

the man in the office or the factory willing to follow in the footsteps of his predecessors. As long as the American sees something that whets his appetite, just so long will he be jealous to possess it.

Construction Has Only Paused.

No where in history can the counterpart of this American psychology be discovered. It is not new with us and there are no signs in the skies that would indicate its recession.

Washington residents realize that many governmental agencies are devoting their time to research and analysis. But few of us appreciate the important contributions that these have given to new functions that lead the way to construction. It would be interesting to review the generous part that Federal funds have played in accomplishing this vast program.

As an ideal which states and cities will attempt to emulate, let us consider the panorama of the city of Washington. Major L'Enfant arrived shortly after the birth of the nation and schemed out a capital city that has come to be the dream of many who have been entrusted with revamping existing municipalities.

And the farsightedness of L'Enfant is being realized today in the Nation's Capital as we see structures of surpassing beauty and usefulness rising out of the earth and

fitting into the pattern which he created.

The longing of America to attain the beauty of European cities is being realized in the heart of the Nation. Technical minds have searched the world for beauty in architecture which we find chiseled in stone and marble in our home city.

This incident is important in itself, but it is far more impressive in visualizing the example which has been set to other cities of the country. What Washington possesses becomes the desire of other localities to meet and surpass.

And, consequently, it comes about that the ambition of the people and their Government to make the City of Washington fairer than the capital of any other nation has unconsciously stimulated and inspired other communities to not only equal but exceed it in the attractiveness of its memorials, bridges, and monumental edifices.

While we have the individual desire for better things we have also instilled in the group mind a similar craving.

If we will permit the vision with which we are endowed to pierce the cloud that immediately obscures us, a vision which has led America to heights never reached by any other nation, we can only conclude that construction in its contribution to national wealth, utility, and happiness has only paused and not stopped.

values it creates, and the ability to grow high-priced crops.

What is needed, therefore, is some added source of revenue that will contribute to the reclamation fund and enable development in the future to more nearly keep pace with the demands for reclamation works. That source of revenue is to be found in the development of the power possibilities of reclamation projects, and especially those projects which have coupled with them the regulation of the water supply through storage. At first power as a feature of irrigation development was not regarded seriously because the demands for power were small and uncertain, but in recent years the returns from power plants built as adjuncts to irrigation works have been large and they are constantly growing.

The first power plants were turned over to the water users, like the drag lines and other features of construction no longer needed. But for the last five years it has been evident that we need a new policy for the operation of power plants which are a part of irrigation works and the disposal of power revenues. The new policy is that the revenues from power plants shall be used to supplement the payments of the irrigators until the entire first cost of the works is returned. After that the power revenues should go into the reclamation funds as the leases from oil lands now go into it, and be used for the construction of additional works.

Misuse of Government Generosity.

I have no objection to those revenues being applied within the state or the drainage area where the power is developed, but I regard the plan of some of the older works, of turning over the power revenues as a perpetual gratuity to the water users on the project as a gross misuse of Government generosity. We have power plants which were built entirely with Government money, where the annual revenues are now practically repaying the entire yearly construction charges. We have others where they are paying a large part of it, and when the works are fully paid for, then a development, for which the irrigator has paid nothing, and in some cases has not even agreed to pay anything, will be operated for the exclusive benefit of the water users and the profits paid to them as dividends in perpetuity. That money is needed to build new works and to turn those plants with their profits over to the people on the project who have been helped in paying for their water rights by the power revenues is a gift which can not be defended as sound public policy.

Up to 1925, all power revenues on a project were treated as the perpetual possession of the water users on that project. Since that time the bureau and the Appropriations Committees in Congress have been seeking to incorporate a doctrine of using these revenues, first to pay for the power plant, next to help pay for the project, and after that to go into the reclamation fund. In pursuance of that policy, the Deadwood Reservoir is being built without any part of its cost being imposed on irrigators. The Kennewick Reservoir is being built on the same principle. The contracts for repayment on the Shoshone project do not include the power plant and it is being operated by the Government and the revenues disposed of as above outlined.

The plans for the Boulder Canyon project are in accordance with the above principles with the exception that payments from power are to be made to Nevada and Arizona in lieu of revenues they would receive from taxation. The ultimate disposal of these revenues after the works have been paid for is left in doubt, but it is my conviction that when the time comes to dispose of them we will have so grown in wisdom that they will be made available for the extension of irrigation and the building of new works within the watershed of the Colorado River, and not

Federal Policy in Regard to Storage Reservoirs Is Explained

Plan of Financing Projects Outlined by Dr. Mead Ten-Year Program Followed by Federal Bureau

By Dr. Elwood Mead*

The growth of the arid West involves an increasing use of water and a greater demand on streams to supply it. It is needed for farms, for cities, and for factories, and that increase in need will continue until the West ceases to grow.

So far as irrigation is concerned we have about reached the limit of dependence on the natural flow of streams. More water means more storage. It is not surprising, therefore, that the demand on the Reclamation Bureau for the construction of storages is far greater than ever before, and that is not a temporary demand. It is destined to grow in intensity for many years. It has been accentuated during the last five years by a diminishing supply. In nearly all the arid region there was either a drought or serious shortage during the past two years. The total yearly run-off of streams was sufficient to meet needs if the floods had been held back until they were needed, but to do that required reservoirs, and the reservoirs have not yet been built.

We have an illustration of this need in the Laramie River in Wyoming where at present there are no storages, but where 200,000 acres depend on the natural flow of the river for irrigation and domestic uses. Early in the season both the main Laramie and the Little Laramie had more water than was needed, but in September, the Little Laramie was entirely dry and the main stream carried only 4 cubic-feet of water a second.

Question of Revenues.

The Colorado, which is one of the most important rivers of the arid region, is as yet unregulated. Throughout its entire watershed, which embraces parts of seven states, there are no reservoirs of consequence. What is the result? In the early part of this year enough water ran to waste to more than meet all requirements, but in September the flow of the river available for the Imperial

Valley dropped to 300 cubic feet a second, which is about one-tenth of the water needed to protect the crops in the United States, to say nothing of Mexico.

I have said that water is needed for cities, for factories, and for farms. The needs of cities and of factories for water can be supplied by the local agencies. Cities can impose taxes on people able to pay them. The revenues from power make the building and operating of power plants a favorite investment for capital, but it is otherwise with the reclamation reservoir. In the case of reservoirs built to irrigate raw land it takes a long time to put the land in condition to use the water, the returns in the early years are small, and the capital of the irrigator is still smaller. Payments sufficient to meet interest on the investment and pay off the principal in a lifetime are not possible without imposing burdens on the settler which ordinarily he can not meet or ought not to be asked to assume. Reservoirs to irrigate highly improved land stand in a more favorable financial position, but even there experience has shown that while payment of the principal can be relied on, payment of interest would be an economic burden that the irrigator can not meet.

Financing Reservoirs.

The building, of these reservoirs involves, therefore, a subsidy in the payment of interest. It means the investment of a large amount of money with a small direct return. The justification lies in the stability that it gives to agriculture, the increased population which it supports, the taxable

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Federal Policy on Reservoirs Is Explained by Dr. Mead

CONTINUED FROM PAGE 38

be made a source of dividends to the water users of Imperial Valley and the other lands irrigated below the dam. The furnishing of free storage to Imperial Valley provided for in the law in accordance with the legislation which imposes no charge on the irrigators for the building of the Deadwood Reservoir.

Water Rights on Inter-State Streams

Where reservoirs are built on interstate streams they give rise to the difficult water right questions that can not be dealt with under any existing law. The water-right

situation on all interstate streams brings out clearly the foresight of Major Powell, the first great irrigation planner. He favored dividing the arid region into water districts the boundaries of which would be drainage lines. The water rights within a watershed would all be based on actual beneficial use, with a priority based on time, as are most of our water rights, but the location and construction of the works would be according to a systematic plan.

Instead of this uniform system, our present water laws and administration of streams have been left to be formulated by each state. The conditions of the arid region and the problems of these rivers are remote from Washington and few legislators realize the future overshadowing importance of water. The boundaries of states ignore

drainage lines or the requirements of water administration. They cut across river channels and as a result widely differing water laws determine the ownership and control of the supply of water.

Already the controversies over interstate water rights have broken down the fiction of exclusive state jurisdiction. Since we failed to foresee the future and did not create a water administration based on drainage lines, I believe in the local or state administration of water so far as possible, and did as much, perhaps, as anyone to make state ownership and control of water within the boundaries of a state a reality. However, I have seen it break down in Wyoming, not by the action of the Federal Government, but by the action of the people of the state. The constitution of Wyoming declares that all waters of the state are the property of the state. Congress approved that constitution. I was one of those who believed it was a doctrine that could be maintained, and I knew the importance to Wyoming of having it maintained, because the state was located on the headwaters where development would be slow as compared to that on the lower valleys of the rivers which rose there.

Exclusive State Ownership Fiction.

The Reclamation Bureau has from the start scrupulously followed the requirements of the water laws of this state. The destruction of the fiction of exclusive state ownership followed diversions in Colorado of the Laramie River, which latter state also claimed exclusive state ownership. Wyoming held that water belonged to her because it was first appropriated there; that the water in Colorado was not the property of Colorado, but the property of older irrigators in Wyoming. That issue was taken to the supreme court of the United States and that tribunal said that priorities in a lower state can and should be enforced against the later water rights in the upper state, and now, Nebraska having the older priorities on the Platte River calls upon the authorities of Wyoming to shut off ditches and send the water down. This doctrine of enforcing rights of a lower state against an upper state was not first announced in the case of Wyoming vs. Colorado, but in the case of Kansas vs. Colorado, and it has been affirmed in the case of Twin Falls Canal Co. vs. Wyoming. Thus the doctrine of exclusive state rights has been shot to pieces by the courts, and whatever it may be as a doctrine it is full of grief for irrigators because there is no administrative body to enforce rights across State lines.

For several years, the Reclamation Bureau instead of being a body overriding state laws, as some think, has been a mediator between states in an attempt to prevent friction and ill feeling, and help the worried irrigators on both sides of a state boundary to get through a season.

As many reservoirs have been built on interstate streams and more are destined to be built, here is a situation that calls for improvement. One improvement which has been suggested is compacts, but I have yet to see a state which has surrendered anything of its rights in order to secure an agreement. Most of the negotiations end in a recommendation that the United States shall build more storages so as to meet all the needs instead of seeking to create an administrative body to protect rights. Even if the United States builds the reservoirs asked for, it only postpones an issue that must be settled in some orderly way, because if we provide for all the needs of today we will not provide for the needs of 50 years from now.

Ten-Year Program is Followed.

The Bureau of Reclamation is today engaged in the construction of five costly and important reservoirs. The number would be several times this if funds for construction were available. Practically all these reservoirs are being undertaken at the request of

the states. The only exception would be the opposition of Arizona to the construction of the Boulder Canyon project, but there it is a case of six states favoring and one opposing, and Congress acted on the assumption that the economic arguments and necessities are with the six states.

All reservoirs being built are to be paid for under the requirements of the reclamation law, but the conditions under which payments are made vary widely.

In 1926 the bureau formulated what has since been known as the 10-year program of construction. It included works begun but not completed and a few works the necessity for which had been determined by careful investigation, and which had been made a part of the program of the department. Among these is what is known as the Salt Lake Basin project, for which \$15,000,000 was allocated. The program was intended to absorb the entire construction income of the fund for 10 years, and while it was never formally adopted by Congress, it has been the guide for our development in subsequent years.

Since 1914, the Reclamation Bureau has had its construction program determined by Congress. In nearly all cases the action of Congress has been based on results of cooperative investigations and agreements with the intending water users.