perhaps; perhaps not. The owners of the Mexican lands will still have to cope with the Gila and Verde and Agua Fria floods, and a part of the Sonora lands require a ditch head in the United States, and Mexico is not going to acquire water rights on the strength of great expenditures made by this country at Boulder Canyon or at any other site. Furthermore, we can turn the natural flow down to them and drown their delta lands for ten days, during the annual flood, every June, until they remove the menace of Asiatic Colonization from our doors.

A few words now regarding transmountain diversion. I understood the Commissioner from Colorado to say at Riverside last December that Colorado hopes to divert 500,000 acre-feet of water from the Colorado River Basin to the Mississippi River Basin. I think that at the Washington meeting in January the

amount was scaled down to 310,000 acre-feet. I believe that is the biggest question before this Commission. In my humble opinion, it is of so great importance, it should be presented to the Supreme Court of the United States, and ample time should be allowed for its settlement. There is no logical reason why this question must be settled before reservoir construction is begun. I admit that much can be said on both sides of this question. I want to say that it will reduce the potential hydroelectric power in Arizona by over 100,000 electric horsepower, and that amount of power (raw and undeveloped) is worth half a million dollars per year, at the lowest estimate. Shall that water be taken out of the drainage basin with no compensation to those states which suffer the loss of this power? The Arizona Industrial Congress has gone on record as being opposed to any further transmountain diversion. This question is so full of dynamite that I hasten to leave it.

In addition to the riparian and priority of appropriation theories of water rights, the Commissioner from Colorado now proposes another theory. It is that the water belongs to the state where the said water falls as rain. I wish to propose another theory: the water supply should be divided according to the areas in the several states included in the drainage basin. This would result in a more equitable division and more effective use of the water supply--and, Arizona would get a much larger share than any other state. I submit that my theory is less absurd than the new Colorado theory. Just as a bolson consists of summit flat and slopy^e and plays, so the typical

amount was scaled down to \$10,000 acre-feet. I believe that is the biggest question before this Commission. In my humble opinion, it is of so great importance, it should be presented to the Supreme Court of the United States, and ample time should be allowed for its settlement. There is no logical reason why this question must be settled before reservoir construction is begun. I admit that much can be said on both sides of this question. I want to say that it will reduce the potential hydroelectric power in Arizona by over 100,000 electric horsepower, and that amount of power (raw and undeveloped) is worth half a million dollars per year, at the lowest estimate. Shall that water be taken out of the drainage basin with no compensation to those states which suffer the loss of this power? The Arizona Industrial Congress has gone on record as being opposed to any further transmountain diversion. This question is so full of dynamite that I hasten to leave it.

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drainage basin consists of a region of upturned mountains whose function is to intercept the clouds and to secure the rainfall, of the foothill areas, and of the broad and level plains of deep rich fertile soil, the function of which is to produce great harvests of food supplies to sustain the populations of this earth. If there is any portion of the drainage basin which is entitled to the use of the river waters for irrigation by "divine rights" it is the stream-built plains between the mountains and the sea, the plains where canal systems can be built to resemble checker boards, and where soil and climate combine to make the earth return two hundred-fold the planted seed. Under the new Colorado theory, Egypt, and Mesopotamia, and the plains of Lombardy watered from Alpine snows, would receive no irrigation water at all.

Many references have been made to the decision of the United States Supreme Court in the Kansas vs Colorado case. The court refused to grant an injunction against the use of all the surface water supply of the Arkansas River in Colorado, because the Court held that Kansas had not proven its claims to injury, but left the case so that it can be reopened at any future time. The decision has always been a matter of regret to me. One of the principal witnesses was Professor C.S. Slichter, who testified regarding the sources of the water supplies in the Arkansas Valley in Kansas. Professor Slichter had to make his studies in a very short space of time, and as a result his conclusions were in error. Had his testimony been

founded on more mature studies, I can believe that the court decision would have been changed thereby.

At the risk of wandering from the subject now before this Commission, I wish to advert to the necessity for haste in bringing these interstate negotiations to a successful issue so that construction works can be begun. Not only is the Imperial Valley in danger of destruction, as has been said here today, --living under a terrible Damocles sword, in fact, under two of them, --but Arizona also urges haste. The mining interests of this State look forward with dismay to the decreasing supply of fuel oil for power purposes. Of course, the supply is not going to terminate suddenly, but the cost is high and is rising, and will be prohibitive for all except the richest ores. I speak also of the power needs for irrigation by pumping. Much of our agriculture in Arizona is dependent on pumped water, and unless the pumping lifts are low, the cost of power derived from fuel oil is greater than the farmers can afford to pay. The reports of the Census of 1920 show that of the irrigated lands, ^{in California} one-fifteenth of the acreage derives its water supply by pumping from wells and that the average cost of the pumped water per year is about ^{eight} times the average cost of gravity water. Our farmers and our miners need cheap hydro-electric power, and they want it, not after they are dead, but now.

I confess to a feeling that the present interstate and other complications will cause a delay of five years before the great federal project can be started. I beg to propose a pro-

gram to utilize that period in some construction, which will constitute real progress in the river development, which will give quick relief to the Imperial Valley, in its two problems of flood protection in early summer and water shortage in late summer, which will increase greatly the available water power at the Diamond Creek site (a project which we expect will be developed rapidly and will give Arizona a much-needed supply of cheap power), which will be modest in cost and can be executed and completed in five years. My suggestion is that two dams^{of} about the size of the Roosevelt dam be built, one on the Grand River at the Dewey site, and one on the Green River, either at the Juniper Mountain site or preferably at the Flaming Gorge site. The cost would be only about \$20,000,000, and, in case Congress will not grant the appropriation, the Imperial Valley is rich enough to finance the project--provided, that the State of Utah will permit of this development. The lands of the Parker and Mohave valleys should share in this program, so that they may be availed of immediately for settlement by ex-service men.

Of the two great, monumental projects that are proposed, the Boulder Canyon and the Glen Canyon projects, altho Arizona would benefit enormously by having the great storage project at the Glen Canyon site rather than at the Boulder site, yet I must confess to a feeling that the Glen Canyon site is at present only a "prospect". No test borings have been made, and therefore it is not demonstrated that an orthodox honest-to-

goodness dam can be erected there, and as for the proposed rock-fill dam of 700 feet height, my engineering instincts rebel when I try to contemplate it. I believe that the highest rock-fill dam at present is about 150 feet high and the owners do not dare to allow it to fill with water, The U.S. Reclamation Service is very determined in its decision that the great federal project should be at Boulder Canyon, and Arizona should not throw any obstacles in the way. It will be for the most part a California project, to water California lands and to furnish power to Southern California. But it will also furnish water to Arizona lands and we shall have the Diamond Creek project to supply our power requirements.

Reverting now to the main point at issue, I note that the Mondell Act states the purpose of this Commission as being to "negotiate a compact, not later than Jan. 1, 1923, providing for an equitable division and apportionment among said states of the water supply of the Colorado River." I regret that the functions of this Commission are limited to this one question. Indeed, I could wish that this one function had been omitted from the Mondell Act. On the other hand, such questions as the following are urgent matters and are pressing for immediate solution:

1. What shall be the location of the great federal dam?
2. How can Mexican lands be brought to pay a part of the cost of the dam?
3. Shall the power plant at the federal dam be built and

operated by the Federal Government, by an association of states or of municipalities, or by a private corporation?

4. How much free power shall be allotted to Nevada and Arizona in lieu of taxes?

5. How shall the remaining power be allocated as between the states?

6. How can a temporary pact or gentlemen's agreement be put in force throughout the drainage basin absolutely prohibiting any further appropriation of water anywhere, provided such appropriation contemplates the use of the water in September, October, and November, until storage is provided somewhere to care for the present over-appropriation of water.

7. Will Utah and the other upper basin states permit the building of the Dewey and Flaming Gorge dams to afford immediate relief to the Imperial Valley,--either by the Federal Government, or if federal aid is not available, then by Imperial Valley through its own efforts?

In conclusion, Mr. Chairman, I wish to thank this Commission for the opportunity to present these matters, and to express my belief that in the settlement of interstate problems and in the prosecution of the development of the great river, Arizona will do anything within reason, and will do her part whole-heartedly and with all the powers at her command.

(End of paper)

This, Mr. Chairman, concludes what I have to say. I

have tried to be as succinct as Governor Sloan was this morning, and I have tried also to be brief. I thank you.

(Applause)

MR. HOOVER: Professor Smith, you have the impression that we should assure priority to agriculture over power?

MR. SMITH: Within reasonable limits, and so far as I can see the actual conditions--so far as I can visualize the conditions existing throughout the Colorado River Basin, I think agriculture should have priority over power.

MR. HOOVER: I understood you to make the suggestion that in case the Boulder Canyon Dam is undertaken, that there should be a provision that as a result of the construction of such a dam, no priority of use should be given as against the other states?

MR. SMITH: Yes, sir.

MR. HOOVER: I assume that would have to be in the nature of a compact between the states?

MR. SMITH: It seems to me if that is written into the Congressional Act, it would accomplish the purpose, but it also could be written into the various Legislature Acts, the object of which are to provide for the participation in the project by the states.

MR. HOOVER: Well, do you think that legislation upon that question would not be subject to repeal?

MR. SMITH: I cannot imagine any state going back upon its word in a matter of that sort.

MR.HOOVER: Well, assuming that the Boulder Canyon Dam were undertaken, with that provision, which I have no doubt would be necessary to the upper states, is it your impression that the vast development of agriculture, and of power below the dam, would be warranted without some assurance that they have a continuity of water ?

MR. SMITH: I think so. Possibly I have too much faith in the Reclamation Service, but I have always found it possible to take their statements at about 100 per cent good. Even if we make a considerable allowance for possible errors in their assumptions, I believe we all unitedly working for the advancement of irrigation, cannot prevent an enormous waste of water through the Colorado River to the sea.

MR.HOOVER: As I understand you to say, Professor Smith, Arizona and California should disclaim any priority of right by reason of any works that they might erect?

MR.SMITH: Yes, sir.

MR. HOOVER: And in so disclaiming, they practically abandon any assurance they would have of water, as against the upper states?

MR.SMITH: In a way. As I look at it, nothing that this Commission can do can possibly alter or affect any present rights, vested or initiated, to the use of water. I believe the water users can maintain the present rights in the face of any legislation that may be accomplished now; but so far as the future appropriations are concerned, the lands which derive

their water rights by virtue of the building of the Boulder Canyon Dam, I believe will be willing to accept their water rights under the proviso, as stated by the Chair.

MR. HOOVER: Well, of course, that would simplify the work of the Commission very materially, if the states below are willing to abandon any claims of priority of water right, as against the upper states. Now, I was wondering if you had given any consideration to the project put forward by Mr. Maxwell yesterday; certain emergency work which might assist in the control of flood water and thereby remove the peril to the Imperial Valley; have you had any opportunity to look into that suggestion?

MR. SMITH: I have, Mr. Secretary. I have visited the Sentinel Dam, in fact, I made rather comprehensive surveys and a report on that project, in 1905, for Eastern capitalists, and I ascertained at that time that the Sentinel damsite has absolutely no foundation on which to found a dam. In the river bed there is a stratum of about sixty feet in thickness of previous gravel in the center of the stream which tapers down to perhaps twenty feet on the edges; and, underneath that, is clay to a depth of at least 180 feet. It is absolutely impossible to build any sort of storage dam at the Sentinel site.

As to the Bulls Head site, the foundations are no better, and it seems to me that the temporary relief desired can be obtained so much better by building the Dewey Reservoir, or, preferably, the Dewey and either the Flaming Gorge or the

Juniper Mountain Dam.

MR. HOOVER: And have you had an opportunity to give consideration to Mr. Maxwell's High Ditch Line Project?

MR. SMITH: Yes, I have consulted all the available data, including the Geological Survey contour maps or quadrangles from Boulder Canyon to Parker, and I have tried very assiduously for the last few months to find a project that should give Arizona a water supply for the elevated desert lands, and I have computed the probable costs. And the least possible cost we can make on that project, per acre, is \$300. And we all know that neither the Federal Government, the State Government, or private capital, would invest one-half of that sum in that project. So, I say, why talk about it?

We have been fed up on that two and a half million acres pretty thoroughly for the last two months, and it has been by force of repetition that we have come to think that there are two and one-half million acres in Arizona somewhere susceptible to irrigation, but I wish to say that after drawing the proposed canal line upon a map of this country, and counting out the irrigable area that would fall under such a canal, I, with considerable difficulty, find only a million acres; and I think that would have to be our contribution that I referred to in the early part of my talk.

A COMMISSIONER: A contribution to the Twilight Zone?

MR. SMITH: To the jackpot.

THE COMMISSIONER: Now, in connection with that High Line

project, have you made any calculation as to the size of the ditch and the length of the ditch needed to carry that?

MR. SMITH: Yes, sir.

THE COMMISSIONER: What sort of a cross-section would the ditch have to have?

MR. SMITH: Why, I allowed one cross-section for earth, and a different cross-section for rock, rock excavation requiring, for economy sake, a much narrower and deeper channel, and I used still a different cross-section for tunnel sections.

THE COMMISSIONER: Have you any idea what the rock cross-section would need to be?

MR. SMITH: Well, as I recall, the rock cross-section was something like 35 feet deep, and about 60 feet wide, to carry the water supply for a million acres. I am not sure about that.

THE COMMISSIONER: Have you any recollection as to what the length of the ditch line would be, as you worked it out?

MR. SMITH: It is about 260 miles down to Parker, and approximately the same distance beyond Parker to the center of the irrigated area.

MR. HOOVER: I was just wondering if a ditch line of that cross-section and that length could be built, even for \$300, upon a million acres; that would be \$300,000,000. Do you think it could be encompassed by that?

MR. SMITH: Well, I tried to be conservative in my figures; I allowed \$4 per cubic yard for excavation in tunnel, and \$1 for open cut work, and I sought the advice of other engineers

also in selecting the assumptions which I used.

MR. HOOVER: Well, I gather that your impression is there is no compact that could be entered into between the states, that would serve any useful purpose?

MR. SMITH: I think the Commissioners in some way should assure each other that no state will throw any obstacles in the way of development in any other state, at least for twenty-five years. --I must except one question; that is, the trans-mountain diversion of water. I will have to admit--well, it is too big a problem for me.

MR. HOOVER: Doesn't the assurance between the different states, that they will not object to each other's use of water, isn't that the basis of the compact?

MR. SMITH: It is.

MR. HOOVER: Then, you have a feeling it would be of serious importance to the basin if Colorado should divert the water ^{out to the} itself?

MR. SMITH: No, I won't say "serious!" but I mean this: whether Colorado should be permitted to do that without some sort of compensation is questionable. The States of Arizona and Nevada would suffer.

MR. HOOVER: Even if this is diverted for the use of agriculture, and to the damage of the states below, you would think compensation was necessary? We are getting again into the question of power and agriculture.

MR. SMITH: Instead of "necessary", I would say "just."

MR. NORVIEL: I gather from your expression that you think this Commission should take into consideration water rights for the Republic of Mexico?

MR. SMITH: No, I don't think so. The Mondell Act is written with much definiteness that the Commission is to negotiate and enter into a compact to apportion the water "among the said States."

MR. NORVIEL: Then we should confine all our considerations to the water rights in these states?

MR. SMITH: Yes.

MR. NORVIEL: And forget whether there is, so far as this Commission is concerned, a Mexico; even going to the full extent of depleting the river entirely, before it reaches the line of Mexico? We have that right legally, do you think?

MR. SMITH: I don't think that is a proper question to ask me.

MR. NORVIEL: Well, if the Colorado River is now in the same situation as was the Rio Grande when our distinguished citizen, Elihu Root, signed the treaty giving to Mexico 60,000 acre-feet per year, --Mr. Root, on the part of the United States, and the Mexican Representative on the other side, signed a treaty saying the United States does not recognize any legal basis of right in the Republic of Mexico against the United States for water for irrigation, but it is a matter of treaty which gives to Mexico 60,000 acre-feet a year, and saying also this must not be taken as the establishment of a precedent to anything

that may come after. If that is true, would you say Mexico had legal rights in the waters of the Colorado River, as against the United States?

MR. SMITH: My feeling in that respect is this: The river in its natural condition was of absolutely no use to what we call irrigable lands of Lower California and Sonora, and the waters have been made available to the Mexican lands only through the constructed works in this country. Now, I don't think we can legally be compelled to respect any rights below the boundary line, resulting from our efforts to secure water upon this side. I would much rather have Judge Sloan answer that, however.

MR. NORVIEL: I thought you said Mexico would obtain rights to the Colorado River?

MR. SMITH: I meant to say Mexico undoubtedly would make use of the water.

MR. NORVIEL: Until the United States and Mexico make a treaty; they will be only temporary rights. Is that your understanding?

MR. SMITH: Yes, sir.

MR. NORVIEL: It is up to the United States and the Republic of Mexico to make such a treaty as they desire. Another question: You say you have investigated the Sentinel, so called "damsite", and have found the site unfeasible for the construction of a heavy dam?

MR. SMITH: Yes, sir.

MR. NORVIEL: What would you say in comparison with the Sentinel project the San Carlos project, as to control of the floods sufficiently to take away the menace of the floods down the river; that is, flooding or menacing Arizona or California lands from floods, taking into consideration the economical use of the water and the social conditions obtaining to our state--the two propositions?

MR. SMITH: Well, I consider the Sentinel project entirely out of the question.

The San Carlos project is as fine a project as there is in the Colorado basin, with a depth to bed rock of only 24 feet, granite foundations, granite walls, with a cross-section almost identical with the cross-section at the Roosevelt dam-site, so that if the Roosevelt dam could be lifted up and carried over the mountains and set down in the San Carlos site, it would very nearly fit; but, in its new position, it would store more water by considerable than it does where it is today, because the reservoir is more favorable, topographically. Furthermore, the water supply in the Gila River, although much smaller than that which serves this valley, is of enormous value, because it will serve an area of magnificent, level, fertile land.

MR. NORVIEL: From which project?

MR. SMITH: Through the Florence and Casa Grande valleys.

MR. NORVIEL: The San Carlos project?

MR. SMITH: Yes, sir.

MR. HOOVER: In the matter of the San Carlos project, Professor Smith, how far do you regard that project as being of value in the matter of flood control? In other words, to put it more clearly, assuming it was built initially for flood control purposes, how far would that militate against its use for irrigation?

MR. SMITH: I think in the year of the maximum flood, which was 1916, when the total flow at Yuma was four and one-half million acre-feet, that a little over one and one-half million acre-feet came past the San Carlos damsite, and to take off one-third of the flood, to take off the peak, would be of enormous value.

When we add to that the fact that a portion of that water at Yuma was coming over the Roosevelt Spillway, and that it is the ambition of this valley to prevent the waste of water in a similar occurrence in the future, and that the Verde River will undoubtedly be controlled in a few years, (and I might say before the Boulder Canyon dam is built), I think we may say that the Gila River problem is likely to be solved before the Colorado problem.

MR. HOOVER: Have you given consideration to the relative merit of the San Carlos, the Dewey and the Flaming Gorge, say, from the point of view of flood control?

MR. SMITH: Of course, they serve upon different streams; they do not conflict in any way.

MR. HOOVER: My point is they all bear upon flood control?

MR. SMITH: Yes, sir.

MR. HOOVDR: If you had one of the three, which would you choose first, as to land brought in, flood control, etc., which would place in the prior position?

MR. SMITH: I shall still have to say I would choose both the San Carlos and the Dewey sites; both should be authorized and started at once.

A COMMISSIONER: You mean by that that you consider the Gila floods more menacing than the Colorado floods?

MR. SMITH: The Gila floods are the greater of the two in volume.

THE COMMISSIONER: They are more of a menace?

MR. SMITH: They are short-lived. That must be taken into consideration.

THE COMMISSIONER: I say, "more of a menace"?

MR. SMITH: I would not want to say; they both are menaces, -dangerous to lives and to property.

THE COMMISSIONER: I only asked that to find out whether or not the flood control of the Gila is actually more important than the flood control of the Colorado.

MR. SMITH: The two problems supplement each other.

THE COMMISSIONER: They do, except in this way: The Gila floods occur at the time that there are no floods on the Colorado. The only comparison is by imagining them separately. They are each a menace. How can you compare the San Carlos site with the Dewey site, as a matter of flood control, unless you selected either the Colorado or the Gila as more or less menaceable?

MR. HOOVER: I think, out of justice to Professor Smith, I added an agricultural factor to my question; I told him to balance all conditions.

THE COMMISSIONER: I was just trying to find out which is really more menacing.

ANOTHER COMMISSIONER: Professor Smith, did I understand you to say that the highest beneficial use of water was on the lower river, that the Creator, in his greatness, had the sunshine there more than in Wyoming, etc., is that it?

MR. SMITH: Mr. Commissioner, I was trying to illustrate my proposed basis of adjudication of water rights, which I think is less absurd than the basis that is claimed and advocated by the State of Colorado.

ANOTHER COMMISSIONER: You do not, then, seriously urge your Divine Right appeal? (Laughter)

ANOTHER COMMISSIONER: May I ask you, Professor Smith, for instance, if you consider an acre foot of water as of greater value on the lower river than it is on the upper portion of the river; would that be your opinion?

MR. SMITH: I don't want to commit myself upon that question.

THE COMMISSIONER: That is all.

ANOTHER COMMISSIONER: Wasn't there a study made by you or by your institution and the Department of Public Roads and Rural Engineering, respecting the duty of water in the Salt River Valley?

MR. SMITH: Yes, sir; it was made largely by the United States Department of Agriculture; the state cooperated through

the University.

THE COMMISSIONER: Has that been published?

MR. SMITH: No, sir.

THE COMMISSIONER: Do you know where we can obtain a copy of it?

MR. SMITH: Yes, sir. I obtained a copy from the Office of Experiment Stations.

THE COMMISSIONER: I mean, it is approved and released for publication now, is it?

MR. SMITH: No; I received my copy with the understanding I should not publish from it. It is available for my use. It would be a discourtesy to the Federal Agency if I should publish it.

THE COMMISSIONER: In that report the investigators arrived at a conclusion respecting the duty of water in this valley, did they not?

MR. SMITH: Yes.

THE COMMISSIONER: And on different crops?

MR. SMITH: Yes.

THE COMMISSIONER: Did they also arrive at any conclusions respecting the production of crops under certain applications of water?

MR. SMITH: Yes.

THE COMMISSIONER: Do you think the conclusions there arrived at were authentic and conservative?

MR. SMITH: I think, with respect to alfalfa, the main crop

of this valley, that the bulletin expresses the situation very accurately; but in regard to the other crops,--cotton, I remember, was taken up in great detail,-I am really not competent to say.

THE COMMISSIONER: How is it respecting the grains?

MR. SMITH: I believe, a very fair statement.

THE COMMISSIONER: That is all.

MR. HOOVER: Thank you very much, Professor Smith.

MR. NORVIEL: I have been somewhat at sea today in regard to our program. I had the list made out and gave it to the newspaper reporter, but for some reason I am unable to find that list in the paper, and I am without my list, and I have no written program. It was impossible to make up a program, because, to hear from all who desire to speak would consume all the time. Since then I have added other names. If I should omit anyone, because I am following my memory, of those who were granted permission to speak this afternoon, I trust you will pardon me. I think we shall have to hurry along faster, from now on, than we have been going.

It seems, now, to fill out the itinerary that the Secretary has, we will have to close our meeting tomorrow at noon, and I fear we shall not be able to hear from all unless we are very brief. Now, I would like to read the names that the Secretary desires to hear from this afternoon. (Reads a list of names of speakers for this afternoon)

Most of these have said they only wanted five or ten

minutes. Now, to hear from all of these people, it will be necessary that we be very, very brief, and come right to the point, as the chairman, in his request that people who address the commission, and those present, should confine their discussion as much as possible to the division or partition of the waters of the Colorado stream system, looking to the formation of a compact. If you will direct your discussion, as far as possible, upon that point, then elaborate as much as you like outside to fill in your time, please.

The next speaker on the program will be Mr. Robert H. Williams, who desires five or ten minutes. Mr. Williams is an engineer, and has been doing some work for Mr. Maxwell of late, I understand, in attempting to trace out a high line canal. Mr. Williams. (Applause)

MR. ROBERT H. WILLIAMS: Mr. Chairman, and Gentlemen of the Commission: There are just a few points that I want to emphasize in regard to the investigations that have occupied practically a year and a half of my time in the Colorado River, below the Boulder Canyon. It is well known that the bottom of the Boulder Canyon dam is at an elevation of about 700 feet. The greater part of the water that will be used, even if there is no high line canal from Boulder Canyon, would be used at an elevation of--averaging about perhaps 250 feet, including the Imperial Valley, including the Parker country and including the Chuckawalla Valley. This would give an average fall of about 500 feet between the foot of the Boulder Canyon dam and the point where the water is used in the different places in

the lower part of the valley.

Now, if it would be possible to take the water from the foot of the Boulder Canyon dam, and carry it in a canal, taking out the power before the water is used, it must be conceded that at least 500 foot of fall, as an average, of the water used in the Imperial Valley and Chuckawalla Valley would result; 500 feet of fall that is in no ways, so far as I have been able to discover, is proposed to be utilized, except by putting a series of dams below Boulder Canyon damsite. If this series of dams should be put in, such as recommended at the head of the Parker project, it would overflow naturally a large amount of land. If there are other dams put in, in order to take a fall out of the water wherever available, it will overflow practically all the lowlands; that is, in order to utilize to the full extent the water below the Boulder Canyon dam, it would be necessary to take the fall out of the river every 50 miles, or, say there would be no water available along the lowlands that would not be overflowed or waterlogged.

Now, in connection with the High Line Canal idea; the original High Line Canal idea I think I am partly responsible for, working out the possibilities to take the water across the Eldorado Ferry and bring in a high line canal to cross the Bill Williams; thence through to Parker, a continuation of this valley, and the central part of Southwestern Arizona, where it can be distributed in all directions, over as fine a country as any of this Southwestern country.

Now, we do not know conclusively the final cost that will be necessary in order to carry out this plan. I just want to submit a few figures.

If the distance as the crow flies from Eldorado Ferry to the mouth of the river, about 400 miles by the valley of the river, is about 300 miles; the route by the proposed high line canal is about the same as the general valley of the river. After you cross the Bill Williams river there are no practical difficulties in the way of a high line canal until you come to the top of the Divide, and the plains of the Lotus Valley. At that point the crest of the hill is a flat country, like South of Tempe, and it would require a cut, upon my original plan, of about 20 miles,--a maximum depth of 162 feet, to go through that clay. There is a pass a little shorter that turns towards Sentinel Reservoir. We do not know that this is the most economical site. We are pleading for some money to be spent to find out what can be done with this high line canal.

I want to point out that every mile of this canal parallels the river. It gains practically 1.75 feet from Eldorado Ferry. It is entirely feasible and practicable, according to the cutter formula, which we use in estimating the grade of a canal. Now, that is not generally supposed to be possible unless we take the size of the canal into consideration and the amount of water it will carry, and then, see what rate of motion we want.

If this canal should be an average of 15 feet of exca-

vation on the level part of the canal, to make the banks, and it should be 180 feet wide upon an average, it would be about three times sixty, or 180 square yards in cross-section, which would result in about 500,000 yards to the mile. This is exclusive of extra difficulties. Now, 500,000 yards to the mile --I don't know--we have no classification of the material, but supposing 500,000 yards to the mile cost \$200,000 per mile to line that canal, we can easily figure out that, if the matter is well worth investigation, that if the whole flow of the Colorado River--we are supposing there will be some left after it comes from our friends in the upper states--I am not arguing that they should give it all to us; that is a question others have argued--but if approximately 25,000 second-feet, the result would be that about every mile that we would parallel the Colorado River with a high line canal carrying the total volume of water, we would get about 4,000 horsepower. If that is worth \$50, it would be \$200,000. If that is divided by two, and make 100,000, we can readily figure that there is a good possibility that the high line canal might even pay for a power project.

I think the possibility or feasibility of carrying all the Colorado River in this high line canal has been considered; and then carry California's water across the dry desert at Parker, on the 750 foot contour, to the Chuckawalla Valley, instead of pumping 282 feet for the Chuckawalla Valley, we would drop that into the Chuckawalla Valley and carry the remainder

into the mountains and into Imperial Valley.

Now, I am admitting there is a whole lot that is mere conjecture, but so far as we have data, we do know the country from Bill Williams country this way,--it is a matter of throwing out and lining the banks to take the water.

I believe we all recognize there should not be any serious consideration of trying to navigate the river on 18 inches fall per mile, and certainly there is no practicability in a current that would carry a steamboat; I should guess it would have to make about 15 miles up hill, in order to stand still.

MR. HOOVER: Mr. Williams, I assume this high line canal to go out somewhere near the Boulder Canyon?

MR. WILLIAMS: Yes, 1,275.

MR. HOOVER: Now, is this project any reason for delaying the construction of the Boulder Canyon Dam?

MR. WILLIAMS: I think not.

MR. HOOVER: Has it any relation in the compact to be entered into between the seven states?

MR. WILLIAMS: I would say only as between California and Arizona. The disposal of what water comes through the canyon naturally falls to Nevada, Arizona and California. If this compact is to cover all points of controversy, I would say the feasibility of a high line canal should be considered in forming a comprehensive plan for the development of the river.

A COMMISSIONER: You are aware, are you not of one or two pending controversies over their separate difficulties?

MR. WILLIAMS: No, sir, I am not.

THE COMMISSIONER: Now, this matter could be settled separately between Arizona, California and Nevada?

MR. WILLIAMS: I don't know. I think when it is decided how much water will come through the canyon, we should decide upon what we would do. It is too precious to use as a tractor for steamboats, when there is nothing to carry. (Applause)

THE COMMISSIONER: Have you made any calculation on the yards?

MR. WILLIAMS: As I said, supposing 500,000 yards, that would carry the peak load of the Colorado River. What is the way I attempted to form very rough figures to see if there was any use of going further. In my estimation, there is use of going further.

THE COMMISSIONER: What figures have you used in tunneling?

MR. WILLIAMS: I didn't get any figures on tunneling, and, contrary to some people's claims, I believe the rockfilled dam is all right; take the dirt out of the harrow to fill the dam.

THE COMMISSIONER: You see no reason why the Boulder Canyon Compact should be delayed?

MR. WILLIAMS: No, sir; I think it is a wise measure. I do want to ask the permission of the Commission to file actual data and calculations of some set time within the next two or three months, as I may be able to get them together.

MR. NORVIEL: You think this proposition is more the problem

of Arizona than the other states?

MR. WILLIAMS: I should say Arizona, California and Nevada, but the way it seems to me, the way it concerns this conference, if we could use this water, there would be no use of leaving it in the channel, if we can use it beneficially. We might find out we had equities in this water, or might establish them.

MR. NORVIEL: What was your yardage?

MR. WILLIAMS: I said a maximum of 500,000 to carry the peak load.

MR. NORVIEL: Based on a width of 180?

MR. WILLIAMS: Yes, sir; based on a width of 180 feet.

MR. NORVIEL: That did not take into consideration the cut of 162 feet, did it?

MR. WILLIAMS: No, there are several things that should be considered, apart from the general problem of a canal; that is, the Bill Williams crossing--I believe it is feasible to cross the Bill Williams; it may not be; I don't know.

MR. NORVIEL: You think it might cost fifty millions?

MR. WILLIAMS: I don't know what it would cost. We had to base it upon topographic sheets only fifty feet contour, but this side of the river we base it upon our own surveys.

ANOTHER COMMISSIONER: You have no figures of the cost upon an acreage basis?

MR. WILLIAMS: No, sir; I think it is worth spending several thousand dollars to get more definite data upon which to see whether we should go further, or not.

THE COMMISSIONER: You have gone into the amount of yardage and the cost of crossing the Williams; why couldn't you give us an estimate of what it would come to, about, upon an acreage basis?

MR. WILLIAMS: I ~~did~~ make an estimate. I have not the figures here, of my plan to cross the Bill Williams; it was on a higher fill; fill that whole canyon in; it is about two miles at grade line. The approach to the Bill Williams has some difficulties on the other side. On this side it would be running the canal at a right angle. If we go around, it will lengthen the canal 20 miles, which I do not think is feasible. I will add that a system of electric control that would hold this water under complete control as this city water system is, is completely practical. The water can be turned into any part of the Imperial Valley that needs water, within 20 minutes, and you can shut it all off at the headgate and the canal stands full of water. I am preparing a report upon that.

THE COMMISSIONER: Everything is resolved into a unit cost of figures per acre. Cannot you give us some idea of the acreage cost, which is a real criterion of the possible feasibility of any project of this kind?

MR. WILLIAMS: I would say, roughly, it will come within one hundred dollars an acre; and the power that will be developed at all these drops--for instance, whatever--

THE COMMISSIONER: That answers the question. You think it could be done for \$100 an acre?

MR. WILLIAMS: I think it could. I think it is well worth investigating. It might cost much less than that. I think we can come within 25 per cent of the actual yardages.

ANOTHER COMMISSIONER: About 24,000 second feet, you propose to carry through this canal?

MR. WILLIAMS: No, I don't know what amount of water will be left in the canal. I made an estimate upon the maximum that could be placed in the canal.

THE COMMISSIONER: How much do you figure the carrying capacity?

MR. WILLIAMS: 50,000 second feet. Now, that might not be feasible for a canal. This is all hasty work.

THE COMMISSIONER: To give a comparative idea, what is the capacity of the outlet of the principal canal of the Salt River Project up here?

MR. WILLIAMS: I believe the Arizona is about 40 feet wide.

THE COMMISSIONER: I mean in cubic feet per second, a thousand or 1,200?

MR. WILLIAMS: Let's see; I believe it is about 1,200.

THE COMMISSIONER: Then at 24,000, this would be twenty times as large as that?

MR. WILLIAMS: Yes.

THE COMMISSIONER: At 48,000, it would be 40 times as large as that?

MR. WILLIAMS: It would be along the side of the valley, above the bench of the Colorado.

THE COMMISSIONER: How along the falls?

MR. WILLIAMS: According to the contour and map, the fall is about 250 feet to the mile. There are no doubt places where it will run into mountain cuts; some of the cuts are 150 feet, for short distances.

THE COMMISSIONER: A canal 250 miles long, carrying about twenty times as much as the outlet canal for the Salt River Valley?

MR. WILLIAMS: Yes, sir; that would control the whole flow of the Colorado River. This opens continuously into the Parker country.

MR. HOOVER: Thank you, Mr. Williams.

MR. NORVIEL: I wish these gentlemen might be prepared to follow in rapid order.

(Reads list of speakers for the afternoon.)

MR. NORVIEL: Mr. William Mulholland, who is Engineer of the Public Service Commission of Los Angeles, who was the engineer who constructed the long water conduit that carries the water from Owens River up into the high Sierras. (Applause). Mr. Mulholland,-- I don't know what he is going to say, but I believe in what he is going to say. I know Mr. Mulholland has been over Arizona, he has been over the ground of the proposed high line canal to the Boulder Canyon dam, and all that country. He has been over that ground for the last twenty or thirty or forty years. If he tells you that, I will believe that too. (Applause)

MR. WILLIAM MULHOLLAND: Ladies and Gentlemen: The most wel-

come announcement I heard today was the announcement of the Secretary that we would be limited to five minutes. I wish he had made it a minute instead of five minutes, because I really do not represent the City of Los Angeles here. The City of Los Angeles is not interested in the waters of the Colorado River. It is interested in the development of the neighboring country around it, and the probable production of power in the neighborhood of Los Angeles; not in the Colorado River, which may go for the economical delivery of power into the City of Los Angeles.

I don't know just how to confine myself. I came here today because I am much interested in the construction of a dam in the Colorado River. The subject of a dam in the Colorado River interested me from my early days. It is not a new project to me; it is not a new project to my associates. I sailed up and down the Colorado River away back in '77. I have been pretty well all over this territory 45 years ago, and I know its potential importance to the adjoining state.

Now, I am glad to have the opportunity to say a few words in behalf of one aspect of this subject. We all recollect, or a great many of us here recollect, what an appalling calamity resulted from the destruction of the City of San Francisco. We were stupified; we hardly realized for weeks what happened. Now, there is impending in the Imperial Valley not such a disaster as that in a way, but a worse disaster by far in another way. The City of San Francisco has since

been rebuilt. You can restore destroyed cities. The destruction of Imperial Valley would be an awful destruction of not only the property of the people, but the property of posterity, if that stream gets away, that is handled there for cultivation and irrigation of the land, the useful application to human uses. If that country is destroyed by a runaway river, property will be destroyed; it will be a staggering loss to the people who live there, not only that, but it will prove a staggering loss to posterity, because it can never be restored. If it is destroyed by the river, the result is something terrible.

That is the only thing that appeals to me, as requiring speed for its attendance right now. I have listened with a great deal of patience and a good deal of disappointment to the many ways in which the law can step in here and interfere and enjoin, and listened to facts until my head is dizzy about it.

We know that a dam should be built there; compacts are with relation to the distribution and subdivision of the water afterwards. I have built many works in my time, some of them monumental, in connection with which the legal questions and quibbles are not settled yet, while the works are hoary with age and have been performing their functions for years. The law's delays are things, I think, that embarrass business. I believe in the law; I have kept out of jail all these years, as a law-abiding citizen, but when it comes to doing any work for a community, or myself, I never go near a lawyer if I can help

it. (Great applause) I never invoke his aid or appeal to him in any manner. But I have a viaduct costing twenty-four and a half million dollars; we had one lawyer and no lawsuits. There are many things hanging fire that are not settled yet. Some may imagine they are injured, and have claims, but the works go on rendering service to the City of Los Angeles. If we had to wait until the law business is straightened out, and all pacts formed with people surrounding us, counties and towns, just as they were in the Owens Valley, that protested against us taking the water-- We are taking the water and settling with them afterwards. We have damaged nobody. I imagine they are running no risk at all in permitting the building of a dam for the protection of the people whose property is in danger.

There are generous contributions in the form of mud and surplus real estate from Wyoming and other states, to make the river erratic in its action. It is that which makes that river difficult to handle. The people of the lower part of the country should be entitled to protect themselves from this mud and stuff; let the water question be settled afterwards. (Applause)

The City of Los Angeles is not interested, as I have said, in the waters of the Colorado River. There have been many propositions here about dams on the river, more or less remote. Boulder Canyon dam is the one that always met my approval. I submit upon this account it should be the one approved. Why? There is an old saying in my country, "It is a good thing to have the Church in the middle of the parish."

MR. NORVIEL: Scotland?

MR. MULHOLIAND: Ireland. (Applause) The proverbs of Ireland are wise proverbs. I have used them for many a year, and I have not been in jail yet. But this question here is not an involved one, and can be considered in its more simple aspect. The building of a dam at Boulder Canyon is not going to deprive the people of Colorado and Wyoming of any water. The people already use that water in the Southern end of the basin and have their rights unassailable. You cannot take that from them; nobody can take that water away from them. The first in use is the first in right in all the water transactions I have ever heard tried in Court.

They have been using the water for 25 years; they are not going to be deprived of it at this late date. It is reasonable to look to see no further rights shall be acquired beyond those that have been already acquired.

To get back to where I started, where are we going to sell this power? There is a potential of 6,000,000 kilowatts to be developed in the Colorado River. The best place to begin, in my estimation, is at the closest point, where there is a market already existing. The City of Los Angeles is bound to be for a long time, at least. The towns in Arizona and Nevada

I am fortunate in having strong support for my opinion. The Reclamation Service, its judgment, I believe, is that the Boulder Canyon should be built first. I looked at the Boulder Canyon damsite several times. I have gone there and studied it. I have discussed the matter of building it with the Chief Engineer of the Reclamation Service, who, I am very proud to say, has been a very old acquaintance of mine, and I am very much flattered to think we agree very closely in that matter, and I am very much gratified that he came to the conclusion that that is the point for the Government that wants to exercise all the energy possible in building a dam, and especially in giving relief to the people of Imperial Valley.

We cannot forget that phase of the situation, and since the building of the dam does not curtail any appeal or any claim made by their people who believe they have other claims to the waters of the Colorado River, since it does not interfere with those claims at all, does not endanger them in any way, I say, "Let's go ahead and build the Boulder Canyon Dam."

(Great applause)

MR. NORVIEL: Is Colonel Benjamin F. Fly in the room?

MR. FLY: Yes, sir.

MR. NORVIEL: Colonel Benjamin F. Fly, of Yuma County, this state, who is the father of the Yuma-Mesa project, and a very active citizen in the matter of building up the irrigation projects of our states, is very much interested in this proposition. Colonel Fly.

MR. BENJAMIN F. FLY: I thank you for your very kind remarks Mr. Secretary, the Commission, Ladies and Gentlemen: I shall not detain you beyond the limited time.

As the Commissioner has said in his introduction, I come from that delightful summer resort, Yuma, where, in the hottest days of the summer it is frequently the case that the Gila Monster, in crawling over the sands, steps on hisstiptoes.

I have the distinguished pleasure right now of standing by two handsome ladies. I want to say to you that Yuma County is the only county on earth that have elected two women to the Legislature. (Applause)

Now, Mr. Secretary, I want to say just a few words in response to the very distinguished gentleman who spoke yesterday and claimed to represent the State of Arizona. I refer to the distinguished orator, Mr. George H. Maxwell. So far as I know, Mr. Secretary, he does not represent a man, woman or child in Yuma County. I am absolutely certain that he does not represent me or anybody that I represent. He was in Yuma about six or seven weeks ago, and we very courteously gave him a tremendous audience in the court house, and let him expound the same wildcat scheme that he gave you yesterday; but instead of going to this enormous expense that Mr. Davis proposes to go to at Boulder Canyon, he was going to dig two holes on either side of the river and put in each of the holes enough dynamite to dam that river, and you would have it dammed for all time to come. That was his method of controlling the river

six weeks ago. Now, it seems that he dropped a little further up the river.

This thing of getting distinguished people to represent some highfaluting reclamation enterprise, and to travel around over the state and spread propoganda in order to scramble the eggs, I am not in favor of it.

This Commission, I take it, is here for the purpose of hearing the citizens of this section of the country tell what we think we would like to have done to curb the waters of the Colorado River, and after having them curbed, to utilize them.

We, in Yuma, said before Secretary Fall, when he held a hearing in San Diego a few weeks ago, we in Yuma are in favor of the building by the Government of the Boulder Canyon Dam at the earliest possible moment. (Applause)

We are in favor of the Government perpetually owning and controlling that dam. (Applause)

We are in favor, at the same time, of the Government developing every kilowatt of electrical energy that that water will develop at Boulder Canyon Dam, and always own that electric power.

And if they sell it to you, to me, or some other individual or corporation, we insist that the Government shall put such a price upon that electrical energy as will not drive us out of business in my section of the country, as so very recently was done by the Sierra High Power Line, which induced some of our citizens there to enter into a solemn contract to

take so many kallowatts at two cents for the first one hundred; 1-1/2 cents for the next one hundred; and all under that 1-1/4 cents--something like that. They entered into that solemn contract with the Sierra High Power Company. They went to the expense of twenty or thirty thousand dollars erecting their power lines, and put in electric appliances to run gins by electricity; then the Sierra High Power Company went before the Commission of California and said, "We are not making any money; we want you to vitiate this and let us charge them more," and, by golly, they did it. (Laughter)

Every gin using electric power went back to good old wood, mesquite, for fuel.

Now, Mr. Secretary, we don't want that power transferred to anybody except under the written understanding and bond, if you please, that power shall be furnished the people of this country, and particularly the people of the Yuma project, at the least possible cost, consistent with a fair return on the investment. We want that Boulder Canyon dam built in the first place for flood control. We are in danger, in Yuma, every year; not so much as formerly, but we are in danger every year. In 1916, when the Gila came down with 180,000 cubic feet per second, and the Colorado had 60,000 cubic feet, 240,000 feet of flood came by Yuma at that time. Our main street was four to six feet deep. It was over the counter in the post office. Now, you can imagine how deep it was.

Every succeeding overflow that comes now fills up the

bed of the river below Yuma, and opposite Imperial Valley at least a foot. That requires them to raise their levy, which is forty to sixty miles long. It is a tremendous expense; it compels us to maintain a rock levy upon our side of the river.

We hoped that the Commission would visit us at Yuma so we could point out the absolute necessity of all the water allotted to us. We are a Government project and we are safe, built by a special act of Congress. We have all the water we can possibly use. We are now, as the distinguished Commissioner said, upon our beloved Yuma Mesa. We had a stream Saturday elevated six or eight feet, through reinforced concrete pipe, six feet in the clear, throwing 65 cubic feet per second, upon that gray desert, and, I want to tell you, my friends, when I saw coming out of that gray pipe line that gurgling water, I stepped out and took a double handful and drank it, to put a little more sand in my craw. (Laughter.)

Now, Mr. Secretary, I trust most sincerely that in the adjudication of these matters that will be presented to you from time to time, that you will bear in mind our rights at Yuma, and be fair with us, and just in that connection I just want to say one word about what Mr. Maxwell said yesterday about Mexico not being entitled to water. If you will all remember, or look up the records, you will find, I apprehend, that your Commission will have very little to do with the allocation of water for Mexico. Mexico is protected in her rights by treaty. It is the ignoring of a solemn treaty as a

scrap of paper that brought on the world's greatest war. I believe absolutely that Mexico will be absolutely protected in her rights. I am interested in two or three hundred thousand acres below there. We have absolutely no apprehension but what we will get all the water we want, through the Federal authorities.

I thank you. (Applause)

MR. NORVIEL: I don't see Mr. Wilde in the room, is he present? No party in our state is more interested in the Colorado River than Mohave county. Mr. Secretary, I take pleasure in introducing to you, Mr. Wilde, who represents Mohave county.

MR. WILDE: Mr. Chairman, Ladies and Gentlemen, I never played to the gallery much in my life.

In Mohave county we are interested in but one subject and that is power, and power now! We want it now. I assumed this hearing was to get down to brass tacks and present some means or some form, some statement or scheme by which the States could get together. During the two days that I have sat here and listened, I have concluded that there is more State's rights, more persons desiring to get something than I knew existed in the entire Southwest.

(Remarks of the Speaker inaudible and cries from the audience of "louder")

Up in Mohave county we believe the Government has sufficient ability to do anything, and we are for it and we want the power. I listened to the gentlemen up here, the experts

and the authorities, talking about agriculture, I am going to say that we haven't thought much about agriculture in Mohave county. We haven't got a real genuine farm; we haven't got cotton or anything else in our county, but we have gold. When that power line is completed, it is going to put me out of business, Mr. Secretary and Gentlemen, because I cannot produce the power at the price the Government will sell it for and that the mines can use it for, and new mines will come in and the country will be developed, and I am ready to go down and go out, and I want that power now. Why? Because my people are going to try, and my county is going to develop, and my state---I am only a newcomer among you. What is power going to do for you besides in the mines. It is going to give the Santa Fe power to go through your country, not only through the State of Arizona, but in this country it will help transportation, and it is going to help every farmer, that is where the farmer gets it in the neck,,first he gets it on freight, and then he gets it on his transportation. It is going to help on the San Pedro Line in Nevada also. We can build into the Boulder Canyon from Chloride, quicker than from any other point. We are so situated geographically, that everything that has been said for Boulder Canyon can be proven by people going and seeing it.

But, Mr. Secretary, with your kind permission, because I do not know that country as I ought to know it, because I do not know the Southwest as I ought to know it, I want to introduce Mr. Anson Smith, who came here before the eighties.

He knows that river and knows Arizona as no man in this room knows it, and let him tell you the truth about the Colorado River, the River that is not only going to make Mohave county, but is going to make the entire Southwest,- if the Government puts this through.

MR. NORVIEL: I take pleasure in introducing to you, Mr. Secretary, Mr. Anson Smith, and I know that he has been working on this problem, or the problems of Arizona, in connection with the Colorado River for many many years, and is exceedingly interested in the matter. Mr. Anson H. Smith.

MR. ANSON SMITH: Mr. Secretary, and Gentlemen of the Commission, for forty years or more, I have been conversant with the Colorado River---

(Cries of "Louder please")

MR. SMITH (Continuing) I can't talk very loud. In 1918, I took the matter up with the late Secretary Lane, and made a report to him on the subject of the building of a dam in Boulder Canyon, suggested that that would cover the entire flood problem in the Colorado River, at the same time it would bring into cultivation a million or more acres of land which could be used for soldier's settlement and so on. Mr. Lane went before Congress with this report, and I am pleased to say that he read it almost as I put it up to him, to Congress, and the subject of Boulder Canyon then became wide-spread. Prior to that time, it is true that the Reclamation Service had their engineers far up the reaches of the Colorado and had

surveyed out many sites, and in 1918 I believe, they went into the Colorado Canyon at Boulder, and started their survey of the project. Now the peculiarity of this Colorado River problem is, that we find lined up here on the subject of State's rights, practically the entire Southwestern States. You would think to hear those men talk that they came from the unreconstructed South, where they believed absolutely in State's rights. Just how far these State's rights go in the construction of dams, on the Colorado River, I cannot see, nor can I believe that the States have any rights whatever to be considered. This is a Federal job; the Federal Reclamation Service is capable. They have built all these other projects throughout the country, and there hasn't been one word of State's rights in them, except possibly the Pathfinder Dam up here in Wyoming, where they poured the water into the neighboring States. That is a condition that will be sooner or later taken up by Congress or by the State Department, and they will say whether any State has any right in the Colorado River, or not, but even if they have, even if every state through which it courses has a right in it, then can they stop the states into which this destructive flood goes, from restraining it? I say they cannot. I say that anytime that they propose to build a dam in any of the Colorado canyons that is capable of restraining that flood, that they have a perfect right to do it. I can't see how any state is going to stop it. But a dam in Boulder Canyon is going to impound enough water every year to

make a continuous flow down onto the lands that are wonderful in productivity. In the North, lands are capable of possibly one or a little more crops a year, while down in this Southwestern country, about eight or nine crops of alfalfa can be garnered every year from every acre that is brought under cultivation. I believe in that good old doctrine of "The greatest good to the greatest number" and I believe that the water in the Colorado should be given where it will do the most good. I believe our Government is all-powerful, and can build these dams and allocate the water, and power, as it should be allocated. The Boulder Canyon outlet lies in the Northwestern part of the State of Arizona, and in the Southeastern angle of Nevada. It has above it every potential stream that supplies the Colorado River with water. It is the last point that a possible dam could be located in the Southwest. Below Boulder Canyon is what is known as Black Canyon. There the investigations of the Federal Reclamation Service are being conducted, and I understand that they have found a possible dam-site some eighteen miles below Boulder that will make possible the recreation of power from the same water that goes over Boulder Canyon. At a depth of 45 feet, bedrock has been found. If that is true--- and the investigations have been going on there for some little time--it will give an additional power close together in those two canyons. But, gentlemen, the control of the Colorado is the paramount issue. As you come down the River all of the lands lying in Nevada that can be irrigated

from this dam, and in Arizona, and along the River bottom in California, are subject to overflow. There are about 15,000 acres in what is known as Cottonwood Valley in Arionza and Nevada, and about 65,000 acres near Fort Mohave in Arizona, and 120,000 acres around Parker, and a large area overflowed over towards the Chuckawalla. There could be altogether brought under cultivation, I believe, about 140,000 acres at Parker. Now, you will understand, in that Colorado reach, there is approximately 500,000 acres of land that could be brought under cultivation, of which there is only a small area now in cultivation. The whole territory embraced below the contract, there are small acreages of land that would be brought into cultivation by reason of pumping. The Mohave below could all be irrigated by pumping system, and I will say it is the richest land in the world, and similar in every respect to lands below down the river, Possibly, as I say, 500,000 acres altogether that is non-irrigable today, which can be irrigated by pumping system all the way through, or by diversion just above Parker.

The feasibility of the Boulder Canyon is understood. It is closest to the points where power can be diverted and used. It is close in, and with an auxiliary dam lower down, I should judge that the two projects ought to be built to run a million horsepower or in that neighborhood; that is it could recreate in the lower dam the same amount that it creates in Boulder Canyon. These are the problems and I cannot see why the states cannot get together, and why there should be objec~~t~~

tions from any state in the Southwest to the building of this first unit, because of its potency in safeguarding the lower river. It looked to me as though it were a dog-in-the-manger policy to say: "You can't put that dam in there unless you come to our terms". They have already established all of the rights that they can establish for the lands that are in cultivation, and therefore they should be protected. I don't believe that Arizona can say that we are going to hog anything. We are only going to take that much interest, to see that we receive that which is ours legitimately. We are not going to stand in the way of any state that has a better right, a paramount right, to ours. But I do say that now is the time to build this Boulder Canyon dam to safeguard people who have gone in and put their labor and money into the development of the lands along the river reaches, and that it is the duty of our ~~lap~~ Government at this time, to take measures to build and safeguard those people in their property and in their homes. I thank you. (Applause.)

MR. HOOVER: Mr. Smith do you believe that in any settlement, there should be a priority given to power, or a priority given to agriculture in the distribution of the waters of the basin?

MR. SMITH: I believe that flood control is the paramount issue.

MR. HOOVER: Well, in any basis of development of the basin, would you give priority in the use of the water to power over

irrigation, or to irrigation over power?

MR. SMITH: I think to irrigation over power.

MR. HOOVER: I thank you.

MR. SMITH: That is the paramount issue.

MR. NORVIEL: I dare say that no man in our state is more or better informed, or takes a more active interest in the industries, and the upbuilding of the industries of our state, or who is more interested, perhaps, in the development of the Colorado River, than our fellowtownsman Mr. Dwight B. Heard. Mr. Secretary, I take pleasure in introducing to you, and to the Commission, Mr. Dwight B. Heard.

MR. DWIGHT B. HEARD: Mr. Secretary, and Commissioners, and men and women who want to see Arizona developed, I think the people of Arizona very generally stand for a policy of the earliest possible practical development of the resources of the Colorado River for beneficial use. I think, as a general thing, the people of the state want to see its great resources developed by the Federal Government for the benefit of all the people and not for private profit. (Applause.)

I think that this is largely an engineering question, and I am going to yield the balance, or a large portion of my time, Mr. Secretary, to a man whom I think knows more about the practical development of water power, and the practical development of irrigation enterprises, than any other man in this country, and that man is Mr. Arthur P. Davis. That man is responsible for the splendid success of the Roosevelt pro-

ject, under which we live and prosper here. He is strictly in the dam business. (Laughter)

And I don't propose as a layman to go into engineering questions. You know the law of common sense is the best law after all my friends and the law of common sense tells us, it is a great deal better for us to leave these engineering problems to men who have been trained, and who have had long engineering experience to handle them intelligently. Now the people of Arizona, Mr. Secretary, I am quite sure have the utmost confidence in you, in your common sense, in your trained ability, in your desire to give to the people along the Colorado basin a square deal. We feel, generally, that under your leadership, with the personnel of this Commission, we can quite safely leave our case in your hands. (Applause.)

But I am going to offer you one or two common sense observations, which perhaps may be of some benefit to you in your consideration. There has been a good deal of discussion here, where does the water--to whom does the water belong--and if you wanted to go into the question, you could go into it ^{if} very indirectly, and you could have all the troublesome litigation that has been the curse of many states, who indulged in it, what I call the policy of litigation. I want to see the policy of common sense, and it seems that in that policy of common sense, we should act in a spirit of neighborliness and fair play, and arrange between the various states in the Colorado River basin, so that construction may proceed, that each

one of them may pledge themselves that no litigation will be started for a definite period of years, In that time we will know more about these problems, and knowing more about them, we can more intelligently meet them. Now as to where the water belongs, under the law of common sense, we clearly deduct that the water belongs to the states where it can be put to the greatest beneficial use.

There is one man in the state who has done more for the people in this state in clearing up some of our intricate problems than any other one man, and I want now to pay tribute to that great man, Joseph H. Kibbey. He developed the law of beneficial use. Let us stand on that. It is a good yardstick for Arizona. Now Arizona realizes very clearly that it has in the possibilities of the Grand Canyon its greatest natural asset. Arizona is possessed of very keen people that propose to have that asset developed. They propose for Arizona to get its full benefit out of it, but in doing that and developing the land, they are going to do it in a spirit of fair play to thier neighbors in the basin, with nothing to go on but "a square deal to all" which should be their slogan. First, let us get to work as soon as possible, The time for action has come. Let us get through with the talking. Now, Mr. Secretary, I would like to yield to Mr. Davis.

MR. HOOVER: May I ask one question. Looking at it just purely from a National point of view, and the best interests of all American people, which do you place first, power or irrigation?

MR. HEARD: It is my impression, Mr. Secretary, that we have to start off from what you call the social standpoint, and that irrigation and the making of homes should come first.

(Applause.)

MR. NORVIEL: Mr. Secretary, Mr. Arthur P. Davis, needs no introduction to your Honor, nor to the Commission. Ladies and Gentlemen, I have great pleasure in introducing to you Mr. Arthur P. Davis, Director of the Reclamation Service.

(Applause.)

MR. ARTHUR P. DAVIS: Mr. Chairman, Honorable Commissioners, and Ladies and Gentlemen, I have only a few points to make. I do not care to take much time. I came along to do what I might to help the Commission in its work, and expect to do that. A great deal of time was spent yesterday in reiterating that this Commission was intending and being asked, and apparently was going to make a decision without sufficient information, upon which to base it. Whatever was said seemed to convey the wrong impression, therefore, I am going to take the liberty in a few minutes to talk you something about the information that exists regarding the Colorado River, and in qualifying for that purpose, I will say a word or two about my own experience in it. My first sight of the Colorado River was in the heart of the Grand Canyon within a few hundred yards of the point where the Diamond Creek Dam is to be built. That was in 1883, about the middle of the summer, 39 years ago.

Since then I have taken more or less of an interest in it, and began actual investigations at Yuma of the water supply, January 1895. Those observations have never been discontinued. They are on a better, more accurate basis since 1902, because we make more frequent measurements. In 1902, the Reclamation Act was passed, and immediately we established a station there and in that fall we began the topographical survey of the Colorado River Valley, from the Mexican line to Bulls Head, and later it has been completed up into the Grand Canyon, much of the map is 18 or 19 years of age, much of the ground has been changed, by changes in the river, which adds to its value. It can now be compared to show where the river was then with where it is now. Those observations of the stream flow and topographical work have never been discontinued. Still more extensive investigations were begun in 1914, with a larger appropriation, and spread over the basin and have been continued ever since. Altogether the Reclamation Service has spent about five hundred thousand dollars in the investigation of the Colorado River basin from the Mexican boundary to the upper portions of the river at the highest point where we are interested in it. In addition to that, we have a great deal of information obtained through the state engineers and other sources, and the Geological Survey has conducted a large amount of stream measurements as you heard this morning. This information was so voluminous that one year was required, in the hardest kind of a job, in getting out our report, that is, in the

preparation of it as to what to exclude and what to include. The report comprises five volumes and contains a very very small percentage of the available information. It has been boiled down and boiled down again until we got it in such a small size that Congress would print it. This is only a small proportion of what we have, and is a great deal more than has ever been published before. When it came to the point of printing it in the newspaper, we had to condense it again, so that every time we had to cut something out and every time we boiled it down we, perhaps, would make it a little more readable, and perhaps it would lead to the conclusion that we did not know much about our subject, but if you will examine the data that is on file you will change your mind about it. The Commissioners have all gone through that data, day by day, in the office at Washington, and they have only begun to scratch the surface, so far as the engineering problems are concerned, but they know its extent, and they are not without information. Upon this subject, investigations are still in progress. Besides moneys spent by the Reclamation Service in those matters, more than one hundred thousand dollars has been contributed by private parties for these investigations, and it is private money that is now being spent in the investigations now in progress on Boulder Canyon and the Black Canyon dams.

A word about the high-line canal, which was so eloquently explained to the Committee the other day, and today. The contention was made that pending a detailed careful investiga-

tion of that high-line canal, the whole purpose of adjudicating the water rights, and making any further progress in this matter, should be suspended. To do that, we of course must wait until we get an appropriation for that purpose. Delay Number One. Then we will probably get a very small appropriation. Delay Number Two. As it progresses, we have got under consideration a project that is going to cost anywhere from two to four or five times as much as the Panama Canal, to build that high-line canal. Nobody knows, but that is the way it looks. Now they were investigating that Panama Canal for about a generation, and they never got as much information as they ought to have had before they started it. That is the conclusion of the Committee of the National Academy of Science, which made a report upon the subject, appertaining to the construction of the Panama Canal, that they went about it without sufficient investigation, when the work had been in progress from 1879 to 1902, when the United States went into it. Thus you may see the possibilities of delay. After investigation, there is always something more that can be investigated and some more delay that can be introduced. Now this question that we have got is an urgent one. Without discrediting any of the seemingly impractical plans, for the high-line canal, it is not necessary to us to have that information as explained yesterday. If it should be in the wisdom of the future the proper thing to divert the Colorado River from the top of Boulder Canyon down, it can be done,

though that dam might be a thousand years old at that time. If the dam stands, that can be done at that time, and conditions will change and no matter what it costs, nobody can tell but what we might want to build something like that, if it should prove practicable to do it. It, therefore, is not necessary to wait for that. The reply was made that in the meantime Mexico would appropriate the water. Now that is just one of the many reckless statements made yesterday with such confidence that they carried weight backed by the eloquence of the speaker. Another statement made, was that the Commission could be assured that the high-line canal, under the scheme proposed would not be too expensive to be feasible. Now I submit that nobody on earth knows that at all, and that assurance in my judgement is not justified. At any rate the statement that the water could be and would be appropriated by Mexico in such a time that it would be very embarrassing to take it back, seems to me to be made without consideration. That water will be under the control of the United States, and if it were used, as it would be used, to the greatest advantage of the United States, it could not, any of it, be appropriated under the laws of Mexico, in my judgment. To properly use the water-- when the Boulder Canyon reservoir is completed, means to use it for power, and to use it , for power, with a constant output, means that the amount of water used in the summer is greater than in the winter, and the water used for power in the summer is less

than in the winter, because the reservoir achieves its maximum height in the early summer, in May and June. Then we have a great head and can develop this constant amount of power with less water than in the winter. As it is drawn down, more water is needed, and when winter comes you are using more water than in summer, and our computation shows, and our report states, that the water used for the development of firm power will be sufficient for the irrigation of just about one and one-half million acres of land and that is just about the acreage there is to irrigate in the United States, in feasible, sensible, projects. So that any additional land, that is irrigated, would be irrigated only with winter water, and we can at any time shut that off and dry up the river, below the line.

As soon as the acreage exceeds the limits that I have stated, it would be necessary to curtail the winter power output in order to supply that with water. We will have to cut down the winter flow from that reservoir in order to increase the summer flow. The summer demands for water are much greater than the winter demands; and the winter demands for power are greater than the summer demands, due to the varying heads which I have spoken of, so when we develop the full amount of land irrigated, we will have less power as a constant output, but we will have more secondary power. To bolster up the high-line canal, the statement was made yesterday that the lands to be irrigated by this line would have a minimum gross annual crop of \$200 per acre and a maximum of, say somewhere about

\$1,000 per acre, and it was claimed that dates would produce even more than that. Now it is true that some people have produced that much from date trees here and there, and it is true that they have from long-staple cotton, and some other things, produced similar amounts, \$200 an acre or more. But I submit that there is no finer valley in Arizona than the Colorado River can be put on than the Phoenix valley, the Salt River Valley. And what does actual experience tell us? We have got intelligent farmers here. We have got cotton farms here, We have the finest kind of improvements, and a first class irrigation system, and in only one year in the history of this valley, has the average gross production of this valley exceeded one hundred dollars per acre and that was in the peak year of 1919. To state that because one individual can make \$1,000 an acre and therefore anybody can, is very much like putting an athlete on the scales and watching him lift six or eight hundred pounds, and then decide that that is a proper load for a man to carry all day on the road. Comparisons have been made in these discussions between the merits of reservoirs in the upper basin with that at Boulder Canyon. Mr. Mulholland gave in short and spicy terms the reason for building a reservoir at Boulder Canyon. That is the place where you can sell the power because it is nearest the market. There isn't any other site on the river nearer to any considerable market of any kind. It is just as near the Arizona market and nearer the Nevada market, than any other site, and it is the only one that is near enough for pre-

sent consideration to feed the great market on which it must depend, the cities of the Pacific Coast, Riverside, Los Angeles San Diego and those other cities. The primary reason as often stated here, for the construction of the Boulder Canyon Dam, is to control the floods to save the Imperial Valley, and the suggestion has been very properly made, by the Commissioner from Wyoming, that the floods from the Gila are also very menacing, and it was suggested yesterday that we should build a special dam to control the Gila. Something of that kind upon the Gila is very important, not as a temporary measure, but permanently, because its floods are menacing, but their brevity greatly diminishes their danger, because of the fact that whatever damage is done we have a chance to repair, but it is a menace, and as long as it remains, the valley is in some danger, and under great expense to protect itself with levees. It, however, affects only the Imperial Valley. The Gila Valley has a drainage area of something like fifty-one thousand square miles, and great part of which has a very low rainfall, and is so flat that the water stands, as many of you have seen it in Southern Arizona, on the clay flats, and when it does move, it moves slowly, but the great bulk comes into the streams and rushes down in great torrents. The area above Boulder Canyon and above the Glen Canyon is a region of torrential rain, but with a steep fall where the water runs off quickly. It is an area of about the same size as the Gila area. The most danger

that can come, that never has come in historic times, is the coincidence of the Gila in a great flood when the Colorado is in flood, the floods between Boulder and Glen Canyon are more apt to coincide with the Gila than is any other part of the Colorado Basin. The saving grace so far has been that the great bulk of the Colorado River water comes down in springtime and summer, while the Gila floods come in the winter. We do get floods from the Little Colorado, from the Virgin from Kaibab Wash, from the Grand Wash and those other streams up there that are between Boulder Canyon and Glen Canyon. We might get those floods in the winter or early spring when they are more likely to coincide with the Gila than is the main stream above Glen Canyon. That might not happen in our lifetime, but it may happen at any time. There are fifty thousand square miles in there, which could not be controlled at Glen Canyon.

Regarding control of the Gila floods, that is quite important. I don't know whether it is feasible or not, but the Reclamation Service has made a very careful investigation of the reservoir site near Sentinel and Professor Smith has examined it and he has given you his opinion here today that coincides with the report of a number of engineers of the Reclamation Service. At the end of an extensive examination, of the foundations of the dam, they concluded that the dam with the necessary height would not be feasible there on account of bad foundations, which is as Prof. Smith has stated here today. That was all on the basis of an irrigation project, which means

holding the reservoir full of water for a long time. Another and, a different problem is the flood control. The trouble with that foundation is, it is leaky to a great depth, and as water would pass through those pervious strata somewhat slowly, if it is relieved in a few hours, it will not hurt anything. Due to that fact, one of the principal engineers, Mr. A. J. Wylie, of Idaho, who was one of the consulting engineers on the Sentinel Dam, and on many dams built by the Reclamation Service, was asked to reconsider all his data and conclusions and report upon the feasibility of that site, as a flood control, or detention dam, and he reported that he believed it would be a safe risk. He expressed considerable doubt in it, so that I am not willing at the present time to say that for flood control the Sentinel Dam is not feasible.

MR. HOOVER: One or two questions in the matter of this high-line project. Is there any reason why that project, if it is feasible at all, cannot be consummated just as easily after the construction of Boulder Dam, as it can before in other words, is there any reason why we should hold up the construction of the Boulder Dam in order to make way for the high-line project?

MR. A.P.DAVIS: There is absolutely no reason why the Boulder Dam should be postponed for that high-line project, because even though it should prove feasible, which I have no idea it can, but even though it may, it can be built at a later date. There are some things about the plans for power which it would

modify, but every part of the plan is going to be modified sometimes in the future. We have to scrap machinery when it wears out.

MR. HOOVER: And is it your impression that there is any intermediate method of flood control, other than by the construction of a great dam somewhere in the canyon; in other words, do you believe we could get flood control through any other method, through Flaming Gorge or Dewey?

MR. A.P.DAVIS: The construction of Dewey, or Flaming Gorge Dam, would greatly improve conditions, but it would not solve the problem, for the same reason as Glen Canyon. Glen Canyon would be better than those two, because it would be lower down and would intercept more drainage, but it would not solve it and those two reservoirs are still above the San Juan and other tributaries of importance.

MR. HOOVER: Of course we all know you have devoted your entire life to this problem. Is it your impression, in any major decision, that we should give priority to power or agriculture?

MR. A.P.DAVIS: So far as concerns the Colorado basin, I should say emphatically that agriculture should be given priority so far as possible. Certainly it should be given preference over power development, for the essential reasons which were so eloquently expounded this morning by Judge Sloan and which have been endorsed by others, and particularly for the reason that there is such a superabundance of power compared with any

present or prospective demand, that it would be very poor policy to hold up irrigation because of the possible future in the power which is located as Colorado Canyon is.

MR. NORVIEL: I would like to ask a question, if you have ever thought of it in that way, whether you consider the proposed high-line canal system to be a part of the work of this Commission, or whether or not it is a problem that belongs strictly to Arizona herself?

MR. A.P. DAVIS: I think it should be regarded, Mr. Chairman as a problem that belongs strictly to Arizona and California. It can be injected, improperly in my judgment, into this general subject. If you are asking for my opinion on that point, I don't think it belongs there.

MR. EMERSON: What would be your recommendation as to the 65/35 proposal of the Geological Survey, the general idea of water allotted by portions rather than by offsets in different states?

MR. A.P. DAVIS: I see much logic in allotting water, placing upon each state its own responsibility for its use. The fact that other states can use all the water that is in them, of course is a good reason for them using that water, but it is just as good a reason for giving the other three states a definite percentage. The general scheme of a fixed percentage does not appeal to me as applicable to the Colorado River problem. I have stated my sentiments on that heretofore. I think there is water enough in the Colorado basin for all feasible

irrigation in the United States, if properly conserved, and that there is no occasion for limiting anyone in the economical beneficial use of water for irrigation in any part of the basin of the Colorado River in the United States of America. But we don't know it all. There is something going to happen in the next fifty years that we don't know, some inventions are going to be made that we don't think of. We should not be unfair, by making a perpetual agreement in the interests of either side in this question, and they should all be subject to adjustment at some future time.

MR. EMERSON: Do you believe that some kind of limitation should be put upon the development in the upper states in the form of a compact that we might be able to draw?

MR. A.P.DAVIS: With the exception of the time limit, I don't know; I do not think it necessary if we make that time limit short enough; I think we might just as well take off the limit until that time is up and then we will know more than we do now and in the meantime all acquired rights shall be valid. I have no fear of there being any shortage of water in the basin, if the time is made a reasonable one.

MR. EMERSON: What would be your idea of a reasonable time?

MR. A.P.DAVIS: That is a matter for discussion and agreement. I think it would be wise to make it twenty years. I think it would be wiser to make it forty years than none at all.

MR. HOOVER: In other words your proposal is a holiday in litigation for twenty years?

MR. A.P. DAVIS: That is about it.

MR. EMEPSON: A closed season for lawyers.

MR. HOOVER: Just one more question. In any proposal of this kind, I assume any division of water on a basis of percentage, must be uniformly based on some calculation of beneficial use of the water; in other words, to arrive at that percentage, it is necessary to give some consideration to the beneficial use of the water?

MR. A.P. DAVIS: Yes.

MR. HOOVER: Do you not think ^{that} it is better, if we are entering upon an explanation of that idea, that instead of dividing on a basis of percentage, that we should go clear back to the beneficial use of the water?

MR. A.P. DAVIS: Absolutely. If you are going to divide the water at all, it should be divided on the basis of beneficial use. There is a brief statement in Mr. Hoyt's memorandum, which has been handed along, to which I wish to take exception, because it leads to a wrong conclusion. He stated in that memorandum, that thus far the irrigation in the upper valley has had **no** "appreciable" effect on the discharge of the lower river; and that was emphasized afterwards by a question from a Commissioner. I don't know what he based that on. The Colorado River is a widely variable stream. Some years it discharges about four times as much as in other years, and you never know when the big year is coming. All you know is,

after it has passed, and you don't know that very accurately, because we haven't enough data, and how he can tell that the discharge for last year is no less than it would have been if there was no irrigation in the upper basin, I am sure I don't know. But I do know this, and it is the reason I disagree with him, I do know that you can't irrigate without consuming water.

MR. CARPENTER: Some water.

MR. DAVIS: Yes, sir, some water. Now he has applied to this development, the use of one and one-half acre feet of water and stated that that much would be consumed and the balance would be returned. In a basin where the excess water would go into the subsoil, or go off into a stream, we can approximately tell how much it will deplete the water supply to irrigate, that is, we can if it is not taken out of the basin, because we can tell what would go into evaporation, and plant growth, but if we depend upon what the farmer puts on the land, nobody can tell anything about it. He may put on half an acre foot, or he may put on one acre foot, or he may put on thirty acre feet. I have known them to do that, but the excess returns to the stream. Thirty feet may sound to you ridiculous, but I can cite you an instance of where on one tract of several thousand acres in a season, the average applications to that land ran thirty feet in depth. Of course that land is a sandy land, and it very soon drowned the country below, and we had to put in drainage to correct it. That was done delib-

erately, and it isn't the only case that was done deliberately. I could bring up the subject of putting on so much water that it could not get away, but that is another story. But you cannot irrigate, without using water, and when you use water you consume some water. It goes into the tissues of the plant, it goes out of the leaves of the plant into the atmosphere.

MR. CARPENTER: As to the use of water in the upper reaches of the streams the only thing that is of any importance is the consumptive use, that is your conclusion?

MR. A.P.DAVIS: The Chief, I don't say it is the only thing, by any means. More water is evaporated, if you keep the land saturated, than if you use it economically.

MR. NORVIEL: On behalf of the Commission, I desire at this time to express the thanks of the Commission for the very great help that Mr. Davis and his department rendered to us during our recent visit in Washington and also to the Geological Survey. They gave us every possible assistance that could be given, not only answering the questions that we might ask, but furnished us through their experience the things that we very much needed to know.

Now we have to be a little bit shorter, perhaps, in our expressions from this on, in order that we may hear from everybody that desires to be heard. The next speaker will be Mr. G. M. Bridges, of Yuma county, to be followed by Mr. C.M. Roberts, who will also be followed by Mr. F.S. Velie, and let us be as

concise in our statements as possible. Mr. Secretary, I desire to introduce to you Mr. G.M. Bridges, of Yuma county.

MR. BRIDGES: Mr. Chairman, Ladies and Gentlemen, the pyramid of our civilization, as we have all read long long ago, is builded on agriculture. The man who deals and handles the agriculture is the farmer, and as the base is always at the bottom, there is where you will find the farmer, and as I belong to the farming race, and belong to farmers of Yuma, all you may expect to hear from me is the song about farmers, and Mr. Secretary, upon the foundation depends the safety of the building, and the people who occupy it. If our civilization is builded upon the foundation of agriculture, then the people will depend and live upon the products of the farm, depending upon this foundation of agriculture.

As I have heard you ask several previous speakers, which, in their estimation was the most important, power of agriculture, I will answer that now, that without agriculture, without this foundation, we haven't any building, and the people that build this, make this foundation, are the people that have to maintain it for this building. The states, and all the intervening business industries, grow out from this foundation of agriculture, and where you have got agriculture you must have homes, and without homes you could not have agriculture, and then maybe after you have got these homes founded and builded, you must have something to maintain them.

Without water in the desert we have here, we are helpless, and as the Almighty has provided this water, long before we ever came to this country, before our engineers have ever thought about it, he has fetched it here for us, and it is up to us now to do away with the two or three little things-- they seem little but they are mighty big, they are some of the things that caused the great eruption that has happened in the last few years, through the War that has dislocated every substantial business and industry in the United States, and the World, and it is petty selfishness, and a crime unrestrained. The gentleman who spoke, I don't remember his name, just a minute ago said that he wanted power and wanted it right away, because it produced gold. When I was a boy I read a piece in the Second Reader about old King Midas and how he loved gold, and finally the one thing he wished was that everything he touched would be gold, and one day a genii stepped up to him and told him to make a wish and he might have what he wished, and that is what he wished, gold. His little daughter kissed him and she turned gold, and the next thing he wanted to get that genii back to get his wish back. Well now that has been one of the things that has lead up to the trouble we have had to date. It is that great desire for gold and money. It is fine and it is good in its place. We could not get along without it, but we must get down and boil it down to a common level where it will be distributed and do the greatest good to the greatest number of people.

And now, Mr. Secretary, in the distribution of this water to the farms of Yuma valley, we simply ask this one thing: That you distribute that water justly and equitably. During the War, the word came to our town that we were asked to "Hooverize" on sugar, and all those things, and they farmers were asked to get out and raise more crops, because we needed them to maintain our army and accomplish our purpose, and, Mr. Hoover, we did it. I remember one time in Flagstaff, I wanted to get some sugar for our coffee and we had used our pro rata all up and we could not get it. We had to wait until the next day. I remember seeing one gentlemen, he came in and sat down right at the table beside me and when he asked for sugar they wanted to see his card and he had used his pro rata and they said you can't have it and he went out and got some sugar out of a bit of paper and put it in his coffee. Now that, gentlemen, wasn't playing square with Mr. Hoover. I think he wasn't the right kind of an American citizen.

Now then, the point I want to get at is that the Grand Canyon is entirely in the State of Arizona. The Lord Almighty made it there, and it is there, and always will be there. But Arizona don't ask you, that you give to the State of Arizona every benefit that can be derived from that Canyon and the possibilities that arise from it because it is the biggest thing the world has ever seen or ever will see in that line. We believe on the farms in Arizona, down in the Yuma valley, that

when that Grand Canyon is completed, and the possibilities of its power, that it is worth more to the United States today than the Panama Canal is, not today, but when it is completed and functioning, and that there is enough power, that there is enough possibilities there to supply the upper states, the lower states, California and all this country with power to do the work, and fuel, where we won't have to go out and cut our wood in the morning, but we will have our electricity in our homes and use that electricity for pumping our water and driving our machines and all these things. Mr. Hoover, we appeal to you, we trust your judgment, and the Commission's judgment, but just one thing more, I am like the boy who always liked to help the under-dog, but it seemed like he always got the worst of it. I don't know anything about the feasibility of that thing, except one thing, I have driven over some of this country and I do know it is as pretty a piece of country as I have seen, and if they can get water for it they should have it, but the thing we are interested in especially in Arizona and Yuma valley is the construction of a dam somewhere or two of them, that will control the flood of the Colorado and the Gila River. In 1891, they came together and cleaned out the town. In 1916 they did the same thing again. I was down in a little place in 1908 and we were sleeping one night when a man came in and says: "Get out, the water is coming" and we had to go to the hills and that thing has been menacing

us ever since, and we have had to go lots of times and we are going to try and settle this thing up. That river comes down at those points and crosses the river and our neighbors in California and the Imperial Valley, many many of those people are not sleeping good nights when the river gets up.

So I ask you, with all the opportunities in your power to investigate this thing, to get this flood controlled just as quick as you can, and I can't see, and the people can't see how the building of a dam for instance in the Boulder Canyon can affect the upper state flow at any time because the water has gone into the Colorado and it can't hurt them at all, and there is no reason that I can see why the Government can't get to work and build that dam and control it. If the Government hasn't got the money to do it, they can control that, they can have another man do it, put the money in and pay him his interest and give him his power, but the Government should have the say-so about it. When we say the Government can do a thing, it is awful easy, Uncle Sam has done everything he has ever tackled, and if he tackles the Colorado Basin, he will go through with it, and I ask you to let Uncle Sam handle the biggest end of this thing. I thank you.

MR. NORVIEL: Mr. Secretary, I take pleasure in introducing to you Mr. Charles M. Roberts, of Cochise county Arizona.

MR. ROBERTS: Mr. Chairman there has been a mistake that was Mr. Roberts from Pima county.

MR. NORVIEL: Is Mr. Roberts from Pima county present?

MR. ROBERTS: Mr. Smith took up the time I was supposed to have. I have nothing to say.

MR. NORVIEL: Senator, I thought you desired to address the Commission.

MR. ROBERTS: I think in the morning, I asked for a few minutes in the morning is all.

MR. NORVIEL: All right, Senator, we will hear you in the morning. Mr. Velie of Prescott, is Mr. Velie present?

(No response.)

JUDGE THOMAS of WINSLOW: (No response.)

MR. WISENER, of Yuma County. Mr. Secretary, I take pleasure in introducing Mr. Wisener of Yuma county. I have forgotten what he represents but it is something down in Yuma county. He represents, I think, some large industry down there.

MR. WISENER: Mr. Secretary, Ladies and Gentlemen, I thought that I had been forgotten, and therefore I had forgotten my entire talk, which I dare say, the audience will say, "God be praised." I am not an engineer. I am not an orator. The orators from our county came first. I am representing the Water Users of the Yuma valley, and I must say that I would most heartily endorse the sentiments of the two speakers before me and the big gentleman that confessed that he was made in Ireland, Mr. Mulholland. The proposition is this: We at the present time have plenty of water down in the Yuma valley. In fact we use considerable water there. We always have had and, since the Volstead Act has gone into force, we have used considerably

more for other purposes that we did not use at that time. The trouble there is the water is not controlled and distribution right. It comes in there and passes around through our streets at times and insists on going through the valley and flooding us out. All we ask is that you distribute the water properly.

I thank you.

(Several other names were called by Mr. Norviel, but no responses were made.)

MR. NORVIED: Mr. Secretary I think that concludes the list of those who were to speak this afternoon and in the morning Judge Baughn who is at present indisposed, not being present this afternoon, will be the first to address the meeting. They will be limited to thirty minutes and Senator Roberts will be allowed, as I understand it, Senator, just about five minutes, is that it? And after that, so far as I know, the time may be taken up by the people from the Imperial Valley and Los Angeles. We will meet at the Federal Building. The Secretary suggests that those who are here present, and prepared, from the Imperial Valley should now be heard, lest they do not have an opportunity tomorrow morning. Now if there is anyone here who can put in the time for this afternoon for the next thirty or forty minutes, the Secretary would very much like to hear you. Is Mr. J. S. Nickerson present?

MR. J.S.MICKERSON: Mr. Secretary and Gentlemen of the Commission, Ladies and Gentlemen, we certainly feel honored in

this Western country to have the Secretary in this Commission hold these meetings in this Southwestern country. In December we had the honor of the Secretary of the Interior holding a meeting in San Diego. They certainly are two of the most important meetings that have ever been held in this Southwestern country and mean more to more people. Now at that time, one of the Commissioners was called on to speak, the gentleman from Wyoming, and he remarked that we hadn't said much of anything about the Commissioners. Well that wasn't right. We expect to say a lot of nice things about them soon after they do anything. If they don't, I won't be responsible for what we do say, but we are behind you gentlemen. We know you have got a hard job and you deserve the support of everybody in this Southwestern country, and we believe that you will help solve our questions.

Now as to the Boulder Canyon Dam, the whole Southwestern people are behind that report of A.P. Davis. We believe in it. He has monuments all over this Western country, and they speak for themselves as to what he has done. Now there have been engineers, there have been lawyers, we have heard them all talk, and, friends, hardly any two of them agree. We can't follow them all, but we have a man here with a reputation and he has monuments all over the Western country, and I want to say to you gentlemen here, that the entire Southwestern country in California, and I believe you in Arizona, are behind this, and I believe the only thing to do is to get behind his proposition.

Now I will tell you why we are in favor of Boulder Canyon Reservoir. Mr. Secretary and Mr. Commissioners, in the Imperial Valley we have fifty thousand people. We have 450,000 acres under irrigation on the American side. We have 150,000 on the Mexican side that we are watering. Now this year we have already spent \$350,000.00 on protection on levees, down in a foreign country to keep the water out of the Imperial Valley, to keep it from absolutely tearing up and breaking up those people, and that money comes directly from the farmers. Now then, why should not we be behind the Boulder Canyon? Then we have a silt proposition that I will venture to say costs the Imperial Valley people one million dollars a year to clean out their ditches that comes from Mr. Carpenter's mud that he send down on us from Colorado. Now the Boulder Canyon dam will eliminate that silt, then it will practically take care of our flood protection, and then it will store us water. Now at a certain time of the year our big demand is sixty-five hundred to seven thousand second feet of water. There are times in the year that give us as much as two thousand feet, while we suffer more or less every year, some years it is more than others, but there will come a time when we will suffer severely. Now we are increasing in acreage all the time and they are increasing the demand for water below the line, so we must have some kind of protection. Now that is why the Boulder Canyon reservoir is needed and I don't see where it is

going to hurt anybody up in the upper region. It looks to me like it is an insurance policy for their water. We have that water now. There are no laws nor judges nor courts nor juries in the world that will take it away from us, because we have it. Now, you talk about waiving water rights, if I would sign a waiver to waive those rights, I would want a train all steamed up to get out of this country on because I believe I would be shot, but I don't believe there is any question about the water rights, because, as Mr. Davis says, there is more water than we will need for years to come, and I fully agree with him to fix a limit, I think for twenty years, about the agreement or division of water and so forth. And I don't believe this Commission could go to work at this day and say what each state is entitled to. I don't think it is possible for any man that lives to say so, but the idea is we must have relief. Now we have got to have that Boulder Canyon Dam and you will find that all of the people in the whole Southern part of California are behind it, and we have those families, we have those women and children there, and we ask the cooperation of all those Northern states, and we ask the cooperation of everybody and the help of this Commission to take this matter in hand and investigate it and see if we are not right in what we are asking you to do. Thank you.

MR. NORVIEL: I beg Mr. Nickerson's pardon, for not stating what he represented. Mr. Nickerson is President of the Irrigation District of Imperial, and is representing the Imperial Valley and his District in particular.

Mr. Mark Rose, representing the Imperial County Farm Bureau, probably the Imperial Irrigation District.

MR. ROSE: Mr. Chairman, Gentlemen of the Committee and Ladies and Gentlemen: I will only take about ten minutes time. I am not an orator. You will find it out in ten minutes. But we are here backing the report of A.P. Davis, absolutely. We are here because necessity brought us here. I am going to tell you the condition of this property, the thing that will bring the case to you. The demand for the waters of the Colorado River, as Mr. Nickerson has told you, has increased. Nobody in either the upper or the lower states can go much further without taking the water away from somebody else below. We have water rights that we have had a long while. We have studied out what would be the best remedy, we think; We have, we believe, two remedies, one is slow and costly, i.e., the legal rights. We believe that that country has got such a right to that water, as could protect it for a long time, which would very easily relieve, probably long after we had dried up. The other way is to make an immediate effort to get water stored somewhere on the Colorado River, which now passes down in great torrents and destroys life and property costs us immense sums of money each and every year to take care of. The situation on the river is largely this: Six months of the flow is very close to the use, but the other six months it is ten times as great as the use. The situation as I view it is not only good for us but it is just as good for Colorado. If we were able to store in Colo-

rado Canyon the amount of water in excess of any possible use, that passes down the Colorado during three of four months of the year, we could then relinquish the entire natural flow we now use to the upper states; in other words, it would be---it would enable them to expand another million acres without a day's storage, because without a doubt it would be of benefit in the future when needed, so far as water for irrigation was concerned. We have the flood problem, it would solve that. That trouble runs into millions of dollars damage each year, approximately, in real damage, in water damage, and it is damaging us in this way, that we are spending large sums of money each year, and it scares people and keeps investment out of our country. It endangers property and makes our interest rates high and keeps out farm loans and the like of that, which of course would be of great advantage to us, but what we really want to ask the Commission and the Northern states is to assist in the immediate construction of the Boulder Canyon Dam, to assist in getting legislation which will enable the Government immediately to construct the Boulder Dam and give us that relief, and it will also give them relief, and give them this additional water to use, and then settle the question of the final distribution of the water at some later time when you can have ample time to settle it. But the Boulder Canyon is the one site for several reasons that we think would best fit our case. In the first place it would protect us more equally from floods. There isn't but little water gets into

the river after it leaves Boulder Canyon. If there ever comes a time when the waters of the Colorado River will be exhausted for the purposes of irrigation, it will store at least the water to irrigate 200,000 acres more land than any other reservoir site above that, because it will store the waters of the Little Colorado, the Mammoth Wash and the Virgin Wash and many other washes, so we would fill it, and we could still irrigate 200,000 additional acres if the dam was built at Boulder, rather than at some other point further up the river. And I don't want to mix into the question of what the states shall do among themselves, or the legal aspects of this proposition at all. That is a question I think the Commission will, and should work out from their own knowledge; the question of whether we shall surrender our water rights or not. Of course it isn't a question for me to determine; it isn't a question I can determine. I doubt very much if it is a question that anyone is capable of determining. I think we have a right to maintain it and as to the question of priority after the dam is built, I think that that is another question to which the Northern states have no objection. If the northern states had any objection to the building of the dam, upon that theory, it could well be provided that, for a period of years, there would be no priority--- in fact it may be provided that the construction of the dam itself should never create a priority so far as irrigation is concerned. I believe, however, the right of prior appropriation will always have to be recognized on the

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Colorado River. I don't believe you will ever find any other just basis, and there is one thing I would like to see the Commission bear in mind, and that is this: That if we all, in our own minds, knew that there was sufficient water in the Colorado River to irrigate every acre, if we wrote across it that the lower countries would have to yield to the upper countries in irrigation, it would absolutely prevent outside financing of the lower countries for irrigation. If the Government expects to finance it, all very good, but if we have to go out and finance it ourselves, in forty years it would be a prohibition against financing a project in the lower countries. I hope, I believe it is unnecessary, and I really hope it won't be done for that reason. Our people feel that if there are any water privileges granted outside of the basin of the Colorado River, that they should be limited to a very small amount and really to that amount of water which is now put to beneficial use outside of the basin of the Colorado. I thank you.

MR. HOOVER: Just one or two questions, please. I want to get it clearly in my mind, what your impression is on the question of an established right in the Colorado Canyon. Assuming there is no present established right, whether true or untrue, that problem immediately arises with the construction of the dam, that perhaps another 500,000 acres will be put in cultivation in the Imperial Valley. Do you consider that it is necessary that that additional 500,000 acres shall have an

established water right, or not?

MR. ROSE: I feel, Yes, and yet I feel it possible that might be for a period of twenty years or such a matter, and have at that time the matter adjusted, and I think in order to finance it, that that would have to be.

MR. HOOVER: Do you think anyone could ever develop that 500,000 acres of land with no assurance of a water right?

MR. ROSE: Well, No. I think possibly limit it to that length of time, knowing what I do know about the quantity of water, I doubt very much, if the Government itself undertook to finance it---

MR. HOOVER: Would not a twenty year limit imply that there should be some sort of title given to the water at the end of twenty years?

MR. ROSE: Yes, I would anticipate at the end of the time the present law would govern. Of course, the first to use is the first in right.

MR. HOOVER: Under the rule of usage, then, the additional 500,000 acres would obtain a water rights

MR. ROSE: It would at the end of that time, against any other appropriation.

MR. HOOVER: But that water right would be established as against the upper states?

MR. ROSE: Not as against the upper states during that 20 years; it would be established against the upper states for any future development, Yes.

MR. HOOVER: That is all.

A COMMISSIONER: Mr. Rose, I am not quite sure I understood that. What I want to know is whether or not during this period of twenty years, you consider that the lands of the lower river would or would not establish a priority?

MR. ROSE: It would establish an equal priority with the lands developed in all of the seven states during that period of twenty years, and after that time it would acquire a priority of any lands developed either in this state, or in any other state later than that twenty year period. That was my idea.

A COMMISSIONER: As to "equal right" or "equal priority" just what do you mean by that?

MR. ROSE: Of course any equal priority would be an equal use of the water. I suppose if during that time there was a development in excess of the amount available, as to what would happen in that case, I am not able to say. However, it is the general opinion in my country, it is the general opinion of everybody familiar with the Colorado River that it would be impossible to reach that point in twenty years, if proper conservation were had of the waters of the Colorado River.

A COMMISSIONER: Well it is a fact from my viewpoint, we are only indulging in theory when we assume there will be a shortage, but our theory ought to be correct. Our theory is, if there will be a shortage in twenty years, in order to make

priority of any importance at all, assuming a shortage, would the development of the lower river during the 20 years period that you speak of, give a priority over rights before or during that period if a shortage developed, would the first right appertain to the upper users because they could divert it?

MR. ROSE: That would depend very largely upon the agreement and upon the contract. I think the question of which would get priority, or whether there would be any priority, or whether there would be an equal right, each one suffering an equal shortage if that obtained, that would of course have to be a matter that was fixed in the pact itself.

A COMMISSIONER: Don't you really mean what you want to do is to leave the thing in status quo for twenty years?

MR. ROSE: That is virtually what it means. It would not mean exactly that, No. It would mean this: If there was sufficient water at the end of twenty years, they would all have a perfect equal right; if there weren't, why if the pact didn't fix it in terms, I suppose it would be a question of a division of the amount of water developed in each of those states.

A COMMISSIONER: Thanks.

MR. NORVIEL: Mr. Secretary, I take pleasure in introducing Mr. E.W.Cuff, representing the City of Brawley, and the Brawley Commercial Club of the Imperial Valley.

MR. CUFF: Mr. Chairman and members of the Commission,

Ladies and Gentlemen, I am not an engineer, nor an orator, nor a lawyer, you might say why are you here, and I might answer I don't know; nevertheless you have the fact, which is not a theory. I represent in a way, a good many business interests in the Imperial Valley, and consequently we feel that we are more or less in the limelight in this particular movement, and we have always believed that this was a big proposition. We have always felt when we have thought about it at all, that your Honorable Board of Commissioners, had some job, and having been here for the past couple of days, I am convinced that you have much more of a job than I ever dreamed of. Having listened to these many thoroughly professional men in their different lines, and so many practical men, and so many business men--- well, perhaps not so practical men, I can say that you have some big job, so I would approach this in a very few words, from the standpoint of a business man, if you please, and consider this as a business deal in the parlance of the street, instead of a treaty or a pact, and I think that in making that deal, we come before you in this light: We, of the Imperial Valley as a whole know absolutely what we want. Now, with all due respect to some of the representatives of other places, and with all due respect to the Commissioners from every other state, it seems that on account of circumstances they do not know exactly what they want. This is not because of any fault on their part, but due entirely to the fact that their resources are to be developed in the future.

Now we want that Boulder Creek dam. I might say we want a dam. We need it. It has been established several times, the necessity for flood protection, and I assure you gentlemen, it is no joke, looking at it from any point of view, and from the fact that we are ready to trade, as the saying goes, and the other gentlemen are not ready to trade. We would not like to see the matter held up indefinitely. It has been the desire, I see, of the Commission, of the Chairman of the Commission, to have some concrete proposition made, on which they can base a decision, and I would be entirely too presumptuous to think that I could give such a proposition, or place such a proposition before the Commission, but we are in a position, as an athlete that was ready to start in a race, if you please, simply because we are on the scratch and ready to go, we don't desire to beat the gun. We are perfectly willing to give all the rest of the states an opportunity to get ready and get set, and I believe that our communities would be perfectly willing to back our committee in conceding any reasonable thing in order to get this thing started. We will concede anything that is in reason, and we are going to be just a little like the lad that was sent to market with the cow to get one hundred dollars for the cow, and if he could not get a hundred, "if you have to take thirty take it". Now I believe that the spirit of fair play and the American spirit of a square deal is not going to hinder our chances any to simply say to the gentlemen from the other states that we are laying our cards on the table, We want

action at once, and in order to have that we are willing to concede anything in reason to get that action, and believe that any basic principle that this Commission can reach as a rule or set of rules to work out our numerous problems, for the arriving at a good condition in years to come will be all right with us, so long as we get immediate relief.

Now that is simply looking at it from a business man's point of view---if you will let me lay claim to being a business man, because I can't claim credit for being anything else, and if the Commission can arrive at something along those lines, why it certainly will be a blessing to the valleys down there, so we can get some stability, some assurance that our water supply is going to be regulated so that we will have it when we want it, and that we don't have to take a long dive from the house where we live, and if I had to take a long dive from the house where I live it would be about one hundred and nineteen feet and you can see that I can't hold my breath that long. And we wish you to see it in that light, gentlemen. If a business agreement can be reached, we are willing to concede everything in reason in order to get all the people who are interested, to find out what they do want---because we do know now what we want.

MR. HOOVER: Mr. Cuff do you think the people in the Imperial Valley would be prepared to agree that they acquire no water rights by way of priority on new acreage brought under cultivation after the construction of the Boulder Dam?

MR. CUFF: I didn't get that. P

MR. HOOVER: Do you think the people in the Imperial Valley, that had acquired no water right through prior usage on such land as they might bring into cultivation as a result of the construction of the Boulder Dam, would be prepared to concede that they acquired no water rights thereby; in other words, no preferred rights, do you think the people of the valley would be content with a situation of that kind.

MR. CUFF: Mr. Chairman, I believe that the people of the Valley, as I have said about the boy with reference to the price of the cow, would be willing to concede anything that was necessary. Now judging from the different statements that have been made, that question is still a matter of theory, and so far as I am concerned, and the interests I represent, I think that the flood control menace is such that if it were necessary to concede that, it would be conceded. I am not speaking as an irrigation expert, nor as a lawyer, but only as a business man. While we desire to guard the danger, we would much prefer to be assured that we are going to continue to keep what we have, than to risk it all on one throw, so we will have three times as much. But I think in answering your question in that way, Mr. Secretary, if that would be necessary, if that was one of the requests of the upper states that that be put in this pact, I believe it would be done rather than hold up the construction of the Boulder Canyon Dam.

MR. HOOVER: I think it is worth while discussing that with some other of the people from the Imperial Valley and see what their intention is, on a uniform holiday from litigation.

MR. CUFF: I will be very glad to discuss it with them. To be perfectly frank with you, I will probably have to hide to keep from discussing it when I get back.

MR. NORVIEL: I think Mr. Cuff and his neighbors deserve everything this Commission can give them as long as they live, one hundred and nineteen feet below the surface of the sea.

MR. Mr. Thomas C. Yager, representing Coachella Valley County Water District.

MR. YAGER: Gentlemen of the Commission, the Coachella Valley is to a great extent in the same position as the Imperial Valley, and it has lands to be brought into cultivation, not now in cultivation. There is a considerable acreage in the valley, which in reality is the Northern end of the Imperial Valley, for which the people have been making an effort to procure water from the Colorado River, and they^{have} expended money and contributed money to investigations, to the Reclamation Service, believing as they did, and do now, that they have put that money in the most reliable channel that they could to get a report from the Government department, with its competent engineers, - a report which they could rely on. That report has been made and the people there do rely upon it, believing that report to be an exhaustive and comprehensive report and that they can rely upon it. They have had occasion to go over the proposition with Mr. A.P. Davis and realize that he is an engineer that understands their problems there and he has reported

upon that to them. We are here, therefore, Mr. Secretary, to urge that this Commission in its deliberations, or in its final pact, do nothing that will interfere with the immediate construction of the Boulder Canyon dam, the dream that the people of the Southwest have had for sometime, and which that report states is possible and feasible from a cost standpoint and an engineering standpoint. We find in that report that there is water in the Colorado River watershed for all of the irrigable acreage and we believe that the upper states should not interfere with those of the South under such circumstances in preventing the construction of the Boulder Canyon dam, and allowing that valuable area to be put under cultivation. I have nothing more, Mr. Secretary, that I could offer or suggest, that would be of any help at all to the formulation of any pact, but that it is our one desire that the Boulder Canyon Dam be immediately constructed so that this development may proceed without delay. Thank you.

MR. NORVEIL: Mr. R.W. Blackburn, representing the Coachella Valley Association, the Chamber of Commerce, Coachella Oasis and former Senator, desires five minutes.

MR. BLACKBURN: (representing bodies named) Mr. Secretary, members of the Commission, Ladies and Gentlemen, I had in mind, when I was called upon, to say as a representative and spokesman, of the Farm Bureaus of Coachella Valley, that I would represent the farmers, and speaking as a member of the Association of the Chamber of Commerce, I would speak for the best interests of Coachella Valley, and the question does come up

that was asked Mr. Cuff, as to whether or not his people, or the people that had been spoken to in the Imperial Valley, would subscribe to the policy mentioned, and ~~waite~~ any priority or right in new development, and that question is one that I will have to admit that I am afraid of, and I would answer it with more hesitancy than Mr. Cuff. Our position in the Coachella Valley is the same as that of the people in the Imperial Valley. If they have a flood, we will have a flood also. And as Mr. Cuff stated he would be 119 feet under water, why ~~we~~ would be at least 100 feet under water, because the 100 foot line runs through our country, and their problems are our problems.

We have at the present time about one-tenth of our area under cultivation, and our needs are urgent. Our engineers tell us that at the present time, we are using more than our regular supply of water from this source, and our supply of water is from the artesian wells, pumped wells. Our engineers also tell us, at the present time that the supply is diminishing year by year, and we realize that from the lowering of our wells. Now, the only source of supply for putting in the rest of our area in the Coachella Valley is by securing water from the Colorado River, so naturally we are very much interested in this project, and we have been interested for a number of years, and we hope that an agreement can be reached. In fact, we have more faith in this Commission than I have heard expressed in the last few days. We feel that you can reach an agreement, or

a pact, between the seven states, and we feel that you will successfully fulfill that commission and we are willing to do this, I am quite sure, in such a time as it will take. It may not be done in the time allotted, one year, it may take five years, or it may take ten years, but we would subscribe to the policy of waiving any priority or right in the useage of water in putting our lands in cultivation, and the lands in the upper part of the state, until such a time as a pact is agreed upon, and if that pact did not perhaps take longer than twenty years, I think we could do that, and the only reason that there is any hesitancy on my part in coming out for that proposition is a question of financing our project. If it were possible, and it will be necessary for us to raise it by a bond issue, perhaps eighteen or twenty millions of dollars, to put a canal through our valley, if it were possible to secure this money, with this in there, I am quite sure the people of the Imperial and Coachella Valley would all agree to it.

(Mr. Norviel called upon J.A.Dobson of San Diego, representing the Chamber of Commerce of San Diego and Mr.Lucius K. Chase, representing the Los Angeles Chamber of Commerce, and there was no response from these gentlemen)

MR. NORVIEL: Mr. John L.Bacon, Mayor of San Diego, representing the Southern section of the League of Municipalities, Farm Bureaus and Districts.

MR. BACON: Mr. Secretary and members of the Commission, I had supposed that I would be given an opportunity tomorrow

morning and had wished to prepare more carefully a resolution which was adopted by a meeting of the California delegates to this conference. As I am called upon at this time, I hope you will indulge me in speaking from notes. A meeting was held of the representatives here present from California and this resolution was adopted without a dissenting vote.

(Thereupon the resolution was read by the Speaker, as follows): "We approve the construction of the Boulder Canyon dam in accordance with the recommendations of Honorable A.P. Davis, Director of the Reclamation Service, and submitted to Congress by Secretary Fall, and without prejudice to the rights of any of the other states, or our international obligations."

Practically a similar resolution was adopted at a meeting at which I had the honor to be chairman, held in Alhambra last week, at which representatives from the various municipalities, farm bureaus and other organizations in the State of California were present. Almost a similar resolution was adopted at the League of California municipalities. I am simply quoting this to show the sentiment that is prevalent among the people of California. Personally, I would hesitate to give to or to attempt to give to this Board this Board/any information regarding the engineering features, because they have information which so far surpasses in accuracy any we have, it would be presumption on our part even to attempt such a thing, but I would like to call attention to one or two of the dominant features.

Imperial Valley has a population, which is almost equal to that of the State of Nevada. It stands in deadly peril of being wiped out. Those are the facts. They cannot be contradicted. When we stop to think that at one time that river flowed into that valley and that through the silting up of the river bed, it broke out on the other side, and that through centuries the evaporation of that water, it finally laid there and left the bed of that basin which is now under cultivation, and that through repeated silting up of that riverbed, today there is imminent danger of its breaking out through its former opening and going back into the Imperial Valley, the facts are almost appalling. As you have been told here by one of the Imperial Valley representatives, if that river breaking through, as is perfectly possible, parts of that Imperial Valley would be 100 feet under water.

The Colorado River is a great national asset. Imperial Valley is part of that asset. It would seem as though, then, it might be developed, We should protect ourselves from the impending danger that is ever present today. We feel the situation so seriously in my section of California-- and I can speak for about one hundred thousand population there-- that we are absolutely back of the Imperial Valley in anything they ask for. We have interests probably only in properly developing the country, but we are willing to forego any such claim in the face of the claim we believe the Imperial Valley has. They need that flood protection and for that reason we feel

that the water necessary--- the work necessary to solve this difficulty, is in the so-called Davis Report. We believe it was impartially made, by as able a man as could possibly be had to gain the data, and we believe that it is the true solution of the difficulty.

Personally, I believe that there is enough water in the Colorado River to supply every possible irrigation project in the Colorado River Basin. I can see no obstacle whatever to the Imperial Valley in waiving all rights, all priority rights for the next twenty or twenty-five years or even longer, that could be set up through the development of that Boulder Canyon Dam. The practical difficulties do not seem to be so great when it comes to the distribution of that water, as when it comes to the legal difficulties. It looks as though it is time to take steps.

We are asking for the construction of that Boulder Canyon dam as the real, logical, natural step in the development of the Colorado River; in other words, the solution might be summed up in two words: "The Davis Report"

I thank you.

MR. NORVIEL: That will conclude the hearings for this evening. We will adjourn now until 9 O'clock tomorrow morning, at the Federal court-room.

Phoenix, Arizona, Hearings,
Fourth Session

Friday, March 17, 1922.

9.00 a.m.

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(Thereupon, at the hour of 9.00 o'clock a.m., March 17, 1922, and pursuant to adjournment of last night, the Colorado River Commission was duly called to order in the rooms of the Federal Court Building at Phoenix, Arizona, Secretary Hoover presiding as Chairman.)

(The first witness of the morning session was A.G. McGregor, of Warren, Arizona, who presented his plans for the development of the Colorado River, at the opening hearing Wednesday afternoon. He desired to be heard, he told the Commission, to correct a mistaken idea or impression as to the policies of his plan. Many had been led to believe, he said, that his plan gave power rights over reclamation in the allocation of benefits. What he intended to say, he added, that power was necessary for irrigation purposes, and that the use of cheap power would add more irrigable land in Arizona than all possible diversions. Power, therefore, was the vital consideration, he concluded. This gentleman spoke before the arrival of the Reporter, and this is the newspaper reporter's version of his statement.)

MR. NORVIEL: Mr. Secretary, I take pleasure in introducing Senator Charles M. Roberts, of this state, whose friends delight to call him "Charlie" even yet.

(Applause)

hundred feet; a country where pumps have been put on and used, which have used gasoline as a fuel, to raise that water. It seems to be almost impossible to have any effect upon the volume of water in a great deal of that valley by pumping it, and in other places there seems to be very little water. In one place 1,600 gallons of water have been pumped a week, and you cannot notice that there is any diminution in the stream. But the price of fuel, the price and cost of raising that water, makes it absolutely impossible for the farmers to meet this condition. We believe that with a very cheap power, electric motors to run these pumps, that with those you will develop more homes in Arizona, and more irrigation, than it will be possible to develop by gravity water, no matter how high you raise your dams. And the thing we wanted you to consider was the necessity, the need and the need now, of the power for these farmers and people who live in Arizona. You will remember that we are located farther from the fuel of the country; we have no coal, no oil, we have to ship the coal from Colorado and New Mexico, and the oil from California. We need power worse than any other place in the world. It costs more here than any other place in the world. It is the most necessary thing, and if we could get some action whereby we could utilize some of the wasted energy of the Colorado River upon these farms, there are hundreds of thousands of acres in my own country, - I would say at least 200,000 acres in that valley, - which you will immediately put into cultivation, if you will

supply this power. The same condition applies in Pima County, and in parts of Santa Cruz County, and in parts of Yuma County. And, gentlemen, if it were possible to get \$20 unit power in Arizona, I believe the power developed in the Grand Canyon would create more irrigated land, and be the means of irrigating more land in Arizona, than the development of the water as far as you can by gravity, and we urge this, and we urge this commission to find some way whereby the people of Arizona can utilize this power, and now. We would ask you, to see if it is possible. We would rather see the Government control and not private monopoly; but ^{if} it is impossible to reach that condition, and under the conditions that exist today, we would rather have private capital develop some of these falls and projects, and furnish Arizona the power which she so badly needs and needs now; and we would ask again, and we would demand that Arizona shall have all that she needs of the resources in her border, power and water both. We hope that whatever this Commission does and approves, that it will not restrict Arizona in the resources which are ninety per cent hers, and under the laws of God and Man she is entitled to them, now and forever. While we don't want anything that we cannot use, we would ask that whatever regulations are made, that the welfare of Arizona's future be considered, and that her power be not taken away to countries which need it less than she does. With the growth of our industries at home, and the growth of our state, and the development of it, the future is going to demand the use of more power than any other area

MR. CHARLES M. ROBERTS: Mr. Chairman and gentlemen of the Commission: Being an ordinary Arizonian somewhat acquainted with the conditions, in a practical way, with the supply of the river from its headwaters to the Mexican Border, I would like to call the attention of the Commission to a few things which I think it may be well for them to consider at this time.

I do not see any particular reason why the lower states along this project should apprehend that the states on the upper Colorado would impair them in their rights. As a boy, when I was familiar with the headwaters of the Grand and the Gunnison and was working through that country, I found on those mesas, where irrigation was used, where the land had been reclaimed this condition, - sometimes it really looked as if there was more water developed and came out under those mesas in springs and seepage than there was went on them. While I agree with Mr. Davis, head of the Reclamation Service, that there must be some loss in water, I don't believe, with all the additional land of Arizona, Utah and Colorado, that can be put under irrigation, that it will hamper the development or be perceptible in the diminished stream of the Colorado.

Now, the thing that I wanted to bring up before this commission, is something my friend and fellow countryman, Mr. McGregor just spoke of. I probably live in the finest valley of land in the West, the Sulphur Springs Valley, being about one hundred miles long and thirty miles wide, a country where we have no gravity water; a country where now here and there wells have been put down a distance of from thirty to one

we have in the Southwest.

Mr. Chairman and Gentlemen, I thank you.

(Applause)

MR. NORVIEL: Mr. Secretary, I take pleasure in introducing to you the next speaker, coming from Southern California, one of the best-known, most loved and most highly respected men, I presume, in California,--the President of the Chamber of Commerce of Los Angeles, and a dynamo of energy, Captain John D. Fredericks. (Applause)

MR. JOHN D. FREDERICKS: Mr. Secretary and Gentlemen: I will take very little of your time. It seems to me there has been quite a number of issues presented to you which are not possibly necessary for consideration. You may, however, wish to know the sentiment of the people of this community, as it may assist you some if you know that sentiment. I know matters of engineering cannot be determined by public sentiment. For that reason, I will express to you the opinion or sentiment or conclusions of the Los Angeles Chamber of Commerce in some of the particulars involved; and those conclusions are not newly formed nor have they been hastily formed. They were formed some six or eight months ago, and they have not been changed by the investigations and discussions since then, although our minds have been entirely open. We maintain on the Board of Directors and as one of our standing committees, a committee known as the Colorado River Committee. We have maintained that committee for two years. The purpose of it was to study the Colorado River situation, in order that we

might be able to advise our constituency and such bodies as this in the premises.

MR. Chase, who is here present, an attorney, well qualified in irrigation matters, can give you any detailed information that you may desire, I think, and will be very glad to assist you and answer any questions you may ask along technical line. It will be my purpose simply to convey to you the position which the Los Angeles Chamber of Commerce has come to upon this matter.

First, and the first thing in importance, we have considered the Imperial Valley situation, and we have concluded and put ourselves on record as in favor of whatever steps may be found necessary to speedily remedy the danger under which that valley now lives. That is the thing that we put first.

Second, and possibly very closely connected with it, is the development of the waters of the Colorado for irrigation and power. We are not at all selfish as to where that water shall be used. We believe that the States of Colorado, Arizona, Utah, and all of the others, have rights which should be considered in the use of that water, and we are perfectly willing to accede to them the rights which you gentlemen here, after deliberation, are able to assign to them, and if we have any selfish desires in the matter, they will be as easily conserved by the development of Arizona and Colorado as they will be by putting water upon California, for it will all run down the hill into the port of Los Angeles eventually, and we

will get the benefit of it. We want to build up the port of Los Angeles.

As to where the dam should be placed, we have come to no definite conclusion as a matter of record, although, personally, I have a preference, but we believe that is an engineering problem that you will draw your conclusions from; that it is within your province to draw conclusions upon that subject, after listening to engineers who are qualified to advise you. But we pledge you here, and I think I may say that the Los Angeles Chamber of Commerce represent the business interests of the City of Los Angeles--we pledge you here that the Los Angeles Chamber of Commerce will be back of any conclusion that you come to as to where that dam shall be located, and how it shall be operated and erected. I am going to go a little further and give you my personal conclusion. As the President of the Los Angeles Chamber of Commerce, that while the body is inclined to the belief that private enterprise should not be interfered with by Government operation or competed with by Government operation, as a principle, still, in this particular, we have come to the conclusion--I have come to the conclusion, I will say, that there does not seem to be any other feasible way, than to try first to have the Government construct the dam at Boulder Creek. (Applause)

And to try in all earnestness and endeavor, if possible, to secure the appropriations from Congress to do it. Having been back in Washington, and knowing that we are rather

the tail end of the dog in things, I know it is not going to be an easy thing to get Congress to make that appropriation. Now, I think that is our position; those are our views. If I have not covered any point that is non-technical, that you would like to have me cover, I would be pleased to do so at request. Otherwise, if there is anything of a technical nature in regard to what kind of a bill you could prepare, or how you could prepare it, I am sure Mr. Chase will be at your service, and you may use him in any way you wish, or ask him any questions you wish.

I want to add further this: While we are not attempting to pass upon the engineering questions, we have a very high regard of the opinion of Director Davis, upon an engineering question.

A COMMISSIONER: Captain Fredericks, I have heard since I have been here in Phoenix, the view expressed that if the Boulder Canyon dam or any other dam were placed upon the Colorado River, that the power will be permanently taken away from the territory in which the power is developed. Now while it probably does not enter into the province of this Commission, I have an understanding-- Am I correct in that understanding, that Los Angeles is perfectly willing that the power should first be used where developed, in preference to taking it, say to Los Angeles, or some state remote from the place of development?

MR. FREDERICKS: I do not know that I entirely comprehend

your question, but if I do not, you can try again and I will try again. The Los Angeles Chamber of Commerce represent the business interests of Los Angeles, and that is separate and distinct from the political or official representation, and I think that I, in all fairness and justness and frankness, can say that we speak for the business interests and we suggest that the Government build this dam. We have gone on record, passed our resolutions to that affect. We have talked it over with our people, and there is no apparent discord. The Government should build a dam at Boulder Canyon, if it will; that then the question of who shall get the power, who shall distribute it, shall be left to the particular governmental department; the Government should determine after the dam is built or while it is being built, what agencies shall distribute that power. Personally some of us have one opinion as to what agency should distribute, and personally some of us have another. We are all perfectly willing to come up to the throne of justice upon that point and fight it out.

THE COMMISSIONER: I don't refer to any agency that distributes it; I refer to the local apprehension that the power, having been taken, for example, to Los Angeles, and there consumed altogether, that in future years to come Arizona would find herself without power to develop her industries, because of the necessary prior consumption, priority of consumption in Los Angeles.

MR. FREDERICKS: Prior consumption of electric energy entails no right.

THE COMMISSIONER: I had heard that theory expressed, and as I had understood it upon some specific occasions Los Angeles was perfectly willing that preference shall be given for the consumption of power where it is developed.

MR. FREDERICKS: That will determine itself. One of the serious features of the development at once of a great supply of power at Boulder Canyon is going to be the selling of that power quick enough to keep it from ruining the people who are trying to handle it. That power has to go where there is a market. Los Angeles had rather see Arizona develop. By develop, I mean everything that the word implies, and the other back country. We would rather see that developed, probably, than anything else, because, in selfish terms, it means more to us. We cannot live off of each other. We want a big, strong, rich country around us, and we have no selfish desires in the way of-- Well, they would not be selfish desires, they would defeat themselves if we tried to take that into Los Angeles, which would leave this a desert.

MR. HOOVER: Captain Fredericks, isn't it a pretty safe generalization if we regard agriculture having precedence over power, and the power developed on the Colorado River is therefore a by-product of irrigation; we are going to be more troubled in the next one hundred years/ⁱⁿfinding a market for that by-product of power than water for irrigation? In other

words, power development for one hundred years is going to be in excess of the needs of the community?

MR. FREDERICKS: Mr. Secretary, the man that can look into the future and answer that question does not exist; he can only guess. We have thought, in Los Angeles, that we had overbuilt many times, only to find that when the time came around, that we had underbuilt.

I believe--Now, I hope you who are not people of Los Angeles, will not think me over sanguine, that there will be a market there for the power when the power is ready, but that is a long way; it is a long way to go in every respect, and it is a big problem. If I were personally putting my money in the erection of a power project, that would be compelled to throw its products into the market, into this market, five or six years from now, 700,000 new horsepower, I would rather spend somebody else's money doing it than my own, if I could get the benefit of winning and not losing.

MR. HOOVER: I thank you.

MR. NORVIEL: Mr. Secretary, I think we have one more gentleman from Arizona who desires to address you and the Commission, Mr. George J. Durminson, who expressed a wish that he might occupy five minutes in explaining a plan for the control of the Colorado River, that has not yet been presented.

MR. GEORGE J. DURMINSON: Mr. Chairman: It has been pointed out here that there is a great need of preserving the Imperial Valley from floods, and some years ago, in the year

1892, I worked in a coal mine in the Grand Canyon, and the particular point I visited and looked at is this point, and bringing those two things together, it brought me to think that I possibly had an idea how to construct a temporary dam over the Grand Canyon, cheaper than anyone else after all, although I am very well aware that Mr. Hoover is a great engineer himself, but I don't know how much of a coal miner he is. (Laughter)

Now, this point is a very steep place. You can practically look down a mile, straight down, and see the river right under you. I decided it was possible to go down there a few thousand feet and dig two holes in that wall, and then turn right around and go East, starting from the West, then to the East, running two, for circulation of air, as most of you know; then as many more as you wished to put in, and thereby make it very easy to, in about one minute's time, tumble down a big dam in the Colorado river. That is about all, I guess.

What rights the different states have, that is not a thing I care to speak on, particularly. (Applause)

MR. HOOVER: I thank you.

MR. NORVIEL: Mr. Secretary, since the other speakers are, most of them, from California, I feel that I should ask the indulgence of your Honor and the Commission and the gentlemen present, as a matter of personal privilege, that I might say something perhaps in justification of some of my statements in this matter, and if you will listen, I would be ^{very} pleased

to have not more than three or four minutes.

MR. CARPENTER: You mean of your goings-on?

MR. NORVIEL: I was appointed as commissioner for this state, and, as always has been my habit and custom, I began at once to work. I have been a working man all my life, and I have worked hard. I have not indulged myself much in talking to the public, nor in any press agency matters. The people of this city rarely know when I come and go. I do not go to the newspapers, and they do not find out when I come and when I go.

I set about to work and try to find some plan or to arrange some method of procedure. There was no precedent that I could find like the one we are working for, a compact between states, so I diligently searched the records. I had Mr. Davis' reports, reports of the Reclamation Services, and all of the other reports I could obtain, and I searched them diligently. I arrived at certain conclusions; then I tore them up and threw them away, and went again, and I arrived at further conclusions, and soon until I had framed a paper containing several propositions, which I carried to Washington and presented to the Commission, not that I, myself, or anyone else here was definitely committed to those things, but I thought it would be better to present something as a basis to work upon, or to at least give some expression or thought to.

This plan or proposition, or the propositions that I presented to the Commission, were not for publication. I

suggested to the Commission at the time, and to the Secretary, that it be not released to the newspaper men who were there, who asked for a copy, and whom I refused.

As I stated at the time to the Commission, it was simply submitted for consideration, either for rejection or any other sort of consideration the Commission desired to give.

However, one of the reporters, it seems, must have secured a copy of it,--how I do not know, and it was reported in the "Los Angeles Times," and this I desire to say for the benefit of my friends from California, that on careful study, perhaps upon more careful study, even, of that document if it might be so-called, will disclose less things to be criticised than it has received already. I do not yet feel like saying it was entirely a failure, though the Commission rejected some of the propositions, and justly so perhaps, and I am very glad they did, for I am arranging others.

Now, at home I have been severely criticised, especially by my friend here, by my quondam friend Mr. Maxwell. He has criticised me openly and picked flaws in what I have said. He has said that I committed the State; that I gave away all the rights of Arizona to other states. Of course, I can only deny that and say that I did not do any such thing. There was nothing in the paper that would warrant such a statement. He has not only criticised me in the paper and on the forum, but he has written letters to everyone, I think, to whom he

thought it might have an influence, even to our Congressmen in Washington, severely criticising me, and I simply say this in justification of my position,--that what I presented to the Commission was merely for their consideration and not even that I, myself, was committed to it, because I knew that further discussion might raise questions that would enlighten me further. But I desire to have some plan^{ts} present to the Commission for a start. I feel yet that many of the criticisms that have been offered orally and through the newspapers are absolutely unwarranted and more complete and careful study given to the matter would probably form in the minds of my critics a different mental condition, and I am constrained to feel like someone who wrote some time ago that "shallow draughts intoxicate the brain; but drinking largely sobers us again; a little learning is a dangerous thing; drink deep, or taste not the Pyerean Spring."

I believe that a less critical, less vicious, less unreasonable mind, would not have been so severe in criticism, but I desire to make this statement this morning, that my friends in Arizona and in California may not take it for granted that the lower states were being deprived of all their rights, for the good Lord knows that I desire to preserve for Arizona, if not for California, all the rights she is entitled to, and to the best of my ability, and I believe that my friends who have known me for many years will say that I am at least more or less honest in my endeavors, and will feel I

have tried to do my best in this matter.

I thank you. (Applause)

MR. HOOVER: Now that Mr. Norviel has felt it desirable to clear that matter up, I would like to make some addition to his statement: I have noticed the criticism of Mr. Norviel's suggestions to the Commission. I would like to call the attention of his fellow citizens to the fact that Mr. Norviel's plans, such as they were, were considered too favorable to Arizona by the other states, and that, far from yielding anything from the people of Arizona, the Commission had not been able to come to a conclusion on the basis of the demands made by the whole of the seven states, as against each other, and that Mr. Norviel had not failed in any contention on behalf of the State of Arizona. If we had had a general yielding of the states' rights, amongst the seven states, during the week we sat in Washington, we would not be sitting here today, and no one state, so far as I am aware, has yet yielded sufficiently to lead the way towards an ultimate settlement.

I make that statement in support of Mr. Norviel's very-properly-taken position that he has not in any sense yielded the position of Arizona as against any other state.

MR. CALDWELL: Mr. Chairman, I don't know whether I should say anything. I don't want to inject myself into this matter, but I am afraid the impression has been given here in Arizona to some extent that the Commissioners are quibbling and bickering over small matters.

I don't think that I objected, for one, to Mr. Norviel's presentation, in Washington, on the ground that it was too favorable to Arizona. I don't think that there is anything that is too favorable for Arizona or for California. I want to say merely that I have been trying to keep my mind open in these matters. I have not been able to agree entirely with all the views that have been expressed by my fellow commissioners, but I have not once, if I know it, lost track of the welfare of Arizona or California or Nevada, or any other state in the basin.

I just want to make that general statement; I want you to accept it without further amplification.

(Applause)

MR. CARPENTER: It occurs to me that Mr. Norviel has taken this too serious. Newspapers have to have stuff to fill their columns.

Now, as a matter of fact, I think, Mr. Norviel, it is a sign you are doing something, if they begin to jump upon you.

As far as our friend of long standing in the irrigation world is concerned, sometimes in the advocacy of measures in which he is interested, he is prone to say unkind things about people, which he later regrets.

No member of this Commission, I may say to the people of Arizona, looks upon Mr. Norviel as other than a high-mind-

ed, zealous, hard-working member, who is intensely interested in the welfare of his state, in session and out of session, but not offensively so, and any criticism aimed at Mr. Norviel I feel must be aimed more because the critic does not fully understand what he is driving at. I should say he does not fully understand the subject matter, rather than anything personal,--any personal criticism of Mr. Norviel.

I think, Mr. Chairman, frankly Mr. Norviel should have no fear of any member of this Commission, or any member of the good-thinking people of this community taking these criticisms seriously. Every member of this Commission who has ever been in public position has had to be shot at. That is the popular recreation of certain newspapers. I don't think you or anybody else should take it seriously; they are advertising you. (Applause.)

MR. NORVIEL: I thank you. I might add I have prepared other papers for submission to the Commission. I am not infallible. These may also be vulnerable, but I propose to submit them to the Commission with a little more close supervision, that they keep them to themselves until we can put them into shape or thrust them into the wastebasket. Perhaps I will not then be so severely criticized.

I now take pleasure in introducing Mr. W.J. Hollingsworth, representing the California Real Estate Dealers Association. Mr. Hollingsworth. (Applause)

MR. W.J. HOLLINGSWORTH: Mr. Chairman and Members of the Commission: The National Association of Real Estate Boards

held their annual meeting in the month of July. It was my privilege to attend part of the deliberations of that meeting. One of the subject matters before that meeting that was discussed in a very lively manner, was that of reclamation and irrigation. And, out of that discussion, there was a resolution formed and adopted, a copy of which resolution I have, and with your permission I would like to read and present to this Committee.

(Reading) "WHEREAS, it is now of vital importance to the States of California, and Arizona especially, that annual floods in the Colorado river shall be prevented and irrigation districts in such states protected from destructive flood waters; and such protection can be provided by storage reservoir construction which would provide water for the irrigation of at least a million additional acres in the lower Colorado River districts; and such storage reservoir construction would also provide large quantities of hydro-electric power needed for the commercial and industrial development of the Southwestern states, thus conserving to a great extent the supplies of coal and oil, and:

"WHEREAS, the States of Wyoming, Colorado, Utah, New Mexico, Arizona, Nevada, and California, as well as Lower California in Mexico, are all interested in the waters of the Colorado river and its branches, and earnest cooperation between these states is necessary in order that early action

may be secured to bring about the reservoir construction desired, and; such proposed work would furnish employment for many thousands of men now idle and would also open up to settlement large tracts of land suitable for farm homes for world war veterans.

"RESOLVED: by the National Association of Real Estate Boards in convention assembled July 15th, 1921, at Chicago, Illinois, that this association urges such action as may be necessary to hasten the inauguration of such proposed reservoir construction, through satisfactory cooperative efforts in which the U. S. Reclamation districts and companies and municipalities interested may participate promptly and effectively, and that realtors in the leading cities in the Southwest interested in the districts to be affected by Colorado river irrigation and power projects are hereby urged to cooperate and harmonize conflicting interests wherever found in order that this great constructive work of land development may not be delayed."

This resolution was formed and adopted by our National Association. I wish to say that we found a lively interest among land owners and land operators, not only on the Pacific Coast, but all through the United States, and we found that as time goes on from year to year, when we meet in National Association to discuss that topic, that the men of our profession are becoming more and more enlightened and more and more interested in this work, and we think that we can prom-

progress of this great development work."

These two resolutions I will submit, and I wish at this time to verbally pledge you the support of the Real Estate men and dealers in this great project. I realize there is no other subject that interests us so much today as the reclamation projects along the Colorado River. Therefore, to say it is of vital interest that these projects shall be carried through, as quickly as possible, to protect the people in Imperial Valley from the eminent danger which is before them, is what I wish to offer. (Applause)

MR. EMERSON: I notice in your first resolution you spoke about "earnest cooperation between the states," What was your idea of that cooperation, from a California standpoint? We note that this resolution from your Oakland meeting was about the first one in California that has not laid stress on the building of the Boulder Canyon project, first, last and all the time, without reference to anything else, and your verbal remarks indicated the same thing.

MR. HOLLINGSWORTH: My earnest cooperation-- What was the first question you asked?

MR. EMERSON: What was your idea about "earnest cooperation between the states"; what would that be?

MR. HOLLINGSWORTH: The engineers have reported that there is plenty of water for everybody. We accept their report and believe it to be true, and our cooperation is that we assist in harmonizing any diversifying opinions. We are perfectly

ise cooperation of the Real Estate Boards all over the United States in this project. Later on, in January of this year, the State Association of Real Estate Boards held their meeting in Oakland, California. They passed a similar resolution, which, with your permission, I will read:

(Reading) "WHEREAS, the National Association of Real Estate Boards at its annual convention in Chicago, July 15th, 1921, adopted a resolution declaring that it is of vital importance to California and the Southwestern states, that annual floods in the Colorado river shall be prevented and storage reservoirs provided, and, also, that Realtors in the leading cities in the Southwest interested in the districts to be affected by Colorado river irrigation and power projects, are hereby urged to cooperate and harmonize conflicting interests wherever found, in order that this great constructive work of land development may not be delayed."

"RESOLVED, by the California Real Estate Association in annual convention assembled at Oakland January 20, 1922, that the action of our National Association as above stated is heartily endorsed.

"RESOLVED, That the officers of this association are hereby directed to take such action as may be necessary to secure the cooperation of state realty associations and realty boards in Colorado, Utah, Wyoming, Arizona, New Mexico and Nevada in order to assist in the adjustment of the many problems affecting Colorado river projects and thus hasten the

willing-- We think there is enough water--we are willing that it shall be adjusted equitably to all parties.

In regard to the Boulder Canyon project, as you will remember, at the time of our convention at Chicago, the report had not been made, the recommendation of Mr. Davis had not been given. I am not sure whether that recommendation was out on the 20th day of January, when we had our meeting in Oakland; but, so far as I know, our people were all ready and willing and anxious to support the building of the dam at Boulder Canyon. (Applause)

MR. EMERSON: What was the idea of the Real Estate people in regard to the formation of a compact? They wish to see the Boulder Canyon dam constructed at the earliest possible moment, no doubt; would they submit that this Commission should subscribe to a plan for the construction of this dam at the earliest possible moment, without anything further, without any protecting agreement, for instance, to the upper states?

MR. HOLLINGSWORTH: I don't think it is in our province to do that. We are willing to leave it to the Commission, that they shall do as they see fit.

MR. EMERSON: The Commission is here, I understand it, for constructive suggestions.

MR. HOLLINGSWORTH: Will you repeat your question again, so I may understand it clearer.

MR. EMERSON: I will explain. This question comes up be-

cause I have heard, both in December and since being in Phoenix, the oft-times repeated assertion by California interests that the Boulder Canyon Dam should be constructed first, and as soon as possible; and it has very often been stated, along with that statement, that they cannot see how the construction of that dam would adversely affect other interests upon this river. Possibly some of us in the upper states can see that. What I want to determine is what is California's idea of cooperation.

MR. HOLLINGSWORTH: Our idea is that the construction of a dam is purely an engineer's question, and we are willing to leave it to the engineers. If the engineer's report is that Boulder Canyon is the place to construct that dam, we say we are with them, --with the engineers.

MR. EMERSEON: Just a moment, Mr. Hollingsworth. That is not answering the question. This Commission is seeking to find a form of compact that can be decided upon by these eight members, to be taken back to the Congress of the United States, for approval and ratification, in order that it may save litigation in the future. What I want to determine at this meeting, if we can at this meeting, or in the Los Angeles meeting, what California's idea is of the compact to be drawn; if they want us to subscribe to the construction of a great reservoir on the lower river, without some kind of protecting agreement in words that upon ratification will become binding for protection of the upper states.

MR. HOLLINGSWORTH: We are perfectly willing for you to go into an agreement to protect the upper states. We don't want to cut the other states out of anything that is coming to them. If you see fit,--

MR. EMERSON: (Interrupting) Will you real estate people be willing to say so at this time?

MR. HOLLINGSWORTH: Yes, sir.

MR. JOHN D. FREDERICKS: I am going to say also that the business interests, represented by the Los Angeles Chamber of Commerce, are perfectly willing, if it be legal, practical and feasible, that reservations or stipulations shall be entered into which will entirely protect the upper states. Absolutely, it should be done, and we believe in a square deal.

MR. HOLLINGSWORTH: We are ready and willing and anxious, if that is the way you would like to have me state it.

MR. JOHN D. FREDERICKS: If that can be done; it may be it cannot be; that is, for you gentlemen to work out. We will help you. Mr. Chase is here. He is here at your service.

MR. HOLLINGSWORTH: We sometimes wonder, Mr. Commissioner, why, in this Colorado River Basin, there should be any such thing as lines or state lines, It is one big project. We are willing to eradicate those lines and handle it as one great, big unit. (Applause)

MR. HOOVER: Mr. Norviel, I suggest that we ask Mr. Chase to speak and see if he has something constructive.

MR. NORVIEL: Mr. Secretary and gentlemen, I desire to in-

roduce to you Major Lucius K. Chase, representing Los Angeles Chamber of Commerce. (Applause)

MR. LUCIUS K. CHASE: Mr. Secretary and Gentlemen of the Commission: I am not entitled to that honor. Gentlemen, as suggested, I represent, as Chairman of the Reclamation and Power Committee of the Los Angeles Chamber of Commerce, probably the sentiment of that organization, as stated by Captain Fredericks, which sentiment has been arrived at after a great many meetings, meetings that have been running over a period of three or four years, and at which meetings were present every interest--every conceivable interest involved in the problems of the Colorado River in its lower reaches, and tributaries and connecting branches, today. We had a series of meetings in Los Angeles, at which we again called together the interests we thought might be involved, so we could come here and speak with some degree of accuracy as reflecting that sentiment.

May I state, before discussing the pact, that we, of Los Angeles, are vitally interested in the protection of the Imperial Valley; we are vitally interested in saving that valley from destruction; and we are also vitally interested in developing our back country. We are just as much interested, if it were not for the fact that disaster stares Imperial Valley in the face--we would be just as much interested in the development of Arizona and Colorado, because, after all, gentlemen, our interests are interwoven. We do business with

Colorado; our business interests are in Arizona, and we want you all to prosper, because we realize your prosperity is our prosperity, and our prosperity is your prosperity.

Again, I desire before directing my remarks directly to the pact to refer to this one thought, and that is this: It has been suggested, --I want to say right now we want a pact made between the states, --but it has been suggested that in case this pact is not made, that there might be litigation involving the erection of the Boulder Canyon Dam that would last for a great many years. If it would, in its ultimate analysis, we would be absolutely at the mercy of Colorado and Wyoming; and we do not consider that we are exactly in that position, for this reason: There is not a decision in the books holding that an appropriator of water, an upper landowner, or an upper state, which may prevent a diversion of water in the lower reaches of the river. You cannot find a decision of that kind anywhere. All decisions point the other way. In case Colorado should institute an action against California, or undertake to prevent the building of the Boulder Canyon Dam, that would be, of necessity, instituted in the Supreme Court of the United States, and in that connection they would seek an injunction to restrain us from building the dam. Now, I venture to say that such an action would not interfere with such development; it would be thrown out of Court upon demurrer; the Supreme Court would not grant a restraining order because they could not state a case of action. We are not in that position. I feel we should clear the air of that.

However, with respect to the position of our friends in the upper river, we realize that their position is based upon apprehension and fear; they are very much fearful.

A COMMISSIONER: (Interrupting) The resolutions down in your lower country?

MR. CHASE: They very much fear that the State of California-- I do not think there we have any grounds to institute any suit against them, unless they are making an unreasonable use of water, just at the time when we were seeking to make proper development and delivery in our state. If we should institute such an action, we might hang them up in their development for a great many years. We do not want to do that. We do not want to do anything that would impede the development of Colorado or Wyoming. On the other hand, we do not want you to do anything that would impede the development of California.

There is plenty of water, as we understand it, for all of us. That being so, there does not seem to be much ground for a quarrel.

As I say, we reflect the sentiment of Southern California. We, some months ago invited Mr. Emerson and Mr. Bannister, of Colorado, to be present at a meeting of the members of our Chamber of Commerce. I think there were about 500 men present. Mr. Emerson and Mr. Bannister stated their position. At the conclusion of the meeting, I doubt whether there was one single man present who did not subscribe to the idea that Colorado and Wyoming were entitled to equitable apportionment

of the waters of that stream. There is no question about it; there is no difference of opinion. They are absolutely entitled to a portion of the waters of that stream.

Now, we come down to how this should be given to them, and as to what is in the pact. Now, we concede that the real scientific way of formulating that pact is to declare that all priority of right through the basin should prevail, because, if you declare priority of appropriation--I only cite priority of appropriation-- Now, I am referring to subsequent appropriations, that would cover priority of appropriation also, but priority of appropriation should prevail. If that is adopted, it would perfect all legal titles to water, both below and above. You, Wyoming and Colorado, who would want to take tomorrow to develop some project, would have a title to your water back of your project. It seems to us that is the scientific way. However, we feel we are willing to go one step further than that. We realize, Mr. Secretary, that this requires an act of Congress, and we realize to put over an act which would provide for the erection of a dam in the lower Colorado River, we must have the united support of the West. We do not want the lukewarm support of Mr. Carpenter; we do not want the lukewarm support of Mr. Emerson or the people of his state. We want their enthusiastic support. We want the enthusiastic support of the Senators and Representatives in Congress, and want them to keep back of this bill. We are not going to get it unless there is a little give and take here. I think we are ready to subscribe to this doctrine, if the Commission thinks

that it is necessary that we go this far. We are ready to subscribe to the doctrine declared here yesterday by Mr. Nickerson and Mr. Rose which I understand is something like this: We are willing to declare that the erection of a dam on the lower Colorado River, at Boulder Canyon, shall create no priority of right, arising out of the erection of a dam or arising out of the future diversions from the dam, as against the Northern states, in so far as diversions up there within the water-shed are concerned.

And, Mr. Secretary, right there I note you smile. We are willing, then, to ^{do} one step further, and we are willing to say there need be some appropriation outside of the watershed; the amount, however, of those appropriations, and the extent of them, to be fixed at this time by this Commission, bearing in mind that you must be fair to all concerned; bearing in mind that your pact must go before the State Legislature of California, and that it must go before the State Legislature of Arizona, and that it must be a fair proposition. We are willing to go that far. Then, we say, however, that there shall be--that our action shall create in your favor, up above, no priority of right, but that there shall be a parity of right take place during this period. And I should say we think there should be a limitation of time to be fixed by your Honorable body, perhaps 20 years; perhaps some other time, so that this condition shall not continue forever, because there must be a time somewhere where these rights must be fixed.

Then, we think, in case of a scarcity of water, in case it should develop at any time that there was a scarcity of water through drought, that then the water should follow the thought expressed by Judge Sloan yesterday, that during such a time the water should be equitably apportioned between the states, to the then appropriations--not appropriations, but then on the basis of actual use of the water, and to carry such a plan into effect possibly your compact should provide for the creation of a Board of three or five engineers, to be named by the President of the United States, or some executive officer of the United States, who should make such apportionment, and whose apportionment and declarations at that time should be final.

Now, that, in substance, is what we have to offer. It represents, I think, the united sentiment of all the interests in California involved in this transaction.

Now, the power rights, I want it understood by appropriation and user I specifically exempt the right for power purpose. As a matter of fact, at all our meetings in Los Angeles, where we have had present members of the City Council, members of our Public Service Corporations, members of the power companies and everybody interested in that, never has it been suggested that power should have any priority or should have any right at all as against flood protection or irrigation, and not until I attended this conference have I heard anybody suggest such a thing.

Now, that is the plan which we should suggest, and we

think it embodies the ideas of Southern California. Now, may I make this suggestion: We think that along these lines the Commission can come to an early determination of this problem, but then it will have to be passed up to the State Legislatures for ratification. Now, during the time of ratification by Congress and during the time of ratification by the State Legislatures, the entire Imperial country may be destroyed, and we hope this commission will come to an early understanding, and that they will pass to Congress the result of their understanding, and that a bill will be formulated for the construction of the dam at Boulder Canyon, on account of the immediate necessity, and in that bill there be the specific recommendations of this Commission for the construction of the Colorado River Dam. Shall we be restricted as to our rights? We wish to protect the rights of Colorado and Wyoming, so that they will get behind that bill for the construction of a dam at Boulder Canyon, and feel that their rights are protected, and give us their enthusiastic support.

And Mr. Emerson, in a question a few moments ago, asked what we meant by cooperation. I will say this: We want you to cooperate with us in the development of or in the saving of the Imperial Valley from destruction, and we want to cooperate with you and help you in putting through any projects you have in Wyoming or Colorado.

I thank you. (Applause).

MR. HOOVER: Mr. Chase, have you considered what the effect would be of a simple compact that no state should undertake to

initiate any action for a period of twenty years, and at the same time there should be no priority of rights as between states?

MR. CHASE: That is another way, I think, Mr. Secretary, of stating our proposition; that would be satisfactory to us.

MR. HOOVER: It has somewhat of a different legal bearing.

MR. CHASE: Well, we had talked it over before the gentlemen expressed themselves yesterday. Our idea is no priority of right should be in our favor.

MR. EMERSON: What would happen at the end of 20 years?

MR. CHASE: At the end of 20 years, all appropriators of water in the Colorado Basin would then have their rights fixed then as of that time, at the expiration of that time. They naturally, I suppose, would have priority as to then subsequent appropriations.

MR. EMERSON: The effect upon Wyoming,--Wyoming would be fixed forever, after 20 years?

MR. CHASE: I don't so understand it, for this reason: We do not undertake-- You shall not undertake to make any further developments up there. The effect of that will be merely that the appropriations made at the expiration of that time would have priority to subsequent appropriations. There is plenty of water anyway.

MR. EMERSON: Well, it happens that Boulder Canyon will store in excess of 1-1/2 years' flow of the Colorado River; that means priority established by this great reservoir, Wyoming and other states letting the water come down; that develop-

ment, after 20 years, will absolutely stop development in the upper states, according to my interpretation.

MR. CHASE: Now, Mr. Emerson, we are not asking for any priority of right in the filling of the dam,--merely a priority of right to put water on and irrigate in Southern California, about 450,000 acres of land; that will be the extent of our priority. You in Wyoming would have made your development and you would, to the extent of those developments, would have priority. We don't want this in any way to grant a priority to keep that dam full of water for 1-1/2 years, as against you.

MR. EMERSON: Mr. Chase, under the Wyoming law, that very thing would happen. If that reservoir was constructed in Wyoming, that reservoir would have the right to call for the flow of that river and to fill that reservoir each year, whether it is used or not.

MR. CHASE: Now, we all have different laws in all these different states, but, regardless of the law, get down to facts; we would not claim any priority arising out of that dam.

MR. EMERSON: You would not claim, still the compact would say just that.

MR. CHASE: You are going to create a new system applicable to the Colorado River Basin, when this treaty is made between the states, and is broad enough to cover these different propositions, it will supersede all laws of the different states upon points covered by the treaty?

MR. CARPENTER: Mr. Chase, under your priority theory, the

development of the states would become a mere contest of speed in the final analysis, wouldn't it?

MR. CHASE: Well, we hope you will develop so rapidly in the next 20 years in Colorado, in that 20 years you will more than keep up with us, and let me tell you this: We are going to get behind you.

MR. CARPENTER: I realize you are earnest in your purpose, but our country, God made it as it is; we have the mountains and the valleys, and do you realize it would probably be a century before that country would reach its normal development, as compared with a fraction of a century down here where development, is more favorable?

MR. CHASE: I assume, Mr. Carpenter, by the development of science, new areas up there might be subject to development, areas we do not conceive of now. There must be a limitation of time--we don't undertake, as a Chamber of Commerce, to say that 20 years is the proper time; that seems to be the consensus of opinion around here. I would assume that you and the Commissioners and the Secretary can arrive at a time which would be a fair limitation. I do not think that possibly we ought to fix the exact period. Now, this is true, if we have a period of that kind, a drought, your titles are not affected; we would all have sufficient titles to go ahead with the different projects. We must have some basis of title in order to properly develop these different projects. Unless we can pass the bond houses and attorneys, it is going to be very difficult to develop.

MR. EMERSON: You realize, do you not, under the present statutes, when you build a ditch of any kind in California, you take it with the full knowledge of the inherent rights of the upper states to develop their territory, and that is read into every title you have?

MR. CHASE: Well, we take it with that knowledge, but as a matter of fact at the present time we can see we have by virtue of appropriation, certain rights that are prior to any subsequent rights you can create in Colorado.

MR. EMERSON: You are also aware they were refuted in the case of Kansas vs. Colorado? Now, after all, are we not quarreling--

MR. CHASE: I am not quarreling at all.

MR. EMERSON: I am not arguing or talking or speaking of any unnecessary details, and borrowing unnecessary details, because there is sufficient water to take care of all requirements.

MR. CHASE: Yes, sir. Assuming Mr. Davis and his engineers are right. We have to leave it to you gentlemen, with the expectation you are going to solve them. We are giving you our views; we are laying down no hard and fast rules.

MR. EMERSON: One more question, Mr. Chase? Isn't it the view entertained by your Chamber of Commerce that all the commerce of the Colorado River basin will naturally flow down the grade in the tendency to get to the ports of the Pacific.

MR. CHASE: We hope so. (Laughter).

MR. EMERSON: I mean, in the natural course, It is your view that the development of the upper territory is essential to your welfare as that territory at your door?

MR. CHASE: Absolutely, Mr. Emerson, we want that territory developed; there is no question about that.

MR. CALDWELL: There is one thing I do not understand. I did not understand Mr. Rose yesterday; you quoted him today. You speak of priorities, and you couple that with, say 20 years or some indefinite period; you do not care to make that period definite in your suggestion, do you?

MR. CHASE: Twenty years seems to us fair, but as a Chamber of Commerce, we are not attempting to fix the time.

MR. CALDWELL: Now, you say you do not wish to establish any priorities during that 20 years?

MR. CHASE: For this reason, as I understand it, your apprehension is that when we erect that dam, or when the dam is erected, then we can turn around and stop your development on the upper reaches. We say we are willing to put ourselves in such a position we cannot do that; we are willing to hamstring ourselves to make you people feel easy.

MR. CALDWELL: As I understand it at the end of 20 years, you are going to take what you had secured by appropriation during the 20 years?

MR. CHASE: Yes. You would take whatever you had taken during those 20 years, and call it yours?

MR. CALDWELL: That is all right. Mr. Chase--

MR. CHASE: We take what we would have, less the storage, which would merely mean we would take the right to appropriate - assuming we have 450,000 acres additional land under appropriation, -we would take our rights in the waters of the Colorado, --sufficient water to irrigate this additional 450,000 acres, just as you in your state up in Utah would declare you had the right from this time on to the right to the water to irrigate that portion of your state which you had brought under cultivation during that period.

MR. CALDWELL: I do not make myself clear. Suppose, Mr. Chase, that down on the lower end you had irrigated in the case of 18 years, say, 450,000 acres of new land, and we had developed some or none, and still there was water coming down; and during the last few years we get in and develop a large number of acres, and say there is not enough water to irrigate 250,000 acres out of the 450,000 acres which you desire to irrigate. Is that what you mean by priority?

MR. CHASE: No. We claim no priority. That does not mean you will have the right to priority. It means we shall play the game fifty-fifty; there shall be--

MR. CALDWELL: I agree with your last remark absolutely; it is not supposed to, but just as soon as you go into the question of priority you have got

As a matter of fact, it is not supposed. Why not get upon a broad principle?

MR. CHASE: We are trying to get upon a broad principle of parity.

MR. CALDWELL: The idea of parity always appeals to me. I like that word. It sounds good. Cooperation. We invented cooperation up there in Utah; we like it, especially when on the head of a stream. Parity--Now, how did you understand Mr. Sloan's paper yesterday? Was it the idea that parity should prevail in times of shortage, as to dry years, for instance, or should it apply all the time, as soon as it was discovered that there was a shortage in the river?

MR. CHASE: I would not undertake to speak for Judge Sloan.

MR. CALDWELL: I am asking you how you understood it.

MR. CHASE: Personally, I should think it should apply to all kinds of scarcity of water. I should not think it should apply to present vested rights in Colorado or California. Now, up there in Colorado they have a vast acreage under cultivation--in Utah. I do not think we should undertake, in the compact, to try to affect present vested rights. You could not, if you wanted to.

MR. CALDWELL: Now, Mr. Chase, just another subject, and, by the way, I want to preface my question by saying I hope you will not think I am trying to start an argument. My friend Carpenter does all the arguing. Why object to diverse

sions out of the water-shed?

MR. CHASE: Well, I will tell you. We do not pretend to be omniscient in our country of California; we cannot see the future. We do not know. We apprehend that today it possibly would cost you too much to build tunnels to take the water out of the water shed, and that it is impractical in any except small amounts, but it may not be tomorrow.

MR. CALDWELL: It is very seldom, Mr. Chase, that an engineer has an opportunity to question the water users, so I am going to avail myself of this opportunity. You do not get the meaning of my question, I am quite sure. What is the objection, regardless of the difficulties; why do you object to our diverting water out of the--

MR. CHASE: (Interrupting) I think my prior answer answers that. You might take the whole river. If you did, where would we be?

MR. CALDWELL: In other words, what is the difference whether we use it in the basin or out of the basin?

MR. CHASE: Now, as an engineer, you know that you do not lose over a third in evaporation? $\frac{2}{3}$

MR. CALDWELL: Mr. Chase, I am not trying to ask questions that would lead anywhere. All I want to find out if you want the water applied where we will get the greatest good out of it; that is the point, isn't it?

MR. CHASE: We want it applied to the basin. We think that is the fair way of solving this problem; and for the further

reason, Mr. Caldwell, if the door is thrown open, possibly water would be taken out of the water-shed and the people going on the farms should be protected. You take the arid land in the Southwest. I have been all over it, If you take up arid land in the Southern part of California and Arizona and New Mexico, level the land, it must be as level as a floor; it will cost anywhere from fifty to one hundred dollars an acre. Now, it would be a crime to get people to go on the public domains and go to that expense, and, after that is all done, turn around and say, "We will take that all away from you by reason of the fact a treaty existed between the different states, and Colorado is going to take the water out of the water-shed."

MR. CALDWELL: You think it is a crime to take the water out of the water-shed?

MR. CHASE: I think it is a crime to take the water out of the water-shed, after inducing people to go upon the public domain and then take the water away from them.

MR. CALDWELL: Well, the public domain exists outside of the water-shed.

MR. CHASE: The first development is bound to take place in the water-sheds. Now, after that development has taken place, it would be a crime to take the water away from those people. Now, I am not discussing the legal problem, because, as a matter of law, you have no right to take the water out of the water shed, thereby diminishing the navigable capacity of the stream. We are simply discussing facts, not law.

I say, as a matter of fact, you do not want, in Utah, to develop a project up in your water shed and then afterwards to permit yourself or Colorado to take this out of the water-shed to the great plains on the other side?

MR. CALDWELL: Or California?

MR. CHASE: It is not so situated.

MR. CARPENTER: How about the navigability as in the Salton Sea?

MR. CHASE: We are not concerned in that. The treaty between Mexico and the United States merely provides that the citizens of the United States shall have the free right of navigation from the Gulf up to the American line, and where the river is a boundary between the two countries, that citizens, both parties, shall have that right of navigation. We are doing nothing to take that away. In any event, that is not a subject for this conference.

MR. CARPENTER: Yes; but you brought in this question of navigation. I was wondering if you would have any water left after you dropped some into the Salton Sea? Now, as a matter of fact, you are objecting to tunnel diversions because they are wholly consumptive uses; they take away wholly from the river.

MR. CHASE: No, I am objecting to it, not upon that theoretical view of consumptive use, but because it would be wrong to induce these people to develop their homesteads in the water-sheds; then, afterwards, take away the work of a lifetime from them.

MR. CARPENTER: Mr. Chase, that is aside, after all, from the question.

MR. CHASE: As a matter of fact, Mr. Carpenter, I understand the people of the great State of Colorado, having only a few diversions outside of the water-shed-- What we are talking of is more or less of an academic nature. You personally can probably state to this Commission just the amount of acre feet Colorado would need at the present time, and probably it might be so reasonable in amount, if we knew what it was, we would probably acquiesce in it.

Bear in mind what I am objecting to is diversions from streams; I am referring to those diversions in the stream that might take place in the future, when you may tunnel mountains at a point lower down, where the expense at this time would be so great you could not do it.

MR. CARPENTER: Let me disabuse your mind of that. The Eastern slope of the Rocky Mountains is not as sharp as the Western slope. We would have to run a tunnel from the Eastern line of Colorado to the Western. It is out of the question.

MR. CHASE: Then there can be no objection upon your part to putting into the compact-- (applause)

MR. FREDERICKS: Mr. Chairman and Secretary, I want to go, and may I just make a suggestion? I think everyone on this committee feels they would like to do something to save the Imperial Valley. I think you are all thoroughly in favor of that. Mr. A. P. Davis suggested the possible way to do that is to build a dam at Boulder Canyon. We have said we are will-

ing to hamstring ourselves in such a way we will obtain no undue advantage over you in the building of it. We have suggested one plan which might accomplish that purpose; that is the purpose of hamstringing us, as it were. Perhaps it does not meet with the approval of the gentlemen from the upper states. Possibly you will get together in Los Angeles.

We are very earnest in desiring something done, and done early. Let me make a suggestion: You gentlemen from the upper states suggest to us what you feel would satisfy you in the matter of protecting your interests, and still permit us to build that dam. Think it over and make the suggestion to us in Los Angeles, because whatever we agree to would have to be in such shape we could get our Legislature to agree to it. Let us know what you think would prevent us from getting an undue advantage of you, and then I think we will agree to your terms.

(Applause)

MR. NORVIEL: Mr. Chase, did I understand you to say that you would be willing to forego any priorities for power or storage rights or damsite rights for all time, or for a period of years only.

MR. CHASE: The idea of power rights has never been suggested.

MR. NORVIEL: What is your idea? While we have never anticipated-- I never examined the subject from a legal standpoint, but I doubt whether we have such rights, but, nevertheless, no matter what our rights will be from a legal standpoint?

MR. CHASE: We declare we are not claiming any rights as against the upper states arising out of the use of water for

power purposes, so far as California is concerned; as far as Southern California is concerned, we are the people interested, I anticipate.

MR. CARPENTER: You say for power purposes; you do not say irrigation?

MR. CHASE: I have explained my standing upon that.

MR. NORVIEL: I would like to ask a question. Do you know of any law that would prevent the diversion of water from one basin to another, in any of the states except those states where the law of riparian rights, known as "common law" prevails?

MR. CHASE: You are absolutely right.

MR. NORVIEL: I am asking the question.

MR. CHASE: I thought you took it as a matter of fact. As a matter of fact, the law relating to diversions of water from one water-shed to another arises only in those cases where the doctrine of riparian rights is involved. In all the Western states excepting California you have no riparian rights.

MR. NORVIEL: Is there any possible way open to the people of the United States to prevent the diversion of all the water from the upper reaches of a navigable stream?

MR. CHASE: That is our protection, as against any action that Colorado might take; if it were not for the fact that the Colorado River is a navigable stream, in my judgment as a lawyer, we could not. If the water were diverted out of the water-sheds of the Colorado, as a legal proposition--I am not

speaking for the Chamber of Commerce, but I say, as a legal proposition, we could not successfully object to the diversion of the water outside of the water-sheds, for the reason that there is plenty of water. We could not sit here like a dog in the manger and say that certain things cannot be done above. We are undertaking to develop a new compact. If Colorado wants our assistance in this, they must make certain concessions to us. It would require an act of Congress to permit them to do it, and possibly we would resist that.

MR. NORVIEL: I think you expressed your opinion about the priority of rights, Now, how would this proposition appeal to your legal mind: Supposing the whole basin were considered as one unit, regardless of state lines, and that priorities for irrigation and domestic use should prevail--of course, we understand that vested rights cannot be taken away, and that no priorities be given to power uses or storage uses, either at all or for a period of years, from 20 to 50,-how would that strike you?

MR. CHASE: Absolutely, that is the scientific way to solve this problem. We make the other considerations out of deference to the people in the North, and we want them to get behind it in Congress.

MR. CARPENTER: Mr. chase, you recognize, don't you, that the reservoir is a mere instrumentality by which water is diverted and applied, in the final analysis, so the preparation is not for reservoir or storage; it is for beneficial use.

MR. CHASE: For beneficial use on the land.

MR. CARPENTER: So your priority for beneficial use would attach to the reservoir, wouldn't it?

MR. CHASE: Only to the extent of the necessity of that water for that particular land, Mr. Carpenter. You can frame your compact to cover that.

MR. EMERSON: Just in an endeavor to clear the smoke away, because I am desirous of knowing the real attitude of the Los Angeles Chamber of Commerce. In the first place, I want to say in regard to my attitude in this thing, in which I am earnestly seeking to find a solution of this interstate problem; in that connection I might say that at the Washington meeting I was willing to subscribe to the proposition submitted by the lower states. I was also willing to subscribe to the proposition submitted by another upper state. We could not all get together upon one proposition. I want to ask you this: Do you think Wyoming, for instance, would have the wildest idea of enjoining you from building a dam on the lower river?

MR. CHASE: The remark was made by somebody before the Commission that that could be done, and I wanted to--

MR. EMERSON: But you appreciate the need of the upper states to put over the program down here in the best way it can be put over?

MR. CHASE: Absolutely, Mr. Emerson; we realize there must be a united delegation in Congress, who shall be enthusiastic, to overcome the apathy of the East; absolutely you must be with us.

MR. EMERSON: When the Commission plan was first proposed, several eminent engineers of Los Angeles, well meaning, no doubt, came out in an engineering magazine. Do you feel this will block the way?

MR. CHASE: I think, Mr. Emerson, as it has developed, I think it is a very logical way. At the time this was first suggested, I rather felt the result might be to hang the whole affair up for ten years, but as I met you gentlemen at different points, I am satisfied you are all sincere, and that your States are sincere, and that you are going to drive this proposition through at the earliest possible moment.

MR. EMERSON: I want to say, when I addressed a few words to your chamber, I was very well pleased with the reception; but to hear the expression from man after man at some of these meetings, that they could not see the bigger aspect of this thing, I thought at some time, if we could take a few carloads of them up to Denver and Salt Lake, to hear well-meaning people talk--it is merely a question of cooperation both ways.

In drawing up a compact, you would see the necessity of going further from the upper state standards than simply committing ourselves to the construction of a great reservoir at the earliest possible moment; you would have to go further than that in the compact; that there would have to be reciprocity of the parties interested.

MR. CHASE: What would be your idea of reciprocity?

MR. EMERSON: A protecting agreement for the protection of

the upper states, so your priority would not be established by the construction of this great reservoir, and for fear there would not be water supply enough. I want to say that Wyoming has had a real illustration of that; we are able to see that possibility. That is what we want to protect ourselves against.

Now, in regard to a time limitation, a period of 20 years has been suggested. Would you be willing to approve of a compact that would set a certain maximum use in those states for all time to come; not limited to 20, 50, or 100 years?

MR. CHASE: That is the limitation by acreage?

MR. EMERSON: Limitation by apportionment of water.

MR. CHASE: I think that a fair limitation of that sort would be acceptable to us. We are not trying to lay down a hard and fast rule. We talked over that limitation, but we felt the other probably was more practical in order to get immediate action. 2

MR. EMERSON: I wanted to assure myself what the feeling of these lower states was. I am not spending my time listening to something that will not lead to some progress. I want to get all the facts I can. I am especially anxious to obtain the viewpoint of such bodies as the Los Angeles Chamber of Commerce.

MR. CHASE: We are willing to reciprocate in all ways,

MR. EMERSON: You are willing to concede that the compact should carry a protecting agreement, and that by subscribing we give our aid in putting over that plan?

MR. CALDWELL: Just a word I want to say, because I probably never will have an opportunity to get on my feet before these people here again. We have a much bigger question to settle on the Colorado River matter, as I see it, than the question of whether or not we should or should not divert some water from the water-shed. I have not the least doubt in the world, if we can get ever some of the larger things, that the Commission can get together on the question of diversion from the water-sheds. And it may be very desirable, from the standpoint of California and Arizona, even, some time, that Utah be permitted to make a diversion from the water-shed; but I want to point out that the amount of diversions from the water shed in the upper states is a comparatively insignificant matter, it is not a matter of any great importance.

Now, I am speaking more particularly--that is my view-- I am speaking more particularly as to Utah. As a matter of fact, we have a diversion now, out of the basin, our Strawberry Project takes water out of the basin, a limited amount. The only way we can get water out of the basin is to go along the uppermost reaches of our tributaries to the Colorado; get up near the backbone of the ranges and drive short tunnels through the mountains. Now, our tributaries that rise in Utah do not contribute to the Colorado River very much in excess of a million acre feet. Am I right, Mr. Hout? They do not contribute much in excess of a million acre feet of water. If we took every tributary out of the basin, there would be

only a million acre feet that I can possibly think of, but we cannot take 20% of that out of the basin; so, I wanted to point out that it is a mighty small matter in the final disposition of the Colorado River matter, so far as Utah is concerned.

MR. NORVIEL: Mr. Secretary and Gentlemen of the Commission: I desire to introduce now Mr. Ralph L. Criswell, of Los Angeles, California; President of the City Council, who desires to address you. (Applause)

MR. RALPH L. CRISWELL: Mr. Secretary and Gentlemen of the Commission: I might say in the beginning I am not an engineer, for which I am very sorry; nor am I lawyer, for which I am not a bit sorry. (Laughter) But we people in Los Angeles are interested in this matter; not particularly from an altruistic standpoint, but because the Imperial Valley and, in fact, all portions of the Colorado Basin, lies tributary to the City of Los Angeles.

We are further interested in the building of a dam on the Colorado River because of the fact that the City of Los Angeles is in the business of generating and selling electric power, and we have our eye somewhat in the future, upon some electric power from that river. But you gentlemen are sitting here and discussing this matter because of the fact that almost every year the Colorado River goes upon a rampage, and it gets up to such a point that the people in the Imperial Valley and Palo Verde Valley are, we will say, within one inch of

destruction, and it was in order to curb that flood menace that the people of the valley contributed money to interest the Government of the United States into a study as to the building of a dam for the control of the flood waters of the Colorado River, Imperial Valley and many other communities contributed money for that work. The City of Los Angeles offered to contribute money; I do not remember whether their offer was accepted or not.

The engineers of the United States Government went to work on the project, and they have said the manner in which that flood should be controlled was by the building of a dam at Boulder Canyon. We have confidence in the engineers of the Government. We of Los Angeles have further confidence in them because of the fact we have discussed the matter with Mr. Mulholland, whom everybody knows as a great engineer, and he has said that the Davis Report for the building of a flood control dam at the Colorado River is the proper solution of the question. We are, therefore, in favor of the building of that dam at that point, for that purpose. The building of that dam, it appears, has raised some question in the minds of the lawyers of things that may happen or may not happen because of the building of that dam. What we are interested in is that this work shall progress as rapidly as possible. We of Los Angeles and Imperial Valley would like to see the dam built tomorrow, if it was possible to do so, but we realize further that this Commission must arrive at a unanimous conclusion in order to accomplish anything; and not only must this Commis

sion be unanimous, but in reporting to your several states, the Legislatures of those states must unanimously, or all of the States, must support the recommendations of this commission, and the Congress of the United States must accept it.

Now, there are many, many small points involved in the matter that it may take considerable time to work out, and we in Los Angeles have wondered whether it would not be possible for you gentlemen to agree upon this one thing, and report to your States and have them agree upon that; just the one thing, that the building of the Boulder Canyon Dam shall not give anybody any rights which they do not now possess, nor shall the building of the dam take away from anybody any rights which they now possess; and if you will do that, then you can go ahead and take all the time you want to work out the smaller details. (Applause)

MR. HOOVER: Just a moment! Captain Fredericks raised the question as to whether irrigation improvements could be financed on the back of such an agreement as that, because that is tantamount, or at least an agreement that provides no title to water.

MR. CRISWELL: Well, I look upon the matter in this way, Mr. Secretary: If the Boulder Canyon Dam is not built, then the title to water is as it is, and whatever schemes,--irrigation schemes, must be financed, would have to be financed upon that basis, and it is my opinion that in order to expedite the work of building this dam, we might treat that matter as

though the dam had not been built.

MR. HOOVER: Well, I think you will have to get it clear that the water in the river is now exhausted, from California's point of view; it is only by the addition of the reservoir that additional land may be brought into play, and I take it that your proposition is that some legal device will be entered upon which will create no title to water by virtue of the land brought under that dam; is that your real meaning?

MR. CRISWELL: That is what I suggest.

MR. HOOVER: Do you think, then, in that case, do you feel that this land can be improved and financed?

MR. CRISWELL: I think it is possible, yes, sir, for this reason: That what I am suggesting, at least I thought I was making it clear, that this would be, well, you might say, an armistice, a temporary agreement which could be entered into, and then a final agreement, which would be more elaborate, could be worked out and more time given to the details thereof, but what we want is the building of the dam. We want to protect the Imperial Valley and the Palo Verde Valley from the menace of the floods which hangs over them every year.

MR. EMERSON: Your answer would be you wish to subscribe to the construction of this reservoir at once, without any protecting agreement for water rights on the upper river?

MR. CRISWELL: You would have the same protection you would have now.

MR. CARPENTER: That was not the first proposition, Mr.

Emerson. His first proposition was that he would afford full and permanent protection to the upper rights.

MR. NORVIEL: Unless we have overlooked someone, I have no other name of anyone from Arizona who has not spoken, who desires to speak to this Commission and to the Secretary. If there is any other person now in the room ready to address the Secretary and the Commission upon this subject, from Arizona, who has not already spoken, will you kindly let me have your expression at this time?

MR. C.S. BROWN: (President of the Arizona Farm Bureau, Tucson, Arizona) Mr. Chairman, I have not had any desire to speak, but I have been asked by several. I represent the Arizona Farm Bureau of Tucson.

I will say to you I have lived in Utah and Colorado, and have lived all over New Mexico, engaging in the cow business, and I believe all the people of those three states would say what I am going to say if they had the privilege, that we are in earnest when we say we want to give and take; and that some of the people have said to me, "We have had to hang our heads in shame, yesterday, when people indulged in personalities that were irrelevant to this cause." And I think that while some of the things which were said today were a little bearing upon what the Secretary wanted to find out, it reminds me of a certain class of literature which I indulge in. I read for information, and sometimes for pastime, and then I read a class of literature which is religious, in that I read sometimes the Bible and Walt Mason, and in the last, I read

this: "That there are blacksmiths making watches; butchers making hats; and there are doctors making botches of our wishbones and our slats." And I think some of the things that happened yesterday were just as awkward as that. Some of the people have asked me to say to the Secretary and the Commission that that did not represent the big-heartedness of this State.

We are willing to give and take; we have confidence in this body; that it will reach an amicable, workable compact, and not delay the protection of the people who live in the lower reaches of the river nor impair the reaches of the people upon the upper. (Great applause)

MR. NORVIEL: Then, Mr. Secretary and Gentlemen of the Commission; The next speaker will be Mr. J.W.Reagin, representing the Los Angeles County Board of Supervisors.

(Not present)

MR. NORVIEL: Then it affords me great pleasure to introduce Mr. E.F.Scattergood, engineer of the Public Service Commission of the City of Los Angeles.

MR. E.F. SCATTERGOOD: Mr. Secretary and Gentlemen: May I digress for just a moment?

The people of Southern California and all the States, I am sure, are sincerely grateful to you for accepting the responsibility that you assume as Chairman of this Commission, because we know that you accepted them knowing the greatness and the extent of those responsibilities in bringing these

seven States together.

Regarding the essentials of their systems of obtaining water and power that may be gotten from a stream like the Colorado, we are very fortunate in that those of the National Government, who have to do with these things directly, are all familiar with and of, I think, the West, Secretary Fall, yourself and Director Davis, because it is necessary that those who have charge of these, in order to give them full justice, and appreciate the difference between the West and the East, and, therefore, present the facts to those in the East in the fullness of their significance. Individual efforts and private enterprise in the East do not appreciate this difference because of the fact that rain comes down where they want it, and the fuel is distributed and simply has to be dug out at a moderate expense.

The situation here in which we find those essentials, water and power, locked up in the flow of streams, we do not appreciate that Governmental function is necessary to unlock and make available for efficient and effective use the waters for irrigation and power.

It would be asking too much to ask these three gentlemen and yourself, Mr. Secretary, to aid us more than you are, because you are doing more than we are in explaining to the Eastern people these differences.

These are so essential and so naturally a gift in the East and only available to us through the exercise of Governmental function efficiently, that they must be developed through Governmental function, and it is logical they should be, because in a time of a slump of business, Government financing comparatively is easy; and Government revenues derived from such financing are available when labor is idle and when materials are low, and there does not come, therefore, the indirect result of the necessity of increasing or effecting such things, because all these things to the individual, and the private enterprises that is utilizing them, and which find them necessary in their business or industrial pursuits and manufacturing, have to suffer in the cost of these because of the unfortunate business slump. It has a steadying effect which in the East they do not suffer from, because those things are naturally given; but in the West, unless they are worked out through Governmental function, they are affected by temporary conditions greatly to the detriment of industry, as has been realized in the Southwest this last few years.

Southern California as a unit is, to the best of my knowledge and belief, solidly for and has been all along, as far as we have been familiar with it, and it has been crystallized, the Davis plan of the development of the Colorado River. That plan relating to a first activity and not being a complete plan, but having been worked out, as we know, in the light of what we know should become a complete and comprehensive plan.

The City of Los Angeles--I am not speaking from the standpoint of the interests of the City directly, but only as a member of the community of Southern California, has a corps of engineers; Mr. Mulholland has been spoken of. There is a consulting board of engineers, which may be of interest to you, Mr. Secretary, and others, an outline of which has been submitted. Those are men of national reputation, leaders among the foremost in their respective specific branches of engineering work, and of international reputation with respect to some, at least. They have considered this carefully, on request of the city of Los Angeles. It is the opinion of the engineers of Los Angeles that the Davis plan is proper and right and essentially a proper part of the ultimate and complete plan of the development of the Colorado River. The Colorado River has storage possibilities, if I may just briefly refer to some points not referred to by Director Davis or Mr. Mulholland specifically, it has storage possibilities above the Glen Canyon. It has some power possibilities if regulated at the Boulder Canyon or Glen Canyon, below the Boulder Canyon and, ultimately, storage above Lees Ferry, which is at the South end of Glen Canyon, for the regulation of the waters that may come down permanently, after a proper irrigation above, which will be worked out eventually as a part of the comprehensive plan unquestionably. But that storage at Glen Canyon need only be a part of the total, because storage above Glen Canyon will be necessary to some extent in connection with the agricultural, more particu-

larly, ultimately, in connection with the power development, because there is five hundred million horsepower above Glen Canyon that may be developed and will be developed; and if that storage is had, it will tend in part, and at least to the extent of 60 per cent of the requirements, regulate the river at Lee's Ferry; and the storage at Glen Canyon need only provide the remaining part. Then, with the large storage at Boulder Canyon, the regulation for agriculture is taken care of so far as the lower states are concerned, and with the regulation at Glen Canyon above, power development upon all those large power sites along the river above Boulder Canyon may take place without regard to agriculture, and, therefore, eliminate the conflict which Mr. Davis has spoken of, between agriculture and power, which is a very material matter.

MR. CARPENTER: Pardon me. You mean that the Boulder Canyon will take care of the slack?

MR. SCATTERGOOD: It will regulate below the power plant, perhaps with the exception of a few of the smaller ones below Boulder Canyon. The development of storage at Glen Canyon at this time, to the extent of a year's flow, which would not be sufficient for complete development, but requiring some 22,000,000 feet for complete regulation, wet and dry periods, throughout, would require a dam of some 400 feet and more, according to the best advices we are able to secure at this time, and would mean a very heavy expense. Then, development by means of dams below Glen Canyon, smaller dams would be that

much additional expense, and would not, unless it is a large one at Boulder, solve the question of controlling the silt for irrigation below, and would result in a much larger percentage of the power being developed with the silt to contend with, which would be eliminated by the general comprehensive plan which I have outlined.

With respect to the question of a compact: As an engineer, I am utterly incompetent to speak in a way that would be using language that would stand the test of the law. There are several considerations which perhaps I am justified in calling to the attention of this Commission, and which you have no doubt considered at times. One of them is that the economic conditions being as they are, Director Davis finds that there is sufficient water for everybody in the water-shed, but those economic conditions may change so materially as to completely alter that situation, and it is my belief that the probability is very great that within the course of, perhaps, thirty or forty years, they may change so materially as to completely alter that situation. Therefore, the lower states could not be asked, and I do not think the other states would ask, on that account, that an agreement be entered into stipulating that the upper states may for all time divert all the water that they might put to economic and efficient use, because it would result, undoubtedly, in my opinion, ultimately in doing what Mr. Chase expresses in his mind as being unthinkable, the withdrawing of water from a district that had put

(district that had put) it to use before. The value of water may become double what it is now, when measured in farm products, with labor and cost of growing. The upper states could then divert twice as much water as they could under present economic conditions. That must be given consideration. Then, in working out a compact along the line that has been suggested by some, the possibility as has been referred to by Mr. Carpenter, possibility of putting water to use, largely wastefully, in order to keep control of the water, might be experienced, and any compact must contemplate that that might be done. I am not challenging the good faith or integrity of any in that matter. I know it has been done in California, and with many streams in connection with irrigation, and at this time is being done. The Commission should take care of that.

MR. CARPENTER: For the purpose of holding their technical rights.

MR. SCATTERGOOD: Exactly so. I have in mind, in that connection, Mr. Secretary, the possibility,--follow my phraseology, except as indicating the practical procedure, legally I do not know the effect of it, but it could be so worded to have the effect I desire to give. It might be as somewhat of an alternative to Mr. Chase's suggestion, and his possibly is right, and this wrong, because he has in mind the effect of the law, that the Southern States stipulate through an act of Congress that for a period of 20 years, development in the Northern states, within the water-shed, and perhaps limited amount

that might be agreed upon outside, that appears to be not an important matter--and that the Southern States would not, during that period of 20 years, assert any right on account of the Boulder Canyon Dam, or otherwise. Second, that development, either during the processes of the development of the 20-year period, or thereafter, as against the development which took place during that 20 year period. Now, you will see wherein the question of possible excess use of water would come in, in order to hold it prior to the end of the 20-year period. If that were agreed to, it would be necessary and fair and, I believe, the Northern states would agree with me in this: that a commission of three Government representatives be provided for that would pass on the question of effective and beneficial use, and confine it to legitimate, effective and beneficial use; ~~and beneficial use~~; otherwise Mr. Chase's suggestion of equality, would be the only protection against that, in which case both the North and the South could indulge in the same uneconomical and improper practice, which would be undesirable. Now, at the end of twenty years, that same commission, or until such time as a further compact might be entered into, would be looked upon as a board of arbitration to determine and control every other department in accordance with the highest and best use, in the North ~~or~~ in the South. The Southern states not, on account of the 50 or 40 million acres which the capacity of the reservoir, having acquired any rights to fill it as against the rights gained in the North

during that 20 years, or thereafter, under the arbitration of said Commission. Now, that merely is suggesting ideas for the purpose of bringing out something better, as to form. I believe that the agreeing upon an acreage at this time is not logical, although I see no reason, as I believe the representatives of Southern California have suggested, why the Southern States would object to it. It is impossible to see what conditions will be in the future, and if in the future there is no prospect of the use of the water in the Northern states that might be allowed, and there is use for power and irrigation in the Southern states, to permit it to lie there indefinitely or for a long period of time, that would not be conservation, according to the policies of our country. We want something that will promote immediate development in the North and South, and protect both. For a 20-year period, I think the South would be safe in allowing for development and that it might be applied to efficient and beneficial use. The Commission, Mr. Chairman, as I have sized it up, from what I have heard at a number of these sessions, is confronted with a responsibility greater than the States in creating it, and the Government probably contemplated, but I believe the people of the seven states will appreciate that this Commission has a responsibility greater than was contemplated; a responsibility to suggest to Congress that a law be enacted containing in it provisions which, in the opinion of this Commission, Mr. Chairman, will protect the States, in order that a great empire in

itself, the Imperial Valley, of 50,000 people, might not be jeopardized while you are waiting to go to your respective Legislatures for approval. It seems that the people of these states cannot expect you to wait to go to the Legislature for approval, before suggesting to Congress such an act. I believe that every one of you appreciate, that in public places responsibilities have to be taken and honest men in public places are forced to take those responsibilities. I can say that the City of Los Angeles, in the advancement of its utility projects, would never be where it is if responsibilities were not taken by its officials, without waiting to go to the people for approval. I say that not for the purpose of endeavoring to impress upon you gentlemen the responsibilities, but to express here openly and publicly that the people of these states, everyone of them, must stand back of you in taking the responsibilities like that, or those people must have the responsibility of the destruction of such an empire as the Imperial Valley. And if you Commissioners do take that, you will relieve your Chairman of a greater responsibility than should be upon him, by joining in such a method, and you have the backing, morally, of the Secretary of the Interior, of Director Davis, and undoubtedly of your own chairman, in taking such a responsibility. I do not believe the people of the states would take exception to it, the recommending to Congress, or suggesting to Congress, at this time, of a law that would protect these states properly, in your opinion, providing you can get together upon that. I am

4

thoroughly convinced in my mind that you can. I think you will find it much easier to get together upon a program of 20 years, permitting work to go on, than in an attempt providing for arbitration to be entered into after 20 years, much easier than you could get together upon a compact allocating the water, because that undertakes to determine it for all time. I do not believe this Commission or any other body of men can do that intelligently. (Applause)

MR. CARPENTER: You made a study, did you not, of the upper reaches of the Colorado River?

MR. SCATTERGOOD: Not particularly, except some data in the files of the Government of the United States.

MR. CARPENTER: You never made a study of the field?

MR. SCATTERGOOD: I have not; that is, further North than Lee's Ferry.

MR. HOOVER: There is one matter raised by Mr. Scattergood, I think I should like to correct any misimpression. So far as I know, there never has been a proposition before this Commission that there should be a complete settlement of the water rights of the respective states. All of the propositions have hinged upon the principle of the division of their water on the basis of acre feet, or on the basis of acreage; they were all proposed upon the foundation of a certain limited acreage to be accepted at the present time, and given priority, with a large reserve in water for subsequent allocation, over a long term of years. I make that clear because I see in

the press that there was some expression that any body of human people could sit down and provide for a division of water for a thousand years.

MR. SCATTERGOOD: I had a correct impression of that, and intended to mention that. That, I understand, such propositions contemplated a further compact or allocation at a later time.

MR. NORVIEL: The next speaker will be Mr. Horace Porter, of Riverside, California, representing a number of cities of Southern California. (Applause)

MR. PORTER: Mr. Chairman, and Gentlemen of the Commission: I am delighted that the Chairman brought out so clearly the attitude of hearing public sentiment regarding agriculture and power, and what I believe is the unanimous sentiment that agriculture is first; that power falls second, and we can all leave the power question. Just as Mr. Fredericks, of the Chamber of Commerce said, that is secondary.

Mr. Chairman, I have a horror of floods. I was born and raised in the Ohio Valley, where there was born into me such a horror of floods that through my youth I saw them rise and sweep away homes and destroy property, and cost life. It is a terrible menace. But there, it was a passing thing; in a few days or weeks it was over. There are floods so destructive that recovery after them is impossible. One of the latest deductions of geologists of Europe is that the whole Mediterranean Gulf or sea was, in a prehistoric time, lower than the

Sahara, lower than the Imperial Valley, lower than the ocean level, and prehistoric man lived in and upon it. There came a time when the ocean broke through in Gibraltar, when men were drowned and destroyed, and this country was destroyed by the sea for all time.

Now, upon a small scale, that is just what may happen to our Imperial Valley; and, Mr. Chairman, I have seen during the past year a very wide divergence of opinion all over California, in cities, in the farming districts, among the public and private people, a great divergence of opinion upon all this Colorado River question, and more or less mutual suspicion of each other; and I have seen it all this past year, all focused unanimously upon the one feature for the saving of the Imperial Valley. In this great danger, there is one immediate duty, the erection of such a dam as in the opinion of your national engineers shall save Imperial, Yuma and the interests of these two cities, and I am sure if it got into the conscience, the danger, the horror-- if it got into the conscience of the men and women of Utah, Colorado and all the Southern states, they, too, would be unanimous for that immediate action.

Reference has been made to the way the Lord made that valley. When he made it, he had no state lines to interfere with its making or administration, and I have a feeling that Uncle Sam ought to have little interference of states' rights in managing that. But this Commission is a good thing to bring out the different states' views--the different state affairs,

and it is a clearing house for it.

Now, I have no doubt, under your leadership, Mr. Secretary, this Commission will get together upon a common ground.

But if you gentlemen learn from that great experience in Australia, where there has been in litigation the questions of water rights and all these rights have been for fifty years in litigation, at enormous expense, and they found themselves absolutely helpless, and laterly the national government, the government of Australia, took it out of the hands of the courts and litigants and put it into the hands of an arbitration committee, to settle it in a few weeks. Now, something of that kind can be done. Gentlemen, I believe you will come together and settle upon a basis to establish things just right. There is enough water and power for all, and you will make your findings in such a way we shall all become happy and contented, and immediate work be made possible. I have simply those two thoughts: The immediate flood control to save wiping out Yuma and Imperial, which may happen at any time. It is too serious and terrific a danger. Second, treat it largely, generously for all.

Now, there is a give and take here of the power question. Some have one view and some another; all stand together. Let it take its place logically when the time comes, but immediately do the human thing as well as the economic and safe thing, and save a great empire from possible destruction.

(Great applause)

MR. HOOVER: Mr. Porter, do you subscribe to the idea that Southern California is prepared to contract with the upper states, that they will claim no title by virtue of the erection of the Boulder Canyon dam?

MR. PORTER: Personally I should say we will make no claims by the building of the dam that would be prejudicial to the interests of the people of the upper states.

MR. NORVIEE: This, Mr. Secretary, concludes our program-- Mr. George Hoodenpyle, City Attorney of Long Beach, California, desires to say a word. (Applause)

MR. GEORGE HOODENPYLE: Mr. Secretary, and Gentlemen of the Commission: I trust that you gentlemen from the upper states will be a little patient with us down in this section, for insisting upon some protection for the Imperial Valley and Southwestern Arizona.

This matter is very near to our hearts. This is a matter of life; it is a matter of property; it is a matter of a place to live, and you will pardon us if we insist strenuously upon this proposition.

Now, we are not insisting particularly upon the Boulder Canyon Dam, because of any interest we have in the matter. That dam has been suggested by the Reclamation Service as the proper place for the protection of this country, for the protection of the Imperial Valley and Southwestern Arizona, and for that reason we are back of that proposition. Had the Reclamation Service suggested some other proposition that would

accomplish the same purpose, we would certainly be back of that proposition.

Now, I am willing to subscribe to the suggestions made by Mr. Chase, and amplified by Mr. Scattergood, relative to the provisions of the compact, that a certain surrender be made by California; but I want to offer to the Commission an alternative suggestion, simply for what it is worth. I know you gentlemen want all angles to this proposition. I want to give you an angle I have worked out, just for whatever value it may be. It may have no value whatever, but I believe it will meet some of the objections that have been raised here. It is this:

It is quite evident in forming a compact that it will be necessary to have an administrative body to carry out the provisions of whatever terms and conditions you set forth in your compact. As suggested here so ably by Governor Sloan yesterday, it would be desirable, I think, that that Commission be non-interested, and that it be appointed by the President of the United States or some Federal authority.

Now, then, the question arises, what power are you going to give this Commission? It seems to me that all of the states in interest ought to be willing to submit the interests in the Colorado River to an impartial Commission; it seems to me that that will be the best way to obtain the speedy development of all of the river as a unit, for the benefit of all the people, not only of the Southwest, but all. It seems to me if this Commission can agree upon an allocation of water, with a

reserve as suggested by the Secretary, that that should be done; and that that should be included in the pact; that if the Commission is unable to agree upon any particular allocation or figures for it, that also might be left for the determination of this Commission.

Now, it occurs to me that if a Commission is appointed to carry out the provisions of this pact, it will make a study of this Colorado situation; it will understand what is best for all of the people, and if your compact should provide for applications to be filed with this Commission, hearings to be had, and the matter of each development presented to the Commission, and that no development in the Colorado River could be undertaken or carried through without a permit from the Commission appointed by the Federal Government, which would be approved by the Legislatures of the various states.

Now, that would avoid two difficulties; a period of holiday from litigation would not be a period of holiday from the rights to be acquired. As suggested here, it will be difficult to finance a proposition for irrigation or power, if the water is to be taken away. Then, if you make your allocation for the various states in addition to the rights that are already here, permit the development of that amount of water in each of those states to proceed immediately under the provisions of a permit from this Commission, and let those rights attach and be permanent, then it can be financed; otherwise, I think it cannot. Then you would avoid unnecessary delays, and it would avoid such mistakes as might be made for setting

down at this time a condition of affairs that should continue without change for twenty or forty or fifty years. Why, if it is to be submitted to a Commission at the end of 20 years, or to the Courts to determine at the end of 20 years, why not let the Commission determine it from time to time as the matter comes up. I believe a Commission of this kind ought to be satisfactory to all of the states. It ought to stimulate the work of development, and it ought to result in the obtaining of the highest development of the river in the shortest possible time. (Applause)

MR. HOOVER: Mr. Hoodenpyle, in the plan you contemplate, do you consider that this Commission that you suggest would have final powers?

MR. HOODENPYLE: I think so.

MR. HOOVER: In the allocation of water? In other words, they should have a large discretion?

MR. HOODENPLYE: Of course, the other was suggested. All that would call for an equitable consideration by the Court.

MR. HOOVER: I was wondering whether you would make it subject to revision of the Supreme Court or the State Legislatures.

MR. HOODENPYLE: Certainly not by the State Legislatures, because I think the further the compact gets away from the interests or, rather, I should say, the biases and prejudices from the various states, the better the results would be.

MR. HOOVER: The proposition would be tantamount to the

states ceding their rights to the control of the river to a Commission?

MR. HOODENPYLE: With such original limitations as may be placed in the compact as may reserve to the state--and with such restrictions as may be placed around the applications and the permits and conditions under which this commission would develop.

MR. HOOVER: I was wondering whether you would mind giving us some kind of a draft of what you thought would be proper,-- formulate a compact along that line? It is much easier to consider something specific. I think it would be a very great help to the Commission, if you could find time to do so.

MR. HOODENPYLE: Well, I hardly feel equal to the task. I would be willing to give it to you for what it is worth.

MR. HOOVER: We would be very grateful.

MR. NORVIEL: I dislike to foreclose anyone who desires to address the Commission, but as the hour has arrived when I know the Secretary has an appointment and it seems our meetings must close at this time.

I have asked Mr. Dwight B. Heard to say a word to the Commission and the Secretary. (Applause)

MR. DWIGHT B. HEARD: Mr. Secretary and Members of the Commission: We of Arizona want to thank you and the Commission for having held this vitally important hearing here in the Southwest, in the center of this valley which is an illustration of what cooperation can accomplish. We want to thank you

for the fairness and the completeness with which this hearing has been held, where different plans have been presented. We feel that there has been a square deal shown to everyone. We feel that in a difference of opinion we really are only approaching the step-ladder of progress; if we all thought alike it would be a deadly dull place to live.

We hope this will result in constructive action upon your part, action which is in the spirit of the generous people who live in this basin, action which is in the spirit of good neighbors one to another.

We hope that here locally we will bring about such cooperation that our good friends, Mr. Maxwell and Mr. Norviel, both of whom have accomplished much for the Southwest, may work together hand in hand in the spirit of cooperation with great success. (Great applause)

MR. HOOVER: Mr. Heard and Gentlemen: I am sure, on behalf of the Commission, they would wish me to thank the people of Phoenix for the fine reception we have had, and especially for the many illuminating suggestions we have received.

I know that every member of the Commission has approached this problem day by day with a perfectly open mind. I was at the first sessions of the Commission, where we spent many days in consideration of the whole problem before we came to Phoenix. I think each member of the Commission is possessed fully and to an extraordinary degree of both engineering and the legal points involved in this problem; but yet I think

they will all agree with me that this session has been of the greatest possible value, and that new ideas have been injected that make the way sensibly clearer.

Therefore, I wish in their name, to thank you all for the assistance you have given to the Commission.

(Great applause)

MR. NORVIEL: Before we retire, I think it would be perfectly right and proper that we make a motion or write a motion to Judge Sawtelle thanking him for the use of these rooms. (Carried.)

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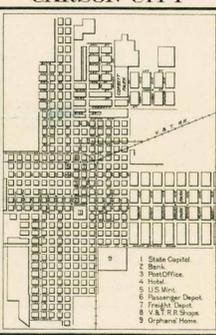
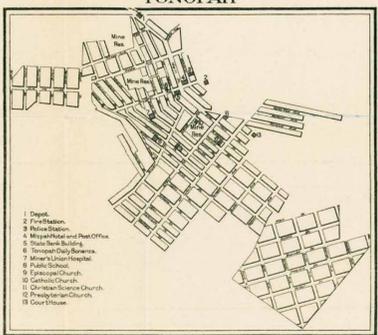
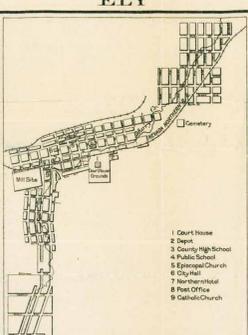
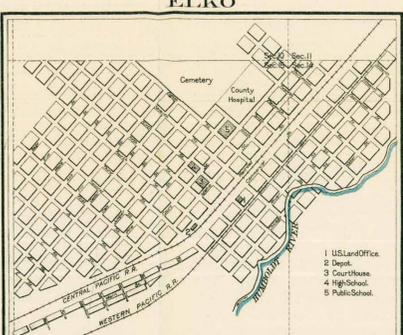


Exhibit A.
APPENDIX TO THE GENERAL LAND OFFICE
SUBMITTALS TO THE LANDERS

DEPARTMENT OF THE INTERIOR
GENERAL LAND OFFICE
CLAY TALLMAN, COMMISSIONER.

STATE OF NEVADA

Compiled from the official Records of the General Land Office and other sources,
under the direction of
I. P. BERTHRONG
Chief of Drafting Division G.L.O.

1914

Scale: 1 Inch = 12 Statute Miles

RECLAMATION PROJECTS

LEGEND

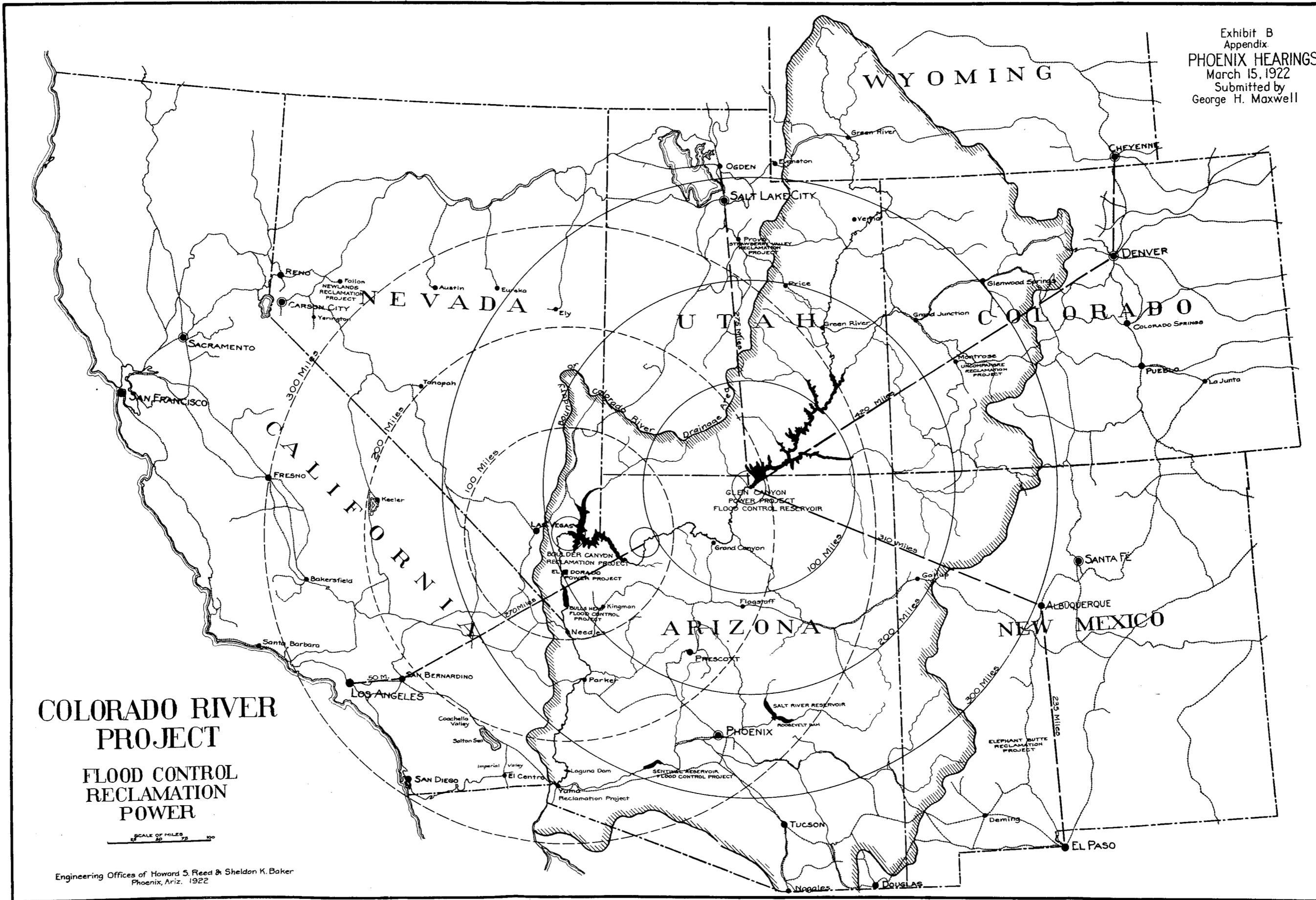
- ☆ Capital (Carson City)
- County Seats
- County Boundaries
- U.S. Surveyor General's Office
- U.S. Land Offices
- Townships not subdivided into sections
- National Forests
- Indian Reservations
- Bird Reservation
- Land District Boundaries

10,000 ACRES
BY QUANTITY
80,000 ACRES
BY SURFACE
COLORADO RIVER

10,000 ACRES
BY QUANTITY
80,000 ACRES
BY SURFACE
COLORADO RIVER

10,000 ACRES
BY QUANTITY
80,000 ACRES
BY SURFACE
COLORADO RIVER

Lettered by Chas. J. Helm



**COLORADO RIVER
 PROJECT**
**FLOOD CONTROL
 RECLAMATION
 POWER**

SCALE OF MILES
 0 25 50 75 100

Engineering Offices of Howard S. Reed & Sheldon K. Baker
 Phoenix, Ariz. 1922

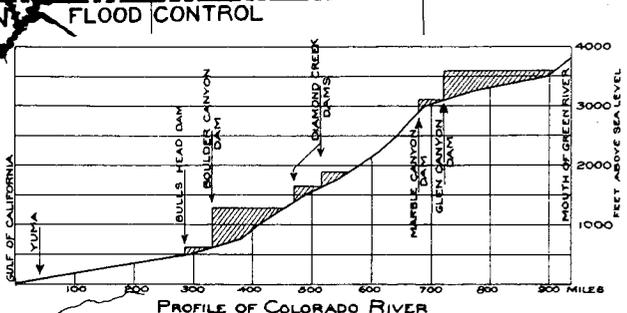
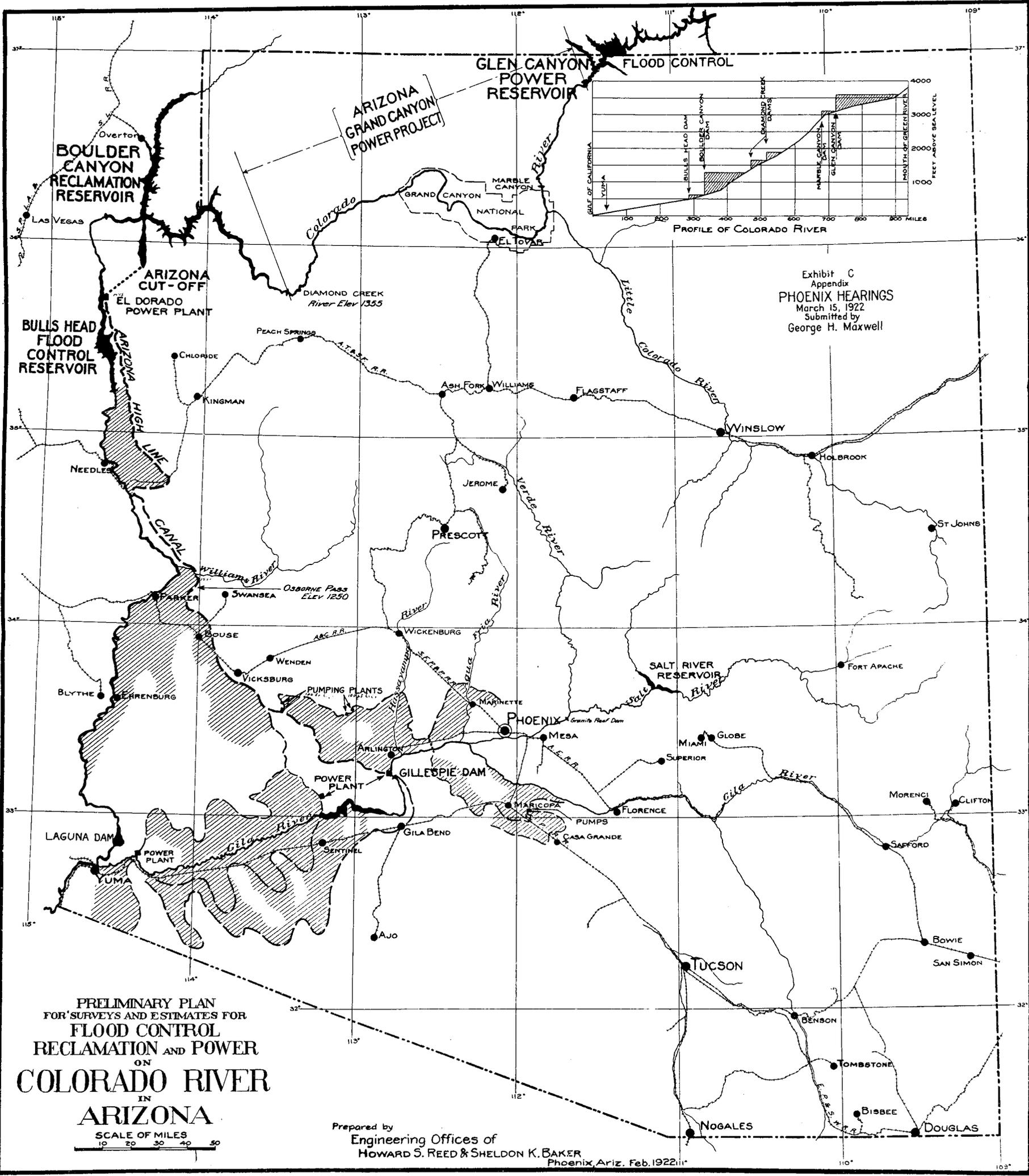


Exhibit C
 Appendix
PHOENIX HEARINGS
 March 15, 1922
 Submitted by
 George H. Maxwell

**PRELIMINARY PLAN
 FOR SURVEYS AND ESTIMATES FOR
 FLOOD CONTROL
 RECLAMATION AND POWER
 ON
 COLORADO RIVER
 IN
 ARIZONA**

SCALE OF MILES
 10 20 30 40 50

Prepared by
 Engineering Offices of
HOWARD S. REED & SHELDON K. BAKER
 Phoenix, Ariz., Feb. 1922