U. S. DEPARTMENT OF AGRICULTURE,
OFFICE OF EXPERIMENT STATIONS.

WATER RIGHTS

ON THE

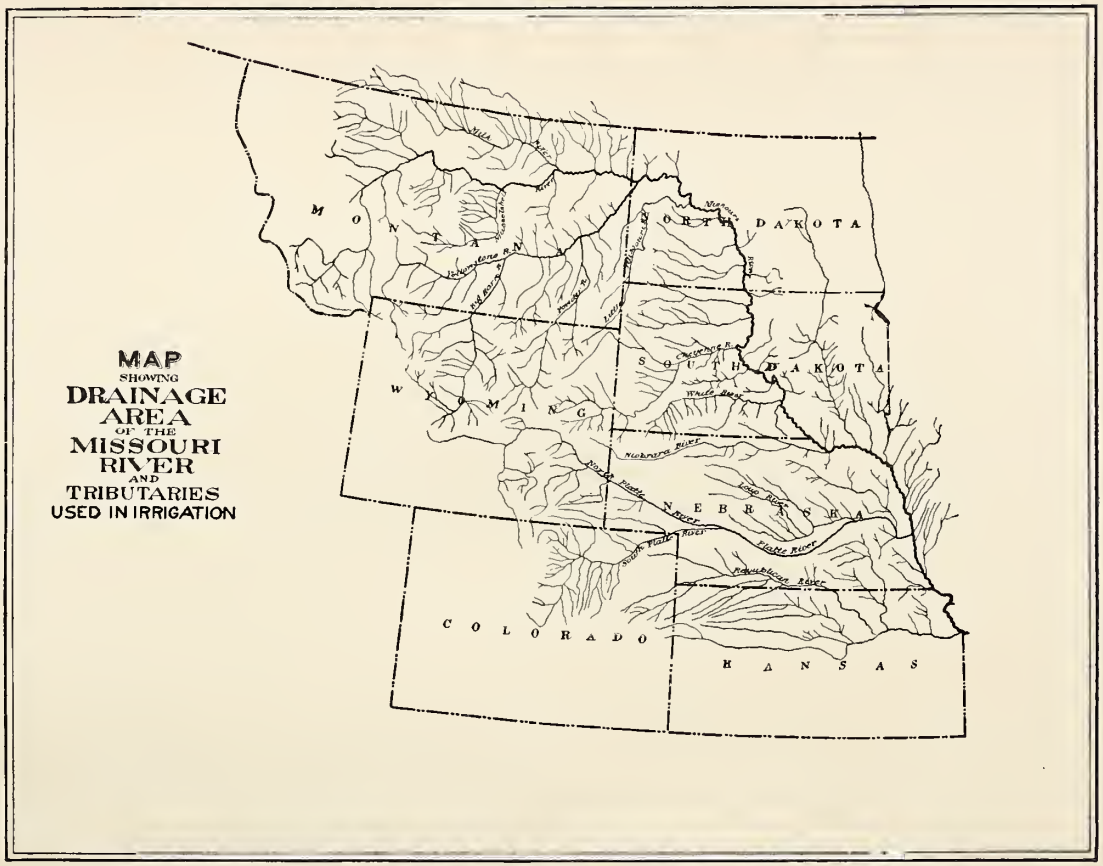
MISSOURI RIVER AND ITS TRIBUTARIES,

BY

ELWOOD MEAD,
STATE ENGINEER OF WYOMING.

WITH PAPERS ON THE WATER LAWS OF COLORADO BY JOHN E. FIELD, STATE ENGINEER, AND OF NEBRASKA BY J. M. WILSON, STATE ENGINEER.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1899.



MAP OF MISSOURI RIVER BASIN.

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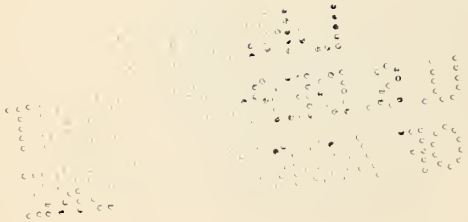

LETTER OF TRANSMITTAL.

U. S. Department of Agriculture,
Office of Experiment Stations,
Washington, D. C., December 15, 1898.

Sir: I have the honor to transmit herewith an article containing a discussion of the irrigation laws which control the diversion and use of water from the Missouri River and its tributaries, prepared by Prof. Elwood Mead, State engineer of Wyoming, in accordance with instructions given by the Director of this Office.

This is the first of a series of bulletins to be prepared in accordance with the provisions of the clause in the appropriation act for this Department for the current fiscal year authorizing the collection "from agricultural colleges, agricultural experiment stations, and other sources, including the employment of practical agents, of valuable information and data on the subject of irrigation, and publishing the same in bulletin form." The general supervision of this work has been assigned to the Director of this Office.

It was decided that the best way in which the Office could get the advice which it needed for the formulation of plans of work along the most useful lines was to call a conference in the irrigated region of experiment-station officers and irrigation engineers who had been most largely engaged in recent years in making experimental inquiries in irrigation, or in dealing with the administrative and practical problems involved in the use of water for irrigation in the West. This conference was held at Denver, July 12 and 13, 1898, and was attended by experiment-station officers from California, Nebraska, Colorado, Utah, Montana, and Wyoming, and the State engineers of Wyoming, Colorado, and Nebraska.

After careful consideration it has been determined to confine the work on irrigation for the present to two general lines: (1) The collation and publication of information regarding the laws and institutions of the irrigated region in their relation to agriculture, and (2) the publication of available information regarding the use of irrigation waters in agriculture as shown by actual experience of farmers and by experimental investigations, and the encouragement of further investigations in this line by the experiment stations.

As the extent and importance of the use of water for irrigation have increased in that vast region of the United States in which the rainfall is not sufficient for successful agriculture, many perplexing questions have arisen regarding the legislation and methods of administration required to secure the most equitable distribution of available water and to promote the most advantageous development of industrial and social life in the communities whose very existence depends on an adequate supply of water for irrigation.

It is believed that this Department may greatly aid in the right solution of these fundamental problems by setting forth the facts and impartially discussing the principles involved in the just adjudication of water rights. As the matter vitally affects a considerable number of States and Territories and many of the problems overrun the State lines, it seems entirely appropriate that the National Government should undertake to collate and diffuse the needed information. In the treatment of the subject of water rights, the comparative method seemed most likely to bring out the merits as well as the defects in existing laws and methods of administration in the several States, and this method has therefore been pursued in the preparation of this bulletin. On the other hand, the vast extent of the irrigated region and the peculiar problems presented by different large areas made it unadvisable to attempt to cover the whole field in a single bulletin. It was deemed preferable for this first bulletin to select a single region covering portions of several States in which there was in general sufficient likeness in the agricultural conditions as affected by irrigation to render it possible to make a clear and definite statement of the problems of water rights and of the directions in which improved legislation is required.

The author of the major portion of the bulletin is thoroughly familiar with the region of which he writes, and has had a long and successful experience as irrigation engineer and administrator of irrigation laws, as well as a student of the agricultural problems of this region. Besides the State of Wyoming, there are two States in the Missouri Basin in which the streams are under State control and in which State officials protect the rights of appropriators of water for irrigation purposes. These officials are better prepared than anyone else to discuss the efficiency of the irrigation laws which they attempt to enforce, and it is considered very fortunate that the cooperation of Hon. John E. Field, State engineer of Colorado, and Hon. John M. Wilson, State engineer of Nebraska, could be secured to prepare the discussion of the laws of their respective States. The success which these officers have achieved in the discharge of their complicated and important duties gives to their views a special interest and value. In addition to their contributions, valuable assistance has been rendered by the Hon. J. S. Dennis and Wm. Pearce, of Canada; Hon. E. D. Wheeler, irrigation commissioner of Kansas; Hon. Allen Cox, attorney, of Wakeeney, Kans.; Hon. S. A. Cochrane, State engineeer of South Dakota; Hon. Edward Van Cise, attorney, of Deadwood, S. Dak.; F. L. Sizer and other members of the Montana Society of Civil Engineers; and many others.

This bulletin is respectfully submitted, with the recommendation that it be published as Bulletin No. 58 of this Office.

Respectfully,

A. C. True,
Director.

Hon. James Wilson,
Secretary of Agriculture.

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INTRODUCTION.

For every acre of irrigated land there has to be a right to water. The title to the water is of as much importance as the deed to the land. It is much harder to establish. These rights take more forms than the rivers they control, and are acquired by as many methods as there are States to frame laws. In one respect they are alike: No matter whether the user of water derives his title direct from the State, buys it from a ditch company which furnishes water for hire, or from the holder of a speculative claim, it is a source of more perplexity at the outset, and of more hours of anxious thought afterwards, than all the other problems of irrigation combined. This is due in part to the fact that the ownership of streams is new and the nature of property rights therein uncertain; but, whatever the reason, the fact remains that the irrigator whose water right does not furnish grounds for either an inquiry or a grievance is a rare exception. Nor are irrigators alone in finding the limits of a water right hard to define or the problems of stream ownership hard to solve. Lawmakers and courts have both found them equally perplexing.

The reasons for this are not obscure. Because of uncertainty of what these rights should be, or difference of opinion on that question, the irrigation laws of many States have been made so ambiguous and contradictory that the finite intellect is not able to interpret their meaning. As a result there are laws and court decisions to sustain about every view of stream ownership of which the mind of man can conceive, and in some cases they are all found in the statutes and decisions of a single State.

The following will serve to illustrate what is meant:

The General Government in 1866 practically abrogated all control over nonnavigable streams used in irrigation by recognizing local laws and customs on this question. Subsequently it passed the desert-land act, which defines what a right to the use of water in the irrigation of that land shall embrace.[1] This act has been made a basis for a conten-

[1] *Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That it shall be lawful for any citizen of the United States, or any person of requisite age "who may be entitled to become a citizen, and who has

tion on the part of many irrigators that they do not derive their rights from State laws at all but from this national act, and that the party who acquires a title to land under the desert act is independent of State laws governing water rights. The General Government, however, does not in any way exercise control over streams or protect these rights, but, on the contrary, recognizes local laws, in many instances accepting as evidence of title to water documents which have no more real force and effect than would a certified copy of the Declaration of Independence.

One of the States included in this discussion has made the common-law doctrine of riparian rights a part of its organic law. The supreme court of another State, in setting this doctrine aside, thus describes the effects of its adoption in any State where irrigation is required:

> Riparian rights have never been recognized in this Territory, *or in any State or Territory where irrigation is necessary,* for the appropriation of water for the purpose of irrigation is entirely and unavoidably in conflict with the common-law doctrine of riparian proprietorship. If that had been recognized and applied in this Territory, it would still be a desert; for a man owning 10 acres of land on a stream of water capable of irrigating 1,000 acres of land or more near its mouth could prevent the settlement of all the land above him; for at common law the riparian proprietor is entitled to have the water flow in quantity and quality past his land as it was wont to do when he acquired title thereto, *and this right is utterly irreconcilable with the use of water for irrigation.* The legislature of this Territory has always ignored this claim of riparian proprietors, and the practice and usages of the inhabitants have never considered it applicable, and have never regarded it. (Stowell *v.* Johnson, 26 Pac. Rep., 290.)

The same State which has in one law required that streams shall not be diminished in volume has in another law legalized the construction of ditches to take water out of those streams and the appropriation of the water to fill those ditches.

In another State where the constitution makes water *public* property and dedicates its *use* to the people the holders of rights thereto are treating them as personal property and selling the stream's flow exactly as they would bushels of wheat or yards of cloth. The laws of this State require that appropriations shall be for beneficial uses, yet appropriations for large volumes of water are being sustained where it is

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filed his declaration to become such," and upon payment of twenty-five cents per acre, to file a declaration, under oath, with the register and receiver of the land district in which any desert land is situated, that he intends to reclaim a tract of desert land not exceeding one section, by conducting water upon the same, within the period of three years thereafter: *Provided, however,* That the right to the use of the water by the person so conducting the same on or to any tract of desert land of six hundred and forty acres shall depend upon bona fide prior appropriation; and such right shall not exceed the amount of water actually appropriated, *and necessarily used for the purpose of irrigation and reclamation;* and all surplus water over and above such actual appropriation and use, together with the water of all lakes, rivers, and other sources of water supply upon the public lands, and not navigable, shall be held and remain free for the appropriation and use of the public for irrigation, mining and manufacturing purposes, subject to existing rights. (Forty-fourth Congress, 2d session, chap. 107.)

admitted that the water was not used for any purpose, beneficial or otherwise, for twenty years after the priority of right was established.

In some States the law is so ambiguous that no one can tell from its terms whether a right to water is acquired by posting a notice on the bank of the stream, by building a ditch to divert it, or by spreading it over the arid plain to make it productive. There is equal uncertainty about the nature of the title after it is acquired. Some contend that whoever files a location claim on a stream becomes the absolute owner of what he claims; others that the right is restricted to the capacity of the ditch, but that the ownership is absolute and, when once acquired, can be moved to other ditches or other lands. There are others who hold that streams are public property; that no right except that of use is or should be conferred; that this right is inseparable from the place where acquired or the use by which acquired, and that rights for irrigation do not inhere in either the individual who makes the filing, or in the ditch which diverts the stream, but in the land reclaimed, and is inseparable therefrom. In the decisions of a single State it has been held that water can not be appropriated for one purpose and then used or sold for another; in a succeeding decision the right to sell an appropriation irrespective of use has been upheld. In the same State it has been held in one decision that the size of the ditch determines the volume of the appropriation, regardless of the use to which applied, while in another decision the volume of the appropriation was determined by the acres which had been irrigated, and in still another decision the construction of a ditch on one side of the stream was held to have established a right to water for land on the opposite side of the stream which had never been irrigated and for which the ditch was not built for many years after the right was acquired.

As yet the subject is new. Laws and customs are in their formative period. The views of each user of water are modified by his knowledge or ignorance of the experience of other lands, and by the influence on his personal welfare which the adoption of any particular policy would have. These conditions make it hard to enact laws which will commit a State to any one of these doctrines. Legislators have preferred to avoid the subject or to confine themselves to glittering generalities which begin and end nowhere so far as the creation of a working code of laws is concerned. This policy has been encouraged by the fact that the ultimate importance of agriculture by irrigation has been obscured by the present prominence of mining and by the greater profit to a few stockmen to be gained from the free use of the public land as an open range.

But the irrigated lands of the West are fertile; the climate is healthful. In the noble mountains of this region are some of the world's greatest sanitariums, where many have to go to live. The remaining public lands are arid, and irrigation is the hope of the home seeker.

With or without laws for their orderly and peaceful use, the rivers of the West have been diverted. Cities have been built where once the coyote was the only inhabitant. The sagebrush and cactus plain is now dotted with orchards and grain fields. The river which once ran idly to the sea has become the lifeblood of the industries and the hope of more than one-fourth of this country. On its right division and use hinge the returns from the millions invested in ditches and canals, and the value of thousands on thousands of homes.

Colorado leads all the States in the production of the precious metals, but the yearly return from her irrigated fields is nearly double the value of the yearly output of the mines. In a half century the cash value of rights to her streams has risen to over seventy millions of dollars.[1]

On many rivers there are now a multitude of claims to the common supply. These rights have to be defined in some way. If laws do not define them, a resort to the courts is all that intervenes between the just rights of water users and anarchy. In many States the exigencies created by a failure to enact an administrative code have compelled the courts to become practically both the creators and enforcers of water laws. They have to devise a procedure for adjudications, supplement the statute law in deciding what rights have been established, and finally have to protect irrigators' priorities by a liberal exercise of government by injunction. The growing volume of this litigation, together with the uncertain and contradictory character of many of the decisions, is making it a heavy burden to irrigators and a serious menace to progress. Unless it can in some way be restricted, it threatens to impair the value of investments in ditches and the success of this form of agriculture. In ten years the water-right litigation of one State is estimated to have cost over a million dollars. In many sections it has exceeded the money expended in constructing the ditches in which it has its origin.

These conditions are not met with in every State. In two States it costs an appropriator less to establish his right to water than it does to prove up on the land it fertilizes, and it is done by the same direct methods. Litigation is conspicuous for its absence, either in acquiring water rights or in preventing interference by subsequent appropriators with their enjoyment. In these two States public control of streams is as much a part of the State government as is the control of public land a part of the National Government.

Wherever rights to water are restricted to its beneficial use, and where such use is followed promptly by the determination of the extent of such rights, controversies are as rare as they are over land filings; and where these laws begin by prohibiting speculative filings and end with adequate protection for just ones there are no more contests among farmers who depend on rivers than there are between those

[1] Address of Hon. E. S. Nettleton, ex-State engineer.

who depend on rain. Litigation does not arise because irrigators desire it. It has its origin either in ignorance of the law or in its imperfections.

To end it the users of water must be informed. They not only need a better understanding of their own laws, but to know how rivers are managed in other countries, so that their experience may be utilized. In a large measure we are dealing blindly with a question which in all ages and all lands has taxed the wisdom of the ablest minds. The General Government aids settlers by publishing explicit directions for filing on public land and acquiring title thereto, but no such instructions have ever been issued to direct users of water in acquiring a right to the volume needed to give the irrigated home a value. The pages which follow are intended to supply in part this omission.

CHARACTER OF IRRIGATION FROM MISSOURI RIVER.

In considering the problems which these different State laws present none seem more perplexing, nor in their larger aspect more illogical, than the change which occurs in the control and in the forms of ownership of a river when it crosses a State boundary. The Big Horn River is the same stream after it leaves Wyoming that it was before it crossed the imaginary line which separates that State from Montana, and users' needs are the same; but the interval required in this passage marks a revolution both in the forms of proprietorship in the stream recognized by law and in the manner of their creation. It has seemed, therefore, that by confining the discussion to a single river the nature of the fundamental problems could be more clearly set forth. The States embraced in this discussion are Kansas, Nebraska, North and South Dakota, Wyoming, Montana, and Colorado. They form a part of the Missouri River basin and their laws control the portion of its waters used in irrigation. The following are the reasons for selecting this stream:

It is the largest river of the arid region. The area and fertility of land which can be reclaimed makes it certain that in time the value of its products and the number of people supported by agriculture will make it a worthy rival of the Nile. The most effective laws have been enacted by the States drained in part by its tributaries, so that we are dealing with the best rather than the worst conditions. Throughout the entire arid and semiarid district which it traverses agriculture is of the same character. It is one of the foremost stock-raising and grain-growing sections of the country. So far as its productions or the needs of its farmers are concerned, there is no more reason for half a dozen water laws than there would be for that many different systems of acquiring titles to land. On the other hand, the complications which would grow out of a half dozen land systems are not to be compared to the complications which are being created by half a dozen different water laws, because these different titles to water and different methods of acquiring them all refer to a common supply.

Irrigation in the Northwest Territories of Canada.—Some of the tributaries of the Missouri rise in the Northwest Territories of Canada—a region so like Montana and Dakota that laws which work well in one country will be a success in the other. The application of the Canadian laws to a portion of the Missouri's watershed makes their consideration desirable, aside from their influence on international water-right questions. We ought to know what those laws are. They are worthy of our study because the control of streams in those Territories is only approached in efficiency and directness by two of the States on this side of the boundary. The Northwest Territories have therefore been included.

NATURE OF THE PROBLEMS.

The map of the Missouri Valley (Pl. I, frontispiece) shows the region included in this discussion. It embraces an area of 491,400 square miles—almost twice as large as the original thirteen colonies. In over two-thirds of this area irrigation is a necessity; in all it would be a benefit. The stream gaugings at Kansas City give the run-off of this watershed, and in a rough way enable us to determine the extreme limits of the acreage which can be reclaimed. The diagram on page 13 shows both the daily and seasonal discharge for the years 1881 and 1885. From these it will be seen that the water which ran to waste in 1881 (67,937,000 acre feet) would have more than sufficed to cover all New England 1 foot deep. In 1885 this discharge fell to 48,377,000 acre-feet, and in the other years in which the record has been examined it fluctuated between these two extremes. Not all of this water can be utilized. The fluctuations in discharge are much greater than the variations in the use of water. Without storage a very large percentage must run to waste, and even with storage not all can be utilized.

There have not been enough measurements of the quantity of water required to irrigate an acre of land to afford a basis for even an approximate estimate of what the available volume of this stream will reclaim. An acre of any crop in Nebraska or Kansas, where there is 20 inches of rain, requires less water than it does in parts of Wyoming, where the rainfall is only one-half this depth. It will also depend on the kind of crops grown. It takes more water to produce an acre of native hay than it does 2 acres of potatoes, so that there are numerous elements which make any attempt at fixing the ultimate acreage which will be irrigated a hazardous performance. Taking the results which have been secured with smaller volumes of water, where both the acreage of land and the water which reclaims it have been definitely determined, it does not seem an extravagant estimate to say that the Missouri and its tributaries are capable, if rightly used, of reclaiming from barrenness nearly a half million 80-acre farms; nor does this contemplate exhausting the stream. A large percentage of the volume diverted will return, so that if every drop which enters the river and its tributaries were taken out so much would return that the most apparent

result would be the equalizing of the flow of the main stream. There would be less water in June and more in October. It must be remembered that the diagram (fig. 1) shows only the surplus. On many of the tributaries the summer flow was entirely used at the time these measurements were made. At that time millions of dollars had been expended in ditches, and many thousands of homes were being made prosperous by the use of the water. Since that time many more millions have been expended, but still the floods of June are a source of destruction to the dwellers along the river below, while the escape of the early summer's discharge of water is a still more serious injury to the farms above. We are seriously considering the beginning of a great

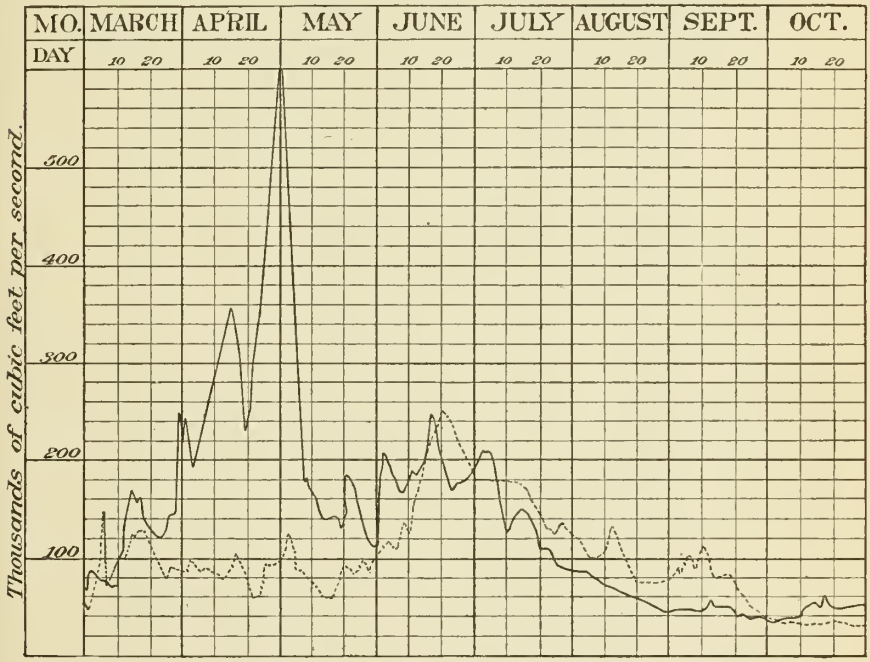

FIG. 1.—Discharge of the Missouri River at Kansas City, Mo., for the irrigation seasons of 1881 and 1885. Total run-off for irrigation season of 1881, 67,937,000 acre-feet; for season of 1885, 48,377,000 acre-feet. Full line shows discharge of 1881; dotted line, discharge of 1885.

national improvement in the construction of storage basins on the head waters of this river to protect people at the lower end of the river from floods, and to relieve those at the source from drought. This gives to the control of its waters a national interest and importance. But whether or not this be done, the mere diversion and use of the natural flow have already created property rights of immense present and far greater prospective value. There is no national or State law which so directly affects the success of the irrigator as that defining his right to water. Whoever owns a river practically owns the land it irrigates, no matter who holds the patent thereto, and the laws which define this ownership are the most important which any irrigated State is called upon to enact.

It is only in recent years that the ultimate importance of these questions has come to be realized. The first irrigation codes were devised to meet immediate needs and the evolution in each State has been much the same, although it has gone farther in some than in others. When the first settlers began the construction of ditches there were no laws governing water titles. The pioneer irrigator selected a location on a creek or rivulet where it could be cheaply controlled and built his ditch to reclaim the land it watered without making any record of his diversion or any claim for an appropriation. He recognized the need of filing on the land because past experience had shown him its value and the need of a definite title thereto; but all his past experience and his inherited prejudices were opposed to the ownership of water or any laws to regulate its control. The early users had all there was, and so long as the supply was ample one right was as good as another. But later other settlers came, and other ditches were built, until on many small streams the demand exceeded the supply. Whenever this condition arises there is need of a law to define and protect rights. Without it position counts for everything. The irrigator at the head of the stream takes whatever he chooses; those lower down take what is left. When the supply is exhausted they go without.

In no State have laws been enacted until someone's crops began to wither because of diversions above. Before any important laws were framed the questions to be settled had been complicated by a modification of the primitive appropriations. When the first rights were established the irrigator was, as a rule, the owner of both the ditch and the land it watered. He filed on the stream, diverted the water, transported it to the field, and used it on land he owned. But on larger streams the individual farmer can not do this. There great dams must be built and substantial head gates constructed to control the torrents which beat against them. The main canals stretch away for scores of miles, skirting cliffs and crossing ravines on flumes and trestles that require the highest engineering skill in their design and construction. The majority of the canals of this character have been built by capitalists who do not use the water diverted, but furnish it to others. When it comes to a determination of these rights, therefore, the question arises as to who is the appropriator. In whom does the right to the water inhere? Is it the owner of the canal which takes it from the stream, or the farmer who uses it on the land? There are other questions. How and when is an appropriation made, and what measures its amount? Is it by filing a claim, building a ditch, or beneficially using the supply? Is the volume measured by the quantity which canals or water ways will take from the stream, or by the volume which has been actually used? These are fundamental questions which every State must definitely answer before water rights become secure.

The right of each of these States to control the diversion of its streams is not the same. In the Northwest Territories streams are

declared to be the property of the Crown. In Wyoming both surface and subterranean water supplies are, by the constitution, made the property of the State. As this document was ratified by Congress, State ownership is a part of the compact between the State and General Government. The constitution of Colorado makes water public property. In the other States the right to enact laws on this question is based upon the act of Congress recognizing local laws and customs. In the Northwest Territories and in Montana, Wyoming, and Colorado riparian rights are abrogated. In South Dakota the question of their abrogation is now before the State supreme court.[1] Kansas is divided. West of the ninety-ninth meridian the doctrine of appropriation prevails. East of it riparian rights are recognized. The adoption of the common law in the Nebraska constitution makes riparian rights a part of the organic law of that State. The statutes, however, make the right to appropriate water as absolute as do the water laws of either Colorado or Wyoming, and the courts seem disposed so to restrict the rights of riparian proprietors as not to interfere with the use of water in irrigation. The importance of this question to that State and the need of all the available water supply in the reclamation of lands in the western half of it makes it desirable that this apparent conflict between the constitution and irrigation code be remedied at an early date.

In Colorado, Kansas, and the Northwest Territories rights for domestic purposes are superior to those for irrigation. It does not matter how early a right for irrigation is acquired, if the subsequent increase in population augments the demand for domestic purposes beyond the stream's discharge the earlier irrigation right may be destroyed thereby. In the other States those first in time are first in right. The holder of the first appropriation can take the volume to which he is entitled before any later rights are recognized. The holder of a second right is entitled to his appropriation from what remains, and so on in succession until the stream is entirely diverted. If there are any subsequent rights remaining, their holders go without. The value of an irrigated farm depends largely, therefore, on the priority number of its water right, or rather on the volume of superior rights.

WATER-RIGHT FILINGS.

Every working code of irrigation laws should provide for three things, and its success depends largely on the way this is done. These are:

(1) An accessible and trustworthy record of preliminary filings on streams.

(2) A clear definition of water rights and a simple, orderly, and inexpensive procedure for their determination.

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[1] Farwell *v.* The City of Sturgis.

(3) Some means of dividing streams in times of scarcity in order that the holders of prior rights may be protected.

Among the reasons for requiring a notice and record of proposed diversions are the following:

(1) They are needed as a protection to existing rights. Those who have built ditches and expended their labor and money in reclaiming land ought to be informed of each new ditch projected, because it may be so located, or of such dimensions, as to seriously diminish the common supply of water and work an injury to existing rights far greater than the benefit to the proposed builders. To prevent this, the notice should be of such character that all who desire to keep informed can do so, and they should have an opportunity to protest if the protection of existing rights makes this necessary.

(2) They are needed as a guide to settlers and to purchasers of irrigated farms.

The first thing an intending purchaser of irrigated land, or a settler on a farm which has to be irrigated, should do is to inform himself fully as to its title to water. The priority number of its appropriation and the number and location of other rights are all of the utmost importance, and it requires some knowledge of these facts to determine whether the paper title has any value, or whether the volume of superior claims makes it either a fiction or fraud.

(3) They are needed as a protection to those proposing to build new ditches or reclaim additional land.

The building of large canals and the settlement of the land under them takes time. It is not a matter of months but of years. It has taken over twenty years to settle the land under some of the canals along the Poudre River in Colorado, one of the foremost agricultural valleys of the West. The Development Canal in Wyoming was begun in 1883; in 1898 not one-half the land it waters is under cultivation. The Bear River Canal in Utah, the Dearborn Canal in Montana, the Gothenburgh Canal in Nebraska, and scores of others are all illustrations of the fact that the reclamation of arid land is slow and that one of the first things to be looked after is to protect those who begin this work from the danger of the creation of fraudulent or extravagant rights, by means of which an abundant water supply, which existed when a canal was begun, will have been absorbed before it was completed. This is no fancied danger or imaginary abuse. The loose methods of recording claims and the imperfect procedure for establishing rights which prevail in so many States makes ditch building on many streams one of the most hazardous forms of investment, when under proper laws it could be made one of the most secure. There are few rights for irrigation, even under the smallest ditches, which are perfected, through the actual beneficial use of water, in less than five years. There are many where a quarter of a century elapsed between the turning of the first furrow on the ditch and the moistening of some of the land it was built to reclaim. Every condition surrounding the

creation of a water right makes the need of an absolutely correct and definite statement of the purpose of the appropriation imperative. The time required to use the water and the fact that conflicting rights are being established elsewhere on the same stream at the same time, make it desirable that each claimant should describe his own project so certainly that no one else can contest his right because of changes, and that all others shall be equally specific in order that he may be fully informed, when he begins, of all the possible opposing rights which can be acquired. Without this, the temptation to exaggerate is too strong to be resisted.

It is the common experience of courts and boards of control that there is frequent disregard for the sanctity of an oath in proving up on a water claim, and the fact that many of these ditches are built in sparsely settled regions, where no one but the owner knows when work began or the rate of progress in construction, makes the temptation to advance the date or augment the capacity very great, when there is no official guide to memory or official check on the imagination. A recent experience of the Wyoming board of control will serve to illustrate this. In the determination of some rights to a small stream, acquired under Territorial laws, the claimants submitted proof of the date when ditches were built and water used. The stream was overappropriated, the cutting of timber on the mountains having greatly lessened the water supply in recent years, so that the establishment of an early priority was of the utmost importance. One of the appropriators submitted a written sworn statement that he built his ditch in 1879. This was contested, and at the contest hearing he swore that he purchased the completed ditch in 1883. The records of the engineer's office show that a notice of this proposed ditch was filed in 1886. It was this official record which first disclosed the original error and which corrected the last one. Without this there is little doubt that the priority would have dated nine or ten years before the sod was broken.

A notice should fix the date when work will begin and when it is to end. It should do more than claim the stream; it should locate the ditch and describe every acre of land to be watered, and no change should be permitted without official record and approval thereof.

A record of the kind outlined can be secured only by subjecting the statements filed to an intelligent and rigid official supervision. Many of the parties desiring to build ditches know nothing of the irrigation laws nor of the measurement of the flow of streams or capacity of ditches. With the best intentions, therefore, they will make such mistakes as will destroy the authenticity of the record if all statements are recorded as filed. It is the experience of land officers that so simple a document as a homestead filing needs to be examined before being entered of record. Fully one-half of the "applications for permits" filed in the Wyoming State engineer's office have to be corrected in some detail before being recorded.

THE TWO SYSTEMS OF FILING CLAIMS TO WATER.

In the region drained by the Missouri there are two general systems of recording claims. Kansas and Montana have one, Wyoming, Nebraska, and the Northwest Territories the other. The system in Colorado is a compromise between these two, while the two Dakotas have no laws relative to this matter, the South Dakota law of 1881 not having been included in the amended laws. For convenience in discussion we will call the Kansas-Montana system the "first plan;" that of Wyoming, Nebraska, and the Canadian Territories the "second plan."

Under the first plan parties desiring to acquire rights must post a notice at a conspicuous place on the bank of the stream at or near where the headgate of the ditch is to be located, giving the volume of water claimed, the size of the ditch or canal which is to divert it, the date of the appropriation, and the name of the appropriator. In Montana this notice must subsequently be recorded in the office of the county clerk of the county where the ditch is situated. In Kansas the notice must be posted in the office of the county clerk and recorded in the office of the register of deeds of the county where the proposed headgate is to be located.

The second plan is based on the theory that streams are State property and the consent of the State authorities is necessary to any diversion and use thereof. This is the basis of the water laws of the Northwest Territories of Canada as well. Parties desiring to acquire a right must file an application for a permit. In acquiring rights for irrigation the application must be accompanied by a map of the ditch, a description of the land to be irrigated, and must state when work will begin and the time desired for completion. In Wyoming and Nebraska these applications are filed with the State engineer, who has to examine and secure their correction if not properly made out, and to reject them if they propose to divert a stream already appropriated or if the diversion is of a character detrimental to public interests. The approval of the permit fixes the conditions under which the right is acquired, and a compliance therewith is all that is needed to insure its establishment. Work can not begin, under these applications, until they have been approved by the State authorities. The procedure in Canada differs from the above only in detail. There the approval of the minister of the interior is required and a preliminary notice by publication in the Canada Gazette and in a local newspaper is necessary.

It will be seen that these two ways of making filings have nothing in common. Under the first the claims to one stream are often scattered in a half dozen places. Those to the Missouri in Montana are divided between fourteen counties. Under the second plan all the claims to a main stream and its tributaries are recorded in one office. The first plan is a claim of what is wanted. The second is a statement of what is to be done. Under the first plan there is no need to be care-

ful about the facts, because an indefinite claim will be recorded as readily as a specific one. The nature of the right established under the second depends upon its accuracy and it will not be recorded unless definite. Under the first plan there is no limit to the number of claims which may be filed nor to the volume of water which may be claimed. Under the second when the applications describe uses which will absorb a stream no more rights can be secured. Systems so different, applying not only to the same conditions but to the same streams, can not work equally well. One must be better than the other.

Wyoming irrigators file on the upper half of Sage Creek under one plan, and the Montana irrigators on the lower half under the other. An appropriator from the Republican River in Nebraska must file a map of his ditch and a description of the exact land it is to water, and he receives only a permit or license to reclaim that land and none other. Across the line, in Kansas, a man can file a claim to the same stream without a map or list of land, and it will be recorded if he claims more water than flows in the Missouri. It is worth while to know which of these two plans is based on right ideas and which has been justified by results.

The first plan requires intending appropriators to post notices on the bank of the stream. What is the object of these notices? Many hours have been devoted to this inquiry. The conclusion has always been that whatever service notices so located could possibly render can be much more effectively and surely arrived at in other ways. They are of no benefit to the proposed appropriator, because they give no definite right nor do they keep anyone else from posting other similar notices beside them if he so desires. They are of no service as a warning to appropriators elsewhere on the stream, because they do not and can not see them. To search for these notices along the two banks of the North Platte River in Wyoming would require a journey of a thousand miles. To look for them along the Yellowstone would require a longer journey. Even on lesser streams such a notice can serve no useful purpose. Who would think of traversing the banks of the Republican River for hundreds of miles hunting for location posts to find who proposed to appropriate its waters.

Not one irrigator in ten thousand ever sees or regards these notices. One newspaper notice would be more effective than a proclamation of this sort even if the post were a thousand feet high. No one can think of it as a part of the procedure in establishing a title to water without seeing how useless it is. Yet it is a feature of the water laws of more than half of the arid States. How, then, did it originate? The answer shows the strength of inherited ideas and what queer forms they assume. It was borrowed from the early custom of posting notices of land and mineral filings. The miner who makes a placer location posts a notice thereon telling the world what he claims. This is a reasonable and proper act, because anyone else desiring to file on the land will

examine it, and in doing so will see the notice. The notice is where it ought to be, and being there it also controls the land itself.

In like manner, settlers who located on unsurveyed land or in regions remote from land offices, asserted their right to possession by posting a notice describing the boundaries of the land claimed. Under existing conditions this action was necessary and effective, since the location and character of the warning enabled all who had need to know of it to see the notice. It is otherwise with a claim to a river which rises in mountains above and flows on to users of its waters miles below. Every user of its waters is affected by what takes place in either direction. The farmer or miner who either seeks to protect himself or inform others by posting a notice in some lonesome bend simply wastes his time.

Inherited ideas are queer things. They have done more than to perpetuate a meaningless procedure in water-right filings; they are the source of some exceedingly mischievous statements in the notices as recorded.

When the early homesteader made his land location his notice declared to all the world that he had a valid right to the exclusive occupation, possession, and enjoyment of the land located upon, together with all the hereditaments and appurtenances thereunto belonging or in anywise appertaining. This was correct. He did have exclusive ownership; but when he posts a notice on a river bank stating that he has the exclusive right to the possession or enjoyment of its waters, when the stream is already plastered over with other claims of the same nature, he only deceives himself when he thinks the declaration has any force.

The legal notices in use in Montana are intended to be posted and recorded before construction begins, and as a rule they are so posted and recorded; yet many of them contain this declaration:

> That John Brown does hereby publish and declare, as a legal notice to all the world, that he has a legal right to the use, possession, and control of and claims ——— inches of water of ——— ——— for irrigation and other purposes.

And further along this notice states—

> that he *appropriated and took* said water, * * * together with all and singular the hereditaments and appurtenances thereunto belonging or appertaining or to accrue to the same.

It will be observed that the idea or purpose of acquiring absolute personal ownership which exists in all mineral locations is applied, at least so far as the statement is concerned, to the filings on rivers. If the language of these notices is to be construed literally, it is not by the building of ditches or the applying of water to beneficial use that the right thereto is acquired, but by posting this notice on the bank of the stream and recording a copy of the same in the county clerk's office.

It does not need any argument to show that such a law would be so repugnant to common sense and detrimental to the public welfare that it never could be carried into effect. The use of these misleading expressions has been in the past and is destined to be in the future the cause of litigation and controversies, the ill effects of which can scarcely be estimated. Before this discussion is completed it will be shown that not only do irrigators think that the filing of these claims gives them the ownership of whatever volume they describe, but that courts in adjudications have upheld that view, and that scores of streams have been disposed of through the recognition of rights which had nothing more substantial than this claim to support them.

EXCESSIVE CLAIMS FOR WATER.

In the later discussion of the Montana law the filings on one stream are given (p. 55). It is not an exceptional case. The claims on scores of other streams were equally numerous and equally liberal. In examining the filings on one stream it was noticed that the claims varied in volume from 1 to 5 second-feet, until one claimant, more expansive in his ideas than those who had preceded him, claimed 300 second-feet. This was more than twice the stream's discharge, but every claim which followed—ten in all—was for 300 second-feet. This disposition to claim everything in sight extends throughout the irrigated area. It is not restricted to the Missouri, as the following facts from the record in another river basin show. The Boise River, when gauged in September, 1898, showed a discharge of 698 second-feet, or 34,900 statute inches. The official records of one of the three counties through which this river flows show 151 claims for water from this stream, amounting in the aggregate to 6,361,800 inches. Thus, with less than 35,000 inches in the stream at its lowest stage when measured and with probably not to exceed fifty times that discharge at the flood season, we have here claims to 6,361,800 inches, with all the hereditaments and appurtenances thereunto belonging or in anywise appertaining, and this without including the claims of the county above or the county below.

A land system which would accept a score of filings for the same quarter section and then leave the settlers to fight for its possession in the courts would not be held in high esteem. A water-right law which places no restrictions on the claims to streams is just as illogical and as fraught with needless abuses. To say the least, these records are of little or no value. They are worse. They are a makeshift which misleads and deceives everyone who relies on them. No worse element can be introduced into a working code of laws.

Wyoming and Nebraska began with a filing law similar to those of Montana and Kansas. Experience showed that reform was necessary. It was not alone the fact that the record was both inaccessible and unreliable. This was bad enough, but the more serious objection was

that filing did no good. There was no way to stop filing claims when the stream was exhausted. There was no way to tell what claims were followed by construction and what not. There was no way to cancel and get rid of those which began and ended with the filing. There was no way to protect actual users when the supply ran short. In brief, it was not a working plan.

Whenever users needed protection they had to go to the courts, and when they did this the county record became one of two things: Either rubbish or a menace to a just settlement. Wyoming's experience showed it could be both. Litigation to settle the rights on Crow Creek was begun while this law was in force, and each claimant brought into court his water claim duly recorded with the county clerk as evidence of title to water. The court accepted it as reasonable and conclusive. As a result, rights to 485 second-feet were decreed out of a creek which seldom carries over 10 second-feet and of which the normal flow is but little over 5 second-feet. Not one acre in ten for which claims were filed had ever been watered. Many of the ditches had not then and have not since taken a drop of water from the creek. So far as diversion and use were concerned, many were wholly without foundation. A right would have been just as valid if its holders had simply looked at the creek and then filed an "appropriation" with the clerk.

The excess decreed was not, however, so remarkable as its division among the claimants. The actual need for water on the land along this creek is small. One second-foot will on an average furnish all the water needed to irrigate 100 acres of land, but in making their claims these irrigators were generous. The second appropriator claimed 6.92 second-feet for 100 acres and got it in the decree. The next claimed 23 second-feet for 200 acres and that was decreed. The fourth claimed 11.36 second-feet for 28 acres; that was enough to cover it about 300 feet deep in a year; but the court was as liberal as the claimant and it was decreed. One appropriator was decreed 37.5 second-feet for 200 acres, while a less fortunate one obtained only 29.8 second-feet for 5,000 acres. One appropriator was allowed 31.9 second-feet for 200 acres, while the succeeding one obtained only 10.98 second-feet for 1,620 acres, or about one-third the water for eight times the land. A recital of the entire decree would be a repetition of these incongruities, which had their origin in treating these claims as vested rights.

When rights began to be based on the volume actually used, those for irrigation being determined by the acres watered, the difference between the claim and the volume allotted always led to one of two conclusions on the part of the irrigator: That the original filing or the later adjudication was a fraud. The two following examples, taken from the Wyoming records, show why they were seldom in accord and how radical was the encroachment on what was regarded as a vested right.

Notice to the public and to whom it may concern.

All persons are hereby notified that the undersigned hereby gives notice that he claims for his own use and benefit all the water flowing within the banks of Wagon Hound Creek through his premises, the same being his ranch and range, for the use of irrigation and agricultural purposes from and above the point where the notice is located until said waters are passed by any lands he may claim or own.

There were already eight claims to that stream when the above was filed, three being for a larger volume than was granted to all when an adjudication based on actual use was had.

On Savery Creek three ditches were built prior to 1881 and the water actually used. In 1882 the following claim was filed:

To all whom it may concern.

Know ye, that I, ——— ———, have, on the 26th day of August, 1882, located and do hereby claim all the water above this notice for irrigation purposes, said ditch commencing at this notice and running in a southwesterly course to section 22, township 13, range 89, for which I do claim all rights and privileges under the United States irrigation laws.

To recognize a claim of this character when these rights were determined was out of the question. There were fifteen other ditches all using water, yet, as in the case before cited, this irrigator had for fifteen years believed that he was the owner of all the water in the stream, and he also believed that to set this aside was an unwarranted and unjust interference with his vested rights.

Where laws mislead or fail to direct, as these do, there need be no surprise that litigation follows. The only wonder is that irrigators who have to deal with such uncertainties are content to settle their differences in so peaceable a fashion.

PERMITS TO APPROPRIATE WATER.

The laws which provide for filing under the second plan are all of recent enactment. They are, therefore, based on ample experience of "how not to do it."

The first change to be noted is that the filing is not a claim to ownership of the stream or any part of it. It is an application for license or permit to divert and use the public water supply. Instead of a claim for a specific volume of water, the purpose of this filing is to accurately describe the proposed use. With applications for irrigation rights there must be a map of the ditch and a description of the land to be reclaimed. Land not described acquires no rights. An imperfectly prepared map simply delays approval. Applicants soon learn the need of accuracy and care, and with this knowledge comes confidence in the law which requires it. The notice to other users is best provided for in the Canadian law. This requires publication by the applicant in a local newspaper, and in the Canadian Gazette, of the intention to apply, and publication of a notice by the Government of its approval of the application. Compare this sort of notice to other appropriators with a placard

on a post in some lonesome bend of a willow-bordered stream. These applications have to be examined and approved by an official who is giving his entire time to the management of the public water supply, who has before him every other filing on the stream, and who either knows the conditions or can and must inform himself regarding the results to follow the approval or rejection of the application. The approval fixes the conditions under which the right is acquired, the engineer's certificate in Wyoming being as follows:

THE STATE OF WYOMING, *State Engineer's Office, ss:*

This is to certify that I have examined the foregoing application and do hereby grant the same, subject to the following limitations and conditions:

Construction of proposed work shall begin within one year from date of approval.

The time for completing the work shall terminate on December 31, 18—.

The time for completing the appropriation of water for beneficial use shall terminate on December 31, 18—.

The amount of the appropriation shall be limited to 1 cubic foot per second of time for each 70 acres of land reclaimed on or before December 31, 18—, and the additional volume used for ——— ——— purposes on or before said date.

Witness my hand this —— day of ———, A. D. 18—.

———— ————,
State Engineer.

No other permit to water the land described will be issued without a hearing and good cause therefor being shown. There is no uncertainty about priorities or the volume of prior appropriation. The record in the engineer's office at any time is as conclusive as to both matters as is the record of the Land Office of the filings on public land. Filings may be abandoned or they may be canceled. The later rights may be improved, they can not be impaired.

The difference does not end with the filing; it continues in the subsequent treatment of these records. The first plan requires work to begin within sixty or ninety days, but it is made nobody's business to ascertain whether or not it does begin, and a claim can not be canceled if it does not begin for sixty years. Under the second plan, reports of progress must be made and where a license or permit is not followed by work the permit is canceled. In this way the unappropriated volume is at all times apparent.

The value of this plan is shown by the constant use made of the filing records. There is not a day in which those of Wyoming are not consulted by land owners, ditch builders, or water users, and the same is probably true of the other States. The contrast between the convenience of having all the rights to a stream and its tributaries brought together and the expense of their examination when scattered in the various counties is so great that none of the States which have adopted the second plan regret the additional expense or consider a return to the primitive system.

FIXING OF PRIORITIES AND AMOUNTS OF WATER RIGHTS.

Parties who file on public lands must later prove up—that is, show that they have complied with the land laws. Parties who file on streams must also sooner or later prove up—that is, establish the priority and amount of their right. The proof required in land filings is in every case the same. If a homestead, it must be shown that the land has been lived on; if a desert, it must be shown that it has been irrigated. The proof in water-right filings depends on the State where the ditch is built. The priority of a ditch on the Laramie River in Colorado is established by a lawsuit in the district court. The priority of a ditch on the same stream, a mile below in Wyoming, is established by proofs filed with the State board of control. The title to public land, when established, is the same in each of these States; the title to water in a stream depends on which side of a State boundary it is acquired. In the Northwest Territories the amount of the right is governed by the size of the ditch. It used to be so in Colorado, Nebraska, and Wyoming. Experience has shown the need of reform in that matter. At present in Nebraska, Colorado, Wyoming, and Kansas, in order to acquire a right the water must have been actually used, and it is the volume so used, not the volume which can be diverted, which determines the amount of the appropriation.

The difference in the methods of making filings is succeeded by an equally striking difference in the methods of establishing the priority and amount of the right.

In Wyoming and Nebraska the permit that is issued for the diversion and use of a stream gives certain conditions which, if complied with, fix the amount of the right. One of these conditions is the date when the ditch or canal must be completed, and the date when the beneficial use of the water must be completed. When this has been done parties file a notice of such completion with the State engineer. This is followed by an official examination and measurement of the ditch and the land reclaimed, the results of which are embodied in a report filed in the engineer's office. The appropriator is also required to file a sworn statement of completion of the ditch and of the irrigation of the land and the acreage which has been irrigated. If the report of a special examiner and the sworn proof of compliance with the permit made by the appropriator agree with each other and with the original permit, a certificate of appropriation of water is issued by the State board of control, which is a title from the State to the right to use the stream, as a patent to land from the Government is a title to its ownership. The priority of the right is governed by the date when the application was filed, and the volume in rights for irrigation by the need of the land described. It will be seen that this procedure follows closely that of the General Government in disposing of land. The forms of proofs are all printed. There is no wholesale disposal of a stream in one adjudication. Each right is settled by itself, applica-

tion to use being promptly followed by issuance of title to the right. The issuance of the certificate of appropriation is simply a ministerial, not a judicial, act. There is a special importance in this, because the opinion prevails in many States that it is impossible to devise an irrigation system by which rights can be established in any way except by a judicial decree.

The procedure in the Northwest Territories is the same as in Wyoming and Nebraska, except that the essential fact required to be established is the construction of the ditch. Its size and capacity govern the extent of the right. The names of the irrigation officials who pass upon these matters there are also different.

In Colorado proving up is accomplished through an equitable procedure in the district court. An elaborate statute fixes all the details of this procedure from the notices of appropriators to the final rendering of a decree. It is cumbersome and expensive to appropriators, and is seldom resorted to for the establishment of a single priority. The usual practice is to delay their settlement until a large number of claims have been inaugurated, when they are all determined at once in an omnibus adjudication. The decree which fixes these priorities is filed with the State engineer, and becomes his guide in the division of water among users.

The laws of the Dakotas make no provision whatever for the determination of these rights. The laws of Montana and of Kansas make the district court the tribunal for the settlement of these questions when controversies arise, but neither of the laws defines the way notices shall be given nor provides for the record or enforcement of the decree when rendered, as does that of Colorado.

As in the matter of filings, not all of these laws can work equally well. They apply to the water of the same river, to rights which are used during the same seasons of the year, for the cultivation of the same kinds of crops, and under very similar conditions. Some have been in operation for a quarter of a century, and all for a period long enough to determine their relative efficiency. If one is better than the other, or if experience has shown that certain features of any one are worthy of adoption, it is of the utmost importance that advantage be taken of this fact. The need of a uniform system in fixing the priorities is too obvious to need discussion.

THE WYOMING AND NEBRASKA LAWS.

The Wyoming and Nebraska laws possess the following merits:

(1) The prompt determination of rights. In those States as soon as an irrigator has complied with the law he is in a position to obtain its benefits. The facts on which the appropriation is based are taken at the time the work is done. In this way one of the great sources of controversy—delay until many of those who know the facts have died or moved away—is avoided.

(2) Cheapness to the appropriator. In States where water rights are established by court procedure every appropriator has to employ a lawyer. He has to incur the expense of himself and his witnesses in presenting his testimony to the court. In Wyoming and Nebraska the testimony is prepared on a blank form and is sworn to before a member of the board of control. The examination of the lands irrigated and the ditch which diverts the water is made by the State. There is no greater need of legal advice in preparing this proof than there is in submitting proof in a land office. The entire indispensable expense in proving up on a water right in Wyoming is $1 for the issuance of the certificate of appropriation by the State engineer and 75 cents for its record in the county clerk's office.

Another important consideration relates to provisions for a final settlement of water rights. In Colorado, Nebraska, and Wyoming there is a statutory period, after rights are determined, during which their validity may be contested in the courts, but after it has expired they become absolute. In some of the other States litigation over these questions may be perpetual.

The remaining question to be considered is which of these methods comes nearest determining the actual facts and has done most to protect the rights of actual users. This is the important question. Delay and expense are of little moment if they result in a better settlement of these rights which will, from year to year, become more valuable and important.

In considering this it is significant that Wyoming and Nebraska are conspicuous for the absence of water-right litigation. There is provision for appeal to the courts at every step, from the approval of a permit to the fixing of the priority in the final certificate, but appeals are not taken. As the years go on what was at first regarded by many as a hazardous innovation is now firmly established in the confidence of water users. The State board of control is in no more danger of being abolished than the State supreme court. A result like this, following a change from all previous systems, is a substantial evidence of the efficiency of the new system.

There are many reasons why the determination of rights under the procedure outlined should be more satisfactory than by a court decree. The facts to be established are physical, not legal. Under the laws of each of these States the priority is fixed by the date of the permit. The facts to be determined are the acres irrigated and the volume of water needed by those acres; and the most direct and certain way to do that is to go on the ground and measure the ditch and the land watered. The surest way to obtain the length of a city lot is to measure it. To obtain the weight of a load of coal we put it on the scales. It does not require a court decree nor the exercise of judicial powers to establish the fact of residence on a homestead or the irrigation of a desert filing. Under a rational code of laws there is no need whatever to file

complicated pleadings in court to determine how many acres of land have been watered or how many miles of ditch built. It is undoubtedly true that the haphazard system of filing claims in some States makes the services of the courts necessary, but this does not insure a satisfactory settlement of rights. On the contrary, it simply requires judges to do the best they can to repair the consequences of previous mismanagement and neglect.

The officials of Wyoming and Nebraska are in an infinitely better position to make a just determination of irrigators' rights than are the courts in the other States. They examined the original filings; they are familiar with the stream and with all the facts relating to other rights; they have measured the water supply and the land reclaimed. When it comes to passing upon the proof of use they have not only the facts of the special examiner but a special familiarity, based on experience in other cases, with the conditions on the stream.

COURT ADJUDICATIONS.

In States where the courts determine these rights they have to act without personal experience and to rely too often on conflicting, indefinite, and interested testimony. Courts have no reason to become specially informed concerning irrigation problems along any stream, with the water supply of the stream, or to know from personal examination anything of the physical facts on which a just determination of these rights must in large measure depend. Their decisions have to be based upon the pleading of attorneys and the testimony of witnesses. Here again is a difference which operates against a satisfactory settlement by means of court decrees. In Wyoming and Nebraska the fundamental idea in the establishment of a water right is that it is a disposal of public property and that public interests are to be first considered. Hence, the examination is made by a State officer who has no personal interest in the right. There is not a State in which these rights are settled in court that provides for the ganging of streams, the measurement of ditches, or land reclaimed by a disinterested public official as a guide to the court in determining the facts. Even in Colorado, with its admirable administrative laws, there is no provision for giving the courts the benefits of the State engineer's experience and knowledge of physical conditions. All court proceedings for the determination of rights to the public water supply are simply and solely contests between private interests where each man wishes to acquire all he can for himself and to do all he can to cut down the allotment to others.

That is the situation regarding court decrees where there is a genuine trial of rights, but it has sometimes happened that these adjudications have been instituted for the sole purpose of acquiring control of a stream in accordance with a division agreed upon beforehand. Such proceedings, no matter what the intent of those in charge, have resulted in gross frauds and injustice to those who actually used the water. In

such cases the contest is one only in name. Whenever appropriators agree among themselves regarding the amount of water they will claim, they can usually secure a decree for the full amount. It is extravagant decrees secured in this way which now are so serious a menace to the rights of users on many streams.

The danger of this was not at first appreciated, but its consequences are now becoming apparent. Judge Victor A. Elliott, who presided over the most important adjudications in northern Colorado, in discussing this in a brief recently filed in the Colorado supreme court in favor of a rehearing and readjudication on one of these streams, thus characterizes both the law providing for court decrees and the decrees themselves:

Prior to the passage of the irrigation acts of 1879 and 1881 this State was sparsely inhabited—not nearly all of our agricultural lands had been brought under cultivation by means of irrigation—and there had been very few controversies respecting priorities of right to the use of water for irrigation purposes.

When any such controversy did arise, it was merely between a few, perhaps not more than two rival claimants, and the rights of such claimants were litigated as in ordinary lawsuits. Each party was well advised as to the claims of the other, and so was prepared to assert his own claim and contest that of his adversary by all legitimate evidence under the law by the aid of legal counsel.

But our people felt that such proceedings for settling the rights to the use of water were too slow, and that many irrigating seasons would pass and many crops be lost before litigants could secure their rights.

Hence the irrigation acts of 1879 and 1881 were passed. The design of these acts was to secure a summary adjudication of water priorities on an extensive scale.

The acts contemplated the promulgation of decrees which could be summarily enforced by the water commissioners, without waiting for an appeal to the courts when a controversy should arise.

The effect of these irrigation acts was not foreseen by the great mass of the people whose most valuable rights were to be affected by them. The agricultural classes are generally the slowest people to take notice of legislative acts affecting their interests.

The result of these irrigation acts was to precipitate legal proceedings upon large numbers of people, and thus make it necessary for them to assert and defend their rights as against their neighbors, when, in fact, their rights had never been assailed or questioned.

By the express terms of these acts a single claimant to water rights could compel every other claimant in the water district (hundreds there might be) to come into court and assert his claims and defend against the counterclaims of all the rest, and this though there had never before been any controversy in respect to such claims.

Under such circumstances it is not strange that very little attention was given by most of our farmers and ditch owners to the adjudication of water priorities. Many of them seemed to regard the proceedings as altogether amicable, and hence took no pains to guard against the overreaching of the few, whereas, in fact, no proceeding could have been devised which would have been more adverse in character or which should have been guarded with more jealous care.

As we have before said: "In the earlier adjudication of priorities, under the acts of 1879 and 1881, there was little or no contention between rival claimants to priorities. People seemed to think all they needed to do was to prove up their appropriation and get decrees for as large quantities of water as possible—evidently thinking the court had the power to make the natural streams yield the amount of water thus decreed at all times, irrespective of senior decrees of priority, and notwith-

standing the fact that the amount of the appropriations decreed from some of our natural streams was four times as much as the ordinary flow of the water of such streams."

Aside from the question of procedure, there is a difference in the nature of the right conferred by the laws of Wyoming and Nebraska and that conferred in some of the States where these rights are determined by court decrees. In the first-named States rights for irrigation attach to the land. The certificate of appropriation described the land where the right was acquired, and to which it is attached. The right is for enough water to irrigate it, not to exceed a prescribed maximum. The acreage of this land can not be expanded; in fact, the tendency is for the demand to diminish as the soil becomes moistened and irrigators become more experienced. But in many of the States the rights decreed are for a continuous flow of a designated volume regardless of the place or kind of use. Where water is attached to the land there is no incentive to claim an augmented volume. All that can be had is enough to produce crops, and that volume is determined by the acres rather than by the maximum volume allowed. But in the second case the tendency to exaggerate the right and to obtain as large an allotment as possible is very great. Where water is personal property, if the party securing the right does not use it, he can sell it or rent it to some one who needs it and is willing to pay for it. Hence adjudications are often not so much for the protection of actual users as a struggle to obtain speculative control of streams. Not having the benefit of expert and disinterested advisers, the findings of the court often lead to peculiar complications. In a decree examined by the author a ditch watering 9 acres of land is given water enough to cover that land to a depth of 536 feet in a year. In the same decree a ditch watering 2,000 acres is allowed 5 cubic feet, while a ditch watering 200 acres has a grant of 20 cubic feet; that is, 1 acre under the last ditch is allotted as much water as 40 acres under the first.

In 1884 and 1885, while acting as assistant State engineer of Colorado, I measured the ditches of northern Colorado on the streams which had been previously adjudicated. My report of these measurements called attention to the discrepancy between the decreed appropriations and the actual carrying capacity of these ditches and canals in the following terms:

> So great was this in some instances that the result of the gaugings and the decreed capacity seemed to have no connection with each other. Ditches were met with having decreed capacities of two, three, and even five times the volume they were capable of carrying, ever have carried, or will probably ever need. Other ditches in the same district have decrees which fairly represent their actual needs. It needs no argument to show the worse than uselessness of these decrees as a guide to the water commissioner in the performance of his duties.

When these decrees were rendered the majority of appropriators believed that rights for irrigation were limited to the lands already irrigated, and that, so long as used there, the actual volume stated in the

decree cut very little figure. Hence there was little solicitude on the part of late appropriators as to any danger arising out of excessive grants. Under the terms of these decrees each appropriator is entitled to a definite volume of water, described in cubic feet per second, and to a continuous flow of this volume throughout the year.

Recent decisions have recognized the right of the holders of these decreed appropriations to sell the entire volume granted. As a result,

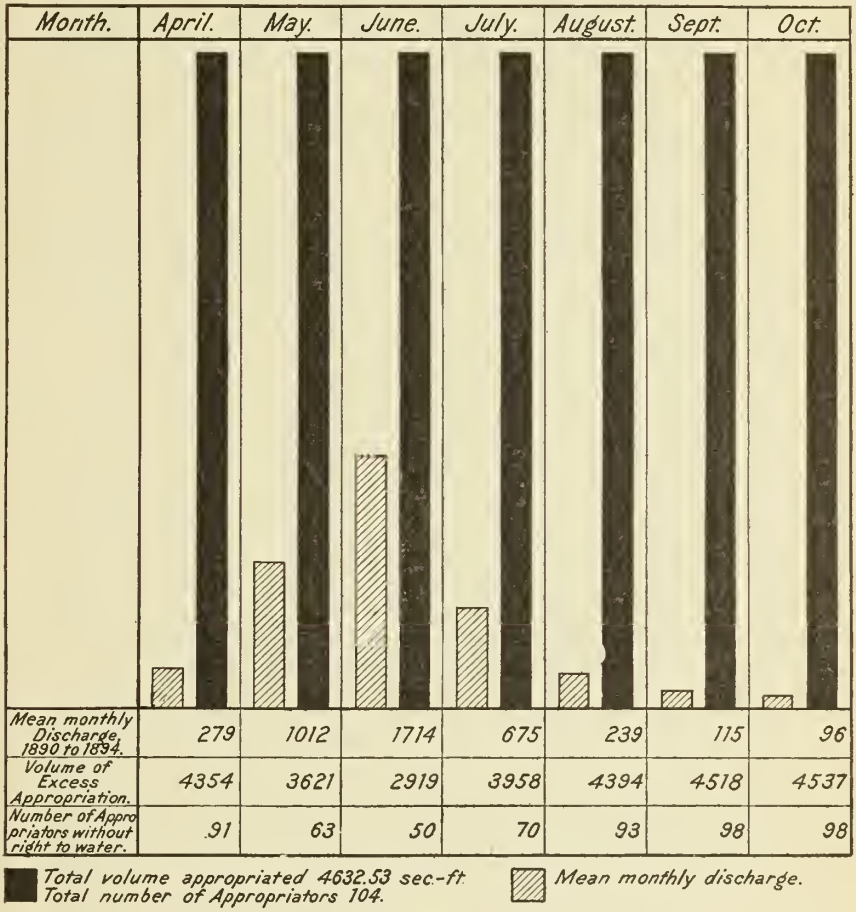


FIG. 2.—Relation between the mean monthly discharge of the Poudre River and the appropriations therefrom.

the owners of earlier priorities are enlarging their ditches and extending them to other lands, or, where this is not possible, are attempting to dispose of the surplus to other users. Every attempt to do this, however, is contested. The truth is that irrigators have, in practice, been building up a system on one theory of water rights while the courts have rendered a number of decisions based on another theory. We have now reached a point where one of the two must give way.

If the doctrine laid down in these decisions is carried to its logical conclusion it will transfer the ownership of a majority of the streams of northern Colorado to a few early appropriators, and compel a large proportion of the actual users of water to purchase from such appropriators the water they have heretofore had for nothing. That this is not an extreme statement is shown by the accompanying diagram (fig. 2), which exhibits the relation between the mean monthly discharge and the decreed appropriations of the Poudre River.

The last examination of the records showed there were 104 appropriators from this river, the aggregate of these rights being 4,632 second-feet, each right being for a continuous discharge of the volume decreed; yet in August of 1894 the stream carried only 162 cubic feet per second; in August, 1893, 141 second-feet; and the stream has frequently fallen during the irrigation season to below 100 second-feet. If the holders of these rights had lived up to their opportunities during the last half of every irrigation season, fully one-half of the actual users of water would have had to buy from the holders of these excess rights every gallon of water used after the middle of August. That they have not been compelled to do this is due to the fact that irrigation practice in that State is superior to irrigation law.

The appreciation of the dangers which this situation creates is not confined to farmers alone. In a different brief from the one before referred to it is thus forcibly stated by Judge Elliott:

> Excess priority decrees are a crying evil in this State. From every quarter the demand for their correction is strong and loud. Such crying demand can not be silenced by declaring that the meaning and effect of such decrees can never be inquired into, construed, or corrected after four years.
>
> In many cases such decrees are so uncertain, so ambiguous, so inequitable, so unjust, and their continuance is such a hardship that litigated cases will be continually pressed upon the attention of the courts until such controversies are heard and settled, and settled right. Litigation in a free country can never end while wrongs are unrighted.

It was not until the holders of these excessive rights began to make use of them for speculative purposes that farmers realized the danger which menaced them. It is more apparent in Colorado than in any other of the arid States herein discussed, because irrigation has made greater advances in that State than in any of the others. Streams are more nearly appropriated and water is more valuable, but the conditions under the Colorado laws are far less dangerous than they are under the laws of many other States, and an equal development in those States will show equally serious abuses. What these are is well stated in a brief recently filed in the Colorado supreme court by the Hon. Platt Rogers, of which the following is an extract:

> We have reached a stage in the history of irrigation development at which it is found highly profitable to the owners of the older appropriations to avail themselves of the rights said to be theirs by the opinions heretofore rendered by this court in the reclamation of new lands. The era of "disappropriation" has fairly set in, and as an injustice will not be submitted to until, by repeated decisions, it is

made manifest there is no hope, we are promised a fresh crop of litigation to prevent the enforcement of decrees that, under the construction placed upon them, lead not to peace but to war. * * * It will, moreover, bring to pass a great wrong, foreseen by John L. Armstrong, one of the witnesses in this case, who, in his report as water commissioner to the State engineer (as published in 1887), said "that by reason of the unjust decrees of the court, whereby greater quantities of water were decreed to ditches than the ditches would carry, it is possible, after ten or fifteen years, for these ditches to enlarge and bring under cultivation land never before irrigated, at the expense of those ditches which have actually used the water for many years for irrigation."

All of the districts in the northern part of the State have decrees similar to those mentioned by Mr. Armstrong. The reports of the State engineers exhibit this anomalous condition in graphic form. We are not, therefore, called upon to treat a sporadic case, but to deal with a prevailing condition. * * *

The decrees, in their entirety, are falsehoods, and universally accepted as such. They furnish a fresh illustration of the truism that "a lie never ceases to do evil." If the construction heretofore placed upon them, in some cases, is to prevail, we

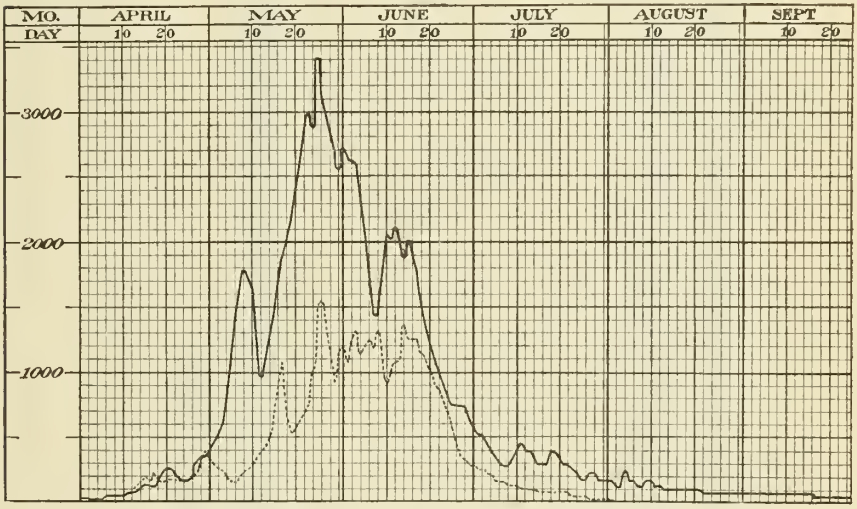


FIG. 3.—Discharge in second-feet of Laramie River at Woods, Wyoming, in 1897. The full line shows discharge for 1897, the broken line that for 1898. Total discharge for season of 1897, 248,000 acre-feet; for season of 1898, 111,000 acre-feet.

have legalized a method of accomplishing the precise thing the constitution intended to prevent, viz, speculation in water. If this court will avail itself of those matters of public history which ought to be within its cognizance, it will learn that decreed appropriations are now being bought, not merely to utilize the volume heretofore diverted and used, but to obtain the advantage of the full amount decreed, for speculative purposes.

There are two objections to making appropriations for irrigation a right to a perpetual flow of any definite volume of water. Such rights do not conform to the necessities of users or to the fluctuations in the flow of streams. No irrigator uses water all the time. In the States under consideration he does not use it one-half the time. Even during the irrigation season the use is intermittent, and much greater in some months than in others. The holder of a right to a continuous flow not needing it during the greater part of the year is continuously tempted

to convert it into a speculative commodity by selling the surplus. The diagram (fig. 3), showing the discharge in second-feet of the Laramie River, is a typical example both of the fluctuation in the volume of streams during the irrigation season and of their variation in discharge from year to year. It will be observed that in 1897 the maximum dis-

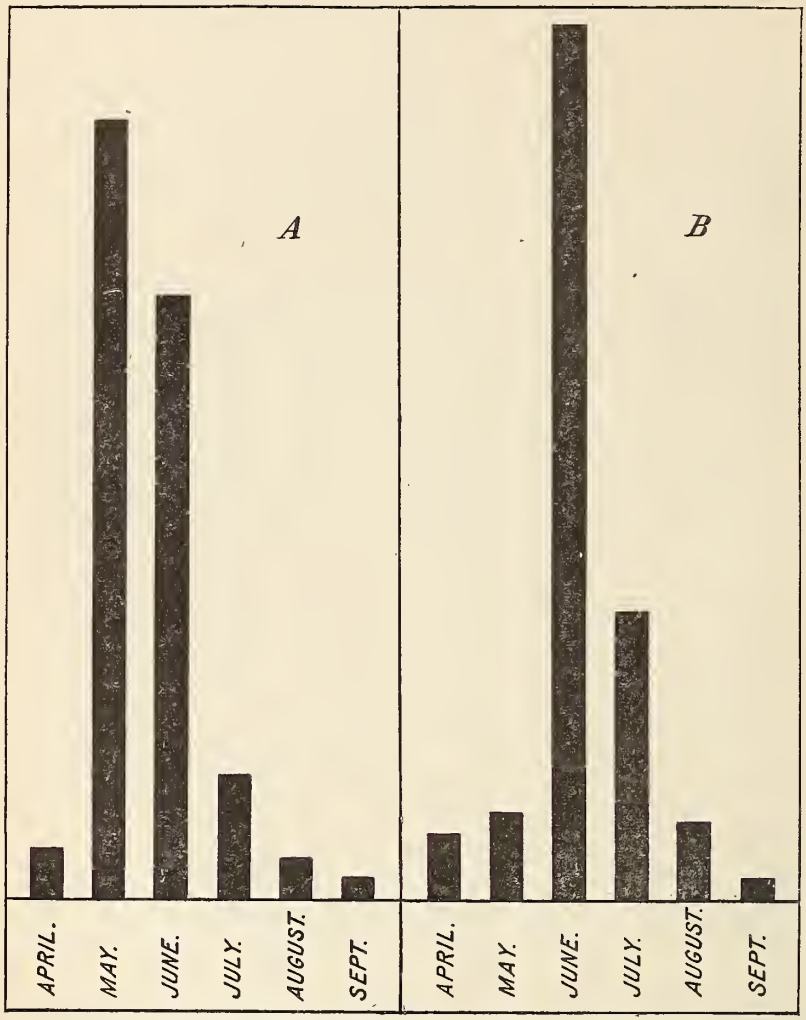
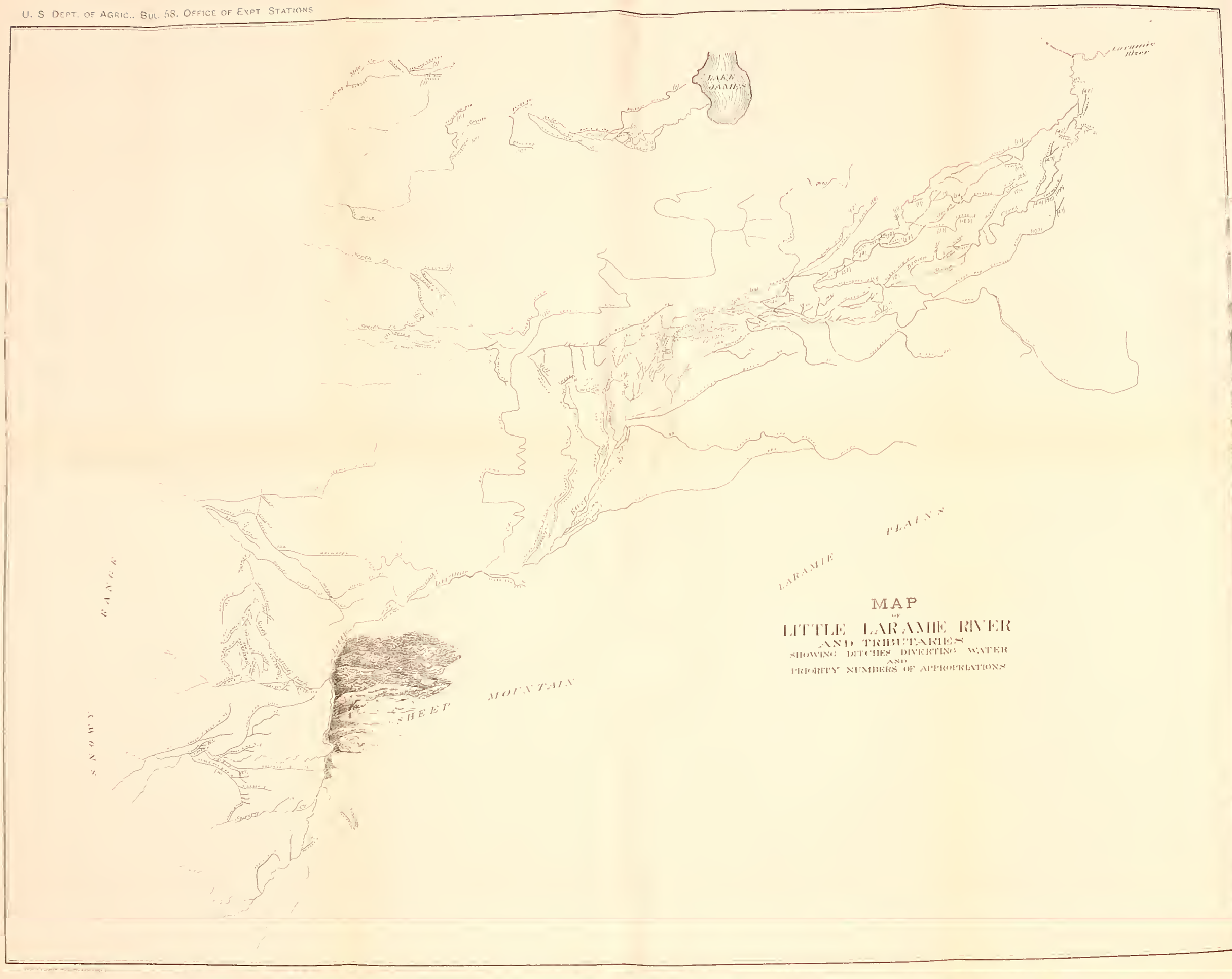


FIG. 4.—Diagram showing variation in the flow of streams and in the use of water in irrigation for the different months of the irrigation period, and the relation between the available supply and the needs of agriculture. *A*. Discharge of the Laramie River at Woods, Wyo. Scale, 1 inch equals 30,000 acre feet. *B*. Use of water, from measurements at Wheatland, Wyo.

charge reached 3,400 cubic feet per second, while in 1898 it was not half that volume. In 1897 its run off would have covered 248,000 acres 1 foot deep, while in 1898 the run off was only 111,000 acre-feet. In 1897 the maximum discharge of over 3,000 feet in May had fallen to



MAP
OF
LITTLE LARAMIE RIVER
AND TRIBUTARIES
SHOWING DITCHES DIVERTING WATER
AND
PRIORITY NUMBERS OF APPROPRIATIONS

2,100 feet in June, and to less than 600 feet in July, while in 1898 the maximum flow of less than 1,600 feet in May had fallen to less than 300 feet in July, and disappeared entirely in September. Great as are the fluctuations in discharge in the different months of the irrigation season, the variations in use are not less striking. On page 34 are two diagrams (fig. 4) to illustrate this. One (*A*) shows the relative discharges of the different months of the irrigation season; the other (*B*) the relative amounts used during these months. Both are taken from actual measurements. It will be seen that for every gallon of water used in May ten were used in June, while, on the other hand, three gallons were used in June for every one used in July. The shrinkage in use from June to July, while not so great as the falling off in discharge, was in the same direction, and by limiting a right to this actual use many more priorities could be satisfied than can be if the rights are fixed at a uniform continuous flow. These latter rights are either based on the capacity of the ditch or on the maximum requirements of the land, instead of on a mean of all the months in which irrigation is needed. Hence, a right for a continuous flow of the same amount, if based on the quantity used in June, gives its holder three times what he needs in July. Or if the stream is nearly appropriated when it shrinks from the June to July discharge, the holders of less than one-third of the rights own all the water.

STATE CONTROL OF STREAMS.

Plate II is a map of the Little Laramie River and the ditches which take water therefrom. It is a typical stream, and the map has been prepared to show the lack of system which prevails in the location of ditches and the accidental arrangement of the priorities along streams. The 130 different appropriations from this river are shown by the priority numbers placed after the names of the ditches. It will be noticed that priority No. 1 is below all others. Every other appropriator has a chance to divert the stream before its water reaches this ditch. So far as position goes there would be no possible chance to get anything in seasons of scanty supply because it often happens that one-half the head gates have to be closed. Even the second appropriator, 9 miles above, would not be much better off, because more than 100 diversions are made before the stream reaches his head gate. There are 50 ditches between his ditch and the thirtieth priority. The largest ditch on the stream irrigates more land than all the 15 first built, but its priority is 110. Realizing the danger of being so far down the list, its builders did all they could to offset this by a desirable position. Its head gate is far up in the hills on one of the branches of the main river, and it requires a journey of 40 miles from the head gate of number one to reach it.

More than 200 farmers depend on this stream for their living. To raise a crop they must have water when they need it, and as the stream

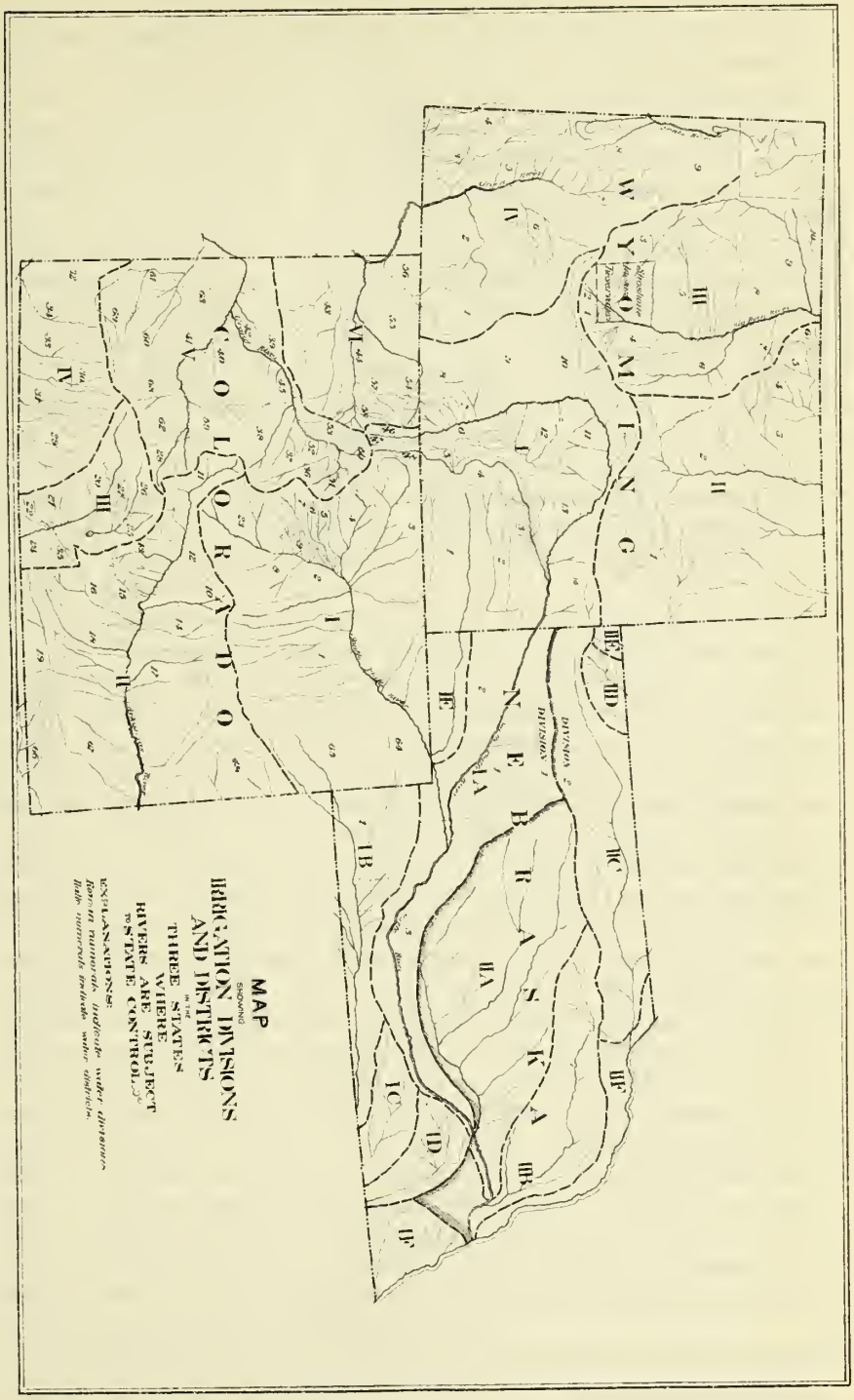
is fully appropriated they can secure this only by the most careful and economical use of the supply. Wasteful use above means parched fields and empty pockets below.

If there is not water enough for all, and this sometimes happens, some ditches have to be closed. The later ones have to be first shut down, and as fields watered by early and late priorities lie side by side, a late appropriator sometimes has to see his crops burn up, while on the other side of the fence those of his neighbor grows rank and luxuriant because of abundant moisture.

To control the division of a stream under these conditions requires administrative tact and ability of a high order. The appropriators can not attend to it themselves. The holder of the first right would have no time to use his right if he attempted to protect it himself. It takes a journey of nearly 200 miles to visit the head gates. In this and similar cases the individual is helpless; only State or community control will serve.

The division of streams is made much more complex by the variation in the discharge. The quantity to be distributed does not remain constant. It varies with every breeze that blows and with every passing cloud. It changes from day to day, from month to month, and from year to year. A daily record has never been kept of the flow of the Little Laramie, but one has been of the main stream. The variations in its discharge, as shown in Plate II, were equaled or exceeded by its tributary. An examination of that diagram and the one on page 34 shows that whenever appropriators exhaust a stream it requires something more than a court decree or order of a board to secure the largest service from the stream or protect the earlier rights. To do this there must be someone to stop waste on the part of the negligent and close the head gates of those who came late. No matter how rights are established, they amount to nothing unless protected. A decree or order fixing priorities is simply a guide to someone in closing head gates; unless there is some officer to execute it irrigators will not and can not respect it.

Thus far only three of the States drained by the Missouri seem to have realized this. Colorado, Wyoming, and Nebraska have been divided into drainage districts, and the streams used in irrigation are under the control of State officers. To Colorado belongs the credit of first recognizing the need of this public supervision, and the system devised has been followed in the other two States. Plate III shows the manner in which these States have been divided in order to make this control most efficient. The larger areas in each State are called divisions. The boundaries of these are drainage lines, and they comprise the basins of one or more rivers. The smaller areas are called districts, each district being formed of one or more tributaries of a stream or, in some cases in Colorado, of a section of the main river. The size of the district is governed by the number of ditches to be


MAP
SHOWING
IRRIGATION DIVISIONS
AND DISTRICTS
IN THE
THREE STATES
WHERE
RIVERS ARE SUBJECT
TO STATE CONTROL
EXPLANATIONS: Indicate water divisions
form minerals; indicate water districts
link numerals indicate water districts.
WYOMING
COLORADO
NEBRASKA
DIVISION 1
DIVISION 2
DIVISION 3

regulated and the importance of the interests to be served. In each State the head of the system is the State engineer; over each division is a superintendent, and in charge of each district is a water commissioner. The water commissioner is a police officer, whose duty is to execute the court decree in Colorado and the orders of the boards of control in Wyoming and Nebraska. He is given a list of the appropriations and the places where they are to be diverted, and as the stream rises and falls, he opens or closes the head gates of the ditches having later rights in such a way as to afford the earlier users the water they need so long as the stream supplies it. So far as the farmer is concerned the water commissioner is the most important officer with whom he comes in contact. On his action, and in many instances on his tact and judgment, depends the acreage of crops which come to maturity or the number of farms where the season's labor is lost. It will be seen that all of the preliminary steps in an irrigation code, the filing of the right and the determination of the priority, are simply preparatory to the work of the water commissioner. He is the enduring feature. Unless this code provides for State administration of streams, water rights can not be considered as having a stable and definite value.

The boundaries of the divisions in each of these States are fixed by law. In Colorado there are six divisions, in Wyoming four, and in Nebraska two. The boundaries of districts in Colorado are also established by the legislature; in Wyoming and Nebraska they are fixed by orders of the board of control. In Colorado the water districts are numbered from 1 to 69, the entire State being embraced in this consecutive numbering. In Wyoming the districts for each division are numbered separately, there being 14 districts in division No. 1, 7 in division No. 2, 10 in No. 3, and 9 in No. 4, or 40 in all. In Nebraska there is a double system of numbering, both divisions one and two being broken up into subdivisions marked by the letters of the alphabet.

The duties of the State engineer and of the superintendents are not the same in each State. In Colorado the division superintendent has general oversight of the work of commissioners in the districts of his division and controls the distribution of water between districts wherever a stream is divided up into sections, as are both the South Platte and Arkansas, in divisions one and two. The State engineer is at the head of the entire system. He furnishes both commissioners and superintendents with their instructions, and hears appeals from their action wherever parties feel aggrieved thereat. The duties of engineer, superintendents, and commissioners in Colorado are, however, only administrative. They take the districts as the legislature has defined them and the priorities as the courts have decreed them and divide the water in accordance therewith.

In Wyoming the State engineer and four division superintendents perform the same administrative duties as do these officers in Colo-

rado. But in addition they exercise a larger measure of authority and hold positions of greater responsibility. They constitute the State board of control, and are the custodians of the State's water supply. They determine what filings shall be approved, pass upon the proofs of appropriators, and issue the certificates of appropriation. Because rights to water are established by judicial decree in other States, it is the custom of those not familiar with the differences in the water laws to regard this board as exercising important judicial powers; but in fact they are seldom called upon to exercise such powers even in a limited degree, and then only in the determination of rights acquired under the Territorial law. The surveys of ditches and irrigated lands are made under the direction of the State engineer. The examinations of ditches and of lands irrigated are usually made by the division superintendent or his deputy. But the performance of these duties and the issuance of certificates based thereon are no more judicial acts than are the examinations of the irrigation of desert filings by a public land inspector or the taking of proof of reclamation by the register and receiver of the land office. The questions which have to be dealt with are, however, much more complex than those relating to land titles, and the board is an important body, charged with serious responsibilities. Special training, capacity, and experience are required of its members to insure its complete success. Thus far this has been recognized. It is one of the branches of the State government where the merit system has been adopted in the civil service. Three of the original members have served continuously since the admission of the Territory as a State. Several water commissioners have also served continuously. In this way a personal familiarity with the irrigation development of the State has been acquired, which is of the utmost value.

In Nebraska the State engineer has a dual responsibility. He exercises the same direction over the work of water commissioners as the engineers of Wyoming and Colorado. But in addition, as in Wyoming, his office is also the office of record of water-right filings for the entire State, and he is a member of the board which determines the rights acquired. The Nebraska and Wyoming boards of control are, however, differently constituted. In Nebraska its members are the governor, the attorney-general, and commissioner of public lands and buildings. The State engineer is secretary and executive officer.

WATER-RIGHT LAWS IN THE MISSOURI RIVER DRAINAGE BASIN.[1]

Those who read the following discussion of the State laws must keep in mind that they do not attempt to deal with the entire irrigation code of any State. On the contrary, only one subject—the methods of acquiring title to the public water supply—is considered. While there are other irrigation questions of great moment which have already been, or must soon be, made the subject of legislation, it would have tended to obscure the relation of stable water rights to the success of irrigation to have presented them here.

While the issues created by many of the laws to promote canal building are important, and many laws, like those accepting the Carey act or the bonding of the land of districts, are experiments, the fact remains that the most momentous issue in this as in all other irrigated lands is the framing of laws to protect the actual user of water in his reasonable and proper use.

WATER LAWS OF COLORADO.

By Hon. JOHN E. FIELDS, *State Engineer.*

Colorado, the pioneer in purely irrigation laws in the United States, has of necessity been compelled to develop its own regulations as the needs of the moment required, these leading often to unforeseen difficulties. Separated from Europe as we were in the early days, it was impossible for us to study the methods as developed through the ages. Doing the best according to our light as each emergency arose, we have developed a system at once a guide and a warning to those who have followed. The common law, as developed in England and fostered in the humid climate of our own country, was, under the altered conditions of the arid region, inapplicable; and water, instead of being a mere incident to the soil, rose when appropriated to the dignity of a distinct usufructuary estate or right of property. "The common-law doctrine as to riparian rights is inapplicable to Colorado." (Coffin *v.* Lefthand Ditch Company, 6 Colo., 447.)

Though California and Nevada preceded Colorado in the appropriation of water, they had the problem of water for placer mining, rather than for irrigation, as the matter of first importance, and so developed

[1] A second bulletin (No. 60) of this series gives extracts of water-right laws and forms of procedure in acquiring titles to water.

a system, which while probably well adapted to their own uses, is not adaptable to appropriations for strictly irrigation purposes.

The criticism of the Colorado system that it overrides the common law (the natural law and rights of the humid region), that it places parties remote from a stream upon the same footing as those settled along the banks, that the settler may be deprived of rights he has enjoyed for years, and that it permits unlimited invasion of private lands for the purpose of constructing ditches is, I think, unjust.

In the first place the early settler along the stream, not having diverted the water, had no use for it other than for domestic and stock purposes; or, if perchance his meadow was overflowed or benefited by the abundance of water in the stream, he still has the right whenever the diversion is so great as to injuriously affect him to construct a ditch sufficient to irrigate the meadow land. Unlimited invasion of rights is not permitted, the most feasible route and the least number of ditches only being allowed, and only upon payment of just compensation.

Our law results in the greatest good to the greatest number; encourages the reclamation of the best (the mesa) land; encourages economy of use; and as our laws and the custom of appropriation were prior to or coincident with the settlement along the streams, settlers had no vested rights, and settled with the full knowledge of the rights of others. The only possible injustice might be to the citizens of a neighboring State, and indeed this has caused some agitation of late, the merits of which question I will not here discuss, except to say that probably our appropriations antedate the settlement of their State, and that they had knowledge of the probabilities of a scarcity of water in the streams. Ultimately, however, I believe that seepage and return waters will result in a more uniform and desirable flow on the lower portions of the river.

The earliest irrigation in Colorado was practiced by the Mexicans along the streams in the southerly part of the territory, and taught us little of economical methods or the rights of water, and less of the great diversity of crops possible under irrigation. The ditches were generally small and in the immediate vicinity of the streams, covering only the low bottom lands, with small areas and insignificant crops.

When the bottom lands were exhausted for settlement the mesas were next taken up, and then, of necessity, began the construction of larger, longer, and more expensive canals, requiring the combined efforts of a number of settlers.

The most advanced of these efforts, known as community enterprises, resulted in the settlement of Greeley in 1870, whose example has since been generally followed in all parts of the State. Some eight years later began the era of canal building by corporations, using large amounts of outside capital and reclaiming many thousands of acres. The area of the irrigated land amounted in 1884, according to the estimate of the State engineer, to about 1,000,000 acres, and in 1897,

from the same source, to 2,000,000 acres, the great majority of which was reclaimed from the uplands and by corporate or community enterprises. I would say, however, that I consider the figures for 1884 excessive, while those of 1897 are probably much too low, as they represent simply the aggregate acreage, as reported by the water commissioners of the several districts, a number of whom filed no reports.

As between the rights acquired under the Territorial laws and those acquired since the adoption of the State constitution, there appears to be no difference. By the Territorial laws of 1861 the owners of land along a stream were entitled to water, and "the water of every natural stream not heretofore appropriated * * * is hereby declared the property of the public, and is dedicated to the people of the State subject to appropriation." (Article 5, constitution.) These, with the act of Congress of 1866 ratifying the right of appropriation, are the basis of the right of appropriation under State and Territorial laws.

No records of the early appropriations were required, and except in rare instances no filings whatever were made, and it was generally supposed at that time that a deed to land carried the right of water with it. This supposition was undoubtedly correct as to private ditches, constructed for the express purpose of irrigating a given piece of land, but does not apply to corporate ditches in which the water right is represented by stock in the corporation. It was not until 1881 that any provision was made for recording water rights. By this law claims were filed with the county clerk only. By the amendment of 1887 it was required that they be also filed with the State engineer. Not until 1879 was any provision made for the proper control and distribution of the waters by and under State authority. At that time water districts were created and commissioners appointed, but the law being defective in many respects, was repealed, and another passed by the legislature in 1881, at which time the offices of State engineer and superintendents of irrigation were created. As early as 1861, however, the legislature foresaw the necessity of providing for the distribution of water, and anticipated a shortage in the supply. This law of 1861, as amended in 1870, provided that the county judge should appoint three commissioners, whose duty it was "to apportion in a just and equitable proportion a certain amount of said water, upon certain or alternate weekly days, to different localities, as they may in their judgment think best for the interest of all parties concerned and with due regard to the legal rights of all."

It appears that, while this law was never repealed, that "due regard to the legal rights of all," in accordance with the court decisions, made it inoperative, inasmuch as the "legal rights" of an appropriator gave him a continuous flow to the amount of his decree, of which he could not be deprived on certain or alternate days for the benefit of a later decree. (Farmers, etc., *v.* Southworth, 13 Colo., 111.) And the only prorating allowable in this State is between the owner or users in com-

mon of a ditch or reservoir. (Laws of 1879, p. 97.) Here priority of use does not apply, as "consumers taking water from a carrier within a reasonable time after the carrier's diversion have the same priority dating from such diversion. As to such consumers, the prorating is constitutional." (Farmers, etc., *v.* Southworth, 13 Colo., 111.)

The courts were first given power in the establishment of decrees by the legislature in 1879, and jurisdiction was then vested exclusively in the district court. In 1881 a similar law was passed, providing that "every person * * * within any water district shall, on or before June 1, 1881, file with the clerk of the district court * * * a statement of claim, which shall contain the name and post-office address of claimants, name of canal or reservoir, and a description thereof, source of supply, date of appropriation by original construction, and also of enlargement."

While the filing of this claim was mandatory, in later decisions its omission was adjudged not a fatal defect in proving an appropriation and obtaining a decree.

The act of June 1, 1881, provides that anyone may petition the court for adjudication of water rights, and the court then will appoint a day for the hearing, and render a decision in accordance with the proof and evidence submitted. Proper notice to interested parties is provided for, the court having power to make just rules and regulations. The court, for good cause shown, may review the evidence within two years; and in case of appeal to the supreme court that court may amend or make a new decree or remand with instructions. But after a lapse of four years from the time of rendering a decree, all parties whose interests are thereby affected shall be deemed and held to have acquiesced in the same.[1] In all these proceedings ample provision is made protecting interested parties; but in no place is the State made a party. Waters are appropriated, decrees granted, and the right to use passed to individuals; and the State, the most interested party, and the interests of appropriators yet to come, are ignored.

In this State the first step in obtaining title to water is to file a statement of the appropriation in the offices of the State engineer and the county recorder. The date of appropriation may be the date of the commencement of the survey, and work must begin within ninety days from the date of the certificate, prosecuted with due diligence, and completed within two years. In the case of flumes, however, or of a company formed for the purpose of constructing a ditch, three years are allowed for the completion of the work. The water having been beneficially applied and the work completed, an adjudication of priorities is in order. There is first filed with the clerk of the district court a statement of claim setting forth the names of the applicants, name of the ditches, their location, dimensions, etc., and the court is then petitioned to set a time for the hearing of evidence. It is the

[1] The present attitude of the courts is that after two years a decree is unassailable.

custom generally for the court to appoint a referee, who hears and takes the evidence. Said referee sets a day for the hearing to begin, and, if the district is large, designates several dates when he will take evidence in as many different localities. Notice of hearing is given by publication in local papers and by posting in conspicuous places throughout the district for at least twenty days prior to the date set for hearing. With this notice is a copy of the order appointing him as such referee, and all interested parties, as appears by the application, are notified, and all other persons within the district are directed to file their application in similar manner. At the trial all interested parties may give evidence, and all evidence previously given is open for inspection. Failure to offer evidence deprives the delinquent of the right to use water in case of scarcity until such time as he shall have made application and obtained a decree in the regular manner. The referee having submitted his findings in writing to the court, there being no exceptions made, the court finds in accordance therewith; the priorities being numbered consecutively in the order of their dates, ditches and reservoirs being in a separate series. Copies of the decree are furnished to the superintendent of the division and are kept in the office of the State engineer.

Companies incorporated for the purpose may in like manner appropriate water and obtain decrees for the users under their canal, and may charge an annual rental for the carrying of the water. They are prohibited from exacting a royalty or requiring an advance payment of the annual charges. The maximum annual charges may be fixed by the board of county commissioners of the county in which the lands irrigated lie, and the common carrier, as such, must, when application is made by a consumer and proper tender made, sell him the amount of water necessary so long as there is a supply. (Wheeler *v.* Northern Colo. I. Co., 10 Colo., 582.) And any person who shall have purchased water for irrigation, and shall not have ceased to do so with the intent to procure water from some other source, shall have the right to continue to purchase water in the same amount on paying or tendering the price fixed.

A decree having been obtained, the right to the use of water continuously to the extent of the decree holds; and all or any part may be sold or transferred to other parties. (Knowles *v.* Clear Creek P. R. & M. D. Co., Supreme Court Colo., 32 Pac., 279.) The surplus waters from either an excessive decree or the result of a higher duty may be carried by extensions of the ditch to new lands and there applied (Coffin *v.* Lefthand Ditch Co., 6 Colo., 449); or it may be transferred either up or down the stream, provided other decrees are not injuriously affected. (Laws, 1881, p. 664.)

It may be transferred to a different drainage. (Coffin *v.* Lefthand Ditch Co., 6 Colo., 443; also Laws, 1897, p. 178, and Hammond *v.* Rose, 11 Colo., 526.) In fact there appears to be no limitation placed upon the

possessor except by the laws of nature and the established rights of others.

In case a ditch can not carry the amount of water decreed it, enlargement is permitted, unless parties injuriously affected bring suit and prove abandonment; but what constitutes abandonment is indefinite, for "it is not reasonable to suppose that the priority of right of water where water is scarce or likely to become so will be lightly sacrificed or surrendered by its owner." (Rominger *v.* Squires, 9 Colo., 329.)

A person on whose land water rises has the first right to the use of such water, but not as against the established rights of others lower down on the stream.

Seepage and waste waters may be appropriated, and are governed by the same laws as waters from running streams. (Laws, 1889, p. 215.) Persons who shall have enjoyed the use of water of a stream upon meadow lands by natural overflow are permitted, in case of the diminishing of the flow to the extent of depriving them of the benefits of such overflow, to construct a ditch to irrigate such meadow, the date of priority being the same as though the ditch had been constructed at the time such meadow was first occupied as meadow ground. (Laws, 1879, p. 106.)

Right of way for ditches may be obtained, limited to the shortest and most feasible route, and the number of ditches, whether owned by one or more parties kept at the minimum, and to this end existing ditches may be enlarged to accommodate the waters of the later comers. (Laws, 1881, p. 164.) Ditches are not subject to taxes, except where the same are constructed for the purpose of deriving a revenue therefrom. (Laws, 1872, p. 143.)

By the laws of 1879 (p. 106), persons desiring to construct and maintain reservoirs for the purpose of storing water may take any unappropriated waters for that purpose, or those not needed immediately for domestic or irrigating purposes, and may conduct such waters therefrom in the bed of any natural stream, and divert the same again without regard to priorities of others, allowance having been made for loss in transit; and, for the more accurate measurement of the waters when so conducted, must maintain an automatic or self-registering device in a measuring flume or weir at the outlet of the reservoir.

Domestic is a higher and preferred use to irrigation or manufacturing, but only in so far as to have the right of condemnation. It is not permitted to wastefully conduct water for domestic purposes in large open canals. The abandonment of the use of water by a mill does not cause the water to revert to the public for use in the order of priority of all the ditches on the stream, but it continues to supply those ditches in order of priority which enjoyed the benefit of the returns of such water to the stream after having performed its duty for the mill.

Aside from making the proper filings and obtaining decrees, owners of canals and ditches must maintain embankments, proper waste ways

at the nearest practical point to the head gate, bridges and crossings; and, when in the limits of a city of the first-class, canals and ditches must be covered and provided with sufficient safeguards to the public. Owners must prevent waste, are not allowed to use an excess of water, and must keep head gates and measuring flumes in repair. All owners of canals carrying water for pay shall, when demanded, keep water in their canals from April 1 to November 1, so far as practicable.

It is the duty of a consumer to see that he obtains no more water than rightfully belongs to him. (Laws, 1887, p. 312.) Co-owners must pay their pro rata of expenses; such expenditures may become a lien on the interest of any delinquent.

The State is divided first into six grand divisions, over each of which is an officer called a superintendent, each division representing a certain drainage area. No. 1 is the South Platte drainage; No. 2, the Arkansas; No. 3, the Rio Grande, etc. Each of these divisions is divided again into numerous districts, each under the direction of a water commissioner, of which there are 69 in the State; generally speaking, they include the drainage of a certain tributary or portion of the main stream. The commisioners may appoint deputies to assist them. (See map, Plate III.)

The administrative department consists of the State engineer and the six superintendents of divisions appointed by the governor, and of the water commissioners, also appointed by the governor from nominations made by the board of county commissioners. The State engineer is paid from State funds, while the superintendents and commissioners are paid by the counties into which their jurisdiction extends.

The duties of the State engineer are numerous. Besides having charge of State engineering work and acting as adviser in that capacity for the different departments, he is the head of the irrigation officers, to whom appeal may be made from commissioners and superintendents. He has supervising control over the public waters, makes measurements of the flow of the streams, collects data on irrigation works, canals, reservoirs, and artesian wells as well as on the snow fall, and estimates the probable supply of water from that source. Designs and plans for dams in excess of 10 feet in height are subject to his approval. He furnishes the commissioners and superintendents data and information for the proper and intelligent discharge of their duties; requires the owners to supply ditches with measuring devices, and superintends their construction, rates the flumes, and in addition collects statistics of crops and the water used in the different ditches by districts.

The superintendent of a division has general control over the water commissioners in his division, and has the power to call out commissioners at any time. He is furnished by the clerk of the district court with copies of decrees, tabulates the same, and furnishes the commissioners with a copy thereof for the ditches in each district; but his especial and main duty is to regulate the flow of water into and from

each district, so that priorities of equal date receive water, or are shut off in the different districts throughout his entire division.

The commissioners report to him each week the names of ditches drawing water, and if the supply runs short make a request for water, and when it occurs that ditches of a later decree in the district next above are receiving water, the superintendent orders such ditches closed and the water sent down to the older appropriators below. The commissioner has direct charge of the head gates. It is his duty to open or close the same in accordance with date of priority and to see that water goes into the next district below in compliance with instructions from the superintendent. It is his duty to see that water is not wasted; he is invested with police authority and may arrest any person violating his orders. He must devote his entire time to his official duties; report head gates and rating flumes not kept in repair; and each season prepare a tabulated statement for his district giving the name of ditch, average amount of water carried for the season, number of days water was carried, number of acres in alfalfa, wild hay, grain, and fruit, also number of acres capable of being irrigated from each ditch.

In their fundamental principles the Colorado irrigation laws are good—i. e., that the water is the property of the people and its use subject to priority of appropriation dependent on its beneficial use. But the principle of next importance is, I think, in error—that is, the segregation of the water from the land—and the right of transfer gives too great privileges to the appropriator and tends in practice to the possession of the water itself, and not simply to the right to its use.

An appropriator primarily takes water for a specific purpose for a definite tract of land, and is granted as much as is necessary for his use, with a fixed maximum also conditioned on its beneficial and economic use. Thus in the very beginning unused or surplus water does not belong to him; and why, then, should he be permitted to sell and transfer what is not his? Where would be the hardship in permitting him to continue the use of water as he had always used it? Obviously, there would be none, and there is no chance for abuses if the law prohibiting waste is enforced, as the only possible abuse would be wasteful application. But with the transfer of the water to other land and other owners infinite complications arise. The first question is, whether any one is injuriously affected by the change; under the new conditions will the same water be diverted? Would not the priority be supplied by seepage or tributaries between the two points? Is the change depriving someone below of his seepage and waste? Is not the entire burden of loss thrown on the users below? These are things that the efficient administration of the law can not prevent. In addition, there are the abuses incident to our imperfect method of appropriation and decrees. Many decrees, and especially our early ones, were greatly in excess of the amount actually put to a beneficial use. Permitting the use of a certain appropriation on other lands encourages the gradual enlarge-

ment of ditches to their full decree to the detriment of all subsequent decrees. While this may be small in a particular case (which it often is not), yet in the aggregate the loss to later decrees is disastrous. With the offenses scattered in time and place, the damages indefinite and small at any particular time, but insidious and persistent, though slow, in their encroachments, the injured parties, also numerous and scattered, with a common cause, but not united, the offense goes unrectified until by their own inaction the injured appear to acquiesce in their own destruction.

This enlargement of ditches, I believe, is not in accordance with court decisions, yet there is one case I can not refrain from quoting, which is so obvious in its tendencies as to require no comments. I quote verbatim from pages 52 and 53 of the fifth biennial report of the State engineer for 1889 and 1890:

DAVID A. RANKIN et al., plaintiffs,
v.
THE COLORADO AGRICULTURAL DITCH COMPANY, THE CLEAR CREEK AND PLATTE RIVER MILL AND DITCH COMPANY, et al., defendants.

The groundwork for the complaint was an application on the part of the plaintiffs to this department to have the water decreed to the Clear Creek and Platte River Mill and Ditch Company, by virtue of its enlargement in 1863, to wit, 20.56 cubic feet of water per second of time, turned into the Colorado Agricultural Ditch, alleging that the two ditches had the same head gate; that their lines were practically parallel and contiguous; and that this water was originally appropriated to and for their lands, which lay, principally, under the Clear Creek and Platte River Ditch; but on account of the difficulty of diverting the water at the head of the latter ditch, and for the purpose of securing a full and uniform flow of water, they had constructed the Colorado Agricultural Ditch.

For the purpose of determining the matter of the application, I had an examination and measurement made of the Clear Creek and Platte River Ditch, from which it was ascertained that the points of diversion of the two ditches were originally about 80 rods apart, that of the Colorado Agricultural Ditch being the upper; that owing to the difficulty of maintaining a head gate and dam at the lower place the two were merged into one and the waters of both ditches carried in the Colorado Agricultural Ditch to a point of divergence near the old head of the Clear Creek and Platte River Ditch, and further that the Clear Creek and Platte River Ditch did not have at the time of measurement and, from the best information obtainable, never had capacity sufficient to carry the water decreed under its original appropriation; and that consequently any waters used on the lands of the plaintiffs from the latter ditch must have been from that original appropriation; that they could not have appropriated and used water the ditch could not carry.

Had the application been made to transfer a portion of the water decreed under the original construction (within the limits of the ditch's capacity) a different conclusion would probably have been arrived at, for it was not intended to deny the right of the plaintiffs to carry the water justly belonging to them through the best and most economical channels onto their lands.

The Colorado Agricultural has a decree for 30.20 cubic feet, dated March 5, 1867.

The Clear Creek and Platte River has a decree for 49.50 cubic feet, under original construction, dated November 1, 1861, and for 20.56 cubic feet, under enlargement, dated November 5, 1863.

The effect of such a permit would be to give the Colorado Agricultural, a ditch constructed in 1867, a decree for 20.56 cubic feet, dating back to 1863, and this water must be taken from some other ditch having an appropriation prior to the latter date, because it could not be taken from the Clear Creek and Platte River, a ditch that could not carry it and had, therefore, never appropriated it.

The court ordered and adjudged that the officers of this department be directed to turn and allow to flow in the Colorado Agricultural Ditch all of the water appropriated and decreed to the said Clear Creek and Platte River Mill and Ditch Company, by virtue of its enlargement in 1863, to wit, 20.56 cubic feet of water per second of time.

As to remedies for this evil there is one, I think, that would meet the requirements and put a stop to future enlargements. Each ditch should have its maximum capacity determined and made a matter of record, and this amount should remain the maximum amount allowed the ditch, notwithstanding any decree in excess thereof; and in case of more than one decree for a ditch, the most liberal interpretation should be given by allowing the quantity to be distributed to each decree in order of priority until exhausted, thus annulling the latest decrees first, the second latest next, and so on.

To prevent a continuance of the abuses I believe that applicants for a decree should be compelled to show a certificate from the State engineer that he has examined their ditch, and that its capacity, length, course, number of acres under it, kind of soil, and probable amount of water required have been determined by him, giving in the certificate these various items.

This would be of great value to the judge or referee; would be both expert and practical testimony by a disinterested witness; the State would be very properly represented; the interests of subsequent appropriators would be protected, and at the same time a valuable record of the canals and irrigation works of the State would be secured.

In the case of large enterprises, where considerable time for both construction and settlement is necessary, there could be a declaration of intention and a time fixed by the State engineer for the completion of the work. If completed within the specified time, then priority to date from the commencement of work; if not, priority granted bearing that date, but for an amount proportionate to the work completed. Should the company care to continue the work, allow another declaration of intention, as in the first instance.

I have here given only a few of the evils which beset us of Colorado, and have not attempted to discuss at length the merits or demerits of the systems of attaching and separating the land and the water. This has been ably done by others and at greater length than permitted me here;[1] both experience and history point one way.

He who expects the letter of the law in relation to irrigation to be executed with the precision of clockwork, and that infallible results will be obtained, has a small conception of the tangled web of diffi-

[1] See State engineer's report, Wyoming, 1895 and 1896, p. 57.

culties in the way, and a meager knowledge of the uncertainties of the element manipulated.

Therefore, I claim that the administration of water, except on the broadest principles, should not be reduced to a law. It is impossible to fix a rule that will meet any but exceptional cases, and the only practical way to properly administer the laws we have is to give the greatest possible latitude to the irrigation department, subject always to review by the courts. My experience is that it is rare to find an officer who has not the good of his district at heart, and there are fewer charges of favoritism or injustice than there are that the letter of the law has not been followed and the pound of flesh allowed. What few complaints have come to me have resulted from mere differences in the interpretation of the law.

The officers should be selected with a view to their fitness for the places they have to fill, and should not be subject to local influences. Dependent as our commissioners are for both their positions and pay on the whim of the county officials, the results can not be entirely satisfactory. Therefore both superintendent and commissioners should be appointed by the governor and paid by the State. Aspirants for appointment should be qualified to perform their duties intelligently, and be able to compute the flow of water.

The commissioners should be empowered, in case of refusal of the owners of any ditch to place head gates, make repairs, or to obey orders, to shut the water off until such orders are complied with, and when water has been turned off and the consumer notified thereof, anyone using water which may be in the ditch, contrary to orders, should be deemed guilty the same as if he had opened the head gate. Officers of the irrigation department should be defended in all actions by the district attorney, and costs should in no case be adjudged against them except in case of willful oppression or malfeasance, and parties beneficially interested should be made parties to the suit.

I regret that it is not permitted in this State to rotate water, as by that method a much higher efficiency could be obtained. When each user is allowed all the water he can handle for, say, two days each week, he prepares himself, and when the water comes every drop counts. More land is irrigated in less time; there is no water running to waste and washing out gullies at night; seepage and evaporation are lessened in the laterals, and when the two days are up he can do something else, and is not harassed to death with an intermittent little stream, the results of "borrowing" on the sly by his neighbors.

The State engineer should be vested with power, in case of emergencies, to arbitrarily divert water for strictly domestic use, as it often happens that settlers under a ditch which has been closed suffer greatly for water for themselves and for their stock.

As between seepage and waste waters and the natural flow from existing springs, it appears to me the line is not sufficiently marked.

If the former has for a number of years been finding its way to the streams, and appropriators, albeit unconsciously, have been using this water, an appropriator of this water before it reaches the river should be allowed to use only the amount of the increase which is the result of his labor in reclaiming the water.

WATER LAWS OF KANSAS.

In the western third of Kansas irrigation is a necessity, but this fact was not realized until the greater part of that region had been settled and the failure of agriculture by rainfall established by experience. This explains some of the features of the Kansas irrigation laws which are peculiar to that State.

The act of 1897 is not general, but only applies to that portion of the State west of the ninety-ninth meridian. The earlier acts applied to the entire State. While this creates no conflicts, it does give rise to some complexities. The doctrine of riparian rights seems to prevail in the eastern two-thirds of the State, while the right to appropriate streams west of the ninety-ninth meridian is specifically conferred by the act of 1897. As all of the important streams of the State flow from west to east, one doctrine prevails at their sources and an antagonistic one at their outlets.

The laws of Kansas resemble those of North Dakota in the prominence given to underground waters. In Dakota this comes from the unusual importance of this supply; in Kansas, from the unusual need of it. When western Kansas was settled, no particular attention was given to securing locations which could be irrigated. The uplands were settled as rapidly as the valleys. The number of homesteaders remote from streams is far greater than the number which can be supplied therefrom. It is only by the utilization of underground or stored water that many of the upland farms can be watered. Hence, legislation has been directed toward the determination of its volume and the enactment of laws to promote its use.

So far as the declaratory provisions of the Kansas water laws are concerned, there is little to criticise. They are generally in accord with the best thought and experience of the West, but when we come to consider the means provided for their administration the result is not so satisfactory. The principles laid down in chapter 79 of the compiled laws of 1897, relative to the appropriation of water, are conservative and just. The right to appropriate both surface and underground waters is recognized, but such right is restricted to the beneficial use of the volume appropriated, and a failure to continue such beneficial use forfeits the right. No appropriation is complete until the water has been used, and the amount of the appropriation is limited to the requirements of that use. Any person attempting to sell, lease, or assign a right of this kind is held to have abandoned it, and there is a stringent penalty against the collection of royalties for the right to use water.

Under these laws the irrigators of Kansas are freed from many of the dangers of speculative ownership which threaten some of the States where the right to water is of far greater moment. In considering the merits of any irrigation code this fact must, however, be kept constantly in mind: Its effectiveness depends in a large measure upon the means provided for its enforcement. No declarations of principles will operate a railroad. In order that trains may run on time and passengers be transported in safety there must be superintendents and engineers and train dispatchers to direct the work. There is an equal necessity for some sort of administrative machinery to protect rights in the division of a running stream. It is here that the law of Kansas is defective. Authority is too widely distributed and no one has sufficient control to make it of much service. "Too many cooks spoil the broth," and too many branches of the State and county governments have a share in stream control to permit of satisfactory results. The county clerk posts notices of appropriation; that ends his connection with irrigation. The register of deeds records these notices and does no more. The district court adjudicates rights, and hears and determines petitions for the annulment of agreements to rotate water. The county records are of little value before it acts, while after such action they are of no consequence because the court decree displaces them as an evidence of title. Even this decree does no good without some way to enforce it. There appears to be none except to enjoin those who disregard its terms. Such a remedy is altogether too slow, expensive, and imperfect to be applied.

The rates for the carriage of water are fixed by the county commissioners, and this ends their connection with irrigation.

There are other controversies that have to be decided by the railroad commissioners. It would be a very unusual coincidence if men could be found fitted by experience to act as railroad commissioners who have the necessary experience to qualify them to act as irrigation experts. The only State official who is supposed to be specially fitted to deal with irrigation matters is ignored. There is a commissioner of irrigation and forestry, but his duties in supervising the acquirement of rights to water or the protection of those rights are not obvious from a study of the statutes. It is believed that this system is capable of betterment, and in support of this belief the following suggestions are offered:

Section 2 of chapter 79 says that the right to have an appropriation date from the filing of a notice depends upon the completion of the ditch within a reasonable time. What is a reasonable time? This has to be determined at some stage in the acquirement of the right. It ought to be fixed before construction begins. In that way injustice both to the parties building ditches or other parties whose rights are affected by such ditches can be most surely averted. By fixing the time allowed for completion before work begins, one of the prolific

sources of litigation is entirely removed. This has to vary with each ditch, and can not be attended to without some administrative head to the irrigation system of the State.

Section 4 of chapter 78 states that work must be begun within sixty days after posting the notice. How is compliance with this provision to be established? Ditches are often built in remote localities. There is nothing in the law which requires a report either of the beginning of construction or of the progress made, and there is no officer whose duty it is to look after these things to see that the law is complied with.

What has been said elsewhere regarding the necessity of some central office for all claims to water applies with peculiar force to Kansas. County boundaries have no relation to the drainage areas of streams or of the basins of the artesian-well supply. Where a river crosses many counties a notice filed in one county is not a sufficient notice to water users in other counties above or below. This has been recognized in the act which requires those who wish to establish a priority of right for an artesian well to file not only in the county where the well is situated, but in the adjoining counties also. If this is regarded as necessary to protect a priority for an artesian well, why should not a similar notice be filed in the other counties through which a stream flows? There the interference with rights is obvious; in the case of the artesian well it is largely a matter of conjecture. A central office of record would, however, be far superior to requiring separate notices in each county, and in the case of artesian-well filings would be immeasurably superior to the separate records of these notices in a few counties.

The establishment of any right on a stream influences the value of every other right. This is so obvious as not to need discussion, and of so much importance that it should be recognized. Apparently it has not been in the law governing adjudications. Priorities on a river ought to be established for the whole stream. Instead, they are in sections. The judge of one district fixes the priorities for his district; the judge of the district above or below establishes the rights in his, and the two have no relation to each other and afford no basis for a protection of all rights.

The law which requires reports from those sinking or boring artesian wells is excellent, and these statistics are destined to be of great service in the future. Their value is largely lost at present by their separation in the different county records and by the fact that they go to someone who is making no special study of these questions. It is believed that the benefits to the State would be much greater if those reports, instead of being pigeonholed in a county office, were sent to some experienced officer at the State capital. In that way the whole State could come under review and water users be promptly informed of any new discoveries of importance.

WATER LAWS OF MONTANA.

Measured by its agricultural possibilities, Montana is one of the foremost States of the arid region. Every important tributary of the Missouri used in irrigation, except the Platte, rises in or crosses this State. The volume of the available water supply and the area of land which can be reclaimed makes it certain that in time the irrigated farms will alone support more people and produce more wealth than all the industries of the State now do.

As yet this greatness is largely prospective. More water runs to waste in this State than is used in irrigation in all the States embraced in this discussion. Stock raising and mining are the two industries which absorb investments of capital and lead in public thought. Water-right questions have received comparatively little attention. It is the extent of the State's resources which has caused this neglect of legislation. So long as streams have a surplus and every user is supplied there is no need of laws. This has been the situation in Montana, and the need of framing a code to meet future requirements has not been recognized.

The water-right laws of this State are the outgrowth of the customs of the placer miner. Rivers were turned on gravel beds before they were on hay meadows, and the laws are largely copied from those of California, where the miner preceded the irrigator and where irrigation is not a general necessity. While the use of water in mining has not kept pace with the extension of irrigation, the influence of early customs still remains paramount.

In framing water laws there is especial need of a clear understanding of what is to be accomplished, and in providing for the use of water for mills, mines, or farms, the differences in these pursuits should be kept in mind. It has apparently been assumed that one water law would serve every purpose equally well. That mistake is not made in disposing of public land. We have one law for placers, another for homesteads. Titles to mineral veins are not secured through desert filings. These different laws are framed to conform to different conditions. There is an equal difference between the conditions which should govern rights to streams. In mining, the use is regular and continuous; in irrigation, it is intermittent and varies from month to month. In mining, the washing down of a placer bed ends the use of water at that place; in irrigation, the farm will be watered as long as the river runs. One is transient; the other permanent. In mining, but little of the volume diverted is absorbed or destroyed; the same supply can be appropriated and used over and over again. In irrigation, the greater part of the volume diverted is absorbed and lost.

Sales of water in mining are in reality simply charges for transportation and delivery, because the water returns to other users. A law making mining rights in streams personal property, while not regarded as necessary, does not inevitably lead to abuses, because the end of the

use is only a matter of time, and the return of the water to the stream gives a practically unrestricted field for others to acquire the same kind of right.

In irrigation making such rights personal property places users at the mercy of their holders, because it enables them to say who shall or shall not absorb the supply.

The changes made in the laws for acquiring water rights have been unimportant. The methods of filing claims, of measuring water, and of determining rights in the courts have been made more definite, but neither the nature of the rights acquired nor the methods of appropriation have been materially modified.

The first Territorial water laws recognized the right of appropriation and set aside, by implication at least, the doctrine of riparian rights. The right to appropriate water for the purpose of lease and sale is recognized, and the court decisions interpreting this statute seem to make water a form of personal property.

The only water-right provision in the constitution is a part of paragraph 15, article 3, of the Codes and Statutes of Montana for 1895. It reads as follows:

> The use of all water now appropriated, or that may hereafter be appropriated, for sale, rental, distribution, or other beneficial use, and the right of way over the lands of others for all ditches, dams, flumes, canals, and aqueducts necessarily used in connection therewith, shall be held to be a public use.

The right to appropriate water for the purpose of sale and rental is not conferred by the laws of the distinctly agricultural States embraced in this discussion, as will be seen by referring to the statutes of Kansas, Nebraska, and Wyoming. There is considerable uncertainty as to just what this involves. Many holders of appropriations believe it is an ownership in the river itself which authorizes an appropriator to sell or lease its waters to users regardless of any ditch or place of use, and parties claiming such rights have given warranty deeds to a definite volume of water from a river, to be diverted in ditches yet to be built. If this conception is correct, then the filing and establishment of titles in this State are of unusual importance to its future development.

Where the only right which can be acquired is that of use, and is to be measured in the future by that use, there is little danger to be feared from extravagant or speculative rights, because the holder can derive no benefit therefrom; but where parties acquire a right to a part or all of a stream, not for the purpose of making a beneficial use thereof, but for the purpose of selling it to those who in time must have it, the temptation to acquire as large an interest as possible and the difficulties in the way of preventing unreasonable appropriations are enormously increased.

Where rights to water are restricted to the land on which acquired the land is always a measure of the extent of the right, but where the location of use is not fixed and where the appropriation is to secure

water to sell, its limitation is fixed only by whatever the court may decree or by the size of the stream. It is not certain that the Montana law permits the acquirement of such rights, but it is true that many appropriators believe it does, and both the law and the declaration made encourage such belief. The notice of water right, in general use, is posted before the ditch is built, yet it states that the party doing this "has a legal right to the use, possession, and control" of the inches specified. It does not say he will have, or that he desires to have, but that he already has such possession.

Many Montana rivers are long. They wind their lonesome courses across the arid plain for hundreds of miles. The claims for ditches already built, and those to be built, are not being recorded for districts based on drainage lines, but by county boundaries which have no relation to such drainage. Sometimes these rivers form parts of county boundaries. Where this happens, the scattering of irrigation records is still more pronounced. Take the Musselshell River, for example. It forms a part of the boundary between Fergus and Meagher, Yellowstone, Dawson, and Custer counties. Ditches on one side of the stream are recorded in one county; ditches on the other side in another county. It would require a journey of hundreds of miles and the examination of five sets of records to learn of the claims to its waters, so that the obstacles to irrigators informing themselves are so great that the records are of little practical utility. Very few appropriators know anything of the claims of others or have any idea of their extent.

Furthermore, the connection of the county clerk with irrigation ends with his recording these statements. He has no further supervision. The law says that work on the ditch must begin within forty days, but it is made no one's duty to see that it does begin or to make a record of failure to begin. Nor is there any official measurement of these ditches, after they are constructed, to determine their capacity, nor any survey of their location to definitely fix the extent of the beneficial use of water, which their construction makes possible.

In investigating the accuracy of the water-right records of this State an examination was made of all the claims to a small stream lying wholly within one county. It showed that it was almost as easy to build a ditch as it was to ascertain its right to water. In this instance there were nine books containing records of claims. Many of these claims reached back to the early Territorial period, yet nothing had ever been done except to record them. As there is no provision in the law for "proving up," there was nothing to show whether the ditches had or had not been built, or the extent to which water had been used. In the earlier records they were scattered among land locations and mining locations. Sometimes a farm, a mine, and a river, would all be located and claimed in one document. Some of these claims were 30 years old, yet there never had been a survey or an adjudication to determine what the just rights of any of the claimants were.

It needs no argument to show that a record of this kind is of little value; that it not only does not protect the rights of those who actually build ditches, but, on the contrary, threatens to become a source of annoyance and expense to users in protecting those rights. To show why this is so, the claims to the water of Trout Creek, a small stream of Lewis and Clarke County, which has a mean discharge in the irrigation season of about 500 acre-inches, have been copied and are given below:

Rights to water from Trout Creek.

Book.	Page.	Amount.
1	2	2,000 inches.
1	7	400 inches.
1	10	1,000 inches.
1	13	3,000 inches.
1	18	2,000 inches.
1	19	1,000 inches.
1	22	All the water from a spring that empties into Trout Creek.
1	25	All the surplus water of Trout Creek.
1	28	Exclusive right to all the water in Trout Creek.
1	28	Claim all the water of the upper part of Trout Creek.
1	29	2,000 inches.
1	39	All the water in creek below ditch taking water to St. Louis bar.
1	42	500 inches.
1	43	All the water that can be "flown" in a ditch at any season of the year.
1	58	1,000 inches and all surplus water.
1	59	All the surplus water of Trout Creek.
1	68	All the water not then in use.
1	88	600 inches.
1	90	2,000 inches.
1	108	1,500 inches.
1	129	1,000 inches.
1	131	500 inches.
1	139	Do.
1	140	Do.
1	273	Do.
1	386	Do.
1	396	800 inches.
1	431	400 inches.
1	450	600 inches.
1	456	800 inches.
1	505	750 inches.

Many of these claims were recorded by homesteaders who had filed on 160 acres of land. It requires about 100 inches to irrigate that area, and anything above that would, so far as the homesteader was concerned, be a surplus. Furthermore, any claims to an excess of 500 inches, the mean discharge of the stream, would be of little value in themselves if the claims to that amount were actually used. Looking at the actual situation, therefore, if the first claim was a legitimate one it absorbed the stream four times over, and all the others are simply paper titles, injuring the first but having no value in themselves. Such is not the actual situation. Claimants have used what they actually needed without any regard to the recorded statements.

The record given above does not include all of the claims to the stream, but as it did include thirty or forty times the entire supply, it did not seem necessary to pursue the inquiry any further.

The records of claims on scores of other streams were looked over with similar results. They lead to one of two conclusions: To recognize as vested a right to all that is claimed will establish appropriations

for much more water than has been used, and will sooner or later compel all subsequent users to buy their supply from those whose rights have no better foundation than the ignorance or greed with which they filled out their notice of claim.

There is another clause in the Montana law which makes the situation more uncertain and the danger from these speculative filings more serious. Section 1897 contains the following:

> Every person having the right to use, sell, or dispose of water and to engage in using, selling, or disposing of the same, *who has a surplus not used or sold, or any person having a surplus of water and a right to sell and dispose of the same,* is required, upon the payment or tender to the person entitled thereto an amount equal to the usual and customary rates per inch, to convey and deliver to the person *such surplus of unsold water.*

This seems to indicate that a person can acquire an ownership in a stream of a surplus simply for the purpose of selling it. It is submitted to the actual users of water that it is a matter for grave consideration whether such rights are equitable or necessary, and whether there is any reason which will justify their establishment. The irrigated regions of the Old World have been prosperous just in proportion as they have restricted rights in rivers to that of use, while in those countries where water has been made personal property, and the man who owns the stream can levy toll on the man who tills the soil, there have been exactions without end and poverty and oppression for the irrigator.

Another obstacle to a definite understanding of the rights to Montana streams is the absence of any law providing for either their prompt or comprehensive determination. While the district court has authority to adjudicate these rights, when controversies arise between irrigators, and numerous adjudications have been had, there is great uncertainty as to whether all rights have been included, and much difficulty in finding the cases in which these rights have been an issue. There is no stream record of water-right cases, and as these decrees are rendered in private suits, which are only indexed in the names of the litigants, it is sometimes necessary to examine the entire trial record of the district court to learn what has been settled by judicial determination. An effort to trace down the water-right litigation on a few streams showed that court clerks, attorneys, and irrigators are often as much in the dark regarding the actual situation as an outsider, and the conclusion is unavoidable that a perpetuation of this system, or lack of it, for another quarter of a century would result in a chaos which would be almost beyond the ingenuity of man to unravel.

Another possible complication is the establishment of two or more sets of appropriations for the same stream. This is due to the fact that the boundaries of judicial districts are not based on drainage lines. One section of a stream may be in one district, another section in another. Litigation in one court will establish one set of priorities;

similar litigation in the other court will establish another; yet both are based on the same water supply, and no systematic administration is possible until both are brought into harmony.

The unit of measurement in Montana is the "inch" (sec. 1893), and the form of device to be employed in its measurement is fully set out in the statute. This again shows the influence of mining customs, as the States in which irrigation preceded mining have adopted the cubic foot per second as the standard of measurement. The latter is a definite unit, but the value of the inch depends entirely upon securing uniform conditions. This may be possible in distributing water from ditches, but it can not be employed in measuring a river or in dividing its flow among canals. To use the device described in the Montana statute to measure the volume turned into some canals would require a box a thousand feet long and a locomotive to pull the slide. In a few States both methods of measurement are recognized by law, and there seems no reason why such would not be an excellent arrangement in Montana. This would enable those who are accustomed to the "inch," or where contracts have been based thereon, to continue its use, and would legalize the employment of the cubic foot per second in the gauging of rivers and canals.

The great rivers and fertile plains of this State are resources of such importance as to warrant the framing of an efficient code of laws for their utilization. It is believed that the experience of the Commonwealths on both the north and south are worthy of study, and that the following changes in the present code would promote development and add to the value of irrigated land:

All records of claims or titles to water from a stream should be recorded in one office.

There should be some authority to supervise the filing of claims and to prevent the overappropriation of streams.

Completed ditches should be measured by the State and rights established by some less costly method than litigation.

The State should be divided into districts and officers appointed to protect prior rights in times of scarcity.

WATER LAWS OF NEBRASKA.

By Hon. J. M. Wilson, *State Engineer.*

Water rights in Nebraska may be briefly divided into the following general classes:

(1) Rights acquired by actual use prior to the passage of the first general irrigation law, March 4, 1889.

(2) Rights acquired by compliance with the law in force from March 4, 1889, to April 4, 1895.

(3) Rights acquired under the law in force from April 4, 1895, up to the present time.

(4) Rights acquired since the enactment of the irrigation law in 1889 by those who, without complying with all of the provisions of the law, actually constructed works and made beneficial use of the water.

To the first class belong many valuable mill claims and several of the earlier irrigation rights. Of many of these claims there was up to 1889 no public recognition. Only those who had been so unfortunate as to get into court could boast of a record. The settler, driven by his repeated failures in dry farming to seek relief in irrigation, had no means of determining what rights were established or what amount of water was unappropriated. If a right was disputed it could be maintained only by force or by a tedious suit at law. This unsatisfactory state of affairs continued until 1889, when the first irrigation law was enacted. The method of establishing a claim for water under this law was as follows:

(1) A notice, stating the amount appropriated and the purpose of the appropriation, was posted by the claimant at the point of diversion.

(2) A copy of the notice was filed with the county clerk in the county in which the appropriation was made within ten days after posting.

(3) The work of construction was to be begun within sixty days after posting and prosecuted with diligence to completion. By compliance with these rules the right dated back to the time of posting notice. To prevent speculative filings, the law prescribed that a failure to observe these rules forfeited all rights as against a subsequent appropriator who made full compliance with the law; that is, the right of the claimant who failed to take the steps required by the law did not relate back to the date of posting, but was determined by the date when water was first applied to a beneficial use.

No provision was made limiting the amount appropriated by the respective claimants, neither was there any provision for the distribution of the water, nor for the protection of the appropriators. Under this law the records of the county clerks soon showed the waters in most of the streams in the State appropriated many times over. Many of the streams of the State cross several counties. The record in each county showed only the filings made in that county, and there was no means of determining the total appropriation from such a stream except by an investigation of the records of every county through which the stream flowed. The filings in a single county would often show more water appropriated than could be found in the stream, even in time of flood. The would-be appropriator could disprove this record only by a careful examination of all the territory susceptible of irrigation from the stream. This was a tedious, expensive process, impracticable for the small appropriator. The result was a condition of hopeless confusion and discouragement for the real appropriator. With slight modifications in 1891 this law remained in force until 1895, when the present law was enacted.

The statute of 1895 reaffirmed the validity of prior rights through

use and made a formal statement of the doctrine of State ownership of water.

Water divisions.—The State was divided into two water divisions. Water division No. 1 includes the basin of the Platte and its tributaries west of the mouth of the Loup River, and all lands south of the Platte drained by streams not tributaries of the Platte.

Water division No. 2 includes the basins of the Loup, White, Niobrara, and Elkhorn rivers and their tributaries, and all other lands not included in Division 1.

State board of irrigation.—By this law a board of irrigation, consisting of the governor, attorney-general, and commissioner of public lands and buildings was created. The governor is ex-officio president of the board. The law provides for a secretary and an assistant secretary of the board, an undersecretary for each of the two divisions, and such underassistants as shall be found necessary for the proper distribution of the water. The term of office in each case is two years. The secretary or State engineer is the executive officer, his acts being subject to review by the board. It is made the duty of the board through its secretary: First, to pass upon and fix the priority and amount of all claims which had been initiated prior to April 4, 1895; second, to pass upon all applications for permits to make appropriations of water under the existing laws; and third, through the undersecretary and his assistants to distribute the waters in accordance with the priorities and amounts determined by the secretary and approved by the board.

The law made it the duty of the county clerks to forward copies of all filings made for water prior to April 4, 1895, on record in their respective offices. These, with the claims filed with the board of irrigation by parties who had neglected to post notices and file with the county clerks, but who had appropriated and used the water, made up the claims to be adjudicated before there could be any intelligent disposition of the new appropriations, or any equitable distribution of the water could be made.

Since the organization in April, 1895, 994 claims and contests under the old law have been placed on record with the board. The steps in the process of an adjudication are:

(1) Copies of the county records of claims are obtained from the county clerks.

(2) Each claimant is required to file a claim affidavit setting forth all important facts, with the history of the appropriation, and a plat showing the location of the stream and ditch and the territory irrigated. To secure uniformity and definiteness, blanks are furnished by the board.

(3) Hearings are appointed at points convenient to the claimants for the taking of oral testimony in support of this claim. This oral testimony is transcribed and made part of the record. A copy of the original filing (if there is one), the claim affidavit, and the tran-

script of the oral testimony, with other affidavits and documents furnished by the claimant, with the report of a responsible engineering assistant after a personal inspection of the works, constitute the record in each case, and on this the decisions of the secretary are based. In determining the rights of these claimants the board is guided by the following principles: Where a notice has been posted at the point of diversion, a copy filed with the county clerk, and the law complied with as to diligence in construction, the priority is fixed by the date of posting notice at the point of diversion. When there is an evident lack of diligence the priority dates from the time when beneficial use began. When there is no filing the priority likewise dates from the time when use began. The maximum allowance is 1 cubic foot per second for each 70 acres of land brought under irrigation. The amount is limited by the capacity of the ditch. When the capacity of the canal is in excess of the acreage covered the area determines the allowance. At the time of the passage of this law many of the younger claims begun under the old law were in an unfinished condition, and in passing upon these it has been necessary to fix a time for the completion of the appropriation. The opinion issued in such a case determines the priority, but conditions the amount of the grant on the capacity of the ditch and the area actually irrigated at the expiration of the time fixed by the secretary. The time allowed for completion varies with the character and extent of the work. The determining of the rights under these claims has presented many perplexing problems and has claimed much of the time and attention of the secretary and his assistants; but this part of the work is now rapidly approaching completion, except in contested and belated cases, and in the future the work of the secretary and his assistants can be given more largely to the new appropriations and to the economical and equitable distribution of the water.

Appeals.—Claimants dissatisfied with the decision of the secretary may appeal to the board, and a further appeal may be taken from the finding of the board to the district court of the county in which the point of diversion is located.

Appropriation under existing laws.—All unappropriated waters of any natural stream in the State are subject to appropriation. Priority in appropriation gives the better right as between those using water for the same purpose, but appropriations for domestic use take precedence over appropriations for power purposes.

How appropriations are secured.—The steps in the process of securing a right to use water are as follows: The person desiring to acquire a right to the use of water files with the State board an application for permit to make the appropriation. This application is made on a blank form furnished by the board, and sets forth in the form of an affidavit the important facts concerning the desired appropriation. If, on examination, the application is found to be properly prepared, the filing is put on the record. If not, it is returned for correction, and the appli-

cant acquires no right till the filing is made in proper form. If there is unappropriated water in the stream and the appropriation is a proper one, the board, through its secretary, approves the permit, authorizing the applicant to take such steps as may be necessary to perfect the appropriation. If the secretary deems the amount applied for excessive, he may limit the appropriation to a less quantity. If there is no unappropriated water in the sources applied for, or an appropriation has been perfected to water the same land, it is the duty of the secretary to refuse the permit. In these matters, as in the case of the claims, the acts of the secretary are subject to the revision of the board, and an appeal may be taken from the decision of the board to the district court. Within six months after the approval of the appropriation a plat must be filed on a scale of not less than 2 inches to the mile, showing the location of the stream, the location of the canal, and the legal subdivisions of land to be watered. The work of excavation and construction must be begun within six months after approval of the application and carried forward diligently to completion. When the appropriation has been perfected in accordance with the law a certificate is issued, signed by the president of the board and the secretary, setting forth the priority and amount and the lands for which the appropriation is perfected. This certificate is forwarded to the county clerk of the county in which the appropriation is made, is recorded by him, and transmitted to the applicant.

The priority of the appropriation dates from the filing of the application with the State board.

Nature and limitations of appropriations.—The importance of this topic has not as yet been fully realized, but it is one that is making itself felt more and more as the value of rights to the use of water increases with the increased use and the consequent diminished supply. The act of 1889 prescribed that all appropriations must be for beneficial use, and that the purposes and places of use should be described in the notices posted at the point of diversion. The notices were, however, in most cases very vague and imperfect in their description of place and use. The act further prescribed that when the use ceased the right should cease. The law of 1895 went still further and required that a description of the land to be irrigated should be given with a plat showing its location. The theory of the board is that in all these laws the purpose of the legislature has been to attach the right to the use of water to the land. This has not, however, as yet come to an issue, though there are cases on the docket now that are likely to raise the question of the right of the appropriator to transfer his water right from one piece of land to another. The law of 1889 limits the appropriation in all cases to the amount required by good husbandry for the cultivation of the crops. The law of 1895 makes the same limitation and fixes a maximum limit of 1 cubic foot for each 70 acres irrigated. There is much difference of opinion and some

difficulty in determining the proper amount. The climatic conditions vary from the humid in the east to the arid in the extreme west, and the soil conditions vary as widely as the climatic; so that much must be left to the judgment of the person who distributes the water.

Since April 4, 1895, there have been filed with the State board 460 applications for water, covering some 3,000,000 acres. It was evident at the beginning of the work under the new law that the claims under the old law would demand the time of the board for some time, and that it would be impossible to determine until these claims were adjudicated what water was appropriated or what land was already covered by canals already built or in process of construction. Not desiring to stand in the way of construction where appropriation could properly be made, a circular letter was issued by the board and mailed to each new applicant when he made his filing, setting forth the facts as to the work before the board and as to the time that might be required before his application could be reached. He was informed of the uncertainty as to there being water for his appropriation, and was notified that he would not be held responsible for beginning his work until after his appropriation had been approved, but he was further notified that if he felt sure there was unappropriated water in the source of supply the board would not seek to prevent his proceeding with the construction, and that such construction should not in any way prejudice his appropriation. In many cases the canals have been built; others await the action of the board.

As fast as the claims under the old law can be gotten out of the way, the applications under the new law are taken up and passed upon. It has been found necessary in most cases to make a personal inspection of the proposed location and the lands to be irrigated. When the supply is sufficient and the plan appears reasonable and feasible the grant is made. If otherwise, the application is either rejected or modified to fit the conditions.

Water divisions and water districts.—The two divisions into which the State is divided by the law, viz, water division No. 1 and water division No. 2, are subdivided as follows:

Division No. 1A, the Platte and its tributaries west of the Loup.

Division No. 1B, the Republican and its tributaries west of the Loup; division No. 1C, the Little Blue and its tributaries; division No. 1D, the Big Blue and its tributaries; division No. 1E, the Lodge Pole; division No. 1F, the Great and Little Nemeha and their tributaries and the tributaries of the Missouri south of the Platte.

Division 2A, the Loups and their tributaries; division No. 2B, the Elkhorn and its tributaries; division No. 2C, the Niobrara and its tributaries; division No. 2D, White River and its tributaries; division No. 2E, Hat Creek and its tributaries; division No. 2F, all tributaries of the Missouri except the Niobrara north of the Platte.

For convenience in the distribution of water, water districts are cre-

ated. Those districts, when the territory covered is not too great, are made up of a single basin or division. When a division covers more territory than can be properly administered by one assistant, the territory is subdivided into districts of convenient size for the distribution of water. For each district so created an under assistant is appointed. He receives his appointment from the board, works under the direction of the under secretary for his division, and is paid by the county for which service is rendered. Five such districts have thus far been created and assistants appointed. These districts are:

Water district No. 1, water division No. 1A, including the waters of the North Platte River and its tributaries in Keith and Deuel counties.

Water district No. 2, in water division No. 1A, including the waters of the North Platte and tributaries in Cheyenne and Banner counties.

Water district No. 1, water division No. 1B, including the waters of the Republican River and its tributaries in Red Willow, Hitchcock, Hayes, Chase, and Dundy counties.

Water district No. 1, water division No. 1E, including the waters of Lodge Pole Creek and its tributaries in Deuel, Cheyenne, and Kimball counties.

Water district No. 3, water division No. 1A, including the waters of the Platte River and the North Platte and South Platte rivers and their tributaries in Buffalo, Kearney, Phelps, Gosper, and Lincoln counties. (For boundaries and locations of these districts see Pl. III, p. 36.)

Enlargement and extension of ditches.—When it is desired to enlarge or extend old ditches so that a larger appropriation is needed, an application is required as for a new appropriation. When changes in the location of headgate become necessary, a petition is filed for permit to make such change.

Storage of water.—Water not needed for immediate use for irrigation or for domestic use may be stored in reservoirs. For this purpose an application is made as for other appropriations.

Dams.—For dams less than 10 feet high, no special permit is required. For a dam over 10 feet in height, plans must be submitted to the secretary for examination and approval.

Fees.—No fees are required for any work done by the State board except for a stenographer when the secretary is conducting a hearing in the adjudication of claims. The stenographer's fee is 20 cents per folio, to be paid by the party in whose interest testimony is given.

The law is working well. The confusion which existed when the law of 1895 came into force is rapidly disappearing. The experience of the three years just past has revealed the necessity for some minor changes, but on the whole the law is working satisfactorily.

WATER LAWS OF NORTH DAKOTA.

Judging from its statutes, North Dakota can not be considered as an irrigation State, the Revised Code of 1895 containing only two paragraphs relating to this subject. In this respect it is in striking contrast to South Dakota, with its comprehensive code of laws designed to promote irrigation from artesian wells. There are no laws for the recording or establishment of titles to water by appropriators. The constitution makes all the streams and natural water courses public property.[1] But the owner of the land is made the owner of the water standing thereon or flowing over or under its surface where it does not form a definite stream. The right to divert and appropriate water from streams is nowhere recognized. The doctrine of riparian rights is a part of the law of this State, and it does not seem to have in any way been modified.[2]

WATER LAWS OF SOUTH DAKOTA.

In 1881 the Territory of Dakota enacted a water-right law which provided that—

> Any person or persons, corporation or company, who may have or hold a title or possessory right to any mineral or agricultural land within the limits of this Territory shall be entitled to the usual enjoyment of the waters in streams or creeks in said Territory for mining, milling, agricultural, or domestic purposes; provided, that the right to such use shall not interfere with any prior right or claim to such waters when the law has been complied with in doing the necessary work.

It also provided that any person or company appropriating water should construct at least 20 feet of ditch or flume within thirty days of the first act of appropriation and turn the water therein from the channel of the creek or stream and in addition construct at least 20 rods of said ditch if needed and turn the water therein within six months from the date of appropriation. It required the locator within twenty days from the date of location to file a certificate of location with the registrar of deeds in the proper county. A copy of such certificate was also required to be posted at the head of the ditch.

Failure to begin work within sixty days after location and to prosecute such ditch or canal or flume to its final completion without unnecessary delay was deemed an abandonment. The Dakota Territorial laws also provided for the organization of ditch companies for the purpose of irrigation. The articles of incorporation of such companies

[1] Sec. 210, art. 17, State constitution North Dakota. All flowing streams and natural water courses shall forever remain the property of the State for mining, irrigating, and manufacturing purposes.

[2] Sec. 3362, chap. 27, Civil Code. *Land includes water.*—The owner of the land owns water standing thereon or flowing over or under its surface but not forming a definite stream. Water running in a definite stream formed by nature over or under the surface may be used by him as long as it remains there; but he may not prevent the natural flow of the stream or of the natural spring from which it commences its definite course, nor pursue nor pollute the same.

were required to specify the stream or streams from which water was to be taken, the point or place on the stream at or near which the water was to be taken out, the line of the ditch as near as might be, and the use to which the water was to be applied, and required every ditch corporation to furnish water to the class of persons using water in the way and for the purpose for which the articles of incorporation declare the water obtained to be used. Whenever they have water in their ditch unsold they were required to give preference to the use of water to the class of persons named in the articles of incorporation, whether manufacturers, miners, or farmers.

Corporations formed under this act were required to commence construction of works within ninety days and to prosecute the same with due diligence until completed, the time of completion not to extend beyond a period of four years.

Since the admission of South Dakota to statehood there has been little legislation regarding the use of surface waters. There are no constitutional provisions relating to water rights and no State laws of any importance governing appropriations from streams. Subterranean waters have received far more consideration from the State's law makers than that found on the surface. Although the Missouri, Belle Fourche, and Cheyenne rivers are important streams and are extensively utilized in irrigation, the State has made no provision for the legal establishment of rights to their waters.

There have been but few attempts to establish or enforce priorities of right to underground waters, but the exceptional volume of the subterranean supply in South Dakota has caused this State to declare that such rights exist and to authorize interference with the construction or operation of wells which threaten to diminish the flow of those sunk at an earlier date. There is a wide difference between governing the diversion and use of a stream whose source and volume can be readily determined and governing a subterranean one, whose source, extent, and duration are all matters of conjecture. It is therefore somewhat remarkable that the legislation of this State, which provides for the restricting of the number of wells in a township, for their location by public officers according to some prearranged or systematic plan, and for the distribution of the water supply by public officials, has gone further than have those of other States in regulating the distribution of a visible supply.

The only law relating to surface streams was enacted in 1897, when two declarations were made appropriating these waters to public uses. The first of these reads as follows:

"That all surface waters in the State of South Dakota are hereby appropriated to the use and benefit of the public."[1]

In a law approved by the governor four days after the one just quoted there is a material restriction upon the dedication to public

[1] Sec. 1, chap. 75, Session Laws, 1897.

use; the first section of the law last enacted being "That all surplus water, above the normal amount in lakes, rivers, creeks, or other bodies of water, is hereby appropriated to the use and benefit of the people of this State."[1]

The expression "above the normal amount" at once raises the question as to what is to be considered the normal flow of a river or the normal depth of water in a lake. If it is simply the right to divert the surplus during the flood season the right is of little value for direct irrigation. Crops need water as badly in July, when streams are low, as in June, when they are at their flood, and a right which would terminate before they are matured would hardly be worth acquiring. How far the later law will serve to modify or restrict the right to take water from streams to store in reservoirs for use in irrigation[2] only a judicial interpretation can determine; but, taking all the facts together, it would appear that the people of this State have not looked with favor on any serious diminution of surface streams by irrigators. If the supreme court should decide in the case now before it[3] that the common-law doctrine of riparian rights prevails the construction of large canals will be attended with serious risk.

Rights to underground waters.—No such uncertainty exists regarding the use of subterranean waters. Any person, corporation, or company can construct artesian wells on land that they own or control, and can under certain conditions store, lease, or sell the waters thus obtained.[4] There are no restrictions on the rights of private parties to make wells on their own lands for their own use in irrigation, manufacturing, or domestic purposes, but since 1895 the right to appropriate water for other purposes is not recognized where such appropriation will reduce the flow of adjacent wells.[5]

The location of private wells is also subject to State supervision in order that the most recent ones may not reduce the flow of those already constructed.[6]

The construction of artesian wells is not, however, left entirely to private enterprise. The laws of the State provide for their construction and control by townships and incorporated villages. While the amount of money invested in this sort of development is far less than the debt incurred through the sale of bonds under the Wright act in California, yet so far as the principle of State aid and control is concerned it is an advance on the legislation of any other State, and the results will be followed with much interest by other arid commonwealths.

The water from these public wells may be used for the purposes of irrigation and for domestic purposes. As the latter term is very differently construed in many of the arid States, it is of interest to notice the limitations placed upon the term in the Dakota law. It is defined

[1] Sec. 1, chap. 77, Session Laws, 1897.
[2] Sec. 1, chap. 104, Session Laws, 1895.
[3] Farwell *v.* The City of Sturgis.
[4] Secs. 1, 2, 5, 18, 19, chap. 103, Laws, 1890.
[5] Sec. 42, chap. 80, Laws, 1895.
[6] Secs. 43, 44, 46, 47, chap. 80, Laws, 1895.

to mean for household use, for the supply of domestic animals kept with and for the use of the household and farm, and the watering and sustaining of trees, grass, flowers, and shrubbery about the house of the consumer in an area not exceeding one-half acre of land. Water may also be used for manufacturing purposes whenever such use will not in any manner obstruct or materially diminish the water for irrigation purposes, but a license for such use shall not be for a period to exceed ten years.

The water from these public wells may also be used for the filling of reservoirs, unless in the judgment of the authorities such use tends to diminish the flow of other wells used exclusively for domestic and irrigation purposes.[1]

No provision has as yet been made for determining or establishing priorities of right between wells constructed at different periods, but the later legislation seems to indicate that the superior right of the wells first dug is recognized, and should the increasing demand result in a diminished flow, it seems reasonable that in the evolution of water laws, which has already taken place, the next step will be to follow the practice adopted in regard to the use of water from streams and recognize the superior right of the wells first constructed.

WATER LAWS OF WYOMING.

Historical.—Water rights preceded water laws in Wyoming Territory. When the first statute giving the right to take water from streams was enacted about one hundred ditches were already doing this.

This law was passed in December, 1875. It gave parties owning or claiming land along a stream the right to take water therefrom to irrigate it, and provided that when there was a scarcity on any stream the county commissioners of the county where complaint was made should appoint three commissioners to divide the supply among those needing it. This law only provided for the use of water in irrigation. No record of either claims or appropriations was required, nor did priority of use give the better right, as it does under present laws. The last man to file on land along a stream had the same right to its use as the first settler. In dividing the flow the three commissioners were required to allow each user all he needed part of the time rather than an inadequate supply all of the time, the diversion being by time rather than by volume.

In many respects it was an admirable beginning for an irrigation system, but it had one weakness which led to its failure and ultimate repeal. It did not fix the salary of commissioners and made no provision for paying for their services. Its most interesting features were the abrogation of the doctrine of riparian rights, making the ownership of land rather than the construction of ditches the basis of a right

[1] Secs. 2, 3, 4, 18, 19, 20, 21, 22, 23, 30, 32, 34, 35, 36, 37, chap. 80, Session Laws 1895.

to water; placing all rights on an equal footing, and requiring streams to be divided by time rather than by volume.

For eleven years after its passage water-right legislation rested, but in 1886 a radical change was made by the adoption of what was intended to be a complete irrigation code. The new law not only made radical changes in methods, but the departure from original principles was equally great. Under the original law, ownership or control of land was the basis of all rights to use streams; under the later one the ownership and irrigation of land were both practically ignored. The building of ditches became the foundation of water rights, and the leading if not sole test of an appropriation. The original doctrine of the equal rights of all users gave way to priority of appropriation, the dates of such priorities being fixed by the time when the ditch on which the claim rested was begun.

These two changes made a record of existing ditches indispensable, and elaborate provision was made for this. Claims for existing ditches had to be filed with the clerk of the district court, claims for new ditches with the county clerk. The county surveyor of each county was required to measure every ditch in that county, issue a certificate of its capacity, which had also to be recorded. The surveyor's charges and all these recording fees had to be paid by the ditch owner. It made a heavy tax, and as the results were not satisfactory the law soon became very unpopular. The claims made were ex parte, and were usually for extravagant amounts. The surveyor's charges were in some cases outrageous and his certificates of little value, being often made out without even a visit to the ditch. In no instance was there an actual measurement of the volume diverted.

After all these fees had been paid, users had no way to enforce their rights. For all practical purposes they were in the same condition they were at the outset. Before anyone could close the headgates of late appropriators, rights had to be adjudicated in the district court. This court was the real authority. Its decree was the sole guide to the commissioner and the basis of all public or private control. The procedure was copied from that of Colorado and was open to all the objections urged by Judge Elliott in the portion of his brief heretofore quoted. The court could not begin an adjudication. When begun by private parties it was simply a contest for the ownership of public property in which public interests were not represented. Nor was the procedure satisfactory to users. It was too expensive. In the five years of this law's existence only six decrees were rendered.

Two years later the law was modified and greatly improved by doing away with the certificates of county surveyors and with requiring claims to be recorded in the district court. The office of Territorial engineer was created. Some needed limitations were placed on speculative rights claimed by ditch builders, and rights for domestic uses were made superior to all others, regardless of the time when acquired.

In 1890 Wyoming became a State, and this change was utilized to reform the water laws. The code of 1886 was an admitted failure. It had no administrative head; there was no central record of ditches or of appropriations; claims against a single stream were often divided between three or four counties. The burden of recording fees had produced a hostility to all irrigation legislation, and the cost of adjudicating rights in the courts was so great that the settlement of controversies was not keeping pace with their creation. The authority of the Territorial engineer was nominal, not real. He had no oversight over the building of ditches or voice in the establishment of rights. Five officers or tribunals, elected to perform other duties and with little or no knowledge of the needs of users, had to deal with water-right questions before they reached his office. The result was chaos, which all recognized should be ended.

The water-right complications which preceded statehood made irrigation one of the leading questions of the constitutional convention. Its members were unusually well informed, both as to the obstacles to be overcome and the need of adequate laws. The constitution, therefore, took advanced ground on these questions. All public water was made the perpetual property of the State. A special tribunal, called the State board of control, was created to manage this property. The State was divided into four water divisions, based on drainage lines, and a superintendent provided for each, these four superintendents and the State engineer forming the board of control. The State engineer is its ex-officio president. In addition to his duties as a member of that board he is the head of the administrative control of streams, and all appropriations therefrom are subject to his examination and approval. The law which carried these provisions into effect was passed in December, 1890, and is still in force.

Territorial claims.—The foregoing is a brief outline of the legislation under which rights to water have been acquired. It now remains to explain the number and character of these rights.

About 3,000 claims to the water of over 600 differently named streams and springs were recorded before Wyoming became a State. On six of these streams court decrees have fixed the priorities and amounts of appropriations. The other 594 had to be dealt with by the State board of control. Many of these were overappropriated, and the scarcity in the supply made an early settlement of its ownership of great importance. The determination of these unsettled rights has, therefore, been the leading feature of the work of the board of control, taking more of the time of its members than all its other labors combined. Lack of accurate records or of satisfactory evidence makes the determination of priorities laborious and difficult, and it is not yet completed. There are still many streams on which not a single right has been confirmed and established There exist, therefore, three classes of Territorial rights—those established by court decree, those determined by the board of

control, and the inchoate or unsettled rights based on statements of claim.

The titles to water conferred by adjudicated rights are not the same; on the contrary, they differ widely in character. Those established by court decrees are not attached to any particular tract of land. In some even the ditch is not named. The owner of the ditch is apparently the absolute master of its decreed capacity. Rights established by orders of the board of control attach to the lands irrigated, which are in all cases described. The ditch through which the water is diverted is also named, it being the theory of the board that even the right of use is restricted to the place and purpose for which it was acquired.

Statements of claim which have not been adjudicated can only be considered as showing a probable right. In but few cases is either the ditch or the use for which the water is claimed properly described. Nearly all claims are for excessive amounts.

The amounts and priorities of Territorial appropriations, established by the board of control, have been based on the following evidence:

Measurement of the stream and of ditches taking water therefrom.

Surveys of the ditches to show the land irrigated or capable of being irrigated.

Proof of the beneficial use of water by the appropriator.

Records of Territorial claims, transcripts of all these records having been furnished the State engineer.

In determining these rights the board has been guided by the following principles:

Priority dates from the survey of ditches if such survey is followed promptly by construction and the beneficial use of the water diverted.

Where proper diligence is not shown priority dates from the time of use.

The amounts of appropriations are fixed by the volume actually applied to beneficial use. In irrigation this is computed from the acreage of land reclaimed.

Where many irrigators take water from one ditch or canal, each one files separate proof and separate certificates of appropriation are issued. No appropriations are issued to ditches or ditch owners separate and apart from the use by which the right was acquired. Forms of proof and of certificates of appropriation are given in the second bulletin of this series (No. 60).

Appropriations made since Wyoming's admission to statehood.—Between January 1, 1891, and July 1, 1898, 1,865 applications for appropriations of water through new ditches and 350 applications to enlarge or extend old ones, have been filed with the State engineer.

The conditions attached to the majority of the earlier permits have been complied with and certificates of appropriation have been issued. A large number have been canceled, owing to failure of applicants to either begin or complete work within the time designated in the permit.

As a rule, small individual ditches have been built. All of the large projects started prior to the passage of the Carey act in 1894 have been abandoned and the permits therefor have been canceled.

How appropriations are secured.—Anyone desiring to secure rights to unappropriated water is required to file with the State engineer an application for permit to make such appropriation. The form of this application is prescribed by the engineer. Blanks can be had at nearly every printing office in the State, or from the engineer's office.

Permits are required where the existing use of water is to be increased or extended. If a ditch is to be enlarged or extended, or if land not described in an existing right is to be reclaimed, the application must be made and approved in the same manner as where a new ditch is to be built.

Priority of right dates from the filing of the application in the engineer's office, provided the application is made out in proper form. Where not in proper form it is returned for correction, and priority dates from the time the application is received in form for approval.

The failure or neglect of water users to secure rights thereto has resulted in many cases of hardship and loss. Settlers who have ignored the law, under the belief that use alone gave title, have had to accept priorities many years later than they would have been entitled to had the law been complied with. In some cases this has involved the loss of an ample water supply and the enforced acceptance of a precarious one.

The authorities of the land offices require parties making proof of reclamation under the desert act to submit evidence of title to water. Nothing will answer in Wyoming but a permit issued by the State engineer's office. Many learn this at the last moment, when it causes delay and needless added expense.

Form and conditions of applications.—The form of application approved has been changed but once, to conform to an amendment to the law passed in 1895.

Two maps must accompany each application. One of these maps must be on tracing linen, and all maps must be prepared in accordance with the following regulations:

Maps must be drawn to a scale of not less than 2 inches to the mile.

They must show the location of the head gate by courses and distances from some Government corner. They must show the actual location of the ditch or canal, and where Government survey lines are crossed the distance to the nearest corner must be given. (Where corners can not be found, give the location of the survey by courses and distances.)

They must show the course of the stream from which water is taken, the location and area of land to be irrigated, or place where water is to be used for other purposes. (This may be done by marking the boundaries or by coloring the areas.)

Wherever the canal line crosses streams or other ditches the location of such crossings must be shown, and such intersecting streams and ditches must be marked by ink of a different color.

Maps of enlargements or extensions of existing ditches must show the point where such extension begins.

Maps must contain the name of ditch, canal, or reservoir, and the name and post-office of the surveyor, with date of survey.

RESERVOIRS AND DAMS.

Plans of dams, cribs, or embankments must be drawn on a longitudinal scale of not less than 1 inch to 100 feet and for cross sections of not less than 1 inch to 20 feet. Timber, brush, and stone, where used, shall be shown in detailed plans, the scale of which shall be 1 inch to 4 feet. The plans for outlet and waste ways for reservoirs shall be drawn on a scale of 1 inch to 4 feet.

The maps of reservoirs shall show the total area to be submerged and enough levels to permit of computing its capacity.

The fees for examining and recording these applications are as follows:

For filing and examining applications for permits to appropriate water, $2.

For recording statements of claim, $1.50.

For recording applications for reservoir permits, $1.

For recording any other water-right instrument—for the first 100 words, $1; for each subsequent folio, 15 cents.

For issuing certificates of appropriation, $1.

For making certified copies of records, per folio, 15 cents.

For attaching certificate, $1.

Construction of ditches or canals must begin within one year. The time of completion is fixed by the State engineer. In determining this the engineer is guided in part by the wishes of the applicant, but chiefly by the magnitude, location, and cost of the work to be done. The maximum time given is five years, but the engineer can, where good cause is shown, extend the time of construction.

Holders of approved permits are required to report the completion of the ditch or canal and the application of water to beneficial use. After the time of completion has expired parties who have not reported compliance with the conditions of a permit are requested to do so, and if no report is made after a second request therefor the permit is canceled.

Proofs of appropriation under permits.—Notices of the complete beneficial use of water under a permit are filed with the State engineer and submitted by him to the board of control at their next regular meeting. It then becomes the duty of the superintendent of the division where the water is used to ascertain, by a personal survey or the survey of some authorized subordinate, whether the conditions of the permit have been complied with and to take the sworn proof of the appropriator. The report of the examiner and the proof of the claimant are submitted to the board of control at its next regular meeting, and if approved a certificate of appropriation is issued and the title is complete. Rights are, therefore, being constantly inaugurated and established along streams, the aim of those in charge of the State's water supply being to promptly determine all claims. Some difficulty has been experienced in doing this on streams where the Territorial claims have not been adjudicated. Until the priority and amounts of these earlier rights have been determined it is impossible to fix that of the later ones.

Nature and limitation of appropriations.—There is no question of equal importance to western agriculture about which there is so wide difference of opinion as the nature of an appropriation. It will be noticed,

in the historical review of the State laws governing this question, that they were radically changed three times in the first twenty years.

From the limitation of a water right to the irrigation of a specific tract of land, which was all the act of 1875 provided for, to the right to use anywhere or sell to anybody, which the act of 1886 made possible, was a long step toward speculative ownership of streams. The declaration of perpetual public ownership or control made in the State constitution and the attaching of rights for irrigation to the land reclaimed which the State law requires is an equally radical return to the original doctrine. Ditches were dug and rights acquired under each of these laws. If the courts should hold that the law in force when a right was established governs its character, then the limitations of appropriations from the same stream may vary widely. They now do on different streams. In the decree establishing appropriations from Crow Creek, in Laramie County, in 1888, the water is given to the man or company claiming it. Neither the land on which water is to be used nor the ditch by which the water is diverted is located or named.

In the adjudication of water rights from Baldwin Creek in 1888 appropriations are based on the construction of ditches which are named, and the appropriations are attached to these ditches. Neither the acreage nor location of the land on which the water is to be used is set forth. On Crazy Woman Creek the name and dimensions of the several ditches diverting water and the acreage of land to be irrigated are given, but the location of the land is not described. These cover the variations in the court decrees. Following these come the adjudications of the board of control, in which the lands irrigated are described and the amount of the appropriation is based on the needs of the acreage reclaimed rather than on the dimensions of the ditches. The right of any appropriator to continue the beneficial use of water by which a decree of appropriation was secured is unquestioned, but the right of an appropriator to transfer the use of water to some other locality or apply it to a different purpose from the one by which it was acquired is still a subject of controversy in this State. In the case of Frank *v.* Hicks, which involved the transfer of a right acquired under the law of 1886, the court has held that "a right to the use of water for irrigation purposes, together with the ditch or other conduit, may, however, be conveyed separate from the land upon which the water is used." (Wyoming Reports, vol. 4). The authority of an appropriator to separate a water right from the land where acquired, if acquired under the State law, has not as yet been determined further than that the board of control has uniformly ruled that such right does not exist, but that all rights acquired under the State law attach to the lands reclaimed and are inseparable therefrom. This action of the board is based upon the following provision:

Provided, That such an appropriator shall at no time be entitled to the use of more water than he can make a beneficial application of on the lands for the benefit of which the appropriation may have been secured. (Sec. 25, chap. 8, Session Laws of 1890–91.)

In the acceptance of lands granted to the State under the Carey Act it is declared:

> That water rights to all lands acquired under the provisions of this act shall attach to and become appurtenant to the land as soon as title passes from the United States to the State. (Sec. 21, chap. 38, Session Laws of 1895).

It is to be hoped that cases may arise under which it will be possible for the supreme court to determine exactly the distinction which exists between the rights acquired under the different laws governing this question. This question has been one of the most perplexing with which the board of control has had to deal in the determination of rights acquired under the Territorial acts. The board has, however, followed the same procedure throughout. It has required parties making proof to describe the land on which the water has been used, and has made the appropriations attach to the lands reclaimed. Corporations or individuals owning ditches, but who are not users of water, have never been granted rights because of such ownership, the proof being made and the appropriations going, in all cases, to the party and use by which acquired. Ditch owners are considered as common carriers entitled to charge for the transportation and delivery of water, but having no authority to sell rights in the stream.

Preferred rights.—Under the law of 1888 appropriations for domestic uses took precedence of appropriations for any other purpose. That is, an appropriation for domestic purposes made in 1890 would take precedence of an appropriation made for irrigation in 1888, the use being superior to the date of acquirement. Only one case has arisen in which this preference has been enforced. This was the case of the Rattlesnake Creek pipe line taking water from Rattlesnake Creek to be used for domestic purposes in a mining town. The law making domestic uses a preferred right was repealed in 1891, and there is no disposition to reenact it. The only preference right which now exists is that of cities and towns to provide for increasing demands due to their growth. Under the constitution they are given the right to condemn and purchase appropriations made for other purposes. (Sec. 5, article 13. State Constitution.)

Rights to stored water.—The law of 1886 contained a provision giving persons constructing reservoirs the right to take and store, from any stream, its unappropriated water, not needed for immediate use. This law made no provision for determining the amount of water stored, nor in any way provided for establishing rights thereto. It did, however, contain a provision which made it inoperative. This was the declaration "that no reservoir shall be constructed or made in or across the channel of any natural or running stream." As this law interfered with the construction of a number of projected storage works it was repealed in 1891. The only law, now in force, relating to reservoirs is that which requires the plans to be submitted to the State engineer and authorizes him in case of necessity to assume charge of construction. There is urgent need of some amendment which will

provide for the determination of the amount of stored water and protect the rights of those making improvements of this character.

State control of streams.—The holders of prior rights to a stream are protected in times of scarcity by the water commissioner, who is a sort of police officer with authority to open and close the head gates of ditches and to arrest any user of water who interferes with such head gates after he has regulated the flow through them. Commissioners are appointed by the governor from names recommended by the division superintendent, so that the selection of these officers practically rests with the superintendent. The present governor has appointed whoever the superintendent recommended, and made him responsible for their efficiency. The preceding governor required the superintendent to submit three names, from whom he made his selection.

The jurisdiction of a commissioner is limited to a water district. These districts are created by administrative orders of the board of control. All are bounded by drainage lines, so that a commissioner usually has jurisdiction over a stream and its tributaries. This is not always possible, as the territory covered may be too great for a single man to supervise. In such cases the superintendent has authority to direct concerted action between commissioners dividing parts of the same supply.

New districts are created as necessity therefor arises. There are now 40, divided as follows:

Fourteen in division 1, 7 in division 2, 9 in division 3, 10 in division 4. Some of these districts are too large and will have to be subdivided, as increasing use and growing scarcity make the need of more efficient control more urgent.

Commissioners receive $5 per day for the time actually employed. They can not begin work until their services are called for by two appropriators of the district, and the length of service is limited to fifty days in each season. In important districts this period is too brief, and appropriators supplement the fund provided by law.

Each division superintendent directs the action of commissioners in contested cases, investigates complaints of unfairness, and secures concerted action of commissioners in charge of different tributaries of the main drainage system which each division embraces.

The State engineer is the administrative head of the distribution system. Appeals from the rulings of superintendents are made to his office.

Commissioners are appointed for two, superintendents for four, and the State engineer for six, years. The board of control has always had representatives of both political parties, and three out of the five members have served continuously since its creation.

The same is true of the water commissioners. The sole test has been honesty and fitness, and no man who has met these requirements has ever been removed.

Where records of titles to water may be found.—Statements of claims, applications for permits, and orders of board of control, in State engineer's office.

Certificates of appropriation, in county clerk's office.

Court decrees, in office of clerk of district court and in State engineer's office.

WATER LAWS OF THE NORTHWEST TERRITORIES OF CANADA.

As has been stated before, a discussion of the water-right laws of the Northwest Territories of Canada has been included to enable those interested to compare the methods of an adjoining country with our own.

These laws are of a twofold character: (1) the general law under which water rights are obtained and enjoyed; and (2) the territorial law relating to the formation of irrigation districts to undertake irrigation as a municipal work.

In considering these laws the first contrast which presents itself is the origin of the general law relating to water rights. This law is an enactment of the Dominion Parliament instead of being the subject of local legislation, and may be compared to an enactment by Congress of an irrigation code for the entire arid West. Under this system the control of both land and water remains under one authority until disposed of to private owners or users. It also avoids the troublesome problem of interstate rights, which now besets a number of localities in the West. This general law, although a Dominion enactment, is administered through the territorial government, the department of public works of that government being the central office of record for applications for water rights, duplicate copies of such applications being forwarded from the territorial department for record at Ottawa, the Dominion capital. The authority administering the law is therefore centrally situated in this arid region, and in direct touch with those desirous of acquiring water rights, while the further safeguard is provided of a record of such rights in the Dominion records.

In Canada admission of a territory to confederation as a Province, or to statehood, as we would call it, is a matter of arrangement between the territorial and Dominion governments, and the provincial constitution is not a matter for expression of opinion by the residents of the territory seeking the provincial status, the rights which can be acquired being closely defined by the British-American act enacted by the Imperial Parliament at the time of the confederation of the eastern Provinces into the Dominion of Canada. The control of the water, except navigable streams, is one of the rights which pass to a Province when entering confederation, but the vacant lands remain within the control of the Dominion; so they, like us, have the divided ownership of land and water, which has caused so much trouble in properly dealing with irrigation in our arid West. In the Northwest Territories they have, how-

ever, the advantage that these water-right laws have been enacted and enforced before the provincial status is reached, and the further advantage that a careful record of all these rights granted is a part of the territorial records.

The water of streams and lakes, like the public land which borders them, is the property of the Crown, and is disposed of under as rigid regulations.

Riparian rights, except for the needs of users for domestic purposes, are not recognized. A user of water away from a stream has the same right thereto for irrigation as the owner of land along its banks. The significance of the fact that a part of the British Empire has promptly recognized the need of abrogating the common law doctrine of riparian rights ought to be recognized by those States which are demoralizing irrigated agriculture by attempting to retain it. The clause which defines the extent of governmental ownership is given entire:

> The property in and the right to the use of all the water at any time in any river, stream, water course, lake, creek, ravine, canyon, lagoon, swamp, marsh, or other body of water shall, for the purposes of this act, be deemed to be vested in the Crown, unless and until and except only so far as some right therein, or to the use thereof, inconsistent with the right of the Crown, and which is not a public right or a right common to the public, is established; and, save in the exercise of any legal right existing at the time of such diversion or use, no person shall divert or use any water from any river, stream, water course, lake, creek, ravine, canyon, lagoon, swamp, marsh, or other body of water otherwise than under the provisions of this act.

The purposes for which water may be acquired are divided into three classes: First, domestic purposes, which include household, sanitary purposes, the watering of stock, and all purposes connected with the working of railways and factories by steam. This does not include the sale or barter of water for such purposes. The second class is rights for irrigation, and the third for other purposes; but no application will be granted where it will deprive any person of the use of water from the stream for domestic purposes.

Method of acquiring rights and character of records.—It will be seen that this law recognizes the importance of titles to water and at the outset impresses it on intending users by the care which is manifested by having the preliminary application give in detail all of the facts on which the right is to be ultimately measured. There are no ex parte claims of more water than streams carry without map of ditches or description of land. There is no recording of claims without examination or correction. Instead of the characteristic procedure of the arid States, there is all the order and method that marks the disposal of public land by the General Government.

The applications for a license to divert and use water from any source must set forth in the fullest detail the names of officers and shareholders, in the case of companies, or the names of the individuals where the applicant is not an incorporated company, their post-office addresses,

their proposed plans, and their financial ability to carry out the projected work. There must be maps and plans giving in detail the location of projected ditches and the location and acreage of land to be irrigated. Simple filing of the applications does not end the matter, as it does in many of the arid States. They must be examined by some qualified officer, and if not correct must be corrected and a copy of the corrected plans filed for public inspection in the central office in the Territory and another with the department of the interior at Ottawa.

In addition to this application, in all ditches intended to divert over 10 cubic feet of water per second a public notice must be given in one issue of the Canada Gazette, and another notice once a week for a period of not less than thirty days nor more than ninety days in a newspaper in the neighborhood of the proposed works. The superiority of a notice of this kind to the plan adopted by some of the arid States of posting a notice on a stake in some lonesome bend of the stream does not need to be dwelt upon.

In cases of ditches of less that 10 cubic feet capacity a newspaper notice is required for thirty days. The purpose of this preliminary newspaper notice is to give those whose interests will be injured by the proposed diversion an opportunity to protest to the authorities of the government, and no work is permitted to be begun until parties have had an opportunity to be heard and until the government has rendered its decision on the merits of the proposed use. After this, work is not permitted to be begun until the approval of the government has been signified, with such changes as the government has seen fit to order. The authorization issued specifies a time in which the work shall be completed, and it is the final authority for proceeding with the work, and the construction of the works is subject to inspection by a government official at any time during their progress. To appropriators of water in the arid States, accustomed to the careless methods which generally prevail, this may seem like a slow and vexatious preliminary, but experience has already shown that a neglect of these precautions at the outset involves ten times as great an outlay afterwards in the effort to unravel the tangle which our lack of definite records creates. It has, moreover, this very marked advantage: That the privilege is definite, and one can tell before entering upon it exactly what is required and when the legal formalities may be completed. Our method of leaving everything for a final settlement in the courts is not only an injustice to these tribunals, but places every irrigator in a position where he neither knows what the expense of a final settlement of his title is to be nor when that expense will end.

Ditches authorized under this act must be begun within two months after the publication of the last notice, unless this time falls between the 1st of November and 1st of the May following, but when this occurs the time shall date from the 1st of May following. The time for completion is fixed by the government, which, however, has authority to extend this for any reason which may be deemed sufficient.

The amount of the appropriation is limited by the capacity of the works, which is determined by an inspection ordered by the minister of the interior, and the report of this inspector is made conclusive. This is believed to be a mistake. The experience of the arid States of this country has shown that making the ditch builder the appropriator of water does not afford sufficient security to the user. It is not the ditch builder who makes the principal return nor whose interests are of enduring moment; it is the man who reclaims the land and makes his home thereon who should receive the first consideration of the lawmakers who deal with the subject. Making ditch builders or canal companies the appropriators of water threatens to put users of water from those canals under a perpetual mortgage to them.

The priorities of rights of the different parties receiving license to acquire water for irrigation are determined by the date of approval of these licenses. In case there is not water enough for all it is made the duty of the government to ascertain the facts and to close the head gates of those ditches which are receiving an undue supply or which are taking the water belonging to other ditches by reason of their earlier rights.

The cubic foot per second is made the unit of measurement for running streams, and the acre-foot the unit of measurement for quantity.

In addition to these statutory provisions the government has the authority to make whatever regulations are needed to make its administration effective.

It will be noticed that, taking into account the differences involved in having one system under State authority and the other under the authority of the general government, the irrigation law of Canada bears a close resemblance to that of Wyoming. In both the distinctive features are the absolute public ownership of the streams; the care exercised in the preliminary steps for the acquirement of title; the fixing by the government, and not by the applicant, of the amount of water to be acquired; the establishment of conditions before a dollar is invested by either ditch builder or water user, and, finally, the celerity and cheapness with which rights are established after the work is done and the care and efficiency with which the government protects these rights when once established. In both cases they are irrigation systems which arrive somewhere. In neither is the court required to become an agency to supply the omissions and neglect of lawmakers in the preliminary stages of the establishment of title. Under both systems litigation has been reduced to a minimum, because at every step the irrigator is dealing with specially trained officials who are giving their entire time and thought to the administration of these laws.