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The history and law of land
drainage with special
reference to Minnesota.

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Introduction.

It has been estimated that there are in the United States today, approximately 80,000,000 acres of swamp and overflowed¹ lands,¹ an area of unproductive land greater than the Philippine Islands and nearly three times as large as Great Britain and Ireland. When we consider that these wet lands are so vast in extent; that they are unproductive and an economic waste, and that they are in many States so productive of malarial diseases as to constitute a serious and ever-present menace to the lives and health of the people, the importance of the problem of land drainage in the United States is apparent. If, --- using the suggestion of Chief Hydrographer Leighton of the United States Geological Survey -- this land were suddenly acquired as an outlying possession, there is no doubt that there would be a great movement for its exploitation. Or "if there lay off our coast such a wondrously fertile country inhabited by a pestilent and marauding people who every year invaded our shores and

1. 60th Congress. 1st Session. Senate Document 443.

killed and carried away thousands of our citizens, and each time shock their fists beneath our noses and cheerfully promised to come again, how the country would go to arms, the treasury be thrown open, and how quickly that people would be subjugated!" And yet that is just the situation which our swamp lands, with their great possibilities for development as additional territory for our people and their cost to the United States in lives lost annually by malarial fevers, presents to us.

The benefits to be derived from land drainage are many. The removal of surplus waters results in: (1) a greater certainty of a full crop on agricultural lands, because of a reduction in the damaging effect of frost on vegetation; (2) an increase in the yield per acre, with a corresponding permanent increase in the market value of the land; (3) improvement of public highways; (4) benefits^{to} transportation companies because of the increase in freight tonnage due to the raising of more agricultural products; (5) benefits to towns near drained districts because of increased business; (6) benefits to railroad companies due to decrease in cost of maintaining trackage, as result of lessening of damages caused by floods, and softening of roadbeds; (7) improvement in public

health, due to the elimination of fever-and-disease-breeding swamps and marshes.

Even those lands which at the present time are used to some extent for farming although somewhat wet, because of the proximity of swamps and completely inundated areas, will be benefited by the drainage of the swamps, and their productiveness increased. For drainage ventilates the soil and helps to give to plants the abundance of free oxygen which they need. It increases the available supply of soil moisture for the crops, since roots on well drained land will pierce deeper and be better able to draw on ground waters during drought, than roots in less well drained soils. And finally, because of the fact that the low temperature of well-drained land does not last long in the Spring, seeds may be planted early in the season.¹

Using an average estimate, although conditions vary greatly according to the engineering problems presented and topography, we may place the cost of making public drains at approximately \$4.00 an acre, and in addition, private drains required to place the land in

(1) King, F. H. Irrigation and Land Drainage. 4th ed. pp. 418-429. (Professor of Physics at University of Wisconsin).

productive condition at \$8.00 an acre, and the cost of subduing and reducing ~~the~~^{to} cultivation at \$5.00 an acre. A fair estimate of the value of such reclaimed lands would be \$37.00 an acre, so that a net profit from drainage work of \$20.00 an acre might reasonably be expected; or a net increase in the market value of the 80,000,000 acres of swamp land in the United States of \$1,600,000,000.² This reclaimed area could furnish farms for hundreds of thousands of people,³ and help to take the place of the free homestead lands of the West. And since the improvement is a permanent one, it would increase the value of the agricultural products raised in the United States by millions of dollars per year.

The decrease in malarial diseases as a result of the drainage of swamp lands is well known. It has been demonstrated both abroad and in the Panama canal zone, as well as in the United States itself.

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- (2) 60 Congress 1st Session. Senate Document 443. p. 6 U. S. Dept. Ag. Circular 76 p. 10. places value of drained land at from \$20 to \$60, and \$400 if near cities. Van Hise, Conservation of Natural Resources, p. 3. Watts, E.E. Eng. News. Vol. 47. pp. 139-140, 1902. Eberhardt, Gov. A. G., of Minnesota in Address June 26, 1910, estimates added value of \$10,00 per acre at cost of only \$1.00. Hill, J.J. In Highways of Progress at p. 194 estimates increase in value from two to three times present value.
- (3) Van Hise. Conservation of Natural Resources. p.4. estimates that reclaimed swamp lands of the United States could support an additional population of 50,000,000 basing his estimate on experiance of Holland.

Malarial diseases prevailed in Indiana, and Illinois to an alarming extent prior to the construction of extensive drainage systems in those States. During the period from 1870 to 1890 the number of deaths from malaria in Iowa, Indiana, and Illinois decreased from 52.5 per thousand of the total, to 8.6 for one thousand, and that was the time of greatest drainage activity in those States, so that it is reasonable to conclude that these changes in malarial conditions were due to swamp land reclamation.¹ From the census of 1870 it appears that the deaths from malaria in the lowlands of the Mississippi River from Cairo to the Gulf during the preceding year were 89.8 per thousand of the total. In the census of 1900 we find that for the same territory the deaths from this disease were 88.6 per thousand. Likewise for the southeast coast lands of South Carolina, Georgia, and Florida, the deaths from malaria in 1870 were 66.2 per thousand and in the same territory they were 61.7 per thousand in 1890. In other words, in both these regions there was practically no decrease in the percentage of deaths from malaria during the very period when there

(1) See 60 Congress 1st Session. Senate Document 443, p.5

was practically no swamp land reclamation being carried on in them. And drainage operations near the city of Charleston, S. C. tend further to demonstrate the remarkably beneficial effect of such work upon the health of the people. The white residents of James Island, opposite the city was formerly obliged to leave the island during the summer months on account of the prevalence of malaria. But they can now safely remain there the whole year round, since no difficulties of this kind whatever have been experienced since the general introduction of drainage upon the farm lands of the surrounding country.¹ If the only result of the unwatering of the overflowed lands of the United States, were an improvement in public health by the substantial reduction of the losses due to malarial diseases, and the other benefits from reclamation were entirely disregarded, the work would still be worth the doing; for it has been estimated that the economic losses due to malaria in this country are not less than \$100,000,000 per annum.²

The reclamation of these swamp lands will include three distinct operations: (1) The construction

- {1} 60 Congress 1st Session. Senate Document 443. p. 5
- {2} Howard, L.O. In Report of National Conservation Coms. Vol. 3, p. 756.

of ditches, or the improvement of natural drainage channels, such as will be required by a large number of landowners in common, and will necessitate the use of the power of eminent domain and of legal procedure; (2) Detailed drainage on individual farms at private expense and the use of tile or open drains; (3) The subjugation of wild vegetation, the removal of stones and stumps, and the preparation of the soil for cultivation. This thesis will be confined to a consideration of the first of these three operations; that is, it will treat only of the public aspect of swamp land reclamation.

DRAINAGE WORK
IN
COUNTRIES OTHER THAN THE UNITED STATES.

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A study of the part that has been played by the government of other countries in the reclamation of swamp and over flowed areas within their borders, and of the general features of their drainage laws, and an attempt to gain some idea as to the amount of wet lands made fit for cultivation by other nations, may help to throw some light on the question; 'How progressive have been the drainage methods followed by the states of the American Union?' Of course, economic and topographical conditions vary so greatly in different countries and even in different parts of the same land that no sweeping statements can be made as to the comparative efficiency of the drainage operations carried on in different countries. It would not be strange, however, if a young nation, which is just beginning to need its swamp lands to support a rapidly increasing population, could learn something of value from older countries that have been

considering ways of solving the drainage problem, and building ditches and dykes for many years, in some cases, indeed, for several centuries.

Holland.

In no other country in the world does the problem of land drainage occupy more of the attention of the government and of the people of the State than in Holland, the "Hollow Land." For over six centuries it has been waging a relentless warfare against the waters of the rivers and the sea, its weapons being dykes and ditches. A large part of the country which is now occupied by hundreds of cities and villages and by many thousands of people, was originally submerged, and even today between two-fifths and one-half of the land is below the level of the sea.

In early times, when the Netherlands were sparsely inhabited by uncivilized tribes, the country was a vast morass periodically inundated by the waters of the North Sea. A few years after the territory had been subjugated by the Julius Caesar, Pliny wrote of the land as follows: "There the ocean pours in its flood

twice a day, and produces a perpetual uncertainty whether the country may be considered as part of the continent or the sea. The wretched inhabitants take refuge on the sand hills, or in little huts which they construct on the summits of lofty stakes whose elevation is conformable to that of the highest tides. They subsist on the flesh of fish left by the refluent waters, and which they preserve with great care; their fuel, a sort of tuft which they gather and form with the hand." So Eumenius wrote during the third century. "There was not, in the whole of the immense plain, a spot of ground that did not yield under the footsteps of man;" and Caesar in his commentaries on the Gallic Wars described the land as being so marshy and level that the rivers had no visible currents. Taine, the French historian of the middle 19th Century wrote that "In Holland the soil is but a sediment of mud; here and there only does the earth cover it with a crust of mire, shallow and brittle, the mere aluvium of the river, which the river seems ready to destroy."¹

(1) Of the Netherlands in their natural state, Motley wrote: "It was by nature a wide morass, in which ~~OOzy~~ Islands and savage forests were interspersed among lagoons and shallows; a district lying partly below the level of the ocean at its higher tides, subject to constant overflow from the rivers and Here, within a half-submerged territory, a race of wretched ithyophagi dwelt upon terpen oimounds which they had raised, like beavers, above the almost fluid soil."

The drainage problem with which the Hollanders have had to deal has always been of a two-fold character; the waters of the sea must be repelled from the land, and the "inner waters," due to lack of natural drainage and seepage through the porous soil, must be expelled. Along the Southern part of the coast sand dunes have formed a natural barrier against the sea, but in the provinces along the Northern coast and the islands in Zeeland in South Holland, it was necessary to build great dykes to keep out the sea. After this was accomplished barriers had to be erected along the lower courses of the rivers in order to keep them from flooding the adjacent low lands at seasons of high tide, or in stormy weather when the waters are driven back up from the sea. After the Dutch had shut out the ocean and rivers by means of dykes, lands were gradually reclaimed by the process of impolding, which consisted in encircling a tract of land with a dyke and then pumping out the water. It was under this system that the great Lake of Harlem was unwatered. This inland sea had been increasing in size for centuries. In 1531 it covered 6,000 acres, and by 1830 it had an area of 40,000 acres. In 1848 the

work of impolding was begun, and by 1852 it had been completed at a cost of \$3,893,200. This gigantic enterprise resulted in the reclamation of 41,675 acres of land which sold for \$120,84 per acre. In addition to Harlem Meer over 38 square miles of territory have been added to the northern provinces since 1877 by enclosing small tracts of shallow shore land at a time.

All this work has been carried on by the government itself. It is reimbursed by charges on the land reclaimed. The dykes and polders are maintained by Waterschaps or boards which are responsible to the respective Provincial Governors and also to a super council which has charge of the main waterways and interprovincial jurisdiction. As a general rule the cost of maintenance is borne by the different districts, but some of the dykes are of so great a size and of so much importance to the safety of the whole country that they are placed directly under the control of the Central Government which makes special appropriations to keep them in repair.

For the last fifty years the hydraulic engineers

of Holland, as well as the people in general, have been dreaming of reclaiming the Zuyder Zee. This is eleven times the size of Harlem Lake, and it comprises more than one-sixteenth of the total area of the kingdom. In 1886 an association was formed for the express purpose of forcing the government to take some action as to the matter, and in 1892 as a result of this agitation the government appointed a committee of twenty-nine to investigate the practicability of draining the Zee. The majority of the commission in 1894 reported in favor of the project. It will cost about \$76,000,000 and occupy thirty-three years. It is estimated that the reclaimed land will have to be sold by the government at not less than \$154 an acre in order to reimburse the state for the expense of the work. This does not seem an unreasonable price, however, since agricultural lands in Friesland, Zeeland, and North Holland are now worth per acre \$215.00, \$219, and \$300.00 respectively.¹ The reclaimed land will be sold to peasant purchasers under an amortization scheme calling for forty-five annual payments. The estimated benefits from the project are placed at \$500,000,000.

1. Land that is cultivable sells at remarkably high prices in Holland. South of Harlem bulb land rents for from \$60 to \$80 an acre and sells for from \$160.00 to \$180.00. The raw land reclaimed from the Y polders when the North Sea canal was opened sold at auction as high as \$540.00.
Gray, E.D.McQ. Government Reclamation Work In Foreign Countries, p. 25.

and the unwatered area will support 200,000 inhabitants.¹

France.

Drainage operations in France are carried on by two different agencies: (1) the government (2) associations of land owners. The government undertakes a drainage work only when it is of too vast an extent to be successfully completed by groups of private land owners, or when the owners of such lands refuse to do a piece of reclamation work which the government considers necessary for the general welfare. When the central government does the work it assumes one-third of the cost itself, and apportions one-sixth to the Department and one-half to the owners of the land.

The chief steps in the procedure where the government itself conducts the drainage operations are as follows:

1. The State designates the lands which it deems advisable to drain, and submits the proposition to the land owners.

2. The latter meet and decide whether they wish to undertake the work themselves.

(1) Gray, E.D. McQ. Government Reclamation Work in Foreign Countries.

Hill, J.J. World's Work, Vol. 19, pp. 12,595-12,617. 1910.

Mitchell, Guy E. World Today Vol. 13 p. 727, 1907.

Tatum, S. Annals American Academy of Political and Social Science. Vol. 35, p. 77, 1910.

Mo. Bureau of Labor Statistics. Bull. On Draining Mo. Low Lands, pp. 7-10. 1910.

3. If the owners refuse to carry out the proposed drainage then the government decides whether it will do the work itself, or grant it to a concessionary.

4. The State Engineers draw up the plans (or approve the plans of other parties if the work has been granted to them) and exercise general engineering supervision over the construction work.

5. The President appoints a special commission to have charge of the whole project, and a board of appraisal is created to make assessments and determine damages. The perfect of the department, the minister of public works, and a syndicate representing the land-owners, each appoint one member of this appraisal board, the findings of which must be approved by the departmental legislative assembly. Appeals from assessments may be taken to the Presidential Commission which has charge of the work.

The most important drainage undertakings that have been accomplished by the government under this law embraced 1,640,000 acres of land. In 1879 the Forez project including 140,000 acres was completed, and in 1865 that of LesLandes and LaGironde comprising 1,500,000 acres of swamp. What were formerly fever-stricken sandy marshes are now agricultural and forest lands. The aver-

age life of the inhabitants of these regions has been lengthened by more than four years, and the lands have increased in value from \$15.00 per acre to over \$50.00. In 1879 there were over 1,365 miles of main canal in Les Landes and LaGironde. Half of this reclaimed area belongs to towns which paid their assessments for the cost of the work by selling 466,000 out of the 720,000 acres of the drained land which they owned, so that no State funds were used. The prefects of the various departments in which the lands are located supervise the maintenance of these governmental works, but the cost of such maintenance is borne by the land owners.

The second agency by means of which lands have been drained in France is the association of land owners. There are two kinds of associations which may carry on drainage operations; (1) those organized by mutual consent of all concerned, (2) those whose organization is controlled by a majority of the owners. Members of the first class may construct drains through the lands of their number, but they do not have the privileges of quasi public associations. In the associations of the second

class proceedings are instituted by means of a petition presented to the prefect of the department, and then if two-thirds of the owners of the land in the proposed district, who pay three-fourths of the taxes, or three-fourths of the owners who pay two-thirds of the taxes, vote at a public meeting in favor of forming a drainage association, the petition is submitted to the minister of public works. If the latter, on the advice of a local improvement committee and of the departmental commissioner of agriculture, decides that the proposed work will be of public utility, the prefect calls a meeting of all the land owners of the district. These elect officers, a representative assembly to make rules and apportion assessments and damages, and a board of trustees to supervise the construction and maintenance of the work. These associations have the power of eminent domain, and may be granted loans by the central government from a fund of \$20,000,000 which was appropriated in 1856 to aid irrigation and drainage works. These loans are payable in twenty-five yearly installments, are collected in the same way as general taxes, and are a lien upon the land. This land owners associations law was enacted in

1865, and amended in 1894. Under it over fifty associations have been organized to drain more than 700,000 acres. Before 1865 several thousands of acres of swamp land had been reclaimed under a law much like that of 1865, and these associations still¹ exist for the maintenance of the ditches which they have constructed.

England.

There have been three great drainage acts in England. In 1846 Parliament passed the "Public Moneys Drainage Act," the purpose of which was to facilitate drainage works by advances of money to a limited amount on the security of the land to be improved. Twenty-two year loans were made to land owners on application to the inclosure commissioners. Although the sum of L.2,000,000 for Great Britain, and L.1,000,000 for Ireland was set aside by the act for advances, yet the fund was soon exhausted, and in 1849 the second great drainage act was passed. This, the "Private Moneys Drainage Act," authorized land owners, with the sanction of the inclosure commissioners to borrow or advance money to be expended in land drainage. Various improvement and drainage companies were organized to take

(1) Wilson, George. Institute Am. Engineers. Min. of Proc. Vol. 55, pp. 234-240. 1879.
X 60th Congress 1st Session. Senate Document 443, p. 12-14.
Gray, E.D. McQ. Government Reclamation Work in Foreign Countries. pp. 12-14. 1909.

advantage of the provisions of the law. After 1849, however, the government gave no direct aid to drainage projects. The third important drainage law was the act of 1861 which applied only to England. This statute authorized the formation of elective drainage districts under the supervision of the inclosure commissioners, and provided that the cost of the work should be charged against the land rentals and payable in installments to run for periods not to exceed thirty years.

The principal steps in the procedure, which is strikingly similar in its main features to that in many of our States, are as follows:

1. A petition signed by the proprietors of not less than one tenth of the proposed district is presented to the inclosure commissioners. This petition must describe the lands which it is proposed to drain, and be accompanied by a guaranty on the part of the petitioners of the payment of all preliminary expenses.

2. The inclosure commissioners send an inspector to examine the lands to be affected by the proposed project, and to examine the same and report thereon.

3. If the inspector's report is favorable, the commissioners may issue a provisional order. This order when confirmed by Parliament establishes the drainage district.

4. The construction of the work is supervised by a drainage board elected by the property owners of the district.

It has been estimated that one-fifth of the most fertile lands of Great Britain and Ireland have been drained.¹

(1) Mitchell, Guy E. Review of Reviews. Vol. 37, p. 433. (Cites Professor Shaler as authority for estimate). Gray, E.D. McQ. Government Reclamation Work in Foreign Countries. pp. 47-49.

Austria.

In Austria government aid is given to drainage uses, (as to other reclamation projects) both by the province in which the land affected is located, acting through the provincial legislature, and by the Imperial government, acting through the minister of agriculture. Whenever a district, commune, or water association desires aid it petitions the provincial legislature to that effect and if the petition is favorably received, a legislative committee decides which of two alternative plans of financing the work, shall be adopted (1) Either the parties directly interested may be assessed to an amount not exceeding 30% of the estimated cost of the enterprise, and the balance made up from the provincial budget and by an appropriation by the minister of agriculture from the reclamation fund (such appropriation not to exceed 30% of the cost of the work). or (2) The provincial government may contribute not to exceed 20% of the total cost, or else loan money for carrying on the work. The general object of both of these financial schemes is to divide the expense of draining lands equally

among the imperial government, the provincial government and the parties directly interested. (When these last are represented by a district or commune, the government grants are usually nonrepayable and amount to direct appropriations rather than loans). Construction is done by public contract; maintenance, by water associations formed for that purpose.

Prussia.

Drainage operations in Prussia have been carried on in three ways (1) by private drainage, (2) by public drainage associations, (3) by the government itself.

The private drainage associations are the agencies especially employed in reclaiming small tracts of swamp land. They are merely a kind of partnership and are entirely free from government control.

Public drainage associations are incorporated with the approval of the minister of agriculture and of the provincial or communal authorities, for the purpose of reclaiming extensive tracts of land when the owners are not unanimously in favor of the work. Before the association can be incorporated it must be proved of

(1) Gray, E.D. McQ. Government Rec. Works in Foreign Countries. pp. 5-6.

public utility and beneficial to agriculture, and approved by a majority of the land owners whose lands are affected. In those provinces where there is a considerable amount of swamp land there are imperial commissions which advise the minister of agriculture, make plans for proposed work, and aid association in complying with the requirements of the drainage laws. The chief steps in the procedure involved in the work of public drainage associations are: (1) presentment to minister of agriculture of a petition, (2) its approval and reference to the Prussian Diet for an act of incorporation,¹ (3) the preparation of detailed plans and issuance of orders for removal of dams or appropriation of necessary private property, (4) the levy of assessments in proportion to benefits. Damages are determined by a board of ^{arbitrators} consisting of one member each appointed by the claimant for damages and a land owner desiring the work, and a third member. Appeals may be taken to the courts. The assessments for benefits are collected like regular taxes and the association may borrow money secured by first mortgages on the land.

(1) Gray, E.D. McQ. Government Rec. Works in Foreign Countries. pp-5-8. See note p. 26.

In 1906 there were 1,400 drainage associations in Prussia, and 700 so-called "Dyke Associations" operating over an area of 756,139 and 39,953,670 acres respectively (total--40,709,809).¹ The most striking example of reclamation work in Northern Germany was the completion of the diking and maintaining of the Memel Delta, between the Ross and Gilge rivers, which for centuries has been periodically overflowed. Although it was first attempted to drain part of this area as nearly as the first quarter of the 17th century, the year 1901 had been reached before 65,700 acres had been reclaimed.²

The private and public drainage associations confine their operations to the reclamation of lands which are principally owned by private individuals, so that the work which the government has done has been almost entirely concerned with the drainage of morass and fens, which are usually crown lands. These government operations are not carried on under any general laws but the Diet makes special enactments to cover each separate undertaking. There is a central morass commission which superintends the projects undertaken by the State and

1. See note 2 p. 26.

conducts an experiment station for investigating the best methods of swamp land drainage. As early as 1868 the government began to make loans for drainage purposes to tenants of the Crown lands.³ In 1890 it began to drain morass and fens itself and from 1892 to 1901 appropriated 1,722,000 marks (\$408,000) to carry on the work. It has been the policy of the government to colonize these reclaimed areas and to reimburse itself for the costs of drainage by selling or renting the lands reclaimed.⁴

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- note 1. Afterwards the association is under the supervision of the town or provincial authorities.
2. One of the associations involved in the work has had a continuous existence since 1613.
 3. Which have averaged 400,000 marks (95000) annually.
 4. Authorities on Prussia:
Gray, E.D. McQ. Government Rec. Work in Foreign Countries. pp. 15-19.
60th Congress, First session. Sen. Doc. 443, pp. 14-16.
Scientific American Vol. 102, p. 165. 1910.

At the present time Prussia is engaged in the reclamation of 16,000 acres of the Friedberg peat bogs in East Friesland. Not only are the lands being reclaimed, but the peat is being used to create electric current, and for other commercial uses.
Scientific American. Vol. 102. pp. 165. 1910.

Italy.

Drainage works in Italy are of two classes (1) those wholly or chiefly for sanitary purposes (2) those wholly or principally for agricultural purposes. The works of the first class are under the complete control of the Central government, but it may delegate to the provincial or communal governments or to interested land owners, the authority to construct the drainage works required. The State pays six-tenths of the total cost of those sanitary projects, the province one-tenth, the commune one-tenth and private land owners two-tenths, the latter being assessed in proportion to benefits received by them. Even if a province or commune is actually outside of the drainage district, it will be required to contribute to the cost of the work if it can be shown that it will be benefited therefrom in any way. The communes levy a special tax to pay their share of costs, and these assessments constitute a lien on the lands of those assessed. Damages are awarded to persons whose property is taken, by a court representing the minister of public works, the land owners, and the judiciary; and appeals may be taken from this court of

arbitration to the ordinary courts of law.

Non-sanitary works, or those of the second category, may be constructed by associations of land owners acting under the provincial prefect, or by individuals. Voluntary associations may be formed by mutual consent of all land owners concerned. Compulsory association may be organized either on the initiative of the government or of interested land owners. If the government commences the proceedings then the individuals interested pay only seven-tenths of the cost; the remainder of the burden is borne by the State, province, and commune in equal portions. But if the owners of swamp land initiate the proceedings, they must pay all the costs. Both compulsory and voluntary associations have the power to levy taxes in proportion to benefits, to borrow money, and to take private property required in carrying out drainage work.

Some idea as to present and prospective reclamation work in Italy may be gained from the fact that between 1900 and 1924, \$36,544,800 will have been spent for works of the first class (that is chiefly sanitation)

especially the Pontine marshes)1 and \$12,285,000 for work of the second class undertaken by associations.²

1. The government provinces, and communes will contribute \$29,700,940 to the cost of this work.
2. 60th Congress. First Session. Sen. Doc. 443. p.16-18. Gray, E. D. M&Q. pp. 19-24.

Belgium.

For more than fifty years there have been systematized efforts made in Belgium to reclaim the marshes of limited area located east of the Sambre and the Meuse. These swamps seldom cover more than 250 acres each, but they have seriously affected the health of the inhabitants of the surrounding country. Nearly all the drainage work that has been done so far has been accomplished by associations (wateringues) either individual or communal, acting under the supervision of the minister of public works or of agriculture. As a general rule the State has paid about one-half of the cost of the work. The largest marshes reclaimed up to the present time do not comprise more than 250 acres each in area, and are found chiefly in the province of Luxembourg. This land has doubled and frequently trebled in value.¹

Russia.

In European Russia reclamation work is carried on at government expense only on the crown lands. Technical assistance furnished to private land owners must be

1. 60th Congress. First Session. Sen. Doc. 443, p. 16. Gray, E.D. McQ. pp. 8-10.

paid for at a regular rate, but in case of associations of peasants this charge is remitted. As to none-crowned lands either private land owners or interested communities must take the initiative; and if the government provides any engineers they must be given entire control of the work. The chief drainage works so far completed by the government have been devoted to reclaiming swamps in the northern and west-central provinces.¹

Denmark.

In Denmark the Rigsdag usually makes a yearly appropriation for drainage work, the money to be loaned under the direction of the department of agriculture. If the petition for a loan is granted the debt must be amortized in forty-two years. The individual land owners desiring public aid must petition the governor of the province stating in detail their financial condition, and giving a description of the land to be drained. In 1906 the State loaned about \$19,720 to aid in the reclamation of swamp lands.²

GREECE.

Until recently, the government of Greece has

1. Gray, E.D. McQ. pp. 34-38.

2. Id. pp. 102-103.

not participated in land reclamation, beyond granting concessions on certain conditions to individuals and associations formed for the drainage of swamp lands as business enterprises. There is no general drainage law, a special act being passed to cover the agreements with the different companies.

The only work of any importance that has been accomplished thus far has been the draining of Lake Copias. This lake in Boeotia was surrounded by a swamp; the total area of the marsh and lake was more than 600,000 acres. Ruins of an extensive canal dating from the heroic age (and probably the work of the Minyoy of Orchomenos) tend to show that a part of the swamp was drained and cultivated in ancient times. No attempt, however, was made to drain the lake after the classical era until 1880, when a French company secured a concession. The ditches required to reclaim the land were built after six years of work, and the lake was then emptied in forty-nine days. By 1894, 17,500 acres of reclaimed land were in cultivation. The contract with the drainage company provides that at the end of ninety-nine years two-thirds of the total area reclaimed shall revert to the State

(estimated at 40,000 acres) and one-third continue to be the property of the company.¹

NORWAY.

Although most of the shallow lakes, sloughs, and peat bogs of Norway are in private hands yet the Storting makes annual appropriations for their drainage. Up to 1910, \$5,000 per year has been appropriated. These contributions, however, have thus far been inadequate to result in the reclamation of very much land. Persons seeking government aid apply to the inspectors of their respective department, who draw up plans and specifications and estimates as to the probable cost of the work, and may report in favor of the project to the agricultural department. Thereupon the government contributes one-fourth of the cost of the work as a free gift. The construction of the ditches is under the control of the government. Some State lands have been drained as a result of special appropriations by the Storting on recommendation of the department of agriculture. No statistics as to the total area of reclaimed land in Norway are available, but in a district called the Jaderen

(1) Gray, E. D. McQ. pp. 103-105.

near Stavanger about 6,000 acres have been drained.¹

SWEDEN.

Private land owners in Sweden may engage the government engineers to carry on drainage work at the expense of such owners, or they may receive direct monetary aid from the government provided their applications for such assistance are approved by the direction of highways and waterways and the ministry of agriculture. Such grants may amount to the total cost of the work, but they may be repaid in installments and until they have been fully amortized, the works constructed remain in the control of the government engineers. Nothing is available to throw any light upon the question as to how much work has actually been accomplished in Sweden, further than the fact that in 1907 the government appropriated 500,000 kroner (134,000) to be loaned for a long period of years to land owners in Norland for drainage purposes.²

ALGERIA. \

In Algeria the government and private syndicates began drainage operations over fifty years ago. They have completed three great projects: (1) the unwatering

1. Gray, E.D. McQ. pp. 106-107.
2. Gray, E.D. McQ. pp. 108-109.

of the valley of the Gardens of Mortaganem at a cost of \$26,000, (2) the drainage of Lake Halloula which had been in winter a sheet of water covering 5,000 acres and in summer a malaria-breeding swamp, (3) the reclamation of the plain of Mitidga, just south of Algiers. This is now one of the richest agricultural regions in Algeria: but before its reclamation it was a marsh so pestilential as to be known as "the grave of the Europeans."¹

AUSTRALIA.

In Australia the government of Victoria has expended national funds through its department of public works. These funds were used to drain crown morass lands covering over 74,000 acres, the State being repaid from the sale of the drained land at enhanced prices, and benefited by the increased settlement of the reclaimed areas. No work had been undertaken up to 1910, either by municipalities or by any private associations under concessions, but all drainage operations of any considerable magnitude had been undertaken directly by the State. In New South Wales an act of 1906 provided for loans from the State treasury for draining malarial swamp lands.

1. Gray, E.D. McQ. pp. 47-48.

Owing to continuous wet weather and lack of surveyors only 10,000 acres had been reclaimed up to 1910, although applications had been made under the act for aid in draining nearly 170,000 acres.²

SOUTH AMERICA.

In South America as far as can be learned no government action has been taken in regard to land drainage, and practically no swamp lands have been reclaimed.³

MEXICO.

One of the most interesting and important drainage undertakings that have been accomplished in any country of the world has been carried on in Mexico. The valley of Mexico occupies an area of approximately 2,700 square miles. It is more or less elliptical in configuration and is surrounded on all sides by mountains and extinct volcanoes, some of which rise to a height of over 11,000 feet above the level of the sea. In the range of mountains to the north there is a sharp depression, and ever since the 16th century the inhabitants

2. Idem. pp. 87-90.

3. Gray, E. D. McQ. pp. 108-115.

of the valley have discussed the problem of draining off through this depression the waters collected in the low lying land around the City of Mexico.

As early as 1607 the first important attempt was made to drain the valley, when one Enrico Martinez cut a tunnel through the mountains at Nochistongo for four and one-tenth miles. Although this tunnel was about 13 feet square, it was finished in the incredibly short period of eleven months. The wonderful speed with which the work was accomplished was due in part to the soft character of the soil, and to the fact that the Spanish government pressed thousands of Indians into service and employed them in several shifts, so that there were practically no interruptions in the construction of the tunnel. Owing to the great haste with which the work was done no masonry was put in the tunnel. Consequently, it collapsed with the first torrential rain, and from 1629 to 1634 the City of Mexico was almost continually flooded. It is estimated that at this time over thirty thousand people perished in one month. As a result of this disastrous flooding of the valley the Spanish government ordered that the City of Mexico be moved to a position

higher up in the valley. But owners of city property estimated them to have been worth over \$50,000,000, did not wish to abandon their land, for they believed that the valley could be drained satisfactorily at a cost of \$3,125,000. In 1637 it was decided to change the tunnel into an open ditch about 197 feet in depth, but it was not until over a century and a half had passed by that the work was completed. (1789) Over \$3,900,000 was spent on the project, and it cost the lives of countless Indians; but when it was finished it was discovered that the ditch was of very little use since its bottom was nearly thirty feet higher than the level of Lake Texcoco. The war of Independence and various revolutions prevented any further consideration of the drainage problem in Mexico until 1856. In that year a government commission decided upon a plan to carry off the surplus waters of the valley through a ditch connecting several lakes. But actual construction was prevented by the Civil War and the French occupation. In 1866 the Emperor Maximilian inaugurated a period of active work which lasted until 1867 when the empire fell, Civil wars from 1868 to 1881 rendered drainage operations intermittent, but in

1885 the government appropriated \$415,000 per year to be used by a new commission, and the City of Mexico borrowed \$12,000,000 to aid in the work. Operations had formerly been conducted directly by the government, but they were now turned over to contracting companies. The construction of a canal twenty-nine and a half miles long was commenced by the contractors in January 1890 and completed in June 1896. About 10,000,000 cubic yards of earth were excavated by dredges and 6,000,000 by hand labor. The canal now carries the sewage of the City of Mexico out of the valley; protects the City from inundation by controlling the level of the nearby lakes; and prevents the accumulation of water in those shallow lakes and marshes which had for centuries been a fever-breeding menace to the inhabitants of the valley.¹

From the foregoing discussion it appears that European countries, with the probable exception of Russia, have not been backward in the work of swamp land reclamation through public action. A considerable amount of

Note D. Body, John B. Article published by the Institute of Civil Engineers in the Engineering Record Vol. 44, pp. 131-4. 1910.

Mr. Body was engineer in charge of the work during 1892 and 1893. His article is practically the only discussion on the subject, except for a few brief references in magazine articles. Mr. Gray in his Government Reclamation Work In Foreign Countries, p. 105 states that it has not been feasible, even with the help of the American Consular Service to obtain particulars concerning the drainage of the valley of Mexico. (1910).

marsh and overflowed soil has been made fit for cultivation; and the practicability and wisdom of such work has been demonstrated from an engineering or sanitary standpoint, as well as shown to be a profitable business investment. A comparison between the method of instituting and conducting ditching operations in lands other than the United States, and that followed in this country, as described in the following chapters of this thesis, reveals a few important differences. Most of these are to be explained by the fact that greater constitutional limitations exist in America, and a different theory of government and its proper sphere prevails here, from that recognized abroad. The national government here has taken no part in drainage work, nor have the states except in a few instances, participated directly therein further than to enact general drainage statutes permitting the co-operation of landowners; while it is common for the central authority to foreign lands to aid such work by loans or the direct appropriation of funds. Furthermore, while it is true that in France, Belgium, Italy, Austria, and Prussia, associations of landowners may unite in the construction and maintenance of public ditches, state work and influence

are very great. The complete control of operations by interested private individuals throughout the proceedings, and the inauguration of work on their initiative rather than on that of the government, which is the characteristic feature of the American scheme of swamp land reclamation, is noticeable absent.

Swamp Land Reclamation

in

States Other Than Minnesota.

It has been estimated that there were originally over 125,000,000 acres of swamp and overflowed lands in the United States:¹ and area of unproductive land as large as either Germany or France, or more than three times as great as all the New England States.² These wet lands were of two kinds: (1) tidewater or delta overflowed lands, (2) glacial swamps. Those of the first class extended from Virginia to Texas. In Florida there were about 19,800,000 acres; in Louisiana, 10,316,605 acres; in Mississippi, 5,760,200 acres; in Arkansas, 5,911,300 acres; and in North Carolina, South Carolina, Alabama, Georgia, and Texas, from 3,122,000 to 1,500,000 acres each. These lands include such swamps as there are along the lower course of the Mississippi River, the Jersey marshes, and the Dismal Swamp of North Carolina and Virginia. The wet lands of the second class, that is, the glacial swamps, were most extensive in Minnesota, which had 7,332,308 acres; Michigan, 4,547,439 acres; Illinois

- (1) Mithhell, G.T. Review of Reviews. Vol. 37, p. 433, 1908.
- (2) World Almanac. 1914. Area in sq. mi. Germany; 208,780; France: 217,054. (p. 424); Maine, N.H. Vt. Mass. Conn. R.I., total 66,465,125,000,000 acres equal 195,312 sq. miles.

4,421,000 acres; and Wisconsin with 2,560,000 acres.¹

Because of the abundance of drier and better lands even in the eastern part of the United States, it was not until the middle of the nineteenth century that these wet lands received any attention from either state or federal governments. Until 1850 all the great swamp tracts, except those included in the thirteen original states (Dismal, Okefinokee, eastern seaboard plain, Jersey marshes and tidal lands of New England) remained in the national estate. In 1847 Senator Westcott of Florida introduced in the Senate a bill for the grant ~~to~~ his state, for the purpose of reclamation, of the overflowed lands surrounding Lake Okichobee, but it failed ~~of~~ passage.² About the same time a movement sprang up in the middle west for the building of levees along the rivers; conventions were held in Memphis, St. Louis and Chicago; and as a result of their resolutions and influence and of subsequent agitation, Congress was forced to take some action. It was not itself willing to undertake the work of building levees and draining lands but as there were in ^{the} Mississippi valley over 32,000 square miles of swamp lands belonging ^g to the nation, it began its policy of giving this land to the

1. Classification by Van Hise. In Con. Nat. Res. p.344. Estimates by U.S. Dept. of Agri. 60-61 Cong. Docs. 443.
2. Minutes of Trustees of I.I.F. of Fla. Vol. 7, pp. 415-437.

States for reclamation purposes by an act of September 28, 1850, entitled "An act to enable the State of Arkansas and other States to reclaim the swamp lands within their limits."¹ This act provided that "the proceeds of said lands whether from sale or by direct appropriation in kind, shall be applied exclusively, as far as necessary, to the purpose of reclaiming said lands by means of (the) levees and drains (aforesaid.)" Later this act was extended to cover other States having swamp lands within their borders. By virtue of the definition in the act of Congress itself of the terms "swamp and overflowed lands," the grants conveyed all lands which in their natural state are unfit for cultivation because of the large amount of moisture in the soil. The States were given their choice of two methods of selection: (1) The field notes of the government survey could be taken as the basis of selection, and all lands shown by them to be swamp would pass to the States. (2) Or the States could select the lands by their own agents, and report the same to the Secretary of the Interior, with proof as to the correctness of their selections.² Up to the year 1908, claims for 65,582,503 acres had been approved, and over 63,000,000 acres actually patented to the States.³

(1) Matthews Conservation of Water. pp. 149-150.

(2) Act of September 28, 1850.

(3) Guy E. Mitchell. R of R's. 37:433.1908.

What has been actually accomplished towards making habitable and tillable these vast areas of wet lands which have been granted by the national government to the States, may best be seen by a review of the work which those States have done in reclamation and drainage, considering each State with reference to its own particular problems.

FLORIDA.

Florida has more overflowed lands within its borders than any other state in the Union. The Everglades surround Lake Okeechobee in the south-central part of the State, and from there stretch due south for one hundred miles to Cape Sable, ranging from twenty to forty miles in width, and comprising over 3,700,000 acres, an area greater than one-half of Florida, or the combined land surface of Connecticut, Rhode Island and Delaware. Here and there in this region there are stretches of prairie land, but most of the Everglades are a saw-grass marsh with soil from three to fifteen feet deep, covered with five inches of water during the greater part of the year, and for many years the haunt of nothing but birds, mosquitoes, alligators and snakes; penetrated not by white men, but only by the Seminole in his canoe.

From 1837 to 1860 various officers of the United States Army stationed on the eastern coast of Florida attempted to cross the glades, but they were unsuccessful.¹ In 1892 J. E. Ingraham succeeded in crossing the Everglades about forty miles south of Lake Okeechobee, and during the last fifteen years perhaps a score of hunters or naturalists have worked their way through the swamps from the lake to Miami, so that to-day the mystery of the Everglades is gradually being dissipated.²

As early as 1835 public men began to discuss the feasibility of draining the glades.³ In the latter part of the very year in which Florida was admitted into the Union (December 1845) her legislature by resolution pressed upon the attention of Congress the propriety of appointing engineers to survey the region. Shortly afterwards the Secretary of the Treasury at the request of Senator Westcott of Florida appointed Breckinbridge Smith to make an investigation into the problem of the Everglades. The latter's report, which was issued in 1848, spoke very favorably of the project to reclaim the overflowed lands of the peninsula. On January 23d of the

1. Expeditions by Major Childs in Dec. 1841, and Captain Dawson in 1855, S.N. Ball. Putnam's Magazine, Vol. 7, p. 796. Ap. 1910.
2. Lupfer, S.S. Engineering News. Vol. 54, pp. 270-80. Sept. 14, 1905.
3. S.N. Ball. Putnam's Magazine. Vol. 7, p. 796. April 1910.

same year (1848) General W. S. Harney wrote: "of the practicability of draining the Everglades I have no question. That such work would reclaim millions of acres of valuable lands, I have no doubt." And many other public men of the time were strongly in favor of the plan to drain this Floridan swamp.¹ In 1849 the legislature of Florida asked Congress to grant the Everglades to the State, "on condition that the State will drain them and supply the proceeds of the sale thereof, after defraying the expenses of draining, to the purpose of education."² In the same year, as we have already pointed out, Senator Westcott's bill for the grant of these lands to the State failed of passage in Congress,³ "but the act of September 28, 1850 named Florida as one of the grantees of swamp lands; so that it was in that year that the Everglades were granted to Florida."⁴ But it was not until thirty-one years after the swamp lands within her borders had been granted to Florida that she made any effort to reclaim them for use. In 1881 the Trustees of the Internal Improvement Fund, to whom the legislature had granted the swamp lands of the State "irrevocably," for the

1. For a series of letters relating to the Scheme, see 62d. Congress, 2d Session. S. Doc. 89.
2. 62d Congress. 2d Session. S. Doc. 89.
3. Wall, T.E. Review of Reviews. Vol. 56. pp. 451-456. Oct. 1912.
4. Act of September 28, 1850.

purpose of reclaiming them, made a contract with a company headed by Hamilton Disston, the saw manufacturer of Philadelphia, which provided that the Company should drain 9,000,000 acres of land adjacent to Lake Okeechobee and render them "fit for cultivation by permanently lowering and keeping reduced the waters of Lake Okeechobee."¹ Disston and his associates were to do the work at their own expense, and were to receive as consideration a grant of the alternate sections of land drained. This inaugurated the first of the two successive policies of reclamation adopted by the trustees, namely: (1) by the letting of contracts, (2) through construction work under the trustees themselves. The first policy may be said to have prevailed from 1881 to about 1905.² In 1898 a contract was made with the East Coast Drainage and Sugar Company for draining 8,000,000 acres of land at the expense of the company, the land to be conveyed in fee to the corporation upon payment to the State of twenty-five cents per acre. Not a single yard of earth was removed by the company under the contract. The trustees made a few other contracts of the same kind, but they

1. Trustees of In. Im. F. of Fla. Min. of Proc. Vol. 7, pp. 415-437. For contracts see pp. 432, 437, 463, 480, 503.
2. Trustees of In. Im. F. of Fla. Min. of Proc. Vol. 7 pp. 415-437.

involved much smaller amounts of land.

Not only did the State grant much of its swamp lands to drainage companies, but the legislature made extensive grants to railroads, (evidently, though not expressly, on the condition that the grantees should reclaim from water the lands granted) and actually deeded over 8,000,000 acres of swamp lands to these transportation companies. But the results of these grants, so far as any progress in reclamation was concerned, were so "diminutive that no record has been made of them."¹

These grants to railroads involved the trustees in a great deal of litigation which is still somewhat unsettled, imperilled the drainage fund itself, and for a considerable period of time completely tied the hands of the trustees and prevented their taking any steps towards reclamation.² It is true that the Disston Company built about ninety miles of canals, but their work had no effect on the drainage of the Everglades.

A few acres were really well drained in the Kissimee

1. Trustees of In. Im. F. of Fla. Min. of Proc. Vol. 7. 1902, in letter from W. S. Jennings, counsel for Trustees.
2. Trustees of In. Im. F. of Fla. Min. of Proc. Vol. 7, p. 102 et seq. pp. 314-321.

valley, but this was under unusually favorable conditions, and only temporarily. Later this tract of drained land was used during a temporary withdrawal of Mr. Disston as a bait for gullible investors.¹ Nevertheless the trustees conveyed 1,052,711 acres of land to the company, and its successors claim that it is entitled to a conveyance of 347,288 acres more.

Thus as a result of the policy of the drainage by contract with land and drainage companies, not more than 100,000 acres of the swamp lands of Florida were actually made fit for cultivation during a quarter of a century, and then only partially and temporarily. For this comparatively small benefit the State paid an enormous price, since it conveyed away over 10,000,000 acres of land. The failure of this plan of reclaiming the swampy areas of the State, led to the inauguration of the policy of land drainage under the direct supervision of the government itself. This was the second plan of reclamation adopted by the Trustees of the Internal Improvement Fund,² and its adoption was brought about principally through the efforts of W. S. Jennings who

1. Lupfer, S. L. Engineering News. Vol. 54, pp. 278-80. Sept. 14, 1905.

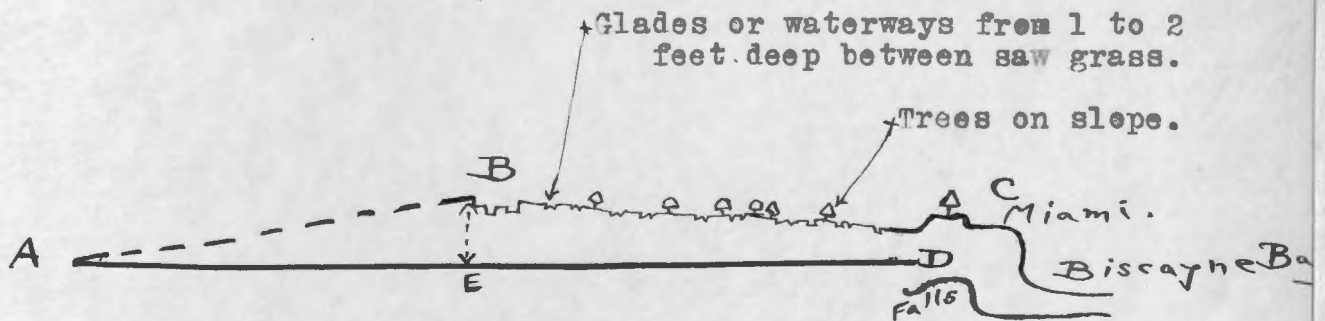
2. Trustees of In. Im. F. of Fla. Min. of Proc. Vol. 7 pp. 415-437.

for a considerable number of years had been general counsel for the trustees.

Until the year 1901 there had been very little public discussion in Florida of its swamp land problem, the grants to railroads and drainage companies arousing little or no comment. But in that year Jennings was inaugurated as governor and the first step was taken towards really accomplishing something in the work of reclamation. Governor Jennings refused to convey any more swamp lands to the railroads, on the ground that the condition in the grant from the national government to the State to the effect that the lands be drained had not been performed. This precipitated a legal and political fight between the governor and his supporters, on the one side, and the railroad companies on the other. Litigation tied the hands of the governor, and prevented the State from doing any work during the term of Mr. Jennings, and he was ineligible for re-election as the result of a constitutional provision limiting the term of governor to one term. But a successor to the policy of Governor Jennings was elected after a bitter contest with the railroad companies, and the work of reclamation entrusted to a drainage board of which the governor is

chairman. This board has authority to lay out drainage districts, and to levy a tax on the lands therein not to exceed ten cents per acre, the receipts therefrom to be used in the work of drainage. A drainage district was at once created to include the Everglades, and a tax of five cents per acre on the swamp lands therein yielded an annual income of more than \$200,000 per year. This income still continues, and, together with the proceeds from the sale of some of the State lands, furnishes the means of carrying on the work at the present time. This work is being done by the Trustees of the Internal Improvement Fund and the drainage board, without the use of contractors¹.

The engineering problem to be solved in the draining of the Everglades is comparatively simple. Someone has said that Lake Okeechobee and the Everglades are like a great tank on the top of a gently sloping house roof on the lower edge of which is an elevated rim. If the tank runs over the rim will hold back the water. The tank is the lake, and the rim is composed of a ledge of coral rock; to cut channels through this rock to the sea is to free the land between the ledge and the lake from the excess of water which now renders it unfit for cultivation. For Sketch Map, and diagram see pp. 52 a and 52 b.



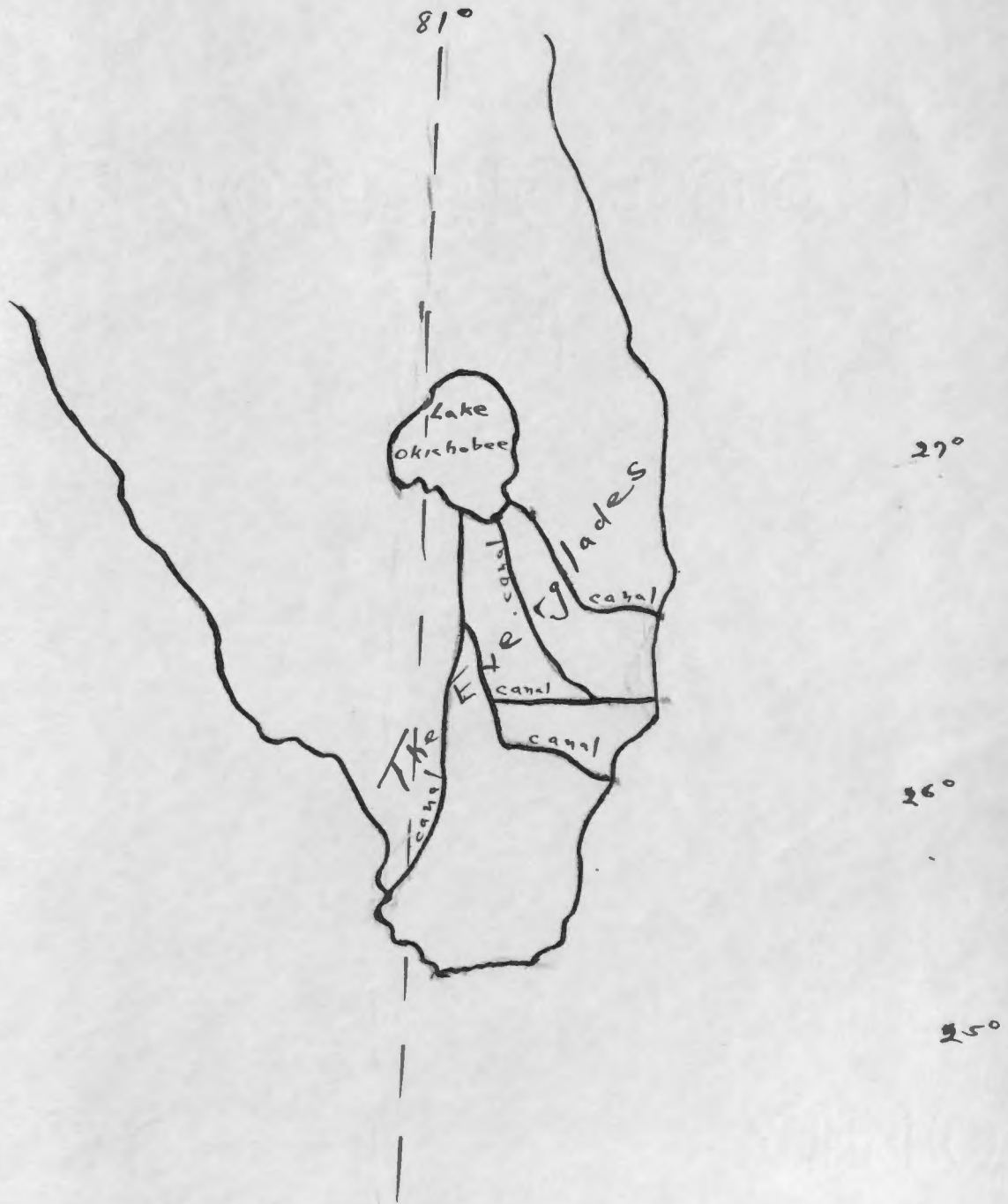
THE EVERGLADES.

The Everglades
Sketch showing slope of the Everglades to southeast and southwest

Explanation.

- A-B : Southwest slope from Lake Okichobee to Gulf of Mexico.
- B-C : Southeast slope to Miami.
- A-D : Medium low waters of the Atlantic ocean.
- A-E : Distance - 20 feet, 6 inches.

(After Eng. News.)



THE EVERGLADES.

Sketch showing canals now under construction for the drainage of the Florida Everglades.

(After Willey in Cassier's.)

vation, and to reclaim the Everglades.¹ A system of canals will be opened, but it is not intended to empty Lake Okeechobee whose continued existence is advisable for several reasons. It is an inland sea valuable for purposes of pleasure and of commerce; and its water is needed for canals and waterways and to supplement the rainfall.² At the present time several large dredges are now at work cutting ditches and canals, and the State is making real progress in its reclamation work.

The question may well be asked as to what these drained lands are really worth after they have been made fit for cultivation. It is difficult to secure accurate estimates. Those interested in the work have stated that the lands are worth \$100.00 an acre or more, while others say that such statements are absurd.

In 1913 the United States investigated the subject, but for some reason the Senate document³ which was printed as a result was more in the nature of an advertising prospectus for a real estate company than an unbiassed or scientific statement of facts.⁴

1. For sketch map, and diagram see pp. 52 a and 52 b.
2. Will, T. E. Review of Reviews, Vol.66, pp.451-56. Oct. 1912.
3. Willis, H.P. Collier's Mag. Vol.49, pp.15-16. Mar.30, 1913
4. 62d Cong. 2d Sess. Senate Doc. 89.

1. Senate Document 89 was well illustrated with reproductions of photographs purporting to show scenes on reclaimed lands in the Everglades; it later developed that some of these pictures were of lands far from the saw-grass marsh lands of the glades, and in particular two, entitled respectively: "A Nine Year Old Orange Grove on Drained Saw-grass," and "Harvesting Sugar Cane, St. Cloud Plantation."

The use to which the document was devoted by enterprising seelers of Florida lands is illustrated by the following circular:

**"BUSINESS OPPORTUNITY & UNITED STATES OFFICIAL
INDORSEMENT.**

First time in the history of the government that such a thing has been done. The Sixty-Second Congress has recently issued a document of 208 pages indorsing the great reclamation, climate, healthfulness and fertility of the Everglades. The greatest opportunity of the century is offered here to the man with small capital to establish himself where the evident co-operation of the government is sufficient to make the country rich and prosperous.

Free Literature -- Call for Some -- Everglades Land Company."

Willis, H. P. Collier's Magazine. Vol. 49, pp. 15-16.

Other authorities on Florida are:

Broward, N. P. Independent Vol. 64, pp. 1448-49.

" " " " Collier's. Vol. 44, p. 19.

Hargrave, Richard. Address before National Convention, New Orleans. 1912.

LOUISIANA.

In Louisiana there were originally about 10,000,000 acres of swamp lands, comprising nearly one-third of the total area of the State.¹ Although the lowlands in the northern part of Louisiana could be drained by the comparatively simple process of building ditches and levees, yet along the seaboard there is a vast tidal marsh which is inundated when hurricanes sweep across the Gulf, and so low that great dikes similar to those of Holland would have to be built in order to wall out the waters of the sea. Because of the difficult engineering problems to be solved in the draining of these coast-line swamps, and the proportionately large amount of overflowed lands in the State, Louisiana was confronted with a vast engineering and financial problem that would have been hard to solve even had the State acted with much more wisdom and foresight than she did.

As it is this State was seriously handicapped in its drainage work by two things: (1) a lack of adequate drainage laws, and (2) the sale of the swamp lands for practically nothing. How much these lands have really

1. World Almanac, 1914. p. 690 gives area as 48,720 sq. Miles.

brought the state it is impossible to tell. In 1902 some of these lands were sold by the commonwealth for twelve and one-half cents per acre, which was just twelve and a half times as much as the State had received for similar lands a few years earlier, and in 1903 the price was raised to twenty-five cents per acre. Not only was much of the overflowed surface of Louisiana sold for a mere trifle, to individuals and private corporations, but many thousands of acres were turned over to the various levee boards who sold them outright instead of securing their reclamation.¹ Consequently, Louisiana to-day owns very little of the swamp land within her borders, and her drainage problem is greatly complicated because of a lack of funds for reclamation work, and the opposition of some of the large land-owners of the State.²

Furthermore it is only recently that Louisiana has secured a general drainage law that is satisfactory. Under the constitution of 1868 there was no limit to the authority of the minor political subdivisions of the State to incur debts and issue bonds, and, as a result, every parish and municipality became heavily indebted during the reconstruction period. During the reaction following the

1. Letter to writer from John A. Kinze.

2. Matthews. Conservation of Water. pp. 168-70.

assertion of white domination, constitutional conventions placed much severe restrictions upon the power of municipal corporations and parishes to incur indebtedness that works of internal improvement were rendered impossible. But in 1898 a constitutional change authorized the issuing of bonds for the construction of drains and other public improvements,¹ and at almost every session of the legislature the power of drainage districts has been increased, so that at the present time at least the laws do not hamper reclamation work in Louisiana. But this delay coupled with the States' sale of her swamp lands for insignificant sums, was very costly to her, for she has reclaimed but 120,000 acres of the overflowed lands within her borders.³ Although the second State in the Union with respect to the amount of wet lands fit for drainage granted to her by the federal government, Louisiana ranks very low as to reclamation work accomplished.

GEORGIA.

Practically all of the 2,700,000 acres of swamp lands in Georgia is still unreclaimed and unfit for cultivation. This constitutes approximately one-fourteenth of the area of the State. A large part of this land is includ-

1. Constitution. Article 281.
2. Laws 1910. Acts 197;256;317. Nation.Br. Cong. 1912.
3. Address of Judge R. E. Milling.
60-1 Congress. Sen. Doc. 443. p. 8.

ed in the Okefinokee Swamp, its name being the Indian equivalent for the words "trembling earth."¹ In the winter of 1866-7 Colonel R. L. Hunter who was employed by the State, ran a line of levels around the swamp for the purpose of determining the practicability of draining it, but his report and maps were lost during the Civil War and not found again until 1875, when the State Geological Survey and the Atlanta Constitution co-operated in several expeditions to systematically explore the swamp with a view to its ultimate drainage.²

In 1889 the Legislature sold to the Suwanee Canal Company that part of the swamp which belonged to the State for \$.26 1/2 per acre, the total area sold being 380 square miles or approximately 243,200 acres. The plan of the Company was to cut ditches and use them to get out the large amount of cypress and other valuable timber which the swamp was known to contain and then to

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1. The small islands dotting the swamp are generally surrounded by a floor of moss, which is usually firm enough to hold a person's weight, but it rises and falls for a distance of from ten to twenty feet hence the name. (Report of Dr. Little of Ga. Geological Survey. Published in Handbook of Georgia by the Commissioner of Agriculture of Georgia 1876).
 2. Harper, R.M. Populace Science Monthly. June 1909. pp. 596-614. During the Civil War deserters from the Confederate Army lived for a considerable time on "Soldier Camp Island." Paul Fromentin described Okefinokee in his "Great Deserts and Forests of North America," but it is doubtful if he ever saw it himself. Id.

use these ditches for draining the land for agricultural purposes. A canal forty-five feet wide and six feet deep was cut into the swamp for a distance of twelve miles and large quantities of timber taken out, but operations were discontinued before the canal was sufficiently completed to have any effect in draining the swamp. The successors in interest of the Suwanee Company in the last two or three years have been continuing the work in the northwestern part of the swamp, but only for the purpose of cutting and removing timber. No action was taken by the State after the surveys of 1875 until 1894 when the law establishing the Geological Survey was amended so as to make it the duty of the State Geologist to survey swamp lands, prepare plans and estimates of the cost of draining them, but through lack of appropriations to carry on the work not very much was accomplished.¹

For several years prior to 1911 there had been some agitation for drainage legislation in Georgia, but this movement was spasmodic and unproductive of results until that year when a general drainage act was passed which will enable land owners to carry out large co-

1. Geological Institute of Ga. Bull. No. 25, 1911. pp. 14-19. Nesbitt's "Georgia, her Resources and Liabilities," 1906. Pub. by the Georgia Department of Agriculture.

operative drainage projects.¹ Because of the comparatively recent enactment of her drainage laws Georgia, however, has done practically no work whatever in the direction of reclaiming the 2,700,000 acres of swamp land within her borders.²

ILLINOIS.

There were, originally, 4,421,000 acres of swamp land in Illinois.³ These were typical glacial swamps, the water having settled in pot holes and depressions made by the Canadian glacier which once covered Illinois and the surrounding states. The people of Illinois were quick to seize their opportunities for profitable drainage work, and in the Constitution of 1870 they authorized the General Assembly to pass laws "permitting the owners or occupants of land to construct drains and ditches for agricultural and sanitary purposes across the lands of others."⁴ In 1871 the Legislature of Illinois passed the first of a series of drainage laws which have been copied in many other states,⁵ and which have enabled land

1. Atkin, L.R. President of Georgia Drainage Commerce in Address before Nat. Drainage Cong. New Orleans 1912.

2. 60-1 Cong. Sen. Doc. 443.

3. Idem.

4. Constitution of Illinois. Art. IV. Section 31.

5. Act of Apr. 24, 1871 entitled "An Act to provide for the construction of drain levees and other works."

For a survey of decisions of the Supreme Court of Ill. relating to constitutionality of Ill. Drainage Statutes see First Annual Rept. of Assn. of drainage and levee districts of Ill. 1911. pp.60-65. As to effect of Drainage legislation in Minnesota see Chap. 5 Ill. Geo. Survey Bull. No. 8.

owners to co-operate in removing the surplus water from over 3,495,000 acres of swamp lands of Illinois.¹

A river and lakes commission was appointed under an Act of July 1, 1911, one of its duties was the collection and publication of drainage data. Its investigators and other men interested in the question have estimated that the drainage districts of Illinois have done their work at an average cost of approximately \$15.00 per acre.² At the present time the work is being carried on in 800 drainage districts, with an aggregate area of 12,000 square miles. There are several large projects now well under way, such as Lower Salt Fork Drainage District covering 168,000 acres and calling for 23 miles of ditch and 525 miles of road, and another for 110,000 acres and 55 miles of Levee.³ None of the work

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1. 60th Cong. 1st Sess. Sen. Doc. 443. The River and Lakes Comm. makes an estimate of 2,571,437 acres. (Letter to writer from Secretary Robert I. Randolph).
 2. Randolph Robert I. Letter to writer 1913. "Total assessment for 2,571,437 acres which the Rivers and Lakes Commission has located as being in organized drainage districts amounts to 27,636,583. Average assessments per acre is \$10.75."
Harman, J.J. of Harman Eng. Co., Letter to writer 1913. "Reclamation cost per acre of the various drainage districts has varied greatly, depending on the size of the districts, the amount of hill water to be taken care of, and the general type of construction. Cost is from \$10 to \$12 as minimum to \$70 and \$80 as maximum; perhaps the average price has been about \$25 to \$30 per acre. Kellar, P.R. Sec. of Nat. Ex. Com. of Natl. Drainage Con. Letter to writer Dec. 24, 1912. As to work done see also Bull. No. 4 of Ill. Assn. of Drainage and Levee Districts.
 3. Letters to writer Cit. in Note. 1 supra.

which is being done at the present time will be anything into the State Treasury, since none of the swamp lands to be benefited belong to the State. All of the overflowed lands in Illinois have passed into the hands of individuals or of private corporations.¹

MISSISSIPPI.

Although only two other states in the Union contain more swamp lands than Mississippi, yet that State has done very little to reclaim that wet waste within her borders, which still comprise about 5,760,100 acres.² Many of these lands are situated along the river deltas and require the building of levees and in many cases of pumping stations. It is estimated that 3,000,000 acres of land in Mississippi ~~are~~ permanent swamp; the remaining 2,760,200 acres are only periodically overflowed.³ In 1907 State and Federal engineers made a co-operative survey of lands in the Upper Yazoo Delta, containing 208,726 acres of land, and reclamation work there is now under way.

ARKANSAS.

Arkansas is the fourth State in the Union with respect to the amount of its swamp lands. It has 5,911,300

1. Letters to writer Cit. in Note 1. supra.
2. 60th Cong. 1st Sess. Sen. Doc. 443.
3. 60th Cong. 1st Sess. Sen. Doc. 151, Vol. VII.
4. 60th Cong. 1st Sess. Sen. Doc. 443.

acres.¹ Much of this land requires the building of levees along streams flowing into the Mississippi, the banks of which are periodically overflowed. The largest swamp in the State is the St. Francis swamp, which extends into Missouri. These lands were covered with a comparative heavy growth of hard wood timber-oaks, immense cypresses, hickories, and gum trees -- which originally constituted one of the most magnificent resources of the Mississippi valley. But instead of following the wise policy of draining these lands herself, and then selling them at advanced prices, Arkansas disposed of them for a song. Many thousands of acres were sold to companies interested in the hard wood trade at fifty cents an acre; and even after enough levee work had been done in other states to demonstrate the profitableness of drainage, that is as late as 1893, the State was still selling large areas of the bottom lands along the St. Francis at \$1.00 an acre. As a result of this prodigal policy of the State practically all of the swamp lands in Arkansas are now privately owned.

Though the State owns no swamp lands itself,

1. 60th Congress. 1st Session. Senate Doc. 443.

yet a considerable amount of work has already been accomplished in protecting the bottom lands by levees,¹ and land which formerly sold for \$1.00 an acre has risen in value to \$20.00 when partly drained, and to \$100.00 when timber and water were finally removed, the timber meanwhile yielding \$15.00 to \$20.00 an acre. A drainage act passed in 1909 was amended in 1911. The laws seem to be satisfactory and there are projects now under way which will result in reclaiming approximately 1,000,000 acres.²

MISSOURI.

Most of the 2,789,600 acres of swamp lands in Missouri were timber covered bottom lands similar in character to those of Arkansas. Like the latter State, Missouri, has followed the policy of selling these State lands at ridiculously low prices, chiefly to hard wood lumber companies. Thus as late as 1870 or 1880 large tracts of land in the southeastern part of the State were sold for a few cents per acre; and in 1868, 800,000 acres

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1. Matthews. "Conservation of Water, pp. 158-166. It is estimated that in Missouri and Arkansas \$6,000,000 have been invested in levees. Of this amount the Federal Government has paid \$2,000,000 for benefit to navigation.
 2. Act 279 of 1909. Acts. 136 and 221 of 1911. Declared Constitutional April 1, 1912, in Lee Wilson & Co. vs. Compton Bond & M. Co. The Morgan Eng. Co., is now draining 731,100 acres in Arkansas (circular 1912).

of swamp land which has now been reclaimed and at the present time is worth from \$60.00 to \$100.00 per acre, ~~and was~~ sold for \$663.95.¹

Reclamation work in Missouri first began in the southeastern part of the State when the situation became so bad as to make hundreds of miles of highways impassable, and to cause the railroads great difficulty in maintaining their trackage. The fact that practically all the State lands had been sold was somewhat of a handicap in carrying on drainage work, yet the Missouri laws were so well drawn² that the work³ was made much easier than it has been in other states with less practicable statutes; and a considerable amount of land has already been reclaimed. Although what may be called the "drainage period" of the State did not begin until about 1900, yet up to 1912, 191,698 acres have been reclaimed. Crops are being raised on over half of this reclaimed land, and the value of the agricultural products of the State increased by \$5,958,990.00 per acre.³

The success of completed work has caused the drainage movement in Missouri to spread rapidly and work

- 1; Supplemental Report of Bureau of Labor Statistics of Missouri for 1910, p. 10.
2. The model law suggested by the National Drainage Congress is exactly the same as that of Missouri except for a few minor changes.
3. Missouri Waterway's Commission. Second bi-annual report 1912, p. 27.

is now being planned which will cost considerably more than \$7,000,000.00 and reclaim 27,040 acres. These projects are of varying character as to size and point of development, running from mere talk as to the reclamation of 1600 acres in one county (Jackson County) to the stupendous project of the Little River District which has been in progress of organization for over eight years. This district has been incorporated, the surveys completed, plans made and contracts let. The work will require the dredging of 700 miles of ditches, the construction of 40 miles of levee, and the expenditure of \$4,880,000, but it will reclaim 530,000 acres of land. When the movement for the organization of this district was begun the land therein was valuable only for uncut timber or speculative purposes and sold at from \$1.25 to \$5.00 an acre. It is now selling at prices ranging from \$18.00 to \$20.00 even the far from railways uncleared and undrained.¹ In spite of the fact that nearly 2,000,000 acres of the swamp lands of Missouri have already been reclaimed, there still remain approximately 1,500,000 acres which need draining; but there is no doubt that much of this work will be done

1. Missouri Waterway's Commission. Second biennial Report, pp. 13-28.

in the not far distant future.¹

NORTH CAROLINA.

The 2,748,160² of swamp land in North Carolina are of three kinds: (1) heavily timbered gum and cypress swamp in the eastern part of the State, (2) open marsh which has little timber and is too wet even for grazing, but productive of good crops when thoroughly drained and limed, (3) poorly drained cleared land which has been under cultivation for one hundred years; this land produces a good crop one year, but may be profitless for the next three years because of inadequate drainage.³

Although the feasibility of reclaiming the wet areas of the State had been discussed pro and con for over fifty years, it was not until 1908, when the North Carolina

1. Idem. p. 23.

60th Cong. 1st Sess, Sen. Doc. 443 has the following estimate: Original area of swamp lands in Missouri 2,789,600 acres; 350,000 drained balance undrained 2,439,600. The above figures from estimates in report of Missouri Waterway's Commission, would give a total for-original swamp land area 3,500,000 acres. The discrepancy is probably due to the fact that the Commission had more adequate data, and included in its estimates much land that is only flooded infrequently.

2. 60th Cong. 1st. Sess. Sen. Doc. 443.

Proceedings of 2d Annual Con. N. C. D. Assn. p. 25

3. Wright, J. O. Pro. of 2d Annual Con. N.C.D. Assn. pp. 11-12, 1909.

Drainage Association was organized, that any definite steps were taken toward actually doing any work. Up to that time land drainage had been hindered by the lack of any law which would enable land owners representing a majority of the area of a given swamp district to build ditches over the objection of a small minority of land owners, or to finance any works, by the issuing of bonds. This first convention of the drainage association adopted a resolution endorsing a drainage bill, and as a result the legislature of 1909 passed a general act authorizing the formation of drainage districts and the issuance of bonds by them.¹ Since the passage of this act a surprising amount of work has been inaugurated. Fifty-three drainage districts have been organized, embracing over 760,000 acres of overflowed land. None of these lands, however, belong to the State.² Of course reclamation work in North Carolina was started so recently that the^s far very little work has been fully completed, but several ditches are now under construction, and the work is being pushed with vigor.

1. Proceedings of 2d Annual Con. N.C.D. Assn. p. 7; proceedings of 4th Con., 1911, pp. 5-8. Letter to writer J.H. Pratt, N.C. State Geologist, Nov. 17, 1912.
2. N. C. Laws; Chap. 442, 1909; Chap. 67, 1911; Chap. 177, 1911. Bond issue under laws held valid in 152 N.C.738.

SOUTH CAROLINA.

South Carolina has not drained any of her 3,122,120 acres of swamp land, but recently her legislature has passed several good drainage laws, drainage districts have been organized,¹ and ditches are being cut out through the sandy and peaty bogs which for a century have been malaria-breeding swamps.

MICHIGAN.

Michigan has reclaimed 1,600,000 out of the 4,547,439 acres of overflowed lands within her limits; she has yet to drain approximately 3,000,000 acres.²

No drainage projects have been taken up by the State, except that the legislature has passed laws enabling land owners to construct ditches under the drain commissioners.³ Most of the southern counties now have reclamation projects under way, and in Bay and Saginaw counties lands which are overflowed every spring with from three to six feet of water are being drained, levees built, and pumping stations established. There are from 40,000 to 50,000 acres of this land in these two counties

1. 60th Cong. 1st. Sess. Sen. Doc. 443. Matthews. Conversation of Water. p. 166. Letter to writer from J.H. Squires, Agronomist of Dupont Powder Co., Dec. 16, 1912.
2. 60th Cong. 1st. Sess. Sen. Doc. 443.
3. Drainage Laws of Michigan Revision of 1911.

alone which will be reclaimed in a few years.¹

WISCONSIN.

The first comprehensive drainage law in Wisconsin was passed prior to 1891, but it was declared invalid since it did not state that the fact that a drain was of public benefit or utility must be a pre-requisite to its establishment. An Act of 1891 was upheld, however, and has since then been repeatedly amended.² But as a result of the doubtful constitutionality of drainage laws, and the abundance of other good lands in the State, Wisconsin was comparatively slow to start drainage operations on any large scale, and she has reclaimed but 200,000 of the original 2,560,000 acres of swamp lands within her border,³ and practically all of this land has been privately owned. About 4,00,000 acres are now included in drainage districts, and there is more or less work being carried on at this time in the State,⁴ but on the whole Wisconsin is not very far advanced in drainage work.⁵

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1. Letters to writer from J. A. Jeffery of Michigan Agriculture College, April 20, 1912; J. E. Porter of La. Golden Meadows Co., Dec. 17, 1912.
 2. Wis. Leg. Com. on Water Powers, Forests, and Drainage, Report of Jan. 24, 1910. pp. 37-39.
 3. 60th Cong. 1st Sess. Sen. Doc. 443.
 4. Letter to writer from E. R. Hones of U of Wisconsin, April 17, 1912.
 5. Report cited in note 2 above.

CALIFORNIA.

There are 3,420,000 acres of overflowed land in California.¹ Seven hundred thousand acres have already been reclaimed. An area of over 1,000,000 acres lying along the San Joaquin and Sacramento Valley is being² drained by building levees and pumping out the waters.

TEXAS AND ALABAMA.

Texas and Alabama have nearly 4,000,000 acres of swamp land, and yet they have made practically no progress in the direction of making them fit for cultivation.³ Alabama does not even have a general drainage law, and all that has been accomplished in that State has been, experimental in character and confined to small tracts owned by individuals.⁴

INDIANA.

Swamp land in Indiana has been reclaimed in three ways: (1) by co-operating land owners acting under the general drain laws of the state; (2) by direct appropriation from the State Treasury of money to drain especially large areas;⁵ (3) by drainage companies such as The Kanakakee Valley Drainage Co., which was organized in 1870 but accomplished nothing of importance until 1892.⁶

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1. 60th Cong. 1st Sess. Sen. Doc. 443.
 2. Matthews Conservation of Water. pp.170-179.
60th Cong. 1st Sess. Sen. Doc. 443. Vol. 7, p.9.
 3. 60th Cong. 2nd Sess. Sen. Doc. 443. Ala. 1,479,200.
Texas 2,240,000.
 4. Letters to writer from J.F.Duggar of Ala. Exp.Sta. Apr. 1,1912 and J.C.Cheney, Chf. Clerk of Dept. of Agri. and
over

Industries of Ala. Dec. 16, 1913.

5. Exp. Sta. Circular 80, p. 7. Thus the legislature appropriated \$65,000 in 1889.

6. Idem.

The work is still being carried on by adjoining owners under the drainage laws, and by private corporations, but of all this land is privately owned.¹ So far Indiana has drained 3,358,000 acres of swamp land.

VIRGINIA.

Virginia had no drainage law until 1910 when an act was passed² closely modeled on the North Carolina Law of 1909. Several districts have been organized, and there is a project now under consideration to drain part of The Dismal Swamp, but as yet practically no work has been accomplished,³ and there are 800,000 acres of swamp lands un-reclaimed.⁴

TENNESSEE.

Until recently decisions of the supreme court of Tennessee had been against the principal of local taxation for local improvements, and as a consequence no drainage act was possible. A change of position by the court, however, led the way to the enactment of a general drainage statute in 1909, which contained the usual provisions for the assessment of benefits against the owners

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1. Letter to writer from A.T. Wiancke of Agri. Exper. Sta. of Perdue U. Apr. 18, 1912.
 2. 60th Cong. 1st Sess. Sen. Doc. 443.
 3. Chap. 159 of March 12, 1912, amends the act of March 17, 1910.
 4. Old, W.W. Jr. Address at Drainage Convention of Southern Commercial Congress. Nashville, Tenn. April 8, 1912.

of lands drained. But as yet practically nothing has been accomplished beyond the making of plans and the bare commencement of drainage operations.¹

SOUTH DAKOTA.

In South Dakota there never has been a very large amount of swamp land. And in that State the drainage question is no so important now as it was a few years ago. This is true because a considerable portion of the land has already been reclaimed through county commissioners under laws as amended in 1909; and county because a heavy drought for the last few years has greatly decreased the need for drainage. Although petitions have been filed with the State engineer calling for the drainage of over 365,000 acres by means of 476 miles of main ditches in 27 counties in the eastern part of the State, yet the work is merely in its preliminary stages.²

IOWA.

In Iowa there has been a very large amount of drainage work accomplished, but information in detail is unavailable.

1. Press Bull. No. 9 of Annual Report of Tenn. State Geological Survey for 1910. p. 45.
Bull. No. 3 of Tenn. Geo. Survey, 1910.
2. State engineer of So. Dak. 4th biennial report 1911-12, pp. 163-64. Letter to writer from A. E. McDaniel of U of Ill., formerly of So. Dak. Dec. 18, 1912.

Utah, Oklahoma, Colorado, Montana, and Wyoming have drainage laws but they were adopted only recently and the work done in these States is comparatively insignificant in amount.¹

From the preceding review of the progress of swamp land reclamation in States other than Minnesota, it is clear that in practically no State has the condition in the Federal Swamp Land grant to the effect that the proceeds from the overflowed lands be used for their drainage, been performed. Thus Florida conveyed most of the lands granted to her to railroads and to drainage companies which accomplished practically nothing. Arkansas and Louisiana sold their overflowed land at prices ranging from one cent to one dollar per acre and Missouri did little better. In very few of the States is swamp land still owned by the States² The greatest amount of reclamation work has been done in Minnesota, Illinois, Iowa, Indiana, and Michigan. About one-sixth of the original swamp land area of the United States has now been drained. Those states which have a considerable amount of overflowed lands within their borders, but have

1. 60th Cong. 1st. Sess. Sen. Doc. 443.

2. Van Hise in his Conservation of Natural Resources p. 334 estimates that approximately 95% of the swamp lands granted to the States by the Federal Government have passed into private hands.

only recently commenced the work of making them fit for cultivation, and which at the present time have the greatest amount of drainage work yet to be done are; Florida, Louisiana, Arkansas, Michigan and Minnesota have done much, but they still have a great deal to do.¹ There are at this time in the United States about 80,000,000 acres of swamp lands yet unreclaimed.

1. See Appendix 1.

DRAINAGE LEGISLATION AND ADJUDICATION.

Thirty-six States of the Union have now enacted general drainage laws, for the purpose of providing the legal machinery which is necessary, if drainage work involving any considerable amount of land is to be successfully carried on.¹ These laws apply to lands which cannot be drained or protected from overflow by their owners, without building ditches across the lands of others, so that it becomes necessary to provide a system of procedure that will enable the more enterprising proprietors to co-operate in draining their farms without being blocked in their efforts by a small minority who refuse to allow ditches to be built across their lands. These laws also aim to insure adequate drainage outlets, remuneration for property taken or injured for the common good, and an equitable distribution of the costs of the work.

In some States the legislatures have been expressly granted the power to pass such acts in the State

- constitutions;² but even in the absence of express
1. 60th Cong. 1st Sess. Sen. Doc. 443, gives 23, but since then laws have been enacted in Georgia, Wyoming and Virginia, etc. See p. 136 infra.
 2. Constitutions of Iowa and Illinois especially Art. IV. Sec. 31 of Const. of Ill. of 1870 as amended in 1878. Florida Const. 1887 Art. XVI. Sec. 28. See note on Statutes of La. New Mexico Consts. 1911, Sec. 186.

constitutional authorization to the legislatures, the courts have quite generally sustained such statutes as valid exercise of the police and taxing powers, and of the power of eminent domain.¹ Of course the taking or injuring of the private property of the non-consenting or objecting landowners under the power of eminent domain, would be unconstitutional and unlawful, unless the purpose of the work to be done were public in character;² and it is for that reason, that most of the general drainage laws now in force, expressly state that, as a condition precedent, to the establishment of any ditch or drain, or the assessment of any damages or benefits, the work must have been found to be of general utility, or conducive to the public health or welfare.³ Statutes have

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1. Duke vs. O'Bryan, 100 Ky. 710 (1897) Lien vs Norman Cty. 80 Minn. 58. In re Drainage Application, 35, N.J.L. 497. Sess. vs. Crinkelton, 20 Oh. St. 349. Bryant vs. Robins, 70 Wis. 258. Wurts vs Hoaglund, 114 U.S. 606; Donnelly vs Decker, 58 Wis. 461; Zigler vs Menges, 121 Ind. 91 (1889) Gifford Drainage Dist. vs Shrorer, 145 Ind. (572 (1896) 14 Cyc. 1025. Freund Police Power, Ed. 1904. Sec. 127.
 2. Coster vs Tidewater County 18 N.J. Eq. 54. Reeves vs Leasure. 8 Oh. St. 333. People vs. Henion. 64 Hen. 471.
 3. For example: Laws of Minn. 1905. Chap. 230. Sec. 10. (1913) G.S. 5532. And most acts provide that they shall be liberally construed so as to promote public health etc. See Laws Minn. 1905. Chap. 230. Idaho Session Laws 1913 Chap. 16 Sec. 40; Laws of Kansas 1911, Chap. 168, Sec. 37; Acts Kentucky 1912. Chap. 132. Sec. 49, Laws Mississippi 1906, Chap. 132, Sec. 30. (Gilbert vs Foot, cited in 5 Barb. 474. 483. Jenal vs Green Is. Dr. Co. 13 Neb. 163; Duke vs O'Bryan, 100 Ky. 710. Fleming vs Hull. 73, Ia. 598).

been held invalid because not requiring the public purpose to appear, even although they provided for full compensation to the owner of the lands across which the ditches were to be constructed,¹ Of course it is clear that mere payment for property taken is not sufficient; it must never be for a private purpose. Thus the Supreme Court of Wisconsin has held that a statute authorizing drains for agricultural, mining or sanitary purposes, without requiring it to be necessary or desirable to promote any public interest, convenience, or welfare, is not valid. The court said: "No doubt such an improvement may be useful to some, or perhaps many, private owners of land, by way of increasing the usefulness and value of their lands. But that is merely a private advantage. It interests the public only indirectly and remotely, in the same way and sense in which the public interest is advanced by the thrift and prosperity of individual citizens. But one man's property can not be taken to make another man's home more cheerful or healthful. It is only when it will make the homes of the public more healthful, that any man's property can be taken for sanitary purposes."²

1. McQuillen vs Hatton, 42 Oh. St. 202.

2. Re Theresa Drainage Dist. 90 Wis. 301.

But if the principal object intended by a drainage act is the public welfare, the statute will not be rendered void by the promotion of private interests as incidental thereto.¹ And private property cannot be taken for reclamation works merely because of convenience to the majority of landowners, or to the public; if the object can be accomplished practically as well in some other way, the land of the individual cannot be taken from him for use as a right of way against his will.²

In passing upon the constitutionality of drainage laws, there has been some difference of opinion among the courts as to what is a public purpose. Some courts have held that in order to make the purpose public, the drain must be necessary to preserve the public health. Thus the Supreme Court of Michigan, in the case of *Kinnie vs Bare* (68 Mich. 625) said: "Drain laws which take from the citizens his private property against his will can be upheld solely upon the ground that such drains are necessary for the public health. They proceed upon the basis that low, wet, and marshy lands generate malaria, causing sickness and danger to the health and life of the people; and when

1. *Session vs Crinkelton*, 20 Ch. St. 349.

2. *Rice vs Wellman*, 5 Ohio. C. C. 334. *Caldwelt vs. Harrison Twp.* 2 Ohio C. C. 10. *Chaplin vs Wheatland, Highways Comrs.*, 128 Ill. 651.

they are of such character as to injure the health of the community, they become and are public nuisances, which ought to be abated, and the legislature have the right, under the police power inherent in every government, to protect the people from plague and pestilence, and to preserve the public health. But drainage for the purpose of private advantage, such as improving the quality of the land, or rendering it more productive or fit for cultivation, cannot be justified under the police power. Neither public convenience nor public welfare, independent of considerations of the public health, will justify the legislature in the enactment of laws 'for the construction and maintenance of drains, and the assessment of taxes therefore'. It is evident that, where the public health is not affected by the existence of low, swamp lands, the only object to be accomplished by their drainage is the improvement of the land itself." This principle to the effect that private property cannot be taken for a right of way for a drainage ditch unless it is found that the lands to be drained are a source of disease, and that the draining of them will promote the public health, has been adopted in Iowa and New York as well as in Michigan.¹

Other courts have adopted more liberal policy

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1. Hull vs Barid, 73 Iowa 528. Catlin vs Munn, 37 Hun. 23
 Re Ryers, 73 N. Y. 1. Re Drainage in Penfield 3
 App. D. 30. Re Draining
 Burk vs Ayers, 19 Hun. 17. in Chili, 5 Hun. 166.

and have held that the purpose of a work of land drainage is public if it involves sufficiently large tracts of land. Thus the Supreme Court of Massachusetts, in affirming the validity of a statute providing for the draining of certain lands along a river by the removal of a dam therein, said that, "The improvement of a large tract of territory situated in several towns and owned by a great number of persons, by draining off the water and thereby rendering the land suitable for tillage, which could not otherwise be usefully improved at all, would seem to come fairly within the scope of legislative action, and not to be so devoid of public utility and advantage as to make it the duty of the court to pronounce a statute, which might well be designed to effect such a purpose, invalid and unconstitutional. The act would stand on different ground if it appeared that only very few individuals, or a small adjacent territory, were to be benefited by the taking of private property. The advantage which may result from the removal of the obstruction are not local in their nature, nor intended to be confined to a single neighborhood. They are designed to embrace a large section of land lying in one of the most populous and highly cultivated portions of the State, and by increasing the productive capacity of the soil to confer a benefit, not only on the owners of the meadows, but on all those who will receive the incidental advantage arising from the develop-

ment of the agricultural resources of so extensive a territory."¹ Following a similar theory to that of Massachusetts, it has been held in New Hampshire, that if the draining of large swamps would add largely to the area of valuable lands in the State and increase its resources, private property may be taken for the purpose;² in New Jersey, that the purpose of draining large districts of land lying within several counties of the State, embracing thousands of acres, is sufficiently public to justify the exercise of the power of eminent domain;³ and in Indiana, that a ditch will be of public benefit and utility, if it will drain any considerable body of lands.⁴ In North Carolina the Supreme Court has decided that an act for the drainage of thousands of acres of land lying in a low portion of the State must be deemed of general and public utility.⁵

Some of the courts have not limited the right to exercise the power of eminent domain for reclamation work to cases where large tracts of land are involved, but have held in effect that the amount of land to be benefited is not a proper test in determining whether or not the purpose of the work is public. Thus it has been said that if

1. Talbot vs Hudson, 16 Gray 417.
2. Batchelder vs Hibbard, 58 N. H. 269.
3. Re Drainage between Lower Chatam. Etc. 35 N. J. L497.
Re Drain on Pequest River 39 J.L. 433;
4. Zigler vs Menges, 121 Ind. 99.
5. Norfleet vs Cromwell, 70, N. C. 634.

the legislature has power to make regulations for draining a swamp containing 10,000 acres, it has the same power in regard to a swamp containing 1,000 acres; so of 100 acres, or of one acre; that there is no distinction in the principle, the only difference being one of degree.¹ The Supreme Court of Montana, in considering the validity of a law providing for the condemnation of a right of way for an irrigation ditch, (the situation being analogous to that in drainage matters) said, "What real distinction is there, so far as the term 'public use' is concerned, between the benefit that results to the State, from the reclamation by artificial irrigation of 160 acres of agricultural land owned by one or two persons, and the reclamation by the same means of thousands of acres owned by many different persons living together in one subdivision of the State? We do not think there is any principle. The reclamation of one small field by means of artificial irrigation promotes the development, and adds to the taxable wealth of the State, as well as the reclamation by the same means of a number of fields."² In Washington it has been held that the construction of ditches of the drainage land otherwise useless for agricultural purposes is a public one; and that

1. Pool vs Trexler, 76 N. C. 397.

2. Ellinghouse vs Taylor, 19 Mont. 463.

it is not necessary that the public at large shall be benefited, but only that part of the public affected by want of proper drainage or by the improvement to be made.¹

To hold that the power^k eminent domain may be exercised for the drainage of small tracts of land would seem to be subversive of the rule that private property cannot be taken for private use. Although the prosperity of individuals may conduce to the welfare of the State, it has never been considered in other connections that the promotion of individual prosperity was of sufficient importance to call in the aid of the power of eminent domain. Some of the courts which have upheld private drainage laws have felt the force of this objection, and have endeavored to justify such laws under the police power. Thus the Supreme Court of North Carolina said: "The Legislature, in the exercise of the police power has authority to enact drainage laws with a view to the promotion of the general welfare, and the mere fact that one or more individuals may derive from it pecuniary and particular benefits and advantages does not destroy its validity."²

1. Lewis County vs Gordon. 20 Wash. 80.

2. Winslow vs Winslow, 95 N.C. 24.

And in Wisconsin the Court, after referring to the provisions of a drainage statute upon the constitutionality of which it was passing, said: "It requires but a casual examination of these provisions for the draining of the swamp and overflowed land of the State to be apparent that such ditching and draining are of no public use whatever in the legal meaning of the term. The pecuniary object is solely to restore such lands to a proper condition for tillage and agriculture by the several owners and for their use alone. It enhances their value, intrinsic and in market. This is the only object which concerns their use, and that use is strictly private. The other object, and the only one mentioned in the law, is that such ditching, draining, and enlargement of drain will 'conduce to the public health or welfare.' It is clear that no private property is authorized by this law to be taken for the public use, and that whether taxation so called or assessment, it is not an exaction of the government for revenue or for any public purpose. It follows that this system of drainage of the lands of private owners by special assessment of all of them proportionably according to their respective private benefits, is not within the

purview of any provision of the State Constitution ----
But there is a sovereign power in the State, to be
exercised by the Legislature --- called the police power
of the State.--- This legislation may readily be referred
to this power by providing for the public health. If it
were not for this obvious and clearly expressed purpose
of the law, it would not be endured for a moment, because
it would provide for a despotic and most unwarrantable
interference with private property for strictly private
purposes and use, in which neither the people of the State
nor the State itself, nor the public, have any interest
whatever."¹

It would seem that a change from the power of
eminent domain to the police power to uphold private
drainage laws would not make their foundation much more
substantial: and that if the public health or welfare is
involved the drainage statute may be referred to either
power.² Where the matter involved is the drainage of
private farms and such drainage is not necessary to the
public health, the branch of plice power resting on the
preservation of sanitary conditions is not involved.

1. Donnelly vs Decker, 2 58 Wis. 461.
2. Cribbs vs Benedict, 64 Ark. 555.

The recognition of this fact have caused some courts to use the possible benefit to public highways as a pretext for holding drainage laws sufficiently public in purpose to be constitutional.¹ Thus an Ohio court held that it is not sufficient that a ditch will drain the lands adjacent to it, or enable the owners of adjacent lands to raise larger and better crops, but the public health, convenience, or welfare must in some way suffer for want of the ditch. The public convenience may be subserved by the fact that in times of freshets water which overflows turn pikes and bridges, will be carried away more rapidly and with less injury to such roads and bridges. If the construction of the ditch --- will result in the reclamation or bettering of a considerable quantity of low, wet or swampy lands, or drain stagnant ponds, thereby improving the public highways of the vicinity and health of the community, and increasing the value of the land surrounding the ditch, it will be sufficiently conducive to the public health, convenience, or welfare to be sustained.²

It has generally been held that it is not necessary that all the people of the State should be

1. Smeaton vs Martin, 57 Wis. 364.
Heick vs Voight, 110 Ind. 279.
Anderson vs Baker, 98 Ind. 587.
2. Thomas vs County Commissioners. S. Ohio. N.P. 449.

directly affected by the drainage. It is sufficient if a particular community is benefited. If the drain is of public benefit the fact that some individuals may be specially benefited over others affected by it will not deprive it of its public character.¹ In *Lake Erie and W. R. Co. vs. Hancock County Commissioners* the supreme court of Ohio held that private property may be appropriated for a drainage ditch if it will be conducive to the public health, convenience, or welfare of the neighborhood through which it is constructed; and that a more general necessity is not required.² It is the public health of the community to be affected by the proposed work, and not that of the public at large, that is to be regarded in determining the power of the legislature;³ and that the works authorized to effect the drainage of land do not extend beyond a particular, and it maybe, a small district does not prevent the purpose from being public;⁴ so that the case must be very clear to authorize judicial interference.⁵

While there seems to be a tendency for the courts to shift the basis of the constitutional right of the state legislatures to enact general drainage laws, from

1. *Ross vs Davis*, 97 Ind. 79.
2. 57 N.E. 1,009, (1900).
3. *Chesbrough vs Putnam, etc.*, 37 Ohio St. 508.
4. *Hartwell vs Armstrong*, 19 Barb. 166.
Re Ryers, 72 N.Y. 1; 28 Am. Rep. 88.
5. *Hartwell vs Armstrong*, 19 Barb. 166.
McDaniel vs Columbus, 91 Ga. 462.

the rights of eminent domain and taxation, to the broader ground of the police power, where such statutes may be justified because they promote the public benefit, welfare, and convenience, yet even there it is difficult in many cases to find a true public purpose for the acts within the established legal definition of the term "public". The judiciary^x have seen that drainage statutes are necessary and wise, even though in their application to some cases only a few landowners may be benefited and the public benefit be non-existent; that without such laws less progressive landowners, by refusing to allow their more progressive neighbors to build ditches across their lands could prevent the reclamation of swamps and marshes, and retard the development of the country; and have sustained drainage acts in many cases by referring to possible benefits to public highways, health or convenience, which are really remote and uncertain, as lending a sufficient public character to justify such laws under the police power;¹ or have practically upheld them by frankly referring to their necessity alone, so far as the real basis of their decisions is concerned. Thus Justice Peckham, speaking of the power of a legislature to authorize the drainage

1. Freund, Police Power. ed. 1904.

of swamp lands said, in a comparatively recent decision: "The power does not rest simply upon the ground that the reclamation must be necessary for the public health. That indeed is one ground for interposition by the state, but not the only one. Statutes authorizing the drainage of swamp lands have frequently been upheld independently of any effect upon the public health, as reasonably regulations for the general advantage of those who are treated for this purpose as owners of common property."² And some time before this Judge Cooley had written, "If it be essential or material for the prosperity of the community, and if the improvement be one in which all the landowners have to a certain extent a common interest, and the improvement cannot be accomplished without the concurrence of all or nearly all of such owners by reason of the peculiar natural condition of the tract sought to be reclaimed, then such reclamation may be made, and the land rendered useful to all, and at their joint expense. In such case the absolute right of each individual owner of land must yield to a certain extent or be modified by corresponding rights on the part of other owners for what is declared upon the whole to be for the public benefit."¹ In other words this basis for sustaining drainage laws might be

2. Fallbrook, Irrigation Dist. vs. Bradley, 164 U.S. 112, 163.

1. Cooley, Taxation. 2d ed, p. 617.

said to be an application in a negative manner of the old maxim, "sic utere tuo ut alienum non laedas." It might will be contended that at least the beginnings have been laid down for a rule to the effect that one should not refuse or neglect to use or improve his own land, when such non-user will prevent others from using or improving their land or property.¹

It will be noted later that in some of the states on the eastern coast of the United States the drainage laws do not state that they are for a public purpose, nor do they require any finding that a proposed work of reclamation is of public benefit or utility. The courts in these states have therefore been precluded from relying upon even the broadest application of the theory of the police power to sustain their statutes; but the latter were enacted as early as 1701 if not earlier, and were not called in question for such a long period of time that the doctrine of stare decisis could be appealed to as authority for upholding them. It is true that in these cases as in others where laws authorized the exercise of the power of eminent domain for pur-

1: This justification of the statutes, and the effect of stare decisis, might perhaps be said to constitute an exception to the oft repeated rule that no indirect benefits to the public resulting from a benefit to private persons, can constitute a "public" benefit for purpose in the legal sense of the term. (See following paragraphs on stare decisis.)

poses really private, such courts have sometimes said that such private statutes could not be held constitutional merely because they had been acquiesced in for a great number of years;¹ but nevertheless similar private acts were declared valid because of the doctrine of stare decisis, in many cases, particularly those relating to private roads,² and the flowage of lands for grist mills.³ Indeed many statutes providing for exercises of that power of eminent domain for uses of at least doubtful publicity were enacted prior to the American Revolution by colonial legislatures, and before the adoption of state constitutions, such as the milldam acts of 1709 and 1714 in Massachusetts,⁴ the private road acts of 1735-6

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1. Hartwell vs Armstrong, 19 Barb. 166.
Sadler vs Langham, 34 Ala. 311.
 2. Hickman's Case, 4 Harr. (Del.) 580.
Waddell's Appeal, 84 Penn. 90.
Robinson vs Swope, 12 Bush. (Kty) 21.
Palairret's Appeal, 67 Penn. 479.
 3. Gaylord vs Sanitary Dist. 204 Ill. 576.
Hankins vs Lawrence, 8 Blackf. 266.
Fleming vs Hull, 73 Iowa 598.
Varner vs Martin, 21 West Va. 534.
Burnham vs Thompson, 35 Iowa 421.
Olmstead vs Camp, 33 Conn. 532
McMillan vs Noyes, 75 N.H. 258
Miller vs Troost, 14 Minn. 365 (Gil. 282)
Fisher vs Horicon Iron Co., 10 Wis. 351.
 4. 1. Provincial Statutes 12 Anne, Chap. 1, 160.
Ibid 12 Anne, Chap. 8, 181; Anc. Charter, 388-406
See Holyoke Water Power Co. vs Lyman, 15 Wall. 500.

in Pennsylvania,¹ the similar New York Act of 1772,² and a Tennessee water grist mill law of 1877.³ With respect to all these statutes it should be noted that their validity is not tested by any constitution restrictive of legislative powers, since the constitutions of these states had not yet come into existence.⁴ And colonial statutes of the kind referred to and the decisions upholding them, have also been relied upon as authorizing similar legislation subsequent to the adoption of restricting constitutions, on the theory that if the people had intended to prevent the legislatures from passing statutes common at the time of the making of such constitutions, they would have embodied in their organic laws express prohibitions of laws of the character of the

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1. Palairret's Appeal, 67 Penn. 479. Acts not attacked for 115 years.
 2. Taylor vs Putz, 4 Hill 142. Act held void, but Nelson, C.J. dissented on ground of stare decisis saying that the law had not been called in question for over seventy years.
 3. Laws 1777, Chap. 23. See Harding vs Goodlet, 3 Yerg. 40.
 4. Woodruff vs N.Y. & N.E. Ry. Co. 59 Conn. 63. Hepburn's Case, 3 Bland. Ch. (Md.) 95. Story, J. in Wilkinson vs Leland, 2 Pet. 627. (4.1). As to refusal to recognize stare decisis as to mill act see Tyler vs Beacher, 44 Vt. 648.

private-road and grist-mill acts.²

Following decisions upholding private-road and mill-dam acts which had long been acquiesced in and enacted prior to 1800, the Supreme Court of New Jersey has affirmed the validity of drainage acts of that state which were really private in character. Thus in the case of *Ooster vs Tidewater Company* such a statute was upheld against the objection that it authorized the taking of private property for a private purpose. The court referred its decision to the "power of the government to prescribe public regulations for the better and more economical management of property of persons whose property adjoins, or which, for some other reason, can be better managed and improved by some joint operation such as the power of regulating the building of party walls; making and maintaining partition fences and ditches; constructing ditches and sewers for the draining of uplands and marshes which can be more advantageously drained by a common sewer or ditch. This is a well known legislative power." said the court, "recognized and treated by all juriconsults and writers upon law through the civilized world."¹

2. ^e *Brewer, J., in Venard vs Cross, 8 Kan. 248.*

1. ³ *O.E. Green, 54, 518.*

And in the leading case upon the constitutionality of such drainage acts, the New Jersey statute of March 8, 1871, was declared valid by the Supreme Court of that state.

This was on the theory that the right of the legislature, though obviously not resting in the power of eminent domain, and derogatory to private property rights by compelling the private owner to suffer, and pay for the improvement of his property because other contiguous owners desired to so improve theirs, and not ^{to} be justified on first principles, had nevertheless become established as a sort of local common law by legislative and judicial and popular recognition for nearly a century, and that it must now be regarded as legitimate legislation.²

This position was affirmed by the United States Supreme Court, which, speaking through Justice Gray said: "General laws for the drainage of large tracts of swamp and low lands, upon proceedings instituted by some of the proprietors of the lands to compel all to contribute to the expense of their drainage, have been maintained by the courts of New Jersey (without reference to the power of taking private property for the public use under the right of eminent domain, or to the power of suppressing

2. Hoagland vs Wurts, 41 N.J.L. 175. Explained and followed in 42 N.J.L. 553; 45 N.J.L. 94; 68 N.J.L. 199; 80 N.J.L. 268 and 648; 46 N.J. Eq. 441; 65 N.J. Eq. 629.

a nuisance dangerous to the public health) as a just and constitutional exercise of the power of the legislature to establish regulations by which adjoining lands, held by various owners in severalty, and in the improvement of which all have a common interest, but which, by reason of the peculiar natural condition of the whole tract, can not be improved or enjoyed by any of them, without the concurrence of all, may be reclaimed and made useful to all at their joint expense. The case comes within the principle upon which this court upheld the validity of the general mill acts in *Head vs Amoskeag Mfg. Company*, 113 U.S. 9.¹

Thus the constitutional right of the legislatures of the states to enact general drainage laws has been affirmed, and the arguments that they authorize the confiscation or taking of private property for private purposes has been refuted by referring to the powers of eminent domain and taxation, the necessity and wisdom of such statutes as conducive to the improvement of lands by more enterprising owners, and to the police power of the State.

But the constitutionality of such acts has been vigorously assailed in the courts, not only for reasons

1. 114 U. S. 610. See also 14 Cyc. 1061.

peculiar to particular statutes or constitutions, (for example that the act is defective as to title; superseded by later acts; special legislation; or violating prohibition of state aid to internal improvements), but also on the ground that the laws in question violate constitutional provisions relating to the separation of the powers of government into three distinct departments executive, legislative and judicial. Such provisions are common, and it is often further expressly stated in the organic laws of the states, that no one of the three departments or its officers shall exercise any of the functions properly belonging to another.¹ The attacks upon drainage statutes on this ground have arisen most frequently in connection with acts providing for hearings, appointment of viewers or commissioners, and the making of ditch orders, by judicial officers; and they have raised two distinct issues. In the first place, the question has arisen as to whether the acts in question really do impose non-judicial duties upon the courts, and thus violate the principle of a separation of powers. And in the second place, it has been necessary for the courts to consider the question as to whether the constitutional

1. For example Minnesota Const. Art. 3; Ala. Art. 3, Sec. 2; Maine, Art. 3, Sec. 1; Mich. Art. 3, Sec. 2; Miss. Art 3, Sec. 2.

provisions relating to distinct departments of governments are applicable to such cases as this, that is to the carrying on of drainage works. These two issues cannot well be satisfactorily discussed by a mere reference to drainage cases, since they are comparatively few in number, and as a rule are unsatisfactory to their treatment of the subject, so that it will be necessary to refer to some of the broad principles that have been laid down by the courts with reference to the doctrine of the separation of powers in decisions on matter other than the reclamation of swamp lands through public action.

The general principle of law is well established that the legislature cannot impose upon the judiciary any duties or confer upon it any powers that are non-judicial in character.¹ The term "judicial power" includes both the power to determine controversies² and to interpret laws;³ and it is to be distinguished on the one side

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1. 8 Cyc. 844. In Minnesota. See Minn., Const. Art. 3 Sec. 1. State vs Brill, 100 Minn. 499. State vs Bates 98 Minn. 110; State vs Stearns, 72 Minn. 200, 214; State vs Bd. of Control, 85 Minn. 165, 168; Rhodes vs Walsh, 55 Minn. 542; McGee vs Hennepin County, 84 Minn. 472, 476; State vs Crosby, 92 Minn. 176; In re Application of Senate, 10 Minn. 78; Rice vs Austin, 19 Minn. 103 State vs Ry. 38 Minn. 281, 299; State vs Young, 29 Minn. 474; 551; McConaughy vs Secy. Of State, 106 Minn. 392, 414; St. Paul etc. vs Brown 24 Minn. 517, 574; State vs Dike, 20 Minn. 363. Gollnick vs Mengel, 112 Minn. 349.
 2. Taylor vs Place, 4 R.I.1; Merrill vs Sherburne, 1 N.H. 204.
 3. State vs Denny, 118 Ind. 382; Wolfe vs McOaull, 76 Va. 80. 6 Am. & Eng. Enc. Law, 1053.

from the power to execute, administer, or enforce, the laws, and on the other side from the power to lay down in advance of the occurrence of the acts to which they relate, general rules of conduct. The legislature is to make the law; the executive, to carry it out; the judiciary, to apply it to particular cases. The fundamental principle of the separation of powers is easily stated; but as is always the case when the abstract and general is to be applied to the concrete and particular, the courts have met with difficulties in testing the constitutionality of given statutes as to the division of governmental departments. They have been forced to concede that in practice it is not only inadvisable in many cases, but even impossible, to enforce a strictly logical separation of functions.⁴ Partly because of this

4. Goodnow, *Comp. Adm. Law*, p. 20; Wilson, *Congressional Govt.* pp. 285, 306; Steven's *Sources of Const. of U.S.*, p. 47; Von Holst, *Const. Law of U.S.* pp. 67, 68. Murray vs Hoboken Land Co., 18 How. 284; Livingston vs Moore, 1 Baldw. 449; Cooley's *Const. Law*, p. 44; Story on the *Const.* Sec. 525; Hare *Am. Const. Law*, Vol. 2, p. 850; Brown vs Turner, 70 N.C. 102; In Minnesota the court has held that the exercise of judicial functions may involve the performance of legislative or administrative duties, and vice versa; (*State vs Dunn*, 86 Minn. 301, 304; *Minn. S.Co. vs Iverson*, 91 Minn. 30, 34; *Rockwell vs Fillmore County*, 47 Minn. 219; *Home Ins. Co. vs Flint* 13 Minn. 244; *State vs Iverson*, 92 Minn. 355, 362. See also as to nature of judicial inquiry, *Prentise vs Atlantic Coast Line*, 211 U.S. 210. *State vs Probate Court*, 112 Minn. 229; *State vs Eberhart*, 116 Minn. 313) and that there are many duties which may be either judicial or ministerial, depending on the officer or body performing them, and the effect to be given to their action or determination, (*Foreman vs Hennepin County*, 64 Minn. 371).

difficulty, and partly because of political reasons for the influence of public opinion, there cannot be said to be uniformity in the application of the general rule that non-judicial functions cannot be imposed upon the judiciary. In some cases it would seem that the courts have recognized a desire on the part of the people to have certain matters controlled by a court which they may deem less influenced by partisan or personal motives than the other departments of the government; and in other decisions it would appear probable that the judiciary were merely unwilling to assume additional duties which they might avoid by a more strict application of the doctrine of separation to the facts involved. Cases that may throw some light upon the validity of drainage acts that require action by the courts, by parity or reasoning or similarity in facts, are those in which it has been held that judges might be authorized to fix the salaries of deputy county officers;¹ that a county judge cannot be endowed with the right of designating the time and place of elections,² (of interest in reference to laws relating to formation of drainage districts after election on the question); that courts cannot exercise the power to create municipal

1. Stone vs Wilson, 39 S.W. 49 (Kty.)

2. Dickey vs Hurlburt, 5 Calif. 343.

corporations;³ that they cannot be required to pass upon claims in non-judicial proceedings;⁴ and on the other hand that even the salaries of court reporters cannot be fixed by the judges.⁵ It has been held that a statute empowering a circuit judge to issue a certificate of incorporation after determining that the proper steps have been taken is valid;⁶ and so is one that imposes upon certain judges the duty of fixing the boundaries of a sanitary district.⁷ In Minnesota it has been held that a duty may involve the exercise of judicial and legislative or administrative functions so connected that they cannot well be separated; that in such cases the legislature in its discretion may impose the duty upon the judiciary, and that the courts will presume that the legislature intended that the duty should be performed in a judicial manner;⁸ and statutes have been sustained authorizing the district courts to establish drainage districts⁹ and roads;¹⁰ to determine

3. *People vs Nevada*, 6 Calif. 143; *Shunway vs Bennett*, 29 Mich. 451. But as to conflict on this point see: *McQuillen, Mun. Corporations*, Secs. 136, 137, 139; and *Dillon, Mun. Corporations*, Vol. 1, p. 107 et seq. 5th ed. *State vs Simons*, 32 Minn. 540 holds court cannot incorporate.

4. *U.S. vs Ferreira*, 13 How. 43.

5. *Smith vs Strother*, 68 Calif. 194.

6. *Elder vs Central City*, 40 West Va. 222; *In re Union Mines* 39 West Va. 179.

7. *People vs Nelson*, 133 Ill. 565.

8. *Foreman vs Hennepin County*, 64 Minn. 371; *McGee vs Hennepin County*, 84 Minn. 472; *State vs Crosby*, 92 Minn. 176, 180; *State vs Bates*, 96 Minn. 110.

9. *State vs Crosby*, 92 Minn. 176 See p. 125 infra:

10. *State vs McDonald*, 26 Minn. 445.

whether assessing officers have correctly determined the facts on which assessments for local improvements are made;¹ to appoint examiners of title under the Torrens law;² to fix the salaries of county attorneys;³ to approve the bonds of applicants for liquor licenses.⁴

It will be noted later on that in many states the general drainage acts require the judges of county or district courts to appoint certain officers to act in public ditch proceedings, so that it should be noticed that there is some conflict of authority in the United States on the question as to whether statutes conferring upon the judiciary the power of appointment are unconstitutional as violative of the rule as to separation of functions. The great weight of authority, however, upholds such laws, and this is the rule in the courts of the United States, and of Alabama, California, Colorado, Georgia, Illinois, Indiana, Kentucky, New Jersey, New York, Oregon, Pennsylvania, Texas, West Virginia, and Wisconsin.⁵ The reasoning of these courts in some cases depends on the character of the appointee, as that he is an officer of the court, as in cases of jury commissioners,

1. State vs Ensing, 55 Minn. 278.
2. State vs Westfall, 85 Minn. 437.
3. Rockwell vs Fillmore County, 47 Minn. 219.
4. State vs Bates, 96 Minn. 110.
5. For cases see note in L. R. A.

or court reporters, or court janitors;¹ or that the appointment of commissioners to borrow money and dispose of bonds involves the exercise of discretion and judgment and is a judicial act.² Other cases hold that the appointing power is neither exclusive nor inherent in the executive department, and that therefore it is not an executive function unless expressly made so by organic law or by statute; and that in the absence of such provision it may be exercised by the courts just as well as by the legislative or executive branches.³ In Illinois a law requiring the appointment of election commissioners by the county court was upheld in part on the theory that the duties to be performed by such commissioners were of a judicial nature since they were to consider evidence, and decide whether the election judges had improperly refused registration;⁴ and in some states statutes have been held valid in part because of practical construction.⁵ And on the theory that commissioners to adjust and settle matters of indebtedness between counties are in the nature of arbitrators or referees, and consequently judicial in

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1. Stevens vs Truman, 127 Calif. 135; State vs Mounts, 36 West Va. 179; Matter of Janitor, 35 Wis. 410; State vs Noble, 118 Ind. 340. Taylor vs Uom. 3 J.J.Marsh, 410 (Kty.) State vs Kendle, 52 Oh. St. 356; White County vs Gwin, 136 Ind. 562.
 2. Sweet vs Gwin, 136 Ind. 562.
 3. Fox vs McDonald, 101 Ala. 51; Russell vs Cooley, 69 Ga. 215; People vs Morgan, 90 Ill. 562.
 4. People vs Hoffman, 116 Ill. 587.
 5. Russell vs Cooley, 69 Ga. 215; Terra Haute, vs. Evansville, 149 Ind. 174.

character, it has been decided that the courts may be authorized to appoint them.¹ But there are many other cases in which appointments have been held proper, which cannot be sustained upon the principle that the appointees are in the nature of officers or agents of the judiciary. Such decisions are those holding that courts may be authorized to appoint election boards or inspectors,² police³ and park commissioners,⁴ appraisers of damages from the opening of streets,⁵ tax collectors,⁶ school commissioners,⁷ tax equalizers,⁸ commissioners or trustees to carry on the construction of a subsidized railroad⁹

1. Tuolumne County vs Stanislaus County, 6 Cal. 440.
See People vs Provinces, 34 Calif. 541 for criticism of reasoning of this case, though not of the result.
2. Russell vs Cooley, 69 Ga. 215; In re North Milwaukee, 93 Wis. 616; Ford vs North Des Moines, 80 Iowa, 626; See McDonald vs Morrow, 119 N.C. 666, that judges may be required to exercise supervision over elections clerks. Ex p. Siebold, 100 ULS. 371. Sundry Citizens etc. 2 Flipp. 228.
3. Staude vs Election com'rs. 61 Calif. 313.
4. Cornell vs People, 107 Ill. 372; People vs Williams 51 Ill. 63; People vs Morgan, 90 Ill. 558; Ross vs Chosen Freeholders, 69 N.J. L. 291.
5. Terre Haute, vs Evansville, etc. Ry. 149 Ind. 174. (Contra Houseman vs Kent Circuit Judge, 58 Mich. 364). Solem Turnpike etc. vs Essex County, 100 Mass. 282.
6. Hoke vs Field, 10 Bush. (Ky.) 144.
7. Johnson vs De Hart, 9 Bush (Ky.) 640.
8. N.J. Zinc. Co. vs Board of Equalization, 70 N.J.L. 186; State vs Myers, 52 Wis. 628; Com. vs Collier, 213 Pa. St. 138. See also Lee County vs Rogers, 7 Wall 175 and Stansell vs Levee Board, 13 Fed. 846.
9. Sweet vs Holbert, 51 Barb. 312; Walker vs Cincinnati, 21 Oh. St. 39.

a resident of a county to take charge of an confine an insane person,¹ members of a board of children's guardians,² excise³ and bridge commissioners.⁴

Although it may be said, therefore, that the weight of judicial authority in the United States sustains statutes authorizing the exercise of appointive powers by the courts, yet in Iowa, Maryland, Michigan, Montana, North Carolina, and Massachusetts a contrary doctrine had been declared, on the theory that the appointment to office is an executive function and cannot be imposed upon or delegate to the judicial department of government.⁵ Thus in Massachusetts the proposition has been squarely decided that the appointment of officers not connected with the judicial machinery of the state, such as election commissioners, cannot be conferred upon the judges without a violation of the tripartite scheme of government.⁶ And in Michigan it has been held that it is not in the sphere of judicial duty or functions to appoint surveyors in order to enable the court to relevy a tax which has been declared invalid.⁷ The supreme court of

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1. Madison County vs Moore, 161 Ind. 426.
 2. Wilkinson vs Children's Guardians, 158 Ind. 1.
 3. Schwarz vs Dover, 70 N.J.L. 502.
 4. State vs George, 22 Ore. 142. See also Bd. of Com's. of Jackson County vs State, 147 Ind. 476, requiring courts to perform certain duties as to relocation of county seats.
 5. State vs Barbour, 53 Conn. 85; Evansville vs State, 118 Ind. 426; People vs McKee, 68 N.C. 429. See also Heinlen vs Sullivan, 64 Cal. 378.
 6. Election Maps. Case 114 Mass. 247.
 7. Houseman vs Kent Circuit Judge, 58 Mich. 364 The Mich. Const. however expressly prohibits exercise or appointive powers by judges except in a few cases, (Art. 6 Sec. 10).

Maryland said: with reference to the reason for its position that statutes, of the kind in question are void, "The mere fact that a judge is called on by statute to execute a certain function does not make it a judicial function. Its character is dependent on its qualities, not on the mere accident as to the person designated to do it.¹ So in the states holding the minority doctrine, it has been held that laws relating to the appointment of waterworks trustees,² jail visitors,³ and county school commissioners⁴ are invalid.

In Minnesota a statute conferring upon the district courts of the state the power to appoint examiners of titles under the Torrens Law, was upheld by the supreme court. Chief Justice Start, speaking for the court said: "The examiners provided for by this act are subordinate officers or assistants of the courts, to aid them in the discharge of the judicial duties imposed upon them by the act. It was therefore competent and proper for the legislature to provide for their appointment by the courts, as much so as would be a

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1. Beasley vs Ridout, 94 Md. 641, quoting Robery vs Prince George's County, 92 Md. 150.
 2. State vs Barker, 116 Iowa 96.
 3. Beasley vs Ridout, 94 Md. 641.
 4. Johnson vs De Hart, 9 Bush (Ky.) 640. See State vs Towns, 153 No. 91. Holding invalid act for appointment by court of successful contestant under corrupt practice act. See also Prince George's County vs Mitchell 97 Md. 330, and In re Weston, 28 Mont. 207.

statute authorizing them to appoint a stenographer or a receiver in insolvency.-- The registration is the act of the court. The fact that it may be done by the registrar, under general orders, where there is no question, is not different from the power of the clerk to enter judgement, in cases ripe for judgement, under a general order or rule of court."¹ The only case in the state, however, which led to a thorough judicial discussion of the doctrine of the separation of powers and the exercise of appointive functions by the courts, is that of State vs Brill, which was decided in 1907. In that case the court held unconstitutional an act of the legislature which empowered and required the judges of the district court of Ramsey County to appoint a board of control to have charge of the almshouse and hospital of that county and for the City of St. Paul. In an elaborate opinion by Justice Elliott, which is one of the leading judicial discussions of the question, it was pointed out that the doctrine of separation of powers is well established under both federal and state constitutions, the history of the development of the theory was traced, and it was said that, "The tendency to sacrifice established principles of constitutional

1. State vs Westfall, 85 Minn. 437 (1902).

government in order to secure centralized control and high efficiency in administration may easily be carried so far as to endanger the very foundations upon which our system of government rests.-- Although there are some decisions to the contrary, it is generally conceded that the power to appoint to a public office is in its nature an executive function,-- (although) there are some exceptions which are necessary in order that the several departments may exercise their express powers and functions without embarrassment,-- (such as) the appointment of subordinate officers and employees immediately connected with the court." The Supreme Court held that this board was administrative in character, entirely disconnected from the judiciary, and that if the courts could be required to appoint its members, they could be compelled, under the same principle, to appoint a mayor, members of the board of public works, a chief of police, all other city and county officers; and the highest court in Minnesota could be required to appoint the state board of control, bank examiner, the regents of the State University, and other State Boards and Commissions. The judiciary could then be compelled to supervise its

appointees, remove them, investigate their actions, report concerning their administration, and even administer the department itself, and thus to render nugatory the constitutional prohibition, and entirely revolutionize the system of government.¹

The question of the exercise of appointive powers by the courts does not appear to have been directly passed upon or discussed in reported decisions, with express reference to drainage laws. In Illinois the validity of such statutes has been practically assumed without judicial comment or discussion;² in Minnesota, as we shall later indicate, a judicial ditch act was held not violative of the constitutional provision for separation of departments, but little or no attention was paid to the appointive feature of the statute.³ As to the tripartite theory and the supervisory authority of the judiciary in public ditch proceedings, as distinguished from its appointive authority, there is nearly an equal paucity of judicial discussion that is not dicta or beside the point. One Minnesota case squarely decides that such court supervision may be compelled or authori-

1. State vs Brill, 100 Minn. 499.
2. Blake vs People, 109 Ill. 504; Kilgour vs Drainage Dist. Ill. Ill. 342; Huston vs Clark, 112 Ill. 344; Owners of Lands vs People, 113, Ill. 296.
3. State vs Crosby, 992 Minn. 178.
4. Idem.

zed, and perhaps Indiana and Illinois may be said to have considered the question, and come to the same conclusion, but it is doubtful whether they can be cited as plainly supporting the propositions.¹ Indeed it seems that statutes providing ditch proceedings under the supervision of courts, are chiefly sustainable by arguments from analogy with reference to cases heretofore cited, and to the old established and well recognized practice of using the judiciary in the establishment of railroads and highways under the power of eminent domain.²

From the foregoing discussion it appears that a carefully drawn drainage statute will generally be sustained against the objection that it violates constitutional provisions requiring a separation of governmental powers in that it requires the courts to appoint drainage officers, or to supervise proceedings for the establishment of public ditches. This is upon the theory that the duties imposed are not strictly non-judicial in character; but it might well be argued that even were such duties non-judicial still the acts would be valid on the ground that the constitutional provisions relating to distinct

1. People vs Nelson, 133 Ill. 565. Scott vs Brackett, 89, Ind. 413.

2. 10 Am. & Eng. Ency. Laws, 1069 et seq. Lewis Em. Domain 3d ed. p. 739. Citizens Savings Bank vs Town of Greenburgh, 173 N.Y. 215. Bryant vs Robbins, 70 Wis. 258. (Tyson vs Washington County, 78 Neb. 711 Contra) Notes in 22 L.R.A. 1, and 60 L.R.A. 174. In Minnesota see Re St. Paul and N.P. Ry. 34 Minn. 227; Fairchild vs St. Paul 46 Minn. 540; Stroud vs G.N. Ry. 65 Minn. 515 Fohl vs Sleepy Eye Lake 80 Minn. 67 N. & St. L. Ry. vs Hartland, 87 Minn. 76; State vs Polk County, 87 Minn. 325. And especially McGee vs Hennepin Cy. 84 Minn. 432 Dunnell's Digest Minn. Secs. 3027 & 3092 et seq.

departments are not applicable to work done by, or to functions of, the county or similar public corporation or drainage district, as distinguished from the state itself. This argument need not be based upon any position to the effect that drainage work is not a function of the state government itself, but of its local subdivisions; nor is it necessary to enter into that domain of controversy as to whether or not a county or municipal officer in a given case (here that of drainage work) is acting as an agent of the state and as an officer of its central government, or merely as a representative of a public corporation.¹ Indeed that question has not received much of any attention in the decisions relating to the constitutionality of drain statutes.² It is sufficient to take the position that the application of the distributive clause is confined to what is clearly within the sphere of the central government, and to those persons who are clearly and unmistakably its immediate officers. While it is true that there are only a few decisions expressly and squarely supporting this view, there are apparently none to the contrary; and whether or not the courts have in theory as a rule recognized the fact, it is certain that

1. See 20 Am. & Eng. Ency. 1223. Dillon, Mun. Corporations.
2. State vs Flower, 49 La. Ann. 1199.

in practice the doctrine of separation has not been applied to counties, or to municipal corporations with any degree of strictness or consistency.¹ In county government it has been common for the county boards to exercise mixed functions; to make contracts,² provide public buildings,³ see to the construction of bridges,⁴ and highways,⁵ manage county funds,⁶ control liquor licenses,⁷ pass upon claims,⁸ and sometimes to levy and collect taxes.⁹ In short a careful separation of powers has not been required by the courts, nor has the *merger* of functions been seriously questioned in county affairs. And so in the case of municipal corporations, in the narrow sense of the term, it has been held that the principle of separation should be confined in its application to the departments of the state government, and not extended to those of public corporations such as the city. All the legislative power of the state itself is vested in the legislature, which in the absence of the constitutional

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1. 6 Am. & Eng. Encyc. Law, 1008.
People vs Provines, 34 Cal. 520, and infra.
Staude vs Election Com'rs. 61 Cal. 313.
Fox vs McDonald, 101 Ala. 51.
 2. 7 Am. & Eng. Encyc. Law. 989 and cases cited
Mitchell vs St. Louis County, 24 Minn. 459.
 3. 7 Am. & Eng. Encyc. Law 997 and cases cited.
 4. Idem, 997.
 5. Idem, 999.
 6. Idem, 1001.
 7. Idem, 1002.
 8. Idem, 1003.
 9. Idem, 1002.

restraints upon its right to organize municipal corporations, may, in the exercise of its discretion, and so far as the doctrine of separation is concerned, provide for any form of city government, and may vest legislative, judicial, or executive functions in one and the same person or authority.¹ Although this rule seems to have been followed in practice in the United States even from Colonial times, and to be generally recognized, yet that recognition is almost entirely a tacit one, and the question has not been the subject of much discussion in adjudicated cases.² It has been held that constitutional prohibitions of a merger of functions do not render invalid statutes authorizing or requiring mayors or town clerks to act as justices of the peace;³ for "from time immemorial similar powers have been conferred upon mayors of cities."⁴ Likewise it has been decided that the police judge of a city may constitutionally be compelled by statute to notify the county attorney of violations of the prohibitory liquor laws of the state, and furnish the latter with the names of witnesses to such offenses; such decision was upon the theory clearly stated that the

1. Cooley, Constitutional Limitations, 133; Smith on Corporations, Sec. 153; 20 Am. & Eng. Encyc. of Law, 1223 Cooley, 7th ed. p. 268. See also cases cited hereafter, and *State vs Barker*, 116 Iowa 109, 89 N.W. 204. especially at p. 208 in N.W. Rep.
2. 6 Am. & Eng. Encyc. Law, 1008. As to mayors as judicial officers see 1 McQuillen, Mun. Corp. Sec. 433.
3. *Uridias vs Morrill*, 22 Calif. 474; *Baltimore, etc. Ry. vs Whiting*, 161 Ind. 228; *Santo vs State*, 2 Iowa 220.
4. *Santo vs State* 2 Iowa. 220.

provisions of the organic law relating to distinct governmental departments did not apply to municipal authorities or governments.¹ This rule as to non-applicability has been more explicitly stated in cases affirming the constitutionality of city charters providing a commission form of municipal government. Thus the Supreme Court of Iowa in 1908 held valid the statute of that state which related to the city of Des Moines, and provided that the powers of the city - executive, judicial and legislative -- should be exercised by a single body composed of the mayor and four councilmen. The court said: in giving its reasons for upholding the statute, "Mayors of cities and towns have conferred upon them powers and duties both executive and judicial, and, particularly in towns, the mayor, in virtue of his right to vote on all questions coming before the council, constitutes in all strictness a part of the corporate legislative body. Boards of supervisors, city and town councils, boards of school directors, township trustees, and various individual officers are directly charged with and are in the performance of powers and duties, now, administrative in character, and again judicial, etc. -- The statute

1. State vs Keener, 97 Pac. 860. (Kan. 1908).

book of this state, as of every state in the Union, is replete with illustrative examples."¹ And in Minnesota, ^{the court with} the commission charter of Mankato was upheld by a similar line of reasoning, the court but briefly referring to the authorities on the question, including the California case of People vs Provines.²

In that case the Supreme Court of California, overruling a long line of their own decisions on the point, squarely and explicitly took the position that the very definite constitutional provisions of that state relating to tripartite government were not applicable to local governments such as counties or municipalities. Although the court based its decision in part upon the wording and arrangement of the sections of the constitution and in part upon the fact that there are no county or city officers referred to in the express exceptions to the prohibition of a merger of functions; yet its position was justified principally by reasons which would apply to cases arising under the organic law of nearly any state in the Union. These are (1) that in practice separation has never been strictly enforced in local affairs; (2) that such an enforcement results in a reductio ^{ad} absurdum,

1. Eckerson vs City of Des Moines, 137 Iowa, 452. To the same effect see Bryan vs Voss, 143 Ky. 422 and State vs Ure, 135 N.W. 224 (Neb).
2. State vs Mankato, 136 N.W. 264 (Minn. 1912).

and would require a multiplicity of officers, and such a cumbersome and unwieldy procedure in many cases as to be preventative of any efficiency or expedition in the administration of local matters; (3) that it was not the purpose nor intention of the constitution makers to extend the doctrine of distinct departments to the minor subdivisions of the state. In speaking of the reasons why such provisions were incorporated into organic laws in the United States, the court referred to the development of abuses in England from the lodgment of more than one function in the same authority; and then said of the framers of American constitutions, "The mischief, however, against which they sought to provide, did not come from inferior or subordinate officers, but from the higher grades, in whose hands the first and leading powers of the government were vested. So far as the former were concerned, they were sufficiently under the control of the latter. Abuse of power could not come from the former in such measure as to destroy or overthrow the liberties of the people, except by directions or connivance of the latter. To surround the latter with checks was a sufficient protection against the former. Hence the framers of American consti-

tutions were content with checks upon the latter, leaving the former, as we consider, to be regulated by the legislative department."¹

From the foregoing review of the authorities, it seems generally established in the United States that, even in the absence of specific constitutional authorization, the legislature of a state may enact general drainage statutes, which, if properly drafted, will be sustained as a legitimate exercise of the powers of eminent domain or taxation, or of the police power, against any attacks upon the ground that they are violative of those provisions common in our organic laws to the effect that the powers of government shall be exercised by three distinct and separate departments.

In Minnesota the right of the Legislature to enact general drainage statutes without express constitutional authority has been referred to the police power, the power of eminent domain, and the taxing power.²

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1. *People vs Provines*, 34 Calif. 520 (1868) overruling *Burgoyne vs Comr's* 5 Calif. 1, and later cases to same effect, and followed in California in *Holly vs County of Orange*, upholding a drainage statute. See also *Elliott, Mun. Corporations*, 196. For cases of mixed functions in local affairs see Appellant's brief in *Burgoyne vs Comr's* supra; and as to County courts, *Stone vs Wilson*, 39 S.W.49 (Ky.) *State vs Judges*, 21 Ch. St.1. *Walker vs City of Cincinnati*, 21 Ch.St.14; *Phinizy vs Eve*, 33 SE 1007 (Ga.).
 2. *Curran vs Sibley Co.* 47 Minn.313.
Witty vs Nicollet Co. 76 Minn.286.
Lien vs Norman Co., 80 Minn. 58
State vs Polk Co., 87 Minn.325
Minn. C.P. Co. vs Koochiching Co., 97 Minn. 429.
State vs Rockford, 102 Minn.442.
Van Pelt vs Bertilrud, 134 N.W.226.

The bases of the legislative right were merely incidentally referred to in the cases of *Curran vs County of Sibley* and *Witty vs Nicollet County*, decided in 1891 and 1899 respectively. The first case passed upon by the Supreme Court of the State in which the authority of the legislature was directly challenged, and the constitutionality of drainage laws in Minnesota, squarely at issue was *Lien vs Norman County* which was decided in 1900, thirteen years after the enactment of the first great drainage statute in Minnesota. In that case it was claimed that the act of 1887 (Chap. 97 Laws 1887, G. S. 1894 Sec. 7793 et. seq.) was unconstitutional because it authorized the taking of private property for a private use, and provided for a levy of taxes which were not uniform or based upon the value of the property. The Supreme Court, however, held the act constitutional. Speaking through Justice Brown it said: "The authority of the Legislature to enact drainage laws is derived from the police power, the right of eminent domain, or the taxing power, and is undoubted. 10 Am. & Eng. Encyc. 2d ed. 233. It is founded in the right of the state to protect the public health, and provide for the public convenience

and welfare -- Where the laws have for their object the reclamation of large tracts of wet and swampy land for agricultural purposes, they are sustained under the right of eminent domain. The fact that large tracts of otherwise waste land may be thus reclaimed and made suitable for agricultural purposes is deemed and held to constitute a public benefit. When the object is to drain such lands in the interest of the public health and welfare, such laws are sustained and upheld as a proper exercise of the police power.

Bryant vs Robbins, 70 Wis. 258. Wurts vs Hoagland ---
There can be no question but that the act is in the interest of the public and for exclusively public purposes. No ditch can be -- established unless the County Commissioners expressly find that it will be 'of public utility or conducive to public health, or of public benefit or convenience.' -- It does not matter that in accomplishing the public objects of the act private interests are advanced. Such a result is merely incidental and does not effect the validity of the law. 'It is not necessary in order to constitute a public use, that the whole community or any large portion thereof should participate in the use, or that all should be equally

benefited.' Ross vs Davis, 97 Ind. 79. 16 Gray 417,
37 Ohio State 508. 10 Am. & Eng. Encyc. 2d Ed. 225.

The benefits may be limited to the inhabitants of a small locality, and if they are enjoyed in common by all, the use is sufficiently public ---- In all cases where such laws are authorized the further power and authority to provide for assessing the cost and expense of the improvement against the lands benefited, follow as a natural result. The power to so assess the cost of the improvements against lands benefited is a necessary and proper incident to the exercise of the power to make the improvement. And a statute providing therefore is not open to the constitutional objection that it is unequal taxation."¹

The constitutionality of the act of 1897 (Chap. 318 Laws 1897) was attacked in 1903, but merely on the ground that it embraced more than the subject expressed in its title. This claim was held untenable, and the validity of the act affirmed.²

The drainage act of 1901 (Chap. 258. Laws 1901) differed from prior statutes in this State, in that it did not expressly and in so many words declare that its

1. Lien vs Norman County, 80 Minn. 58

2. Gaare vs Clay County, 90 Minn. 530.

purpose was to subserve the public health, convenience, or welfare; nor did it specifically provide for a determination of the question as to whether or not a particular ditch was of public utility by the county commissioners. And it was again urged by those seeking to overthrow the statute that it authorized the taking of private property for a private purpose. The Court, however, refused to recognize these objections to the law. It is said that "while the element of public health is often made an important factor in the consideration of statutes of this kind, it is believed that any public benefit, such as the improvement of highways or the reclamation of large tracts of otherwise waste lands is sufficient to support and sustain them. 1 Lewis Em. Dom. 2d Ed. Sec. 188.--- To authorize proceedings under the statute -- that question (Whether a public benefit) must be determined either at the preliminary hearing upon the petition, or at the second or final hearing. While the statute does not in express terms require the board to determine it, the existence of the fact being essential to their authority to proceed in any case and essential to the validity of

the statute, too, the power to determine it must be implied."¹ The court not only applied in this case the familiar principle that the presumption is in favor of the constitutionality of legislative acts, and that they should not be declared void on account of mere mistakes, omissions, or inaccuracies of language unless a clear repugnance to constitutional provisions results therefrom; but it frankly admits the influence of considerations of expediency upon its decision, and expressly refers to the fact that large sums of money had been spent in numerous proceedings already conducted under the statute, and that disastrous results would follow, were the Court to hold it invalid.

In the case of State vs Crosby 92 Minn. 176 (1904) the Supreme Court of Minnesota affirmed the validity of the drainage statute of 1902 (Chap. 38, Laws 1902). This act relates to the construction of ditches under the authority of the District Court; it was attacked on the ground that it attempted to confer upon the courts legislative and administrative powers. The court in its opinion written by Justice Brown said: "The marked tendency of legislation in recent years, not only in this State, but in other States, has been, to a large degree, to break

1. State vs Polk County, 87 Minn. 325.

away from the theory of three separate and independent departments of government, by imposing upon other departments, duties and powers of a legislative character, which the courts have been inclined to sustain. Perhaps few, if any, cases are to be found, however, where statutes imposing purely legislative duties and powers upon the courts have been upheld; but the authorities are numerous, sustaining statutes which impose upon the courts powers involving the exercise of both judicial and legislative functions--such as the condemnation of land for public purposes, the appointment of commissioners of election in proceedings for adding territory to municipal corporations, and laying out and establishing highways. The proceedings provided for by the statute under consideration involve the exercise of both legislative and judicial powers. The question of the propriety ^{is it} of necessity of public ditches to drain marshy or overflowed lands is one of legislative character. The condemnation of land through which such ditches may be constructed, the assessment of damages, and the determination of the legal rights of parties affected are judicial. The exercise of all these powers is involved in proceedings under the statute.

The power and authority to lay out and open public highways is legislative in its nature and in no

sense except in some details is it judicial. Yet we have sustained legislation providing for the laying out and opening of so-called judicial highways; statutes conferring upon the district courts of the State authority to lay out and open highways where they extend into two or more counties. State vs Ensign 55 Minn. 278. State vs McDonald 26 Minn. 455. ---Though the power and authority in each case is legislative in character, in carrying out and applying the statutes the exercise of judicial functions is also involved. No distinction can be made between the judicial highway and the judicial ditch --- There being no logical distinction, the statute under consideration must be sustained, or we must overrule the cases "as to highways." "We prefer to follow those decisions and sustain this statute."

The judicial ditch act was again attacked in 1904. It was claimed that since the law required an assessment against the land owners of all the benefits received, and then permitted the town supervisors to assess the same lands for the cost of repairs and the removal of obstructions, there was double taxation, and the taking of property without due process of law.

But the court following its previous decisions in State vs Polk County and State vs Crosby (92 Minn. 176) held the act constitutional, reaffirming their position in a very brief opinion.¹

In the case of Miller vs Jensen 102 Minn. 391 (1907) the Supreme Court upheld the validity of the act of 1907 against the objection that it authorized the taking of private property without due process of law and for a private purpose. Chief Justice Start in the opinion dismissed the objections of those opposed to the law with a brief reference to the prior decisions of the court.

Chapter 191 of the Laws of 1907 was declared unconstitutional in that year in State vs Rockford, (102 Minn. 442). The court pointed out that the county drainage act had been held public in character and therefore constitutional, and did not question the correctness of its prior decisions to that effect. But it held that the act of 1907 was different in character. Under it proceedings could be instituted (1) when public health might be in danger, (2) when the drainage would result in the reclamation of waste lands, (3) or "where the construction of such ditch or drain is (was) of benefit to the lands of the adjoining owners or owners." The

1. McQuillan vs Freeborne County 93 Minn. 16.

court said: "The use of the disjunctive in this connection is significant.-- Under the express terms of the law of the property of adjoining landowners may be taken for a private purpose only.-- The law authorizes the taking against the owner's will of enough of his lands to make a ditch, or the imposition of a burden on that land to that extent against the owner's will, and for the benefit of an adjoining landowner. It is plainly designed to promote individual convenience."

In 1908 section forty of ~~Chapter~~ 448 of Laws of 1907 was likewise declared void and unconstitutional; but this was not upon the ground that the purpose of the statute was not public, but because of a faulty method of assessing benefits, which the court considered as resulting in taking private property without due process of law, and without just compensation therefore. It pointed out that if, after a public ditch has been constructed, and the entire cost thereof assessed upon all lands benefited thereby, another ditch be constructed so that it discharges its waters into the original ditch, whereby the cost of keeping the first drain in repair and of enlarging it when necessary is increased, it is obvious that the lands benefited by the new ditch should be assessed for their just and proportionate share of the cost of maintaining the original ditch; that the legislature evidently intended

to enforce this equity by the section in question; that it arbitrarily provided that the owners of land along the new or second ditch should pay into the county treasury the same proportion of the benefits received by their lands that the lands assessed for the original ditch were forced to pay; that is, this did not provide any reasonable means of ascertaining the actual benefits to landowners along the new ditch from the maintenance of the first one. The cost of establishing and constructing the original drain, matters as to which landowners benefited by the new ditch had neither notice nor opportunity to be heard, were by the act in question made the basis of an inflexible rule. If the method prescribed by the statute were followed in a case where the cost of building a certain ditch was seventy-five per cent of the benefits received, then the owners of the land drained by it before a second ditch was constructed so as to empty into it, were forced to pay into the county treasury a sum equal to that seventy-five per cent. But those benefited by the new ditch must also pay into the treasury a corresponding seventy-five per cent. This the court held to be a taking of an amount arbitrarily fixed, without any reasonable relation to benefits received, and therefore uncompensated and without due process of the law. The act was also criticised because

it failed to specify the purpose to which these payments were to be devoted; so that it was problematical whether or not that purpose was a public one.¹

Chapter 230 Laws of 1905 Sec. 26 authorized the county commissioners to widen and deepen ditches, and to assess the costs of repairs and removing obstructions against the owners of land benefited without any provision being made for a hearing. This the court held invalid because without due process of law. ~~It~~ pointed out that if the statute authorized ordinary repairs it would follow Iowa and some other States, and hold notice and hearing unnecessary because of small amount involved and the delay that would result from requiring such hearings. But this act went further and permitted the county commissioners to widen and deepen ditches already built. This might result in the construction without notice or a hearing of new ditches in effect, if the enlargement were sufficiently great. To that extent the act was unconstitutional.²

These last two decisions of the Supreme Court of Minnesota show that it is careful to preserve the ostensibly public character of drainage acts as justification for them. But it is clear that in Minnesota as in other States the courts have seen that unless some constitutional

1. County vs Lyon vs Lien. 105 Minn. 55.
2. State vs McGuire. 109 Minn. 88. For brief reaffirmance of constitutionality of drainage acts see Van Pelt vs Bertilrud, 117 Minn. 50.

ground for general drainage acts could be found, less progressive owners of land, by refusing to allow their more progressive neighbors to build ditches across their lands could prevent the reclamation of swamp lands, and retard the development of the county[^]. But it is also apparent that in many cases, as an actual fact the purpose of the work is really private, and for no public purpose whatsoever, so far as the legal definition of that term is concerned, and that the courts have seized upon the possible benefits to the public health or welfare as a mere pretext for upholding legislation which practically everyone agrees to be wise.¹

The legislatures of the States, in the exercise of their constitutional right to enact general drainage statutes, have as a rule provided a system of drainage procedure the principal features of which are substantially as follows:

1. The county court, or circuit court, county commissioners or supervisors, are given authority to administer the law, and in most States[!] the procedure is kept within the county (although sometimes several counties may co-operate); and with the exceptions of South Carolina and California which require reports to the Governor, and
1. Freund Police Power. Ed. 1904.

Minnesota and Florida which have State commissions, the State government itself takes no direct part in the work.

2. The proceedings are initiated by petition to the county commissioners or corresponding authority, signed by a certain number of land owners, describing the lands which it is proposed to drain, and indicating in general the location, size, direction, and number of proposed ditches, and asking for the establishment of a drainage district. The petition must be accompanied by a bond conditioned to pay all costs in case the board refuse to establish the drainage district.

3. If the petition complies with the law, the board appoints a certain number of viewers, who examine the land and file with the board a report containing a description of the lands that will be benefited or damaged, the amount and kind of drainage required, and a finding as to whether the total costs of the work will exceed the total amount of the estimated benefits.

4. The Board, after publishing and personal notice to persons whose lands will be likely to be affected by the proposed work, has a hearing at which objections to the proposed work are heard and considered, as well as the report of the viewers. The board may either dismiss the petition, if it discovers that the work will cost more

than it is worth, or if it will not be of public benefit or utility; or it may declare the drainage district organized.

5. When the district is organized the board orders a complete survey, maps and plans and specifications to be made by an engineer; and a report is filed by him which contains an estimate of the cost, and a description of the lands benefited or damaged.

6. The board may amend or adopt the engineer's report; then it either awards ~~or~~ damages to, ~~an~~ assesses benefits against individual landowners itself, or it appoints special commissioners to do that work. The reports of assessments charged against, and damages allowed to, each tract of land are filed with the board, and then a public hearing is held at which persons charged with benefits or allowed damages may object to such awards and assessments. These may then be changed by the board so as to make them more equitable.

7. The board lets contracts for the work to the lowest responsible bidder and appoints an engineer X

(sometimes the statutes require that the work be done by the county surveyor) to supervise the work, and report as to whether or not the plans and specifications are being complied with by the contractors.

8. The assessments for benefits as a general rule are made a first lien upon the property benefited, and are usually collected in the same way as taxes, but generally in installments extending over several years. The moneys collected constitute a separate drainage fund which is used to reimburse the country for preliminary costs advanced by it, and to pay off the bonds issued by it or the district. In many states these bonds may be issued to the extent of ninety percent of the cost of the work, provided the landowners so decide by vote, or, in some cases ~~at~~^{at} request in their petition. The laws generally provide that the bonds shall not be sold at less than par, and prescribe a maximum rate of interest. The landowners are protected by provisions for due notice to them of all steps in the procedure which may effect their interests, and by the right to file protests against the proceedings, or to object at

at public hearings or otherwise to allowances of damages and assessments of benefits, and to appeal to the state courts.¹

"In appendix 2 is given a list of the statutes upon which the text is based and a brief summary of their provisions. For the sake of clearness, and brevity, it seemed best to confine a discussion of the statutes in particular states and of any provisions not covered by the text, because of local or peculiar character, to the Appendix. If any state is not referred to in this Appendix it is an indication that up to the year 1914 it had enacted no general drainage law.

To enter into a discussion of the adjudicated cases relating to drainage procedure would be proper in a treatise on the law of public drains, but would unnecessarily prolong this thesis, and would not be particularly valuable since it would involve a treatment of many questions of detail dependent for their solution largely upon the construction or provisions of particular statutes. It seemed best to confine the statement of the principles derived from the case law on the subject of public ditch acts, to the ~~narrow~~^{broad} question of the constitutionality of such laws.¹

1. For matters relating to adjudication of questions of more detail and of procedure the reader is referred to articles on drains in such works as Am. & Eng. Encyc. of Law; Cyc. of Pleading and Practice; and to notes in 58 L.R.A. 353. (Assessments) and 60 L.R.A. 161 (Procedure).

THE DEVELOPMENT OF DRAINAGE LEGIS-
LATION IN MINNESOTA.

The first law relating to drainage in Minnesota was an act of August 3d, 1858, entitled, "An Act to regulate and encourage the drainage of lands." This statute provided that any number of persons might associate for the purpose of draining lands, and be incorporated with the usual powers of a corporation, after filing a copy of their proposed charter with the register of deeds of the counties through which their drains were to be constructed. Before the corporation could commence to construct ditches it would have to secure the written consent of the majority of the owners or occupants of the lands through which the drains were to pass. Published or posted notices were to be given of the course of proposed drains, and a description of the lands over which they were to be laid out. Such drainage companies could levy a pro rate tax on all lands benefited. Land owners assessed could construct lateral ditches, but no other persons were authorized to do so without the consent of the corporation. The land-drainage company was to be liable

for all damages due to its drains injuring or overflowing lands of private owners without their consent. Such damages were to be assessed by a jury in action brought in any court of record, but no vindictive damages were to be allowed.

Three years after the passage of this act, when land was still plentiful and cheap, and men were engrossed in the problems of a new frontier state, it was perhaps natural that Governor Ramsay should refer optimistically and but briefly to the drainage problem in Minnesota. After referring to the fact that the state has 5,000,000 acres of swamp lands, not "miasmatic bottoms, reeking with the elements of disease," but "flat low lands of the summit levels," he said of them in his message to the legislature in January 1861, "From their nature and situation they are capable of easy reclamation; and in fact this is being gradually effected without expense, by the progress of cultivation and settlement. And it is well known fact that a constant and rapid process of drainage is going on in the upper lake country by the silent agency of nature, which in no long time will add largely to the agricultural areas of the state. In a climate so dry as ours, we may naturally expect that lands of this class will eventually be the most valuable of these lands,

in the state." Far-seeing as Governor Ramsey, was as to the future value of these lands, he thought that it would be sufficient if "the silent agency of nature" were aided merely by requiring purchasers of swamp lands from the state, to drain them as one of the conditions of sale. He made no further suggestions as to drainage legislation.

As might be expected, there was no drainage legislation during the period of the Civil War, but by Chapter 27 of the Laws of 1866, it was provided that any person owning swamp land and desiring to drain it, but considering it necessary to ditch lands of other persons, who refused to permit him to do, so, might apply to a justice of the Peace. Such justice would cause summons to be served ~~on~~ such owner if a resident of the county, and if not, then on the occupant of the lands through which the applicant desired to construct a drain. After sufficient notice and hearing, the justice of the Peace might dismiss the application for any sufficient reason, or else he could summon a jury in the same way as in a civil case. This jury should personally examine the premises and report to the court whether or not it considered that the ditch petitioned for would be "necessary and advantageous" and also report the amount of damages

which it considered just compensation to the owner of the land crossed by the ditch. Appeal from this finding could be taken to the ~~D~~istrict Court. The work could not be proceeded with until the applicant paid to the person through whose lands he wished to construct the ditch, the amount of the damages assessed by the jury. The persons laying out the drain, his heirs and assigns forever, ~~were~~^{ed} to have the right to enter on other lands for the purpose of cleaning and preparing the ditch, and persons obstructing it were to be liable to the one constructing it in double damages, such damages to be determined by a jury.¹

In 1874 a statute was enacted which authorized the board of town supervisors in any township to open ditches for the purpose of draining public highways. On notice from the overseer of highways, the chairman of the board of town supervisors was to call a meeting of the board, and then the members were to examine the premises personally, have a public hearing after published and posted notice, and then assess/damages and benefits against land owners, and order the construction of the ditch by the supervisor of highways under their direction, if they

1. Laws 1866, Chap. 27.

should deem such action advisable. All damages were to be paid in the same way as these assessed for the construction of public highways. Appeal could be taken to the district court as in civil actions.² It will be noticed that the prime object of this law¹ as not the drainage of lands for agricultural purposes, but for the improvement of highways.

In 1877 an act was passed "to provide for the draining of wet lands, marshes, and swamps." Persons desiring to open ditches across the lands of neighbors who refused to allow such construction, could appeal to the town supervisors, who were to hold a public hearing after due notice, determine on the application, assess damages and benefits, and determine the course of the drain. The applicant, after first paying the damages assessed, was to construct the ditch himself, and after it was completed if the land-owners assessed for benefits did not pay such assessments to the applicant who built the ditch, such assessments were to be filed with the Register of Deeds and constitute liens on the lands benefited. Persons feeling aggrieved as to assessment for damages could appeal to the District Court.³ Thus by this

2. Laws 1874, chap. 57.

3. Laws 1877, chap. 91.

statute of 1877, the principle of a public hearing and an assessment of damages and benefits by the town supervisors in the drainage highways under the law of 1874, was carried over and applied to the drainage of lands of private persons for purely agricultural purposes. The requirement of the law of 1866 (relating to action by the justice of the peace) that the one desiring the ditch should build it himself and first pay the damages, was continued.

An act of March 10, 1879 provided among other things that when it should be necessary to extend any drain into more than one town, the supervisors of the town where the application was first filed should submit the same to the county commissioners of that county at the first subsequent meeting, and on being satisfied that such ditch or drain was a "public necessity or accommodation" such county commissioners should direct the supervisors of the several towns, to take measures for the construction or extension of such ditch in their respective towns.¹ This statute may be noticed for two reasons: (1) because it marks the first use of the board of county commissioners, which has been one of the chief agencies used in drainage work in this state, and which

1. Laws 1879, chap. 38.

is still the basis of Minnesota's drainage system, and (2) because it is one of the first illustrations of the fact, that, as drainage work progresses, it becomes necessary to extend the ditches over larger and larger portions of the watershed, and, as a consequence, governmental agencies having successively greater territorial jurisdictions ^{is} are found necessary. In this particular instance, no doubt these who had constructed ditches as far as they could under authority of the board of supervisors, that is, to the township line, often found difficulty in getting neighboring supervisors to permit them to enter their townships at all, or at least soon enough to be of any benefit to such ditches constructors. And so the county commissioners were to be used as a means of securing that united and reasonably prompt action by several town boards that was found necessary whenever a ditch was to extend through more than one township. ^{the use of}

Probably this act of 1879 did not prove satisfactory to those who wished to open drains through more than one township, for a statute of March 1st 1883 provided for regular proceedings directly through the board of county commissioners, without any action by the town supervisors. This law, chapter 108, furnishes many of the principle features of the present scheme of drainage

procedure. It provided that the board of county commissioners, should have power at any regular session, when the same should be "conducive to the public health, convenience, or welfare," or where the same would be of "public benefit or utility," to cause drains to be constructed in the county. The principal acts authorized or required by the law were as follows:

- (1) Petition filed with the County Auditor, signed by one or more of the land-owners whose lands were liable to be effeted by, or assessed, for the construction of the proposed drain, setting forth its course in general.
- (2) Bond by petitioners, conditioned to pay all expense in case the county commissioners should not establish the ditch.
- (3) Appointment of three resident freeholders as viewers.
- (4) Viewers, with a civil engineer, to make a survey of the course of the proposed ditch, estimate the cost of the work in detail, "apportion to each parcel of land and to each corporate road or railroad and to the county when public highways are benefited, a share of said ~~work~~ *cost* in proportion to the benefits which will result

to each from such improvements," provide general plans for the ditch, and determine whether it will be of "public utility." The viewers also *were* to assess the damages that any person might sustain by reason of the construction of the ditch, to establish the route, and report in full to the county auditor by a certain time.

- (5) Notices to be published, and posted in certain places for three successive weeks by the auditor, and describing route, lands crossed or assessed, time and place of hearing etc.
- (6) Public hearing at which the county commissioners determine whether the ditch will be of public utility, or convenience, or will promote the public health.
- (7) Review of the proceedings of the viewers to be taken by "reviewers" on remonstrance of persons interested in the ditch.
- (8) Final report, and order of construction by the county commissioners.
- (9) Appeals by persons "aggrieved" from order of the county commissioners determining:

- (a) Whether conducive to public health, convenience, or welfare.
 - (b) Whether route is practicable.
 - (c) Whether assessments are in proportion to the benefits.
 - (d) Amount of damages allowed.
- (10) Auditor to let jobs to lowest bidders.
- (11) Acceptance by county surveyors, by certificate, such to be liens on the lands against which such pieces of work were respectively charged.
Collected like taxes.
- (12) Repairs to be made by town supervisors. Paid out of general township fund, reimbursed by assessing lands for benefits.

Thus the town supervisors, who had been the agencies used in the drainage laws of 1877, were now to be used for the purpose of making repairs instead of original construction.

The act of 1883 further provided that whenever the route of a proposed drain was to extend into two counties or more, the petition should be signed by one or more of the land owners in each county whose land was liable to be assessed, and filed with the auditor of the county containing the head or source of the proposed drain. A copy of the petition should then be transmitted

to the auditor of each other county interested, after which the county commissioners of such counties should appoint viewers to meet and act conjointly. The joint ditch could then be established by action of the county commissioners, auditors, viewers, and other officers, acting together, and following the procedure provided for ditches extending through single counties alone, so far as practicable.¹ Thus there was an attempt to anticipate the demand that would be sure to arise for some means of securing the action of the necessary officials in more than one county whenever it should be found necessary or advisable to extend a ditch into more than one county. We shall note later on, that this provision for the joint action of several different bodies proved unsatisfactory, in the same way that the act of 1879 which required the working together of different boards of town supervisors, where a ditch was to extend into more than one township, did not work well.

Between 1875 and 1891 there were fifteen acts passed authorizing certain persons named in the acts to drain lands bordering on certain lakes, or to lower such lakes on securing the written consent of land owners affected, and in some cases filing such consent with the

1. 1885, chap. 108.

Register of Deeds and acknowledging them in the same way as deed of real estate.¹ In 1883 and 1885 certain named persons by special act were empowered to drain specified lakes on complying with the laws of the state relating to the drainage of wet lands.² Acts of 1875 and 1876 authorized any persons to drain lands near lakes named in the acts on giving bonds to the county commissioners conditioned to pay all damages assessed by such commissioners in case the ditching should be accomplished.³ A special statute of 1883, passed three days before the "county commissioners" drainage law of that year, permitted the drainage of a lake in Douglas County by certain named persons, provided the total costs were paid" by all the

1.	Special Laws,	1875,	chap.	152
	"	"	"	153
	"	1875,	"	159
	"	1876	"	192
	"	"	"	193
	"	1876,	"	194
	"	1876	"	195
	"	1877,	"	127
	"	1879,	"	187
	"	1883,	"	268
	"	1883,	"	309
	"	1885,	"	193
	"	1889,	"	358
	"	1889,	"	300
	"	1891,	"	408
2	"	1883,	"	267
	"	1885	"	192
3	"	1875,	"	157
	"	1876,	"	190

owners of lands whose lands shall be benefited by such drainage.¹ And an act of 1887 gave the county commissioners of Anoka County authority to ditch certain marsh on apportioning the benefits, damages, and expenses, and complying with the requirements of the law of 1883 and acts amendatory thereto.² These statutes, special in character as they are, are indicative of the difficulties met with, during this period from 1875 to about 1887 or 1891, in connection with the drainage of meandered lakes, and the dealing with special problems in certain localities, as well as the need of a comprehensive code of drainage laws.

P The first organized attempt to secure the enactment of a carefully worked out and comprehensive statute that would provide a satisfactory procedure for the drainage of wet lands, arose in the Red River Valley, because of the great need of drainage in that section. The Minnesota side of the Red River Valley is composed of three planes, all of which slope towards the north, like the bed of the river. The planes to the west and east have a sufficient incline to be tolerably well drained by natural watercourses, but the middle plane, which is ten miles wide and about two hundred and twenty-five miles long, has a slope of but a few inches to the

1. Special Laws 1883, chap. 257

2. Special Laws 1887, chap. 357.

foot or about two feet per mile, is crossed by practically no small streams, and its drainage aided very little by the few large ones because their courses are so winding as to be incapable of rapidly carrying off storm water. Red River lands are, as well known, among the richest wheat producing lands in the world, but the farmers in this middle plane soon found its lack of proper drainage a serious handicap. If they seeded early, a frost would be almost certain to destroy their crop, because the soil remained wet so late in the spring that a frost was more disastrous on their lands than on the better-drained and drier lands to the east and the west. If they put off their seeding until they were sure to escape any late frosts, they had difficulty in maturing their crops, or else they frequently lost advantages which might have been gained had they been able to get their wheat earlier to market. Thus it was natural that the need and advantages of artificial drainage should early be seen in this section of the state, and land owners there take the first steps as an organization to secure the action of the state.

The first attempt to drain lands in this middle section, that can be traced, were made ^{under} the direction of Mr. J. J. Hill as President of the St. Paul, Minneapolis and Manitoba Railway Company, one of the predecessors of the Great Northern Railway Company. About 1879 ditches were constructed along the line of the railroad for the purpose of carrying off storm waters, especially in the spring. It is true that prior to that year certain energetic owners of large farms in the valley had built a few drains, but these were quite small and were strictly private enterprises. The Great Northern ditches were about fifteen in number, and their aggregate length was about forty-five miles. With the exception of one ditch sixteen miles long they were from one-half to three miles each in length, not much more than three feet wide at the bottom, and not very deep. They were located in Kittson Polk, Norman, and Glay counties.¹ As the engineer for the drainage commission says in the report of 1899, "Without doubt much good was done by these small pioneer ditches, not the least of which was the object lesson they furnished to the farmer of what service even small drains could be. From the working of these they could

1. Report of Drainage Commission, 1899.

easily see of what incomparable good larger ditches would be if they were of adequate size."¹ Thus it is clear that these railroads and private ditches, though small, strictly local in character, and far from adequate, especially during the spring freshets, are nevertheless of importance as leading the way to the development of a comprehensive system of drainage.

In June of 1886, newspapers in the Red River Valley published a call for "a general mass convention" of the people of that section to meet in Crookston on the first and second of July, "for the purpose of considering the subject of drainage in said section generally, and to devise means for the accomplishment of a thoroughly effectual and general system of drainage for said section of country." All interested persons and three delegates from each of the towns and cities in Wilkin, Clay, Marshall, Polk, Norman, and Kittson counties were invited to be present and take part in the discussion.² At the meeting of the convention in July, two of the principle addresses were given by Mr. J. J. Hill, and C. G. Elliot, a drainage engineer from Illinois.³ The former pledged the hearty co-operation of the railroad company

1. W. R. Hoag in same report.
2. Crookston Times, June 5th 1886. Call signed by E. D. Childs, M. R. Brown, H. Steenerson, Wm. Main, C. Sangstad.
3. Mr. Elliot, up to a recent date was chief of drainage investigations for the U. S. Dept. of Agriculture.

which he represented, and which at that time owned 1,013,000 acres of land in the Red River Valley, and suggested a payment for drainage work by direct assessment on lands benefited. The latter after pointing out the great benefits to be derived from drainage in the Valley, described the plan of doing work in Illinois, where a majority of the land owners in any township, not less than one-third of the area being represented, might petition the county authorities for a survey, after which the work might be constructed under the road masters who acted as ditch supervisors. The expense of main drains was met by issuing bonds, and sub-drains were built on the farms of private land owners at their own expense. One skeptical delegate said that the whole valley was not worth enough to pay for the cost of drainage, and a few representative from Kittson County were a little afraid that the construction of drains opening into the Red River might lead to the overflowing of that stream to the damage of the lands along the lower part of its course. These men were, however in a very small minority. It was the general opinion of the men in the convention that before anything could be accomplished there must first

- (3) Crookston Times, July 3d 1886.
J.J.Hill, "Highways of Progress." pp. 184-202.
Drainage Commission. Report of 1899.

be an accurate topographical survey of the section which it was proposed to drain, and the sum of \$10,000 was to be raised for that purpose, one-half ~~by~~ the counties concerned and one-half by the Great Northern Railroad. Mr. Elliott was appointed chief engineer and Mr. Fanning consulting engineer, and the convention then adjourned, to meet again in the following December after the survey should have been completed.

The convention met again at Crockston on December 8th 1886, and received an exhaustive report for the engineers who in the meanwhile had completed the topographical survey.¹ The report established the feasibility of draining this section, defined what ditches were needed, and indicated in a general way their location. It called for about 275 miles of main ditch cost about \$750,000.² A committee of five members, one from each of the counties interested, was appointed to prepare and present to the legislature ~~in~~ a general drainage --

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1. J.J.Hill, "Highways of Progress." pp. 184-202. The legality of contributions by the counties towards the expenses of the topographical survey had been seriously doubted, but some had suggested that the county treasurer nevertheless honor the warrants of the county commissioners, in view of the need of a survey as a prerequisite to a demand for action by the legislature that was to meet in a month (Crockston Times) Aug. 7, 1888. Later the legislature did authorize the counties of Kittson, Wilkin, Norman, Polk, Marshall, to contribute to such expenses, and legalized their action if they had already done so. (Spec. Laws, 1887, chap. 222, pp. 834. Feb. 21, 1887).
 2. Drainage Commission, Report of 1899. W. R. Hoag.

law, such law to embody provisions for the "organization of drainage districts as municipal corporations; the equitable assessment of benefits and damages; the charging of lands benefited with cost of construction and maintenance, for main drains and outlets, and also the damages to land injured; the construction of roads in connection with ditches;----- for the prosecution of work by bonds to be paid from the assessments of benefits; for the payment of those assessments by installments extending through a series of years; and the appointment of a state drainage commission, whose duty it shall be to approve and supervise in a general way the work of the districts ---." ³ Another resolution also was unanimously adopted which called on Governor Hubbard and Governor elect A.R.McGill, in their messages to the legislature to call attention to the need of "careful and judicious legislation on the subject of drainage and the justice and necessity of a very liberal appropriation by the state to open up the obstructed river channels in "that section of the state."¹

At the opening of the legislative session in the following January, Governor Hubbard expressed his willingness to comply with the request of the Crockston

3. Crockston Times, Dec. 12th, 1888.
1. Crockston Times, Dec. 12th, 1886.

convention and do what he could to aid in the drainage of the wet lands in the Red River Valley, but stated that the constitution stood in the way of state aid since section 10 of article 9 provided that "the credit of the state (should) shall never be given or loaned to aid of any individual association or corporations;" and section 5 of article 9 prohibited the state from contracting "any debts for work of internal improvement," or becoming a "party in carrying on such works except in cases where grants of land or other property shall have been made to the state specially dedicated by the grant to specific purposes." But he stated that appropriations² of portions of the internal improvement fund which is biennially distributed to aid in the construction of roads and bridges could very properly be devoted to drainage purposes as herein contemplated.² Governor McGill in his inaugural message to the same legislature took a substantially similar position, and then went on to urge the passage of a "well considered" drainage law. He said: "The law on the subject now on the statute books, has been found inadequate to the necessities, and should be radically amended or superseded by an act much more comprehensive

2. Crookst

Gov. Hubbard, Message Jan. 5th 1887.

Ex. Docs. 1886-7, Vol. 1, p. 29.

and better adapted to our wants."¹ In spite of the work of the legislative committee that had been appointed by the Crookston Convention, the suggestion of Governor Hubbard, and the support of men from the Red River Valley, the legislature of 1887 made no general appropriation in aid of drainage in that section;² but it did do considerable in the way of improving the general laws of relating to drainage. It elaborated the system that had been provided by the laws of 1883 for procedure through the county commissioners,³ and provided that lands owned by

1. Gov. McGill, Message Jan. 5th 1887. Ex. Doc. 1886-7 vol. 1, p. 58.

2. Drainage Commission Report of 1899. Legislative Manual 1909, p. 314.

Please note that I say "general" appropriation. It is true that in 1885, and up to as late as 1897 there were a few special appropriations. Thus in 1885, \$700 was appropriated out of the internal improvement fund to be spent by the county commissioners of Renville County on drainage work. Special Laws 1885, chap. 69. Similar laws are cited below with the amounts purposed for which to be spent, and authorities under which the work was done.

Gen. Laws 1891, C. 162, title P, county commissioners, Waseca. \$800. Bridge & to drain lake.

Gen. Laws 1891, C. 162, title Z. county commissioners, Steele. \$700. Roads and to drain lake.

Gen. Laws 1895, C. 807. County commissioners, Pope. \$3000. Drainage.

Gen. Laws 1897 C.103, title 114. Town supervisors in Ottertail county. \$75 Drainage.

Gen. Laws 1897 C.103 title 86. Three men named. Town of Carlos, Douglas County. Drainage \$100.

Gen. Laws 1897 C.103. title 94. Three men appointed by the Governor. Kandiyohi County. Drainage. \$100.

(Gen. Laws 1893, C.241. Reimburse Becker County for money paid out in ditching the state lands. \$980. Not strictly to be included here; really curative in character).

3. Laws 1883, chap. 108.

the state should be subject to assessment for benefits in the same way as the lands of private persons,¹ this latter provision having been suggested by resolutions of the convention at Crookston.² The law of 1883 had allowed appeals to be taken to the courts on four grounds alone, but the statute of 1887 allowed appeals on five grounds now including the question whether the total costs exceeded the total benefits. Damages were to be paid out of the county treasuries, which were to be reimbursed from the assessments of benefits. The county commissioners were authorized to issue bonds to provide funds for drainage works, and might "transfer from the general revenue fund of the county to such drainage fund any surplus moneys -- that can be properly used for the purpose" of the drainage act.³

Up to this time there was no permanent drainage organization in the counties, or books, funds, or accounts. The county commissioners and other officers merely acted on each petition as it was presented, and supervised the construction of each ditch, and the matter was dropped. The law now provided that the county commissioners by majority vote at any regular meeting might organize the county into a drainage district. The county commissioners

1. Laws 1887, chap. 97, sec. 22.

2. Crookston Times, Dec. 12, 1886.

3. Laws 1887, chap. 97.

were to constitute a permanent board of drainage commissioners, and by that name should be a body corporate with power to sue and be sued etc. They should have general supervision and control of all drainage matters pertaining to their district, subject to the provisions of this act of 1887. Their accounts as drainage commissioners, and the records of their meetings as such were to be kept separate from those of county commissioners. The county auditor was to be clerk of the drainage district, and the county treasurer its treasurer. Sub-drainage districts could be organized on petition of a majority of the land owners in a district having a common outlet, if owning one-third of the lands affected. The board of drainage commissioners was to issue bonds for the benefit of such sub-drainage districts.¹ These two acts of 1887 were patterned after drainage laws in Illinois.²

Another statute of the same year provided that town supervisors might construct ditches on petition of not less than six legal voters owning real estate within one mile of the proposed drain. The supervisors were to examine the premises personally,³ and the

1. Laws of 1887, chap. 98.
2. Drainage Commission Report of 1899, p. 16. W.R. Hoag. (Crookston Times, Dec. 12th 1886. C.G. Elliott on the procedure in Illinois.)
3. Laws of 1887, chap. 99.

petitioners were to pay all damages assessed before they could open the ditch.¹

Governor McGill in his Message to the Legislature of 1889, stated that these laws of 1887 met the needs of the state generally, but that more comprehensive measures were needed for the Red River Valley.² The farmers in that section were having difficulty with their wheat crops because of heavy frosts which were causing severe losses because of the wetness of the soil, and men from that section urged the legislature to give special assistance to those seeking to drain lands in that part of the state, but their efforts were unavailing in 1899 and 1891.³

Chapter 221 of the Laws of 1893, is worthy of considerable notice, not so much because of the things which it accomplished at that time, but because it was the germ of the present state drainage commission, which is of such great importance in the conduct of drainage operations in this state at the present time. By that act, the Legislature appropriated the sum of \$25,000 per year for four years, to be expended in opening closed

1. This latter provision was added by chapter 168 of the Laws of 1889, which expressly repealed C.99 of the Laws of 1887, but substituted similar procedure.
2. Gov. McGill. Message of Jan. 9th 1889. Ex. Doc. 1889 vol. 1, p. 49.
3. Gov. Merriam. Message of Jan. 9th 1889. Ex. Doc. 1889 Vol. 1, p. 49. Legislative Manual 1909, p. 314. Drainage Commission, Report of 1899.

error in paging 160 omitted

watercourses in eight counties of the Red River Valley. An amount equal to one-fourth of this sum was to be contributed by the Great Northern Railway Company as an additional fund for the work, which was to be done under the supervision of a board of audit, consisting of the governor, Secretary of State, one person named by the Railroad Company, and one person chosen by the chairman of the Board of County Commissioners of the counties concerned.¹ The Railway Company contributed its share of the money and its chief engineer served on the board of audit.² Further appropriations to continue the work of this commission were made by later legislatures.³ By a subsequent act of the board was to continue in existence until 1902.⁴ And under a law of 1897, a board of state drainage commissioners was created. It consisted of three members appointed by the Governor for three year terms and serving without compensation. It was to have the care and control of all the ditches constructed under Chapter 221 of the Laws of 1893, and Chapter 164 of the Laws of 1895 i.e. under the Red River Board of Audit; cause annual inspections of such works by a competent engineer; and

1. Laws 1893, chap. 221.
2. Legislative Manual. 1899, p. 314. Gov. Nelson. Message of Jan. 9th 1895. Ex. Docs. 1894, vol. 1, p. 27.
3. Laws 1895, chap. 164; Legislative Manual, 1909. p.314.
4. Laws 1897, chap. 142.

require the county commissioners to keep them in repair and free from obstructions. Evidently this board was to tend to the details of the work while the Board of Audit was to tend to construction and financial matters.¹

In 1901 the present state drainage commission was created, consisting of the Governor, the Secretary of State, and the State Auditor, with practically the same powers and duties that it has at the present time.² Since these powers and duties will be discussed in a later chapter dealing with the existing system and procedure, it is unnecessary to give them in detail, at this point.

From 1901 to the present date, every session of the Legislature has seen the enactment of a constantly increasing number of drainage laws, because of a steadily increasing demand for lands in this state and a growing realization of the many advantages of land drainage and its profitableness. These statutes have made a great many changes in the laws, as to details, and are so voluminous that to attempt to trace them in any detail would serve no purpose unless it would be to confuse the reader. Consequently, this thesis will confine itself to a very brief reference to them. A list of such statutes may be found

1. Laws 1897, chap. 318.

2. Laws 1901, chap. 90.

in Appendix 1, for the convenience of any person who may wish to pursue the matter further.¹

An act of 1901, relating to county drainage, collected together in one act the previous enactments as to procedure through the county commissioners.² This was amended by a Law of 1902, which provided a procedure to be followed whenever it was desired to extend a ditch into more than one county, such ditches to be constructed under the supervision of the judge of the District Court of the judicial District in which such counties are located.³ It will be remembered that the drainage act of 1883 attempted to meet the demand for machinery that could be used in constructing drains through several counties by providing for joint action by the county officers, who were to follow the procedure used in the establishment of county drains so far as possible. Doubtless such a plan was cumbersome, and it was difficult to secure prompt and harmonious action by the many officials involved, in the same way that a similar difficulty was met with in the procedure under the Law of 1879 relating to action by several boards of town super-

1. Thus the approximate number of pages of drainage statutes enacted by the legislatures of 1905, 1907, 1909 and 1911 respectively are, 46, 90, 50 and 43. In the session of 1907 there were 14 separate acts passed relating to drainage.
2. Laws 1901, chap. 258.
3. Laws 1902, chap. 38.

visors. Of course the Revised Laws of 1905 contained a compilation of all existing unrepealed laws on the subject,¹ but many details considered necessary by the legislature were omitted in the revision. Chapter 230 of the Session Laws of 1905 supplied these details and is practically the latest complete statute on the subject of drainage.² By an act of 1909 a procedure through township supervisors was authorized.³ In addition to these acts there have been several curative acts.

To summarize briefly, then, the following were the chief steps in the development of drainage legislation in Minnesota:

- (1) Private drainage corporations authorized. 1858.
- (2) Procedure through Justice of the Peace. 1866.
- (3) Drainage ~~to~~ highway purposes alone, through town supervisors. 1874.
- (4) For agricultural purposes, through town supervisors. 1877.
- (5) County Commissioners may have town boards act together, if ditch is to extend into more than one town. 1879.

1. Revised Laws of 1905.
2. Laws of 1905, chap. 230.
3. Laws of 1909, chap. 127.

- (6) Procedure through County Commissioners. 1883.
- (7) Permanent county drainage districts. 1887.
- (8) Red River Valley Board of Audit. 1893.
- (9) State drainage commission. 1901.
- (10) Judicial Ditches. 1902.
- (11) Complete Laws. Chapter 230. 1905.
- (12) Procedure through town supervisors. 1909.

(Revival of old procedure; similar, as to agency used, to Law of 1877).

Thus we may trace the origin of the use of those agencies that are at the present time engaged in drainage work, back to the following dates; the town, 1877; the county, 1883; the district court, 1902; the state drainage commission, 1893.

There is one fact that is apparent, from the development of drainage laws in Minnesota, and that is, that, as drainage work has been developed it has been found necessary to extend the ditches over larger and larger areas without regard to the artificial boundary lines of towns, counties, or judicial districts, so that the use of governmental agencies having ever greater territorial jurisdiction and more power and authority has been found to be advisable. Whether it is either desirable or probable that any still more powerful agent be used, will be discussed in another chapter.

DRAINAGE PROCEDURE IN MINNESOTA.

In Minnesota public drainage ditches may be established by procedure through any one of four agencies; (1) the town supervisors, (2) the county commissioners, (3) the district courts, (4) the state drainage commission. The steps to be taken in the construction of public drainage works through action by the county commissioners, are much the same as those necessary for the establishment of ditches by means of other governmental bodies, and the general outline and underlying principles of the county drainage law are typical of the drainage statutes of the State in general; so that this chapter will contain first a description of the procedure followed at the present time in establishing county drains. It will then point out the principal differences between such procedure and that followed in the laying out of town, judicial, and state ditches, as well as the general principles embodied in the drainage statutes and decisions of the state courts relative to procedure in general.

Before the county board can establish any ditch or drain, a petition must be filed with the county auditor,

signed by one or more of the land owners whose lands are liable to be affected by or assessed for the expense of the construction of the same, or by the supervisors of any township or the officers of the council of any city or village, or by the duly authorized agent of any public institution, corporation, or railroad, whose lands are liable to be affected by or assessed for the expense of the construction of the proposed ditch, or by the state board of control. Such petition must set forth the necessity of such a drain and that it will be of public benefit or promote the public health, and must also contain a description of the proposed starting-point, routes, and termini.¹ It must be accompanied by a bond conditioned to pay all expenses in case the county board shall fail to establish the ditch petitioned for².

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1. In the petition it is sufficient that the starting-point, course, terminus be stated with approximate accuracy; the board in ordering the construction of a ditch being finally guided by the description as contained in the surveyors report. State vs Pope County 87 Minn. 325, State vs Lindig 96 Minn. 419. Johnson vs Morrison County 107 Minn. 87. See State vs Watts 118 Minn. 326. Showing a petition as to health and public

Note:-

benefit need not be in language of statute, State vs Watts 116 Minn. 326. Technical nicety of description in ditch proceedings, nor language such that every layman may trace the ditch upon the ground not required. (Dictum) in Slingerland vs Grant County 113 Minn. 214.

A petition need not describe the land by sub-divisions to correspond with individual ownership. If an entire section is within a district it may be described as a section, through the subdivisions are owned by different persons. State vs Quinn, 108 Minn. 528. The proceedings are purely statutory, (Lager vs Sibley County); and in invitum, (Harran vs Sibley County, 47 Minn. 313), and in rem, (McMillan vs Freeborn County 93 Minn. 16).

2.

Where petitioners did not sign bond and there was failure to establish ditch, they were not liable for preliminary expenses paid by county even though they signed petitions, McLeod County vs Nutter 111 Minn. 345. Where five petitioners for ditch signed bond as principal each is liable to pay one-fifth of preliminary expenses regardless of the benefit which it appears from viewer's report he would have received had ditch been constructed, Gugisberg vs Eckert 101 Minn. 116. (bond under Laws 1901 c. 258) Obligors not liable where order establishing ditch was set aside for irregularity; bond not designed to indemnify county against failure of its officers to comply with the law (bond under Laws 1901 c. 258) Freeborn county vs Helle 105 Minn. 92.

Notice of the filing of the petition, and of the time and place of the hearing thereon, must then be given by the county auditor by publication for three successive weeks in a newspaper published and printed in that county and by posting for at least three weeks in three public places in each township where the proposed work is located and at the door of the court house. Printed copies must also be mailed to all non-residents of the county whose lands lie within two miles on either side of the routes specified in the petition and whose addresses are known to the auditor or can be ascertained by inquiry at the county treasurer's office.

The county board, when it is satisfied that all of these steps have been taken, appoints "a competent and experienced civil engineer,"¹ whose duty it is to make a survey of the line of the proposed drain, estimate the number of yards of each to be excavated, the cost of excavation per yard and of construction work considered necessary, such as flumes and masonry, and the total cost of laying out the whole work, including preliminary expenses. The engineer is also to furnish the general specifications for doing the work, and to make out a form of contract which shall give him the right, with the con-

1. Laws 1905 c.230 sec. 3. Amended by laws 1907 c.367. sec. 1, Laws 1909c.469, sec. 2. Laws 1911 c.384 sec. 1. (Laws 1905 c. 311 was repealed by Laws 1907 c. 367 sec. 11).

sent of the county auditor, to modify his plans and specifications as the work proceeds," provided that no changes are made that will substantially impair the usefulness of any part of the ditch, or substantially alter its original character or increase its total cost by more than ten per centum." Under certain circumstances the engineer may vary somewhat from the line specified in the petition. In case the route proposed is along public highways, he is to prescribe such a disposition of the excavated matter as will improve such highways; and, so far as practicable, he is to locate the ditch on division lines between lands owned by different persons, and to avoid constructing it diagonally across lands, but he is not to "sacrifice the general utility of the ditch to avoid diagonal lines." Before entering on his duties, the engineer is required to give bonds to the county in the sum of \$5,000 for the use of the county, or for the indemnification of all persons injured by any negligence or malfeasance on his part while acting in the establishing of the ditch. The results of the engineer's work are to be set forth in a detailed and tabulated report to be made to the board of county commissioners, and filed with the county auditor.

auditor.¹

At the same session of the county board at which the engineer is appointed, or within at least ten days thereafter, the board selects three resident free holders of the county, "not interested in the construction of the proposed work, and not of kin to any of the parties known to be interested therein," to act as viewers. These viewers then make a tabular statement showing: the names of the owners of each tract to be benefited or damaged, the description of ^{each} tract benefited or injured, the amount of damage or benefit to each, the damage, if any, to riparian rights, the estimated benefits to public and

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1. Laws 1905, chap. 230. Sec. 4 Amended by Laws 1911. chap. 384, Sec. 2. Laws 1905, chap. 230. Sec. 5. Amended by Laws 1909 chap. 469, Sec. 3.

A change by the engineer in starting point, even if not authorized by laws 1905 chap. 230, Sec. 4, is no defense to proceedings to obtain judgment for assessments lien, State vs Mack 112 Minn. 493, following Johnson vs State 111 Minn. 255. For authority of engineer to lay out proposed ditch along practicable lines see State vs Watts 116 Minn. 326. In State vs District Court 114 Minn. 424, a judicial ditch, court held notices of first hearing properly posted, altho in only one town; it appearing that proposed ditch was wholly located in that town.

corporate roads, roadbeds, or railroads, the damages awarded to natural and artificial persons, and the total estimated benefits in respect to the entire ditch and branches. They also report "whether or not, in their opinion, the estimated expense of the construction of such ditch, including the damages awarded therefore, are greater than the utility of the proposed ditch, or that the construction of such ditch is impracticable for any reason, stating the reason why it should not be constructed."¹

All lands benefited are to be assessed in proportion to the benefits received from the construction of the ditch, whether or not it passes through such lands; and all lands owned by the State or any of its departments are liable to assessment in the same way as taxable property.²

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1. Laws 1905, chap. 230 Sec. 6. Amended by Laws 1909 Chap. 469, Sec. 4. Provisions directing board to appoint viewers within specified time are directory merely, and neglect to strictly comply therewith does not invalidate the proceedings, *McMillan vs Freeborn County* 93 Minn. 16 (Under Laws of 1901 Chap. 258)
 2. Laws 1905, Chap. 239. Sec. 7. Amended by Laws 1905 Chap. 469 Sec. 5. The sum of \$5,000 per year, beginning with 1905, was appropriated out of the general revenue fund of the State to pay assessments against State lands which might be levied under authority of the above statutes. (Laws 1905, Chap. 230, Sec. 24. Laws 1909 Chap. 469, Sec. 5).

The report of the viewers must be filed with the county auditor, and all their duties performed within thirty days from their first meeting,¹ which meeting must be held within fifteen days after the filing of the engineer's report.²

Upon the filing of the viewer's report, a special meeting of the board of county commissioners is held, at least three week's notice having been given in much the same manner as the notice of the petition and first meeting of the board. At this second meeting the county board heard and considers the petition, and the reports of the engineer and viewers. All persons interested may appear before the county commissioners and be heard by them. The county board may resubmit to the engineer or viewers for reconsideration the matters originally reported upon by them, or amend their respective reports.³ If the board finds that the engineer's and the viewer's reports, and all other proceedings in the matter, have been made and had in accordance with the statutory provisions, and that the estimated benefits to be derived from the construction of the work are greater than its total costs,

1. Delay in viewer's report necessarily caused by high water, inclement weather, or unavoidable accident may be excused by county commissioners. Laws 1905 Chap. 230. Sec. 8.
2. Laws 1905, Chap. 230 Sec. 6. Amended by Laws 1909 Chap. 469 Sec. 4.
3. Laws 1905, Chap. 230, Sec. 9. Amended by Laws 1907 Chap. 367, Sec. 21 and Laws 1911 Chap. 384, Sec. 3. Heinze vs Buckham 104 Minn. 389.

including damages awarded, and that such damages and benefits have been duly awarded and assessed, and that the proposed work will be of public utility or benefit or promote the public health, and that the reports are complete and correct, it establishes the ditch as specified in the report of the civil engineer, and confirms the report of the viewers.¹

In its final order establishing the ditch the county board is limited to the description thereof as set forth in the petition, subject to such reasonable departures in the course distance and termini as are necessary to render the improvement of practical utility. An extension of a proposed ditch for a distance of seven miles, for example, beyond the terminus named in the petition, is unauthorized where the length of the ditch as originally petitioned for its only four miles.² A radical departure by the engineers and county commissioners from the line of a public ditch as demanded in the petition may render the order of the county commissioners laying out the ditch and all subsequent proceedings void, and the abandonment of terminus as petitioned for and its

1. Laws 1905 chap. 230, sec. 10. Amended by Laws 1911 chap. 384, sec. 4. So also the court in judicial proceedings at second hearing is required to determine the utility of the proposed ditch. And the fact that the petitioners have expended money on faith of the first determination will not prevent court from differing in its conclusion at the second and final hearing from that at the first or preliminary hearing and determination. *Wheeler vs Almond* 110 Minn. 503.
2. *Lagers vs Sibley County* 100 Minn. 85 Under Laws 1905 chap. 230.

establishment on the land of a private owner when the petition designates a proper outlet is unwarranted.¹ And if waters are to be diverted from their natural source, the ditch must follow the general direction of the water-course and terminate therein whenever it is practicable to do so; although there may be a reasonable departure where such is necessary to secure a practicable drain.² The order establishing the ditch must in itself, or by reference to the viewer's report, which is itself sufficient, definitely locate the ditch by giving the proper starting point, route, and terminus.³

Within ten days after the filing in the office of the county auditor of the order establishing the ditch, such auditor sells the jobs of digging and constructing the entire work, either as one job, or in linear sections of one hundred feet each. Notice of the letting of the work, and requests for bids, must be published in the official newspaper of the county for three successive weeks, but no bid is to be entertained which exceeds the estimated cost by more than thirty per cent.

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1. *Jurries vs Virgens* 104 Minn. 71. Under Laws 1905 chap. 238. sec. 3.
 2. *State vs Baxter* 104 Minn. 364 Under Laws 1905, Chap. 230, sec. 1.
 3. *Johnson vs Morrison County*, 107 Minn. 87 Under Laws 1905. chap. 230 sec. 10. Order laying out ditches sustained on certiorari against objection that the drainage district was unlawfully split; that as good or better drainage could be obtained by other routes at less expense and with less, if any, damages; and that

The engineer attends to the letting of the work, and no bid can be accepted by the auditor without the approval of such engineer as to the compliance of the bid with the plans and specifications. The auditor enters into the contract with the lowest responsible bidder,¹ but such contract must require the work to be done according to the report, plans and specifications of the engineer, and subject to his approval and that of the county auditor, and must be drawn to the satisfaction of the engineer and the county attorney.² The contractor must furnish a bond in the penal sum of not less than the contract price, conditioned that he will faithfully perform his contract and pay all damages which may accrue by reason of the failure to complete the work in the manner and within the time required in the contract. Of course the contract by the auditor is in the name of the county.³ On compli-

 note 3 continued:

the ditch ordered was inadequate in its responsibilities, in State vs Buckham 108 Minn.8. See also Slingerland vs Conn. 113 Minn 214. State vs Watts 116 Minn. 326. Gourd vs Morrison County 126 NW.874. For case relating to sufficiency of evidence to support certain finding that certain lands were damaged see: Backus vs Wronoy 104 Minn. 242.

1. Laws 1905 Chap. 230 sec. 4.
2. Laws 1905 chap. 230 sec. 15. Amended by Laws 1911 chap. 384 sec. 7 and Laws 191E chap. 568 and Laws 1913 chap. 578 sec. 1.
3. Laws 1905 chap. 230 sec. 14. Landowner is entitled to sue on a bond of contractor (under Laws 1902 chap. 38 sec. 10) Eidsvik vs Foley 99 Minn. 468. Owners of land in a drainage district are not entitled to recover from the contractor and his bondsmen for a loss of profits arising from failure to complete ditch within the time specified (under laws 1901 chap.258) Grams vs Murphy 103. Minn. 219.

ance with certain statutory conditions, the contract may be altered, or the time for completing the drain extended, In case of default, the jobs may be resold.¹ Whenever any contractor has completed his job the work is inspected by the engineer, and if he finds that the contractor has been performed according to the plans and specifications, he reports that fact to the county board and gives the contractor a certificate stating that such work has been properly finished. Certificates showing partial performance may also be issued during the progress of construction under certain statutory restrictions, one being that those for work done shall not exceed seventy-five per cent of its total value, nor those for materials or supplies as more than fifty per cent of their total value.² These certificates become prima facie evidence of the completion of the work only after approval by the county board, and they may be exchanged for warrants due and payable at once

1. Laws 1905 chap. 230 sec. 15 and 16. Amended by Laws 1911 Chap. 384. Sec. 7. Laws 1913 chap. 568, and Laws 1913 chap. 578 sec. 1. Laws 1913 chap. 22, secs. 1 and 2.

2. There is an exception as to maximum percentages with reference to contracts involving more than \$30,000.

out of the general ditch fund of the county.1

1. Laws 1905 chap. 230 sec. 17. Amended by Laws 1909 chap. 469 sec. 6, Laws 1911 chap. 384 sec. 13 and Laws 1913 Chap. 567 sec. 1. Under the act of 1887 it has been held that the authority of the county surveyor is limited to inspecting the work of the contractor, when completed, and, if he finds the same in accordance with the specifications of the viewers, to accept it and give the contractor a certificate of acceptance; and that he has no right to authorize the contractor to incur extra expenses which are not embraced within the original specifications; that the cost of ditch work must be assessed against property benefited so that the board has no authority to incur any liability on behalf of the county for material or services; and that even though the board accepts a ditch as complete, knowing that the contractor by direction of the county surveyor has spent money not embraced by specifications yet such acceptance does not make the county liable therefore. *Bowler vs Renville County* 105 Minn. 26. Partial payments may be made without approval of county board (under laws 1905 chap. 230 sec. 17) *Moody vs Brasie* 104 Minn. 463. Mere irregularity in the award of contract has been held not to defeat a recovery against the county, *Interstate D & I Co. vs Freeborn County* 158 Fed. 270. For case holding that the engineer's estimate is not the basis of the bid; that an action by contractor lies against the county to reform a contract for mutual mistake of parties thereto, such action not being considered as one against the county for an error by one of its officers in the exercise of governmental functions see *Mulgrew vs Freeborn County* 112 Minn. 5. In awarding contract to "lowest responsible bidder" auditor is not limited to consideration of financial responsibility of bidder but may exercise sound discretion and consider fitness and ability of bidder to do the particular work, so that award to one not lowest bidder may be sustained if sufficient reason therefore. *Kelling vs Edwards* 116 Minn. 484. Approval of certificates is condition precedent to issue of warrants by auditor and board cannot be controlled in approval by mandamus, contractor's remedy being a suit on the contract. *State vs Clarke* 112 Minn. 516. In such case contractor is not required to resort to certiorari to review refusal of board to approve; Sec. 620 of R.L. 1905 requiring presentment to board of claims against County as condition precedent to suit against county is not applicable to the final payment due contractor in drainage proceedings, *Merz vs Wright County* 114 Minn. 448.

When damages are awarded to any person or corporation in excess of benefits, warrants are issued at the expiration of the time allowed for appeals to the courts, and these warrants become due and payable immediately after the setting of the contracts. In order to meet the expenses of constructing the drain, the county commissioners issue the bonds of the county, in terms not exceeding twenty years, and bearing interest at the rate of not more than six per cent per annum. The proceeds derived from the sale of these bonds are placed in, and constitute the general ditch fund of the county.¹ Thus the moneys used for the payment of damages,

1. Laws 1905 Chap. 230 Sec. 18. Amended by Laws 1907 Chap. 367 Sec. 3. and Laws 1909 Chap. 469 Sec. 7. The bonds issued by the county are the direct and general obligations of the county, and its auditor and board cannot be restrained from issuing bonds in such form on the ground that the legislature intended the lands assessed to be the security, and not the county itself, or that if the legislature intended the latter it had no power to do so. "To bring the best price and a ready sale, bonds must be issued by an obligor whose responsibility is readily ascertainable and undoubted.-- Prospective purchasers of bonds might well be turned away, if the law is that the only security is the assessments against benefited property." And as to the power of the legislature the court said: "The construction of drainage ditches being the exercise of a governmental function, delegated to the counties of the state for the promotion of public health, welfare and utility, there ought to be no doubt that all the property within the county may be subject to a taxation to provide the funds therefore. The most, or part, of this burden is laid on property specially benefited is no reason why the owners of other property thus relieved should have any warrant for claiming that the law violates any of their constitutional rights. In other words the legislature may provide different taxing districts within a county, and is not bound by governmental subdivisions therein." Van Pelt vs Bertilrud 134 N.W. 226.

awarded and of the warrants which are given to the contractor in exchange for the engineer's certificates of completed work, are derived in the first instance from the sale of county lands.

As soon as possible after the letting of the contract, the county auditor makes out a tabulated statement showing: (1) The names of the owners of the lands, roads, and railroads benefited, (2) A description of these lands, (3) The number of acres benefited in each tract, (4) The amount of benefits to each tract of land, road and railroad, as well as of the damages thereto, (5) The amount that each of these lands, roads and railroads so benefited will be required to pay towards the cost of constructing the drain.¹ This statement is then filed with and recorded by the register of deeds of the county, and the amount which each tract of land, public or corporate road or railroad, is liable, for, together with interest thereon not exceeding six per cent, constitute a paramount lien on such property until paid, and takes precedence of all mortgages, charges, incumbrances or other liens of any kind.² These liens are to be paid off in ten equal annual installments, by the county board

1. Laws 1905 Chap. 230 Sec. 19.

2. Laws 1905 Chap. 230 Sec. 20. The amount charged against each tract of land bears interest at note more than six per cent as fixed by the county board which must make the interest rate the same as that on bonds issued. (Laws 1905 Chap. 230 Sec. 11 Amended by Laws 1911 Chap. 384 Sec. 12.

may provide for fifteen of such payments in its discretion. These liens are collected at the same time of the year and in the same manner as real estate taxes,³ except that in the case of railroads they are collectable in the same way as personal taxes.⁴ Thus the bonds of the county.

3. Laws 1905 Chap. 230 Sec. 22 Amended by Laws 1909 Chap. 469. Sec. 8.

4. Laws 1905 Chap. 230 Sec. 25 Amended by Laws 1909. Chap. 469 Sec. 9.

The duty of the county auditor to file the lien statement is mandatory, and no other and speedy remedy at law being available he may be compelled by mandamus to file such statement, or correct an insufficient one so as to protect the county. *State vs Johnson* 111 Minn. 10. (Same case held a delay of four years in filing such statement was not fatal to the rights of the county.) It has been held under G.S. 1894 Secs. 7810, 7811, that the lien attaches at the time provided in the statute, and the privilege given the landowner to pay the same in installments does not change the character of such lien, nor control the time when the lien takes place, which is upon the filing of the lien statement by the auditor; that the provisions of G.S. 1894 Sec. 1623 for the attachment of lines for ordinary taxes as between the state and the landowner as well as between grantor and grantee, do not affect or control the assessments provided for in the state drainage laws by virtue of the fact that such assessments are collected in the same manner as ordinary taxes; and that the liens provided for in Sec. 1623 and in Sec. 7811 are distinct, created for different purposes, attach at different times, and impose different conditions upon the landowners under a covenant against incumbrances upon the sale of the land by him. *Clapp vs Minn. G.T.Co.*, 81 Minn. 511. And under laws 1911 Chap. 258 it was held that recording of assessment list and statement is essential to the creation of a lien. *Meeker County vs Schultz* 110 Minn. 405. Prior to May 20, 1908 land of the United States entered as a homestead, but not finally proved as such, was not subject to the lien of a drainage assessment. *State vs Johnson* 111 Minn. 255. Where in proceedings to enforce a delinquent tax on real estate a defense is made to an installment for ditch assessment included therein on ground that proceedings establishing

are issued only for the purpose of supplying the funds that are needed at once for the construction of the ditch and the payment of damages, and for the purpose of lightening the burden of persons assessed for benefits by enabling them to pay such obligations in installments. The bonds issued are retired by the persons for whose benefit they were originally issued.

It is evident that great care is necessary in determining the principles to be followed in assessing land for benefits received, because of constitutional restrictions which might result in the courts holding the statutory provisions relative to such assessments invalid as inconsistent with the constitution of the state. The constitutional amendment authorizing the legislature to empower "municipal corporations" to levy assessments for local improvements, without regard to cash valuation of property assessed, has been held to authorize such legislation with respect to the powers of counties in drainage matters, so that costs of drains may be secured by assessments in accordance with benefits received.¹ And, as we have already pointed out, the legislature may, in the

Note 4 continued from page 308.

ditch are void, and a judgment is entered discharging land from such tax, such judgment is res adjudicata as to the enforceableness of subsequent installments; and landowners can compel county to remove cloud on his title raised by the apparent lien of the whole ditch assessment. Lindberg vs Morrison County 116 Minn. 504.

1. Dowlan vs Sibley County 36 Minn. 430.

enactment of laws providing for public improvements in the interests of public health, convenience, and comfort provide that the cost and expense of such improvements be assessed against lands benefited and improved thereby such assessments not being open to the objection that they result in unequal taxation.¹ But a statute providing in effect, that the owners of lands benefited by the construction of a new ditch and its connection with a ditch already established, for which their lands were not assessed, shall pay into the county treasury the same proportion of benefits received by their lands, that the lands assessed for the original ditch were forced to pay, is unconstitutional, since it deprives a class of land-owners of their property for a public purpose any compensation and without due process of law.² So that it is clear that great care must be taken in drawing and applying rules relating to assessments so as to avoid any arbitrary method of determining the amount of benefits received by an individual landowner. Although all lands benefited by a given ditch in whole or in part are to be charged in proportion to actual benefits received, yet

1. Lien vs Norman County 80 Minn. 58 See also Swenson vs Hallock. 95 Minn. 161. Gourd vs Morrison County 136 N.W. 874.
2. Lyon County vs Lien 105 Minn. 55 (Laws 1907 Chap. 448 Sec. 40).

it is not necessary in order to assess a given tract of land that the ditch pass through such tract; it is sufficient that it receives a benefit. But only direct benefits from the ditch in question can be considered, and not the benefits which the land may or will receive after some other and different ditch is constructed.¹ An allowance should be made for any damage to the riparian rights of the landowner against whom an assessment is made, as well as for any private ditch which he may have already constructed, and which can or will be used in the public ditch so as to decrease the cost of the latter.² The amount any land shall be liable for on account of the drain shall in no case exceed the benefits which will accrue thereto from the building of such drain.³ After the ditch has been opened, it is kept in repair and free from obstructions by the county board, the costs of such work being paid out of the general revenue funds of the county, which funds are reimbursed by assessments on lands charged for the construction of the drain in the

1. Laws 1905 Chap. 230 Sec. 7 Amended by Laws 1909 Chap. 469 Sec. 5.

2. Laws 1905 Chap. 230 Sec. 6. Amended by Laws 1909 Chap. 469 Sec. 4.

3. Laws 1905 Chap. 230 Sec. 38 The right of way of a railway company, paying a gross earnings tax in lieu of all taxes and all assessments as provided in Sp. Laws 1873 Chap. 111 is exempt from assessments for special benefits thereto from a public ditch. *Patterson vs Chi. Etc. Ry.* 99 Minn. 454.

same proportion as the original assessments.¹ And the county commissioners, after a report from viewers, may compensate persons whose lands have been damaged subsequent to the construction of a ditch, who were not paid for such damages in the original award of damages, provided a petition to that effect is presented to the board within six years after the completion of the ditch.² Ordinary repairs may be made without any notice.³

1. Laws of 1905 Chap. 230 Sec. 26 Amended by Laws 1907 Chap. 367 Sec. 4. and Laws 1909 Chap. 469 Sec. 10, and Laws 1911 Chap. 384 Sec. 8, and Laws 1913 Chap. 179 Sec. 1. Part of Laws 1905 Chap. 230 Sec. 26 was held unconstitutional in *State vs McGuire* 109 Minn. 88, but this was as to enlargement of ditches without notice, and not mere repairs. Consequently above statement still holds true. Wilful or negligent obstruction of ditches or injury thereto is a misdemeanor. Laws 1905 Chap. 230 Sec. 43 Amended by Laws 1907 Chap. 367 Sec. 7. But in a prosecution for obstructing a drain, it was held error to admit an order establishing the drain because of insufficiency of description, *State vs Lindig*, 98 Minn. 419. An action will lie against a town for obstructing a ditch. *Rasmussen vs Hutchinson* 111 Minn. 457. Since the power to assess property for local improvements is a continuing one, it may be exercised to cover the cost of maintaining a ditch. *McMillan vs Freeborn County* 93 Minn. 16.
2. Laws 1905 Chap. 230 Secs. 39-41.
3. *State vs McGuire* 109 Minn. 88 (See also *State vs McGuire* 114 Minn. 281).

The statutes relating to the procedure to be followed in the establishment of ditches contain^{any} provisions designed to protect landowners; and such owners have been further safeguarded in their rights by the recognition on the part of the courts of certain remedies under the common law or without express provision therefor in the drainage statutes themselves. Furthermore, it is worthy of note, that the rule that the public drain acts of the state are to be liberally construed¹ so as to promote the reclamation of swamp lands, does not mean that exact compliance with the statutory provisions relating to such steps in procedure as notices, petitions, and public hearings, can be to any degree dispensed with; on the contrary, the courts have held that all statutory provisions which are designed for the protection of landowners must be strictly complied with, and failure to do so may render the proceedings void as to owners whose rights have been prejudiced.² Thus it had been held that a petition in proper form is a jurisdictional pre-requisite to the authority of the county commissioners to entertain any proceedings for the establishment of a ditch;³ that

1. Laws 1905 Chap. 230 Sec. 47. Laws 1907 Chap. 470 Sec. 33. State vs Polk County, 87 Minn. 325. State vs Isanti County, 98 Minn. 89. Backus vs Conroy, 104 Minn. 242 State vs Baxter, 104 Minn. 364. Interstate D & I Co. vs Freeborn County, 158 Fed. 270.
2. Curran vs Sibley County, 47 Minn. 313. Lager vs Sibley County 100 Minn. 85. See also McMillan vs Freeborn County 93 Minn. 16.
3. State vs Polk County 87 Minn. 325. State vs Watts, 116 Minn. 326. State vs Lindig, 96 Minn. 419. Johnson vs Morrison County 107 Minn. 87.

the notice of the time set for the hearing of the petition and of the report of the viewers is likewise jurisdictional, and must be given in accordance with the provisions of the statutes before the board can proceed; that the publication of the notice for three weeks or twenty-one days must be fully completed before the day fixed for the hearing;¹ and where, at the first hearing an engineer and viewers have been appointed and reports required from them, notice of the second and final hearing must be given and an opportunity afforded to parties interested to support by competent evidence valid objections to the laying out of the ditch.² And the statutory provisions relating to parties are to be liberally construed, so that the right of landowners affected to appear before the county board and be heard by it is not confined to those who are strictly parties to the drainage proceedings, but extends to landowners with a well-grounded claim for damage resulting from the construction of the drain even though it may not certainly appear that such damages are recoverable at law.³

Not only are landowners protected by the necessity

1. Curran vs Sibley County, 47 Minn. 313. Johnson vs Morrison County, 107 Minn. 87. (under laws 1887 Chap. 97 Sec. 8). State vs District Court, 114 Minn. 424.
2. Heinz vs Buckham, 104 Minn. 389 (under laws 1907 Chap. 448).
3. State vs Isanti County, 98 Minn. 89 See also Billsborrow vs Pierce, 101 Minn. 271.

for proper petitions, notices, and hearings, but they may also protect and enforce their rights, by appeals to the courts of the State including the supreme court; by injunctions; and by certiorari. The statute provides that any person or corporation aggrieved thereby may appeal from an order of the county commissioners determining either of the following matters; (1) the amount of benefits to any tract of land or any public or corporate road or railroad, (2) the amount of damages allowed by any person, persons, or corporation, or assessed to any tract of land, (3) refusing to establish a proposed ditch. As might be expected; notice of the appeal, and bond conditioned to duly prosecute the appeal and pay all costs adjudged against the appellant and to abide the decision of the court, must also be filed. Any person deeming himself aggrieved in the assessment of his damages or the estimate as to his benefits may demand a jury trial to determine the correctness of such assessments and allowance. The issues raised by such a demand stand for trial at the next term of the district court, and take precedence over all matters of a civil character in that court.¹ (for note see next page).

Note 1. Laws 1905 Chap. 230 Sec. 12 Amended by Laws 1911 Chap. 384 Sec. 6. An appeal from an order of a county board laying out a ditch, does not bring up for review the question of whether the board has exceeded its authority by establishing the ditch so as to drain a public meandered lake. *Dressen vs Niclett County*, 76 Minn. 290 (This was under Laws 1887 Chap. 97 Sec. 11) An informal notice of appeal and bond under laws 1887 was sustained in *Anderson vs Meeker County*, 46 Minn. 237. A notice of appeals otherwise specific directed to a county board, is sufficient in form, and, after bond filed, operates to perfect an appeal to the district court from an order of said board dismissing an application for the establishment and construction of drainage ditches made pursuant to Laws 1901 Chap. 258 as amended, and vests the district court with jurisdiction. This jurisdiction upon appeal extends to a trial de novo of all issues, both of fact and law, *McMillan vs Freeborn County*, 93 Minn. 16. *Schumacher vs Wright County*, 97 Minn. 74. As to remedy by appeal see also *State vs Johnson*, 111 Minn. 255. The right of appeal is unaffected by a failure of the auditor to file the lien statement. *State vs Johnson*, 111 Minn. 10. (As to time when time to appeal begins to run see same case). Not only is appeal to district court to be conducted in the same way as a trial de novo, but even the findings of the board are to be given no special or particular force or effect. *Madsen vs Larson*, 117 Minn. 369. Where appeal is tried in court of county other than one in which proceedings were instituted verdict of jury or order of court is final in that court and no judgment thereon is necessary. And right of appeal is limited to persons aggrieved or claiming damages not necessarily including ditch petitioners merely because they petitioned. The assessment of viewers is prima facie correct and one appealing has burden of proof. *State vs Nelson*, 116 Minn. 424.

Appeals from any final appealable order, except the order establishing the ditch, may be carried to the supreme court of the state by filing the notice of appeals and the bond required as in civil actions upon an appeal to that court.¹ Where no provision is made for an appeal,

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1. Laws 1905 Chap. 230 Amended by Laws 1909 Chap. 469. Sec. 13. Laws 1905 Chap. 51. An order of the court on appeal from the assessment of damages in ditch proceedings under Laws 1905 Chap. 230, assessing the appellant's damages and directing judgment to be entered accordingly, is not a final appealable order within the terms of the statute. *Prahl vs Brown County*, 104 Minn. 227. No appeal lies from a judgment establishing a county ditch, since Laws 1905 Chap. 230 Sec. 41. does not apply except to proceedings for assessing damages arising after construction of ditch. *Hohenstein vs Murray County*, 115 Minn. 440. A judgment of the district court, upon appeal, affirming the order of commissioners in assessment proceedings, is not defective because the lands affected are not described therein, they are sufficiently described in other parts of the record. *Dowlan vs Sibley County*, 36 Minn. 430. See also *Lindberg vs Morrison County*, 116 Minn. 504.

certiorari, injunction, nor his right to appeal upon the statutory grounds, he has one means left to protect his rights, and that is to become delinquent in his payments of the assessments, whereupon, since these are collectable like ordinary taxes, an application will be made for a judgment against him for the amount of such delinquent taxes, and he may come in and oppose such application.¹ But in such a case he is confined to those defenses which are permitted under the statutes relating to applications for judgment for delinquent taxes in general, (that is that they have been partially or unfairly assessed, or have been paid, or that the property was not subject to taxation);² and he cannot at that time avail himself of an insufficiency in the order establishing the ditch,³ a change in the starting point of the ditch not authorized by the county board.⁴

Thus it appears that the chief steps in the establishment of a public drain through the county commissioners are the petition, appointment of engineer

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1. State vs Johnson, 111 Minn. 255. Jacobson vs Lac Qui Parle County, 137 NW 419.
 2. Revised Laws of 1905 Sec. 919. (General Statutes 1913 Sec. 2108).
 3. State vs Johnson, 111 Minn. 255.
 4. State vs Tuck, 112 Minn. 493. (With respect to irregularities in general, and appeals, injunctions, etc. it should be noted that no one can take advantage of any error, in proceedings or defects or irregularities in records, unless he is directly affected thereby. Laws 1905 Chap. 230. Sec. 50. Amended by Laws 1907 Chap. 367 Sec. 6).

and viewers after notice and hearing, reports of engineer and viewers, hearing thereon, order establishing the ditch, assessments of benefits and damages, letting of contracts, bond issues, approval of work done, and collection of assessments to pay off bonds.

Not only may a drainage ditch be established by procedure through the county commissioners and other county officials, but it may be secured through action by either the town supervisors, or the judge of the district court, or the state drainage commission.¹

Town drainage ditches may be established on petition filed with the town clerk and signed by one or more of persons or corporations owning lands that will probably be benefited, or by the chief executive of any city or village with streets likely to be improved thereby, or by town supervisors, in similar cases. In such petition the town supervisors may be requested to appoint an engineer and an attorney. The town clerk gives notice of the hearing on the petition in much the same way as the auditor in county ditch proceedings, and then there

1. What might perhaps be called another method of establishing ditches is provided for through the county board or district court in cases where the petitioners are willing to pay all the expenses themselves, so that no obligation whatever is placed upon either the county or upon landowners not joining in such petition. This procedure as might be expected, is moresimple, than the others provided by statute. See Laws 1905 Chap. 230. Secs. 55-62

~~the auditor in county ditch proceedings, and then there~~
is a meeting of the town supervisors, who may appoint
the engineer and attorney. The whole body of supervisors
or a committee composed of three of their number, then
perform substantially the same duties as the three viewers
used in the case of county drains; and the board as a whole
acts as the county board does, and orders the establish-
ment of the ditch. The remainder of the proceedings are,
in general, the same as those followed in the opening of
county drains, as to the letting of contracts, the giving
of bonds, the form of the contract, modifications in plans,
recording of lien statement, rules to be followed in the
assessment of drainage and of benefits, and certificates
of completion. In these proceedings the town clerk and
supervisors perform substantially the same functions
respectively, as the county auditor and county commissioners
in county drain proceedings. The chief points of differ-
ence between the township drainage law and that for
county ditching, are as follows: (1) as might be expected
because of its lesser functions, the town law is much
less detailed, and more simple than the county statutes;

(2) the use of the procedure for the improvement of highways, and the consequent assessment of public corporations for benefits thereto seem to be slightly more emphasised in the township laws; (3) in the case of town ditches no bonds are issued to provide immediately available funds, but the ditch petitioners are required in advance all costs and expenses of the proceeding from its inception to its completion, including damages awarded and the cost of constructing the drain. Such advances are repaid pro rata when the moneys come in from the paying off of liens and assessments for benefits.¹

The action of the district court is invoked whenever it is desired to extend a ditch into more than one county. In such proceedings the judge of the district court, and the clerk of that court, respectively, perform all the duties and have all the powers of the county board and county auditor, and are governed by many of the same statutory provisions. Thus the judge appoints the engineer and viewers and hold the hearing, while the clerk of court posts and publishes the notices, and receives the petition. The procedure throughout is practically the same as that followed in the establishment of county ditches.

1. Laws 1909 Chap. 127.

The distinguishing characteristics of the judicial system which should be noticed are the following: (1) in case any proposed ditch extends into any other judicial district, proceedings may be commenced before the judge of either district, and such judge has jurisdiction of all subsequent matters relating to that ditch; (2) in the matter of financial administration, the judge by his order at the time of the hearings, or at any other time upon five day's notice of the time and place of such hearing given to the auditor of each county interested or affected, apportions the items and portions of expense to be borne by the respective counties, each one of which may then issue its bonds as in the case of a public drain in one county alone.¹

The state drainage commission consists of the governor, the state auditor, and the secretary of state. It has power to construct ditches, widen, deepen, and straighten natural watercourses for drainage purposes, and open new outlets to lakes, if such lakes are normally so shallow as to be incapable of any beneficial public use of a substantial character for fishing, boating, or

1. Laws 1905 Chap. 230. Amended by Laws 1909 Chap. 469. Laws 1911 Chap. 384, Laws 1907 Chap. 367, Laws 1913 Chaps. 179, 568, and 578.

public water supply.¹ It makes surveys of wet lands and watercourses, and cleans and repairs state ditches, but as a condition precedent to the exercise of these latter powers it must require that persons or corporations benefited thereby shall pay for such benefits. The commission may, when necessary in order to carry out its duties, acquire private property by purchase of the exer-

1. Laws 1907 Chap. 470 Secs. 1 & 2. By Sec. 34, Laws 1905. Chap. 106, relating to a state drainage commission, was repealed. If the lake be meandered it can be drained or lowered only on petition of at least sixty per cent of the legal voters who are freeholders with lands affected, and who reside within four miles of the lake. Laws 1907 Chap. 470 Sec. 2 (With reference to meandered lakes it may be noted that the drainage act of 1887 did not authorize the drainage of public meandered lakes. *Witty vs Nicollet County*, 76 Minn. 286 See also *Dressen vs Nicollet County*, 76 Minn. 290. As to sufficiency of evidence to sustain finding of county board as to the character of a lake, under proceedings to drain it by authority of Laws 1905 Chap. 230 see *Madsen vs Larson*, 117 Minn. 369. It has been held that a statute making it a criminal offence for any person to drain a meandered body of water is not applicable to limit the effect of a later statute authorizing the draining of wet and overflowed lands through legal proceedings therein prescribed. (The drainage statute related to county drains and was Laws 1883, Chap. 108). *Dowland vs Sibley County*, 36 Minn. 430.

cise of the power of eminent domain.¹ Before the commission constructs any public drain it files a petition with the judge of the district court of the county in which it is proposed to construct the ditch, setting forth its necessity and containing a description and map of the route contemplated, land affected, and estimates of cost. With in ten days the judge of the district court appoints two residents of the county or counties concerned, who, together with one non-resident appointed by the state commission, perform functions similar to those of the viewers in county and judicial ditch proceedings, and report in detailn within thirty days from the date of their first meeting. This report is filed with the clerk of the district court. Any persons aggrieved by the allowance of damages may petition the court for the appointment of appraisers in the same manner as in cases of appropriations of private property for public use, provided such petition is filed within ten days after the report of the viewers. After the filing of the viewer's report, there is a hearing before the court, due

1. Laws 1907 Chap. 470 Amended by Laws 1909 Chap. 207 Sec. 1. Special powers were given to the state drainage commission by the three following acts: Laws 1911 Chap. 136. "An act to authorize the state drainage commission to construct an outlet or the waters of the Mustinka state ditch in Traverse County etc." Laws 1911 Chap. 370. "An act to authorize the state drainage commission to co-operate in the construction of an additional outlet for the waters of the Snake River in Marshall County, etc." Laws 1909 Chap. 336 Sec. 1. relating to Big Stone Lake, and the Minnesota and Whetstone Rivers.

public notice having been given. At such hearing the assessment of benefits and damages, determined in a manner similar to that used in county and judicial ditch proceedings, are confirmed if satisfactory, and the construction of the drain is ordered by the court. Jury trials, appeals, and the filing of liens statements are provided for in the usual manner. The state commission, however, furnishes the plans and specifications and lets the contract, to the lowest responsible bidder, a bond being required, and the contract approved by the attorney general of the state. The county boards, in the counties concerned, issue the bonds of their respective counties, for amounts apportioned to them in assessments; and the liens, which are relied upon as the source of the moneys to be used in retiring the county bonds, must be paid off in twenty years, the first installment being due in not more than five years. The proceeds from the sale of county bonds are transferred by the respective county treasurers to the state treasurer, who credits them to the state drainage fund. The commission may appropriate out of its funds, money in aid of ditch work not done by itself, provided such appropriation does not exceed one-

half of the total cost of the work.¹ The state drainage commission is authorized and directed to make a topographical survey of the watersheds of the state; prepare maps, plans, and specifications for their drainage for the use of counties concerned; prescribe rules governing ditches constructed in the various counties of the state; and co-operate with the United States Department of Agriculture in the making of surveys.²

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1. Laws 1907 Chap. 470. Amended by Laws 1913. Chap. 4.
 2. Laws 1909 Chap. 471. The legislature of Minnesota has enacted a great number of statutes designed to adapt the general drainage laws of particular conditions or various contingencies arising in their administration, to remedy defects or irregularities in prior proceedings to modify the statutes in the light of court decisions or protect rights which might otherwise be left unprotected as a result of proceedings in particular cases being held invalid in such decisions, and in general to make the laws more practicable. Given below is a list of the more important of such laws now in force.
 - Laws 1905, Chap. 230 as amended by Laws 1907 Chap. 367. Sec. 9, and Laws 1911 Chap. 113 relating to assessments anew by county boards in cases where assessments already made have been declared invalid by the courts of the state.
 - Laws 1905, Chap. 230 as amended by Laws 1909 Chap. 469 Sec. 13, authorizing purchase of right of way in adjoining states when necessary.
 - Laws 1907 Chap. 136, providing for changes in method of construction.
 - Laws 1911, Chap. 54, authorizing the consolidation of proceedings.
 - Laws 1911, Chap. 278 providing for readjustment necessary as result of formation of new county.
 - Laws 1913, Chap. 208 permitting reduction in estimating benefits to the extent of the value of land taken by the ditch and its waste bank from owner of land charged with benefits.
 - Laws 1913 Chap. 379 Sec. 1 permitting addition to cost of ditch of cost of culverts omitted from estimates in engineer's report. (See next page for continuation of this note).

It will already have been noticed that there are at least three great principles underlying all drainage procedure in Minnesota, whether the public ditch be established under the authority of town supervisors, or county commissioners, or judges of the district court, or of the state drainage commission. (1) All proceedings

(Note 1 p.228 con't).

The following statutes which are curative are now in force:

Laws 1905 Chap. 157
Laws 1905 Chap. 180.
Laws 1905 Chap. 247
Laws 1907 Chap. 9
Laws 1907 Chap. 72
Laws 1907 Chap. 371
Laws 1907 Chap. 246
Laws 1907 Chap. 75
Laws 1907 Chap. 363
Laws 1909 Chap. 83
Laws 1909 Chap. 422
Laws 1909 Chap. 257
Laws 1909 Chap. 10
Laws 1905 Chap. 230 as amended by Laws 1909 Chap. 469
Sec. 13.
Laws 1911 Chap. 384 Sec. 14 as amended by Laws 1913
Chap. 335 Sec. 1.
Laws 1911 Chap. 292
Laws 1911 Chap. 273 Sec. 1.
Laws 1913 Chap. 2
Laws 1913 Chap. 463

(It has been held that a judgment restraining a county board from collecting a tax for benefits under irregular drainage proceedings did not prevent the board from instituting fresh proceedings under Laws 1893 Chap. 153, a curative act. Curran vs Sibley County, 56 Minn. 432).

are commenced by petition, which, except, in the case of state ditches, must be made by interested landowners.

(2) The cost of the work and the damages allowed those whose property is taken or injured are paid by the landowners themselves in proportion to the benefits received by each of them. (3) All persons concerned are fully protected by requiring due notice of all important steps in the procedure; public hearings with an opportunity to protect against the establishment of the ditch, its plan and route, or damages assessed and awarded; jury trials; and the remedies of certiorari, injunction and appeal.

SWAMP LAND RECLAMATION IN MINNESOTA.

Minnesota in her natural state had an area of more than 10,000,000 acres of swamp lands, most of which was located in the northern counties of the state. St. Louis County contained 1,392,160 acres; Beltrami, 1,451,520 acres; Koochiching, 1,000,000; Lake, 798,600; Itasca, 590,600; Roseau 533,680; Aitkin, 529,880; Cass, 316,240; Pine, 293,000; Marshall, 258,240; Clay, 230,000; and there were over 100,000 acres each in the counties of Kittson, Otter Tail, Polk, Crow Wing, and Cook.¹ Although not recorded in surveys there were large amounts of swamp land in the southern counties of the state as well as the northern.

While Minnesota was still a territory, the federal government had already adopted the policy of granting to the new states, on their admission into the Union, the swamp lands located within their borders. Two of the territorial governors urged the legislature to see to it that steps be taken to secure for Minnesota the wet areas within their boundaries;² but Congress took no action during territorial days.³ By an act of March 12th 1860, the federal government conveyed to the state in fee "the whole of the swamp and overflowed lands, made unfit thereby for cultivation" within the state, provided "that the proceeds

1. Drainage Commission. Report of Aug. 1910. pp.66,67.
(See Appendix 5 Chart A).

2. Gov. Gorman Message of 1856, p.9 Gov. Medary, Message Of Doc. 11,1857, p. 34.

3. In Session of 1855 of territorial legislature a member gave notice of intent to memorialize congress on the subject, but I find no such memorial.

of said lands, whether from sale or by direct appropriation, in kind, shall be applied exclusively, as far as necessary, to the purpose of reclaiming said lands by means of the levees and drains aforesaid."¹ The commissioner of the general land office advised Governor Ramsey that he himself could decide whether to accept the plats and surveys of the federal government, or to order a resurvey under the direction of the state, and that he need not refer that question to the legislature.² But the Governor did not refer the matter to the legislature and asked them to decide the matter.³ An act was passed establishing the bureau of public lands, composed of the governor, attorney general and the superintendent of public instruction, and that body was to have charge of the swamp lands as well as of other lands, and to cause a survey to be made of the wet lands embraced in the grant by congress, such surveys to be confined to twelve townships.⁴ The object of this experimental survey, was to test the correctness of the plats of the federal government, but the provisions of the

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- 1/ An act of Sept/ 28th 1859, entitled "An act to enable the state of Arkansas to construct the necessary levees and drains to reclaim the swamp and overflowed lands therein" by the act of March 12th 1860 was extended to Minnesota and Oregon. See also Minn. Ex. Doc. for 1860 at p.5 of Gov. Ramsey's special message
 2. Letters of Aug. 8th 1860, to Gov. Ramsey. Minn. Ex. Docs. 1860.
 3. Gov. Ramsey Message of Jan. 26th 1861. Ex. Docs. 1860
 4. p. 5 of Message
Laws of 1861, Chap. 13.

statute were impracticable, and the survey was not completed. Largely for the purpose of avoiding the expenses that would be involved in a resurvey of the state, the bureau of public lands recommended the acceptance of the survey made by the general government,¹ which recommendation was carried out by the legislature.² It then remained for the general land office to see to it that deeds covering the lands granted should be turned over to the state as fast as complete surveys in detail of such lands could be made. The grant of swamp lands thus having been duly accepted by the state, the question then arose as to the disposition of those lands, and the use that should be made of the funds derived from their sale if they should be sold.

It will be remembered that the grant of overflowed areas to the state contained a provision that the proceeds from the sale of such lands, or the lands themselves in case of direct appropriation, should be applied "exclusively, so far as necessary," to the drainage of these lands. It may be that this phrase, "so far as necessary" was construed to have the practical effect of sweeping away any conditions attached to the grant, and

1. Ramsey Message Jan. 9th 1862, p. 14.

that for that reason the use of these lands for other than drainage purposes was urged from the time of the acceptance of the grant, but the fact seems to be that the condition of the conveyance to the state was simply ignored or forgotten, for a great many years. For from the very first, the leading public men of Minnesota advocated the use of these swamp lands for many other purposes than drainage. This was probably natural, because, as we have suggested, men in those early times were interested primarily in other things than drainage, and much better lands were still cheap and readily available for agricultural purposes. It will be remembered that the movement for state aid to drainage did not gain much headway until the Crookston Convention of 1886.

The first objects to the support of which it was seriously urged the state swamp lands should be devoted, were state institutions, said Governor Ramsey, in his message to the legislature in 1861, "Upon the proceeds of the swamp lands we will have mainly to depend for the means of building up those great humane institutions, asylums for the blind, deaf and dumb, and insane, which are at once the glory and necessity of our modern civilization." He also suggested that some of such funds

might be devoted to the erection of a new state prison, or to the endowment of normal schools, or distributed to the counties as a road fund.¹

Notwithstanding this recommendation that state institutions be endowed by the moneys derived from the sale of the state's swamp lands, the legislature, did nothing in that direction. But because of the great demand at that time for transportation facilities, the first of a series of acts was passed granting swamp lands in aid of railroad companies. An act of 1861 granted to the Lake Superior and Mississippi Railroad Company seven full sections of swamp lands for each mile of railroad constructed from St. Paul to Duluth.² In all this grant included 694,000 acres of land.³ Another act of the same year conveyed to the Taylors Falls and Lake Superior Railroad Company seven sections of the state's wet lands for every mile of line built from Taylors Falls to Wyoming, Minnesota.⁴ Besides these two acts using the swamp lands for railroad purposes, all the state's wet lands situated in McLeod County were conveyed to the county commissioners in trust to be used in aid of the construction and maintenance of an agricultural college in that

1. General Ramsey Message of January 9th, 1861.

2. Laws of 1861. Act of March 8th.

3. Auditor's Report of 1909-10, p. 22.

4. Laws of 1861. Act of March 8th.

county.¹ At a later time, upon the location of the agricultural elsewhere, it was enacted that these lands should be used for the endowment of Steven's Seminary.² About 4,683 acres accrued under this statute.³ An act of 1862, provided for the construction of a state road from Medelia to a point on the western boundry of the state; named three persons as a commission to see to the carrying on of the work, and appropriated 10,000 acres of swamp lands to furnish the necessary funds. The road was to extend towards Sioux Falls, South Dakota.⁴ Later it was charged that this last grant was "very loosely guarded, and the gist of the whole scheme was to obtain valuable lands for a small consideration;" the patenting of the lands was delayed for a time; and the land finally conveyed amounted to but 4,683 acres.⁵

At the opening of the Legislative session in 1863, Governor Ramsay again rferred to the need of adopting a wise and far seeing policy in regard to the disposition of the wet lands owned by the state. Because of

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1. Laws of 1861 Act of March 12th. Chap. 65.
 2. Special Laws, 1868, Chap. 114, p. 404. G. Laws 1865, c. 7.
 3. Auditor's Report of 1909-10, p. 23.
 4. Special Laws 1862, Chap. 56.
 5. Other acts re McLeod affair are: S.L. 1870, c. 92; S.L. 1879 c. 70. Special Laws 1866. Chap. 3111. Gov. Marshall's Message of Jan. 10, 1867, p. 16. Auditor's report for year ending Nov. 1866. Laws 1869, Chap. 96, p. 118. Auditor's Report 1872. Ex. Doc. 1872, Vol. 1, p. 379. Ex. Doc. 1873, Vol. 1, p. 507. Statistics.

the timeliness of the warning^{and} of the fact that it incidentally throws some light on the expectations possessed by the governor as to the value of these lands in the future it may be well to quote in some length from this message by Governor Ramsey. He wrote: "I cannot but trust that the people and their representatives will continue to have an increasing appreciation of the value of these lands, and will steadily resist every application that may arise for their appropriation, unless for the most absurd public necessity and benefit. Unless some new policy of this kind is inaugurated, these swamp lands, which I confidently anticipate will in a few years furnish us with a large reserve fund of millions of dollars to discharge whatever indebtedness the necessities of the follies of the state, in its earlier history, may have imposed upon us, as also for the erection and maintenance of those great eleemosynary institutions, which, before many years the state will be called upon to erect, at a cost of several hundred thousand dollars each, such as asylums, for the insane, deaf, dumb, and blind, will have been wasted; and nothing but taxation, the great hindrance to immigration, will be left to us^{as} a resource for such purposes."

In spite of this vigorous message from Governor Ramsey, the legislature of 1863 did nothing towards devoting the state swamp lands to the support of state institutions, but on the contrary, passed an act granting to the St. Paul and Chicago Railroad Company, a predecessor of the Chicago, Milwaukee and St. Paul Railway Company, seven full sections of swamp lands for each mile of railroad constructed between St. Paul and Winona, a distance of about one hundred and three miles, such lands to be deeded to the company in each twenty mile section of the line as completed.¹ This act is if the railroad complied with the conditions of the grant, would result in about 462,336 acres of swamp lands passing out of the control of the state.²

Governor Miller, in his inaugural message of 1864, reaffirmed the position taken by Governor Ramsey, and gave a similar warning to the legislature against squandering the swamp lands, or the proceeds from their sale. He said: "We are evidently drifting upon that alternative which shall secure the early appropriation of these lands," to the support of state institutions, or of

1. Spec. Laws of 1863, Chap. 5, p. 149.

2. About 425,300 acres were actually charged to the company, it having complied substantially with the terms of the grant. Auditor's Report of 1909-10, p. 23. For subsequent acts relating to this grant see: Spec. Laws 1865, chap. 6. Also Gov. Swift's Message of Jan. 11th 1864, p. 6; Gov. Marshall's Message of Jan. 10th 1867; p. 16; Auditor's Report of 1873; chap. 5, p. 149. and Ex. Docs. 1877, Vol. 1, pp. 397 and 405.

kindred objects or result in their inequitable distribution to corporations important to our prosperity, but secondary to the great interests involved. Along the track of legislation in the neighboring states, we everywhere discover the wreck of similar gratuitous; and if, with these warnings we pursue an equally reckless course, we shall deserve the condemnation both of our contemporaries and of the generations that will succeed us.¹

Again in 1865 he urged the legislature to dedicate several hundred thousand acres of swamp land to the support of state institutions,² and this time his efforts and those of Governor Ramsey were successful. By an act of February 13th 1865, it was provided that as soon as the title to enough swamp lands as patented to the state by the federal government, the commissioners of the state land office should select and set apart for the erection and support of the following institutions the following amounts of swamp lands, the lands so selected to be irrevocably dedicated to those purposes; an insane asylum, 100,000 acres; deaf and dumb at Faribault, 100,000 acres; each normal school then or thereafter established, not

1. Governor Miller. Message of Jan. 13th 1864.
2. Governor Miller. Message of Jan. 4th 1865.

exceeding three, 75,000 acres; state prison, 100,000 acres.¹ Another ~~set~~^{act} passed later in the same session appropriated the remainder of any wet lands in the state to the erection and support of an orphan asylum for children of Minnesota officers and soldiers killed in the war.²

Though action regarding state institutions was thus secured in the session of 1865, the legislature had already passed two acts in further aid of railroads. One act granted to the Minneapolis and St. Cloud Railroad Company, now succeeded by the Great Northern, ten sections of swamp lands for every mile of line built from St. Cloud to Hinckley.³ This amounted to 425,664 acres.⁴ The second act granted to the same company four sections of similar lands per mile of railroad constructed from St. Cloud to any southern Minnesota railroad running from east to west, or to connect with the Winona and St. Peter Railroad Company's line.⁵

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1. Gen. Laws 1865, Chap. 5, Feb. 13, 1865; For subsequent acts relating to this appropriation, see: Gen. Laws 1875, Chap. 95; Gen. Laws 1907, Chap. 385.
 2. There does not appear to have been any action taken under this last act, and the auditor's report of 1909-10 records no selections as having been made under the act, which was Chap. 3, of the Gen. Laws 1865, March 3d.
 3. Laws 1865 Act of Feb. 11th 1865.
 4. Auditor's Report, of 1909-10, p. 23.
 5. Special Laws 1865, Chap. 3, p. 24.

Though the conditions of the former acts were complied with, those of the latter were not and that grant was subsequently declared forfeited to the state.¹

And even after the act relating to aid for state institutions had been passed, the legislature went on to make further grants in aid of railroads, and of other private undertakings. A statute of February 16th appropriated four sections per mile to the Southern Minnesota railroad, from Fillmore County to the western boundry of the state.² An act of March 2d gave to the Minnesota Central Railroad Company 275,000 acres for a line from Red Wing to Mankato by way of the Cannon River.³ To aid the Cannon River Improvement Company in the construction of slack water navigation on the Cannon River it was given all swamp lands in the odd numbered sections in the St. Peter land district, not to exceed 30,000 acres, and at the rate of four sections for each mile of navigation completed. Later these rights were transferred to others, for railroads and manufacturing purposes.⁴

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1. Gen. Laws 1895 Chap. 66. Other acts relating to this grant are: Spec. Laws 1869, Chap. 56, p. 249; Spec. Laws 1881, Chap. 65, p. 112; Gen. Laws 1887, Chap. 19 p. 76.
 2. Spec. Laws 1865, Chap. 1.
 3. Amended by Spec. Laws 1873, Chap. 110.
 4. Special Laws 1865, Chap. 76, p. 225.

"	"	1870,	"	118,	p. 438
"	"	1873,	"	110,	p. 300
"	"	1875,	"	58,	p. 290
"	"	1877,	"	244,	p. 309
"	"	1883,	"		p. 196
"	"	1885,	"	101,	p. 271.

In 1870 Governor Austin suggested that after the grants already made were satisfied, the swamp lands might be disposed of in the same manner as school lands, and the proceeds be devoted to the purchase of libraries for the public schools.¹ Nothing resulted from his proposition as to the use of the proceeds, but his suggestion as to the manner of sale may be noticed because it is an early forerunner of the constitutional amendment of 1881, and the present method of selling the state's swamp lands. Five years after this statement by Governor Austin a statute relating to the disposal of the state institution swamp lands provided that they should be "appraised and sold in the same manner and by the same officers, and the minimum price should (shall) be the same as provided by the law for school lands under title one of chapter thirty-eight of the general statutes" with certain modifications. The principal of such funds should remain inviolate and invested in United States bonds or those of the state, and the interest annually apportioned to the support of the different institutions, entitled to receive the same.² Six years after this method of

1. Governor Austin, Message of Jan. 7th 1870, p. 17.
2. General Laws 1875, Chap. 95, p. 125.

sale was applied to those swamp lands that were set apart for certain institutions, it was extended to all swamp lands owned by the state as a result of the following constitutional amendment: "All swamp lands now held by the state, or that may hereafter accrue to the state, shall be appraised and sold in the same manner and by the same officers, and the minimum price shall be the same less one-third, as is provided by law for the appraisement and sale of the school lands under the provisions of title one of chapter thirty-eight of the general statutes. The principal of all funds derived from sales of swamp lands as aforesaid, shall be preserved inviolate and undiminished. One-half of the proceeds of said principal shall be apportioned to the common school fund of the state; the remaining one-half shall be appropriated to the educational and charitable institutions of the state, in the relative ratio of cost to support said institutions."¹ The statute referred to provided for public sale, and a minimum price of \$5.00 per acre. The similarity between the amendment and the law of 1875 is manifest. Thus it was that Governor Austin's suggestion as to the manner of sale, made eleven years before, and Governor's Ramsey's, as to the

1. Proposed by General Laws 1881, chap. 48. Mar. 3d, 1881. Adopted November 8th 1881.

use of the proceeds for the support of state institutions, made twenty years before, were incorporated into the constitution of the state, after about 2,883,594 acres of swamp land had been granted in aid of private enterprises, chiefly railroads.

Here the suggestions leading up to the constitutional amendment of 1881, have been radicated. It will be necessary, however, to turn back for a moment and briefly mention two swamp land grants which went into effect before the adoption of the amendment. An act of 1875 granted to the Duluth and Iron Range Railroad Company ten sections for each mile of line built from Duluth to a certain township on the Mesaba Range, to be deeded in ten mile tracts.¹ And act of March 3d 1881 provided for the deeding of six sections per mile to the Sioux Falls and Dakota Railroad Company, a predecessor of the Northern Pacific, for a road from Little Falls to the western boundry of the state. This grant, if the required conditions were complied with by the railroad would consist of 265,856 acres of swamp land.²

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1. Spec. Laws 1875, Chap. 54. Other statutes regarding the same grant are; Spec. Laws 1885, Chap. 87; Spec. Laws 1885, Chap. 300; Gen. Laws 1897, Chap. 168.
 2. Auditor's Report. 1909-10. The state disputed the claims of the Northern Pacific, on the ground that 2.3 miles had not been completed at the western end of the last section of 30 miles of line built by it. The Governor was authorized to compromise in 1901 by offering 35,456 acres, but not settlement was reached, and the state now denies the claims of the company. See Gen. Laws of 1901, chap. 193, p. 267.

Thus we have seen that by the adoption of the constitutional amendment in 1881, further appropriations of the state's swamp lands to the purpose of aiding in the construction of railroads were forbidden. The wet lands of the state were used to help railroads, state institutions a slack water navigation company, and a seminary, and now they were to be also used to add to the common school fund of the state. From the time of the acceptance by the legislature, of the lands granted by Congress in 1860 no attention seems to have been given to the clause in the act by which the grant was made: "Provided, that the proceeds of said lands --- shall be applied exclusively as far as necessary, to the purpose of reclaiming said lands." The first public reference to this condition in the grant, which I have thus far been able to find, does not occur until nearly thirty years after the grant was made by Congress. In 1887 Governor Hubbard urged that the legislature take some action in aid of drainage, having been requested to do so by the Crookston drainage convention, which had met in 1886. Desiring to help the drainage movement, which had just begun to be strongly felt, he found that the constitution of the state stood in the way of direct appropriations to aid such ditches

as proposed in the Red River Valley, and then it was that he called people's attention to the condition in the grant of 1860, and pointed out, that if it had been considered there might then have been available a large fund for the purpose of drainage.¹ In 1895 Governor Nelson said: "The state, having accepted the lands stands morally, if not technically, charged with the trust, and in expending money for this work of drainage, is doing no more than what it fairly undertook to do when it accepted the grant."² In the succeeding paragraphs of this chapter we shall see what the state has done to carry out the trust and to reclaim the swamp lands within her borders.

It has already been pointed out that there were originally in Minnesota over 10,000,000 acres of swamp lands, most of which was located in the northern counties of the state.³ Fully ninety-five per cent of this entire area could be easily and cheaply drained, and about sixty per cent of it was either open marsh, meadow or swamp sparsely timbered. The surface slopes^e were favorable to drainage works, since in some of the northern swamps there is a slope of as much as ten feet to the mile,

1. Governor Hubbard, Message of Jan. 5th, 1887. Ex. Docs. 1886-87, vol. 1, p. 29.
2. Governor Nelson, Message of Jan. 9th 1895. Ex. Docs. 1894, vol. 1, p. 27.
3. Minnesota State Drainage Commission Report of 1913, pp. 16 and 139.

and a declination of three and four feet to the mile is quite common.¹ The state does not have to face the problem of shutting out sea waters from low tidewater lands, nor is it necessary to build great levees along its watercourses. Drainage can be accomplished by digging the shortest possible canals to the nearest watercourses.

Although a drainage survey of the counties of the Red River Valley in 1886 had shown that outlets for the drainage of swamp lands in that region were not only feasible, but could be constructed at a cost which was very low compared to that in other parts of Minnesota or in many other states, very little work was done prior to 1895. In 1887 the first important drainage law was enacted, and the legislatures of 1893, and 1897 made appropriations amounting in all to \$162,500; but these appropriations were small compared with the magnitude of the work to be done and to subsequent expenditures by the state, and it may be said that real progress in swamp land reclamation in Minnesota began about 1900.²

Because of the relatively greater importance to them of the swamp land problem, it would be expected that those counties that would accomplish the greatest amount

1. Minnesota Drainage Commission Report of 1913, p. 16.
2. Ralph, G. A. Pioneer Press of St. Paul, Jan. 21, 1912.

of reclamation work in the state would be those of the Red River Valley and the northern part of the state; and such has been the case. Under the county and judicial laws Marshall county has drained 1,349,064 acres; Polk, 997,341; Beltrami, 370,039; Pennington, 284,945; Clay, 284,717; Kittson, 268,618; Red Lake, 241,568; Aitkin, 226,141; Wilkin, 198,183; Roseau, 168,470; Norman, 164,463; Koochiching, 127,749; Redwood, 127,254. The northern counties lead in the number of miles of ditches constructed by them as well as in the total cost of their work. Marshall county has built 920 miles of drain at a total cost of \$1,496,702; Beltrami, 463 miles for \$685,235; Pennington, 237 miles for \$330,020; Clay, 186 for \$328,224; Kittson, 159 miles for \$296,290; Red Lake, 172 for \$276,731; Aitkin, 280 for \$470,620; Wilkin, 196 for \$265,690; Roseau, 147 for \$221,344; Norman, 134 for \$172,053; Koochiching, 85 for \$139,757; Redwood, 354 for \$417,000.

The total number of acres of land drained or benefited by judicial and county ditches is 5,846,126. This work has involved the construction of 8,941 miles of public drains, and the excavation of nearly 80,000,000 cubic yards of earth, and cost \$12,131,075.

But the estimated benefits from the work are \$20,844,223. The average price per yard paid contractors has varied from eight cents in Steele and Waseca counties and nine in Doge and Fairbault, to twenty-five in Koochiching, and twenty-two in Itasca:¹ and the average cost per acre of land benefited has frun from sixty-four cents, eighty-one cents, \$1.10 and \$1.10 in Traverse, Polk, Norman, and Marshall counties respectively, to \$14.00, \$14.80, and \$16.00 in Jackson, Brown, and Lincoln counties.² In all county and judical ditch work the average price per yard paid contractors has been 15.7 cents, and the average cost per acre for lands benefited, \$2.07.

State ditches have been constructed under the authority of the Red River Valley Drainage Commission, and the present state drainage commission, During the years from 1893 to 1899 the Red River Valley Commission built nineteen state ditches at a total cost of \$162,412, these drains being located in Grant, Traverse, Wilkin, Olay, Norman, Polk, Kittson, and Marshall counties.

The present commission, beginning its work in 1901 has built seventy-six more state ditches, and aided in the construction of nine co-operative drains. Over 1157 miles of state and co-operative ditches have been

1. See Appendix 5 Chart C.
2. See Appendix 5 Chart D.

completed, and over 16,000,000 cubic yards of earth excavated at a cost of \$1,566,249. But this work has drained, 336,641 acres of swamp lands, and benefits have been assessed against landowners amounting to \$3,830,848. The work done since 1907 drains 292,037 acres of state land, and 681,105 acres of private lands.

The legislature of 1907 appropriated \$280,000 for the use of the state commission, the legislature of 1909 an additional \$200,000, and that of 1911 appropriated \$50,000 for topographic and water resources surveys, \$35,000 for the construction of an outlet for the Mustinka state ditch, \$12,000 for assessments against state lands drained, and \$5,000 to be used in co-operation with Marshall county in the construction of an additional outlet for Snake River. The total sum appropriated for the use of the present commission since its creation is \$502,000.¹ This fund, however, has been augmented by moneys paid in from time to time for assessments against private lands, by counties, in which the state ditches have been located. The amount received from this source and credited to the drainage fund is \$686,350. Thus the

1. The attorney general of the state in an opinion dated July 27, 1909, held that the appropriation of \$25,000 to aid in the improvement of watercourses and drains, other than those benefiting state lands, and of \$25,000 for the Whetstone River canal, were unconstitutional. On this point see also Const., Art 9, Sec. 5.

commission has had at its disposal in the last six years \$1,188,350. This fund has been appropriated as follows:

For drainage of state lands -----	\$1,009,636
Co-operative ditches and surveys -----	63,540
Topographic surveys -----	39,629
Water resources surveys and investigations	35,544
Outlet for Mustinka state ditch -----	35,000
Improvement for Snake River -----	5,000

On June 21, 1909 a co-operative agreement was entered into between the state drainage commission and the United States Geological Survey, under which a topographical survey supervised by state and federal engineers was made of a large area of land in Ottertail, Douglas, Grant, Traverse, Stevens, Pope, Swift, and Crow Wing counties, and a report of the work published.

In May of 1909 a co-operative agreement was entered into between the Water Resources Branch of the United States Geological Survey, and the state commission, under the terms of which surveys and investigations of the water resources of the state were to be made, as directed by a resolution of the 1909 legislature.¹ The cost of the work was to be equally divided between the state

1. Joint Resolution Number 19.

and federal authorities. The results of these investigations were embodied in a special report. At the present time surveys have been made of all or parts of the following streams: and plans, estimates, and specifications for their improvements so as to prevent disastrous overflows, have been prepared and furnished in the counties effected thereby. These rivers are the Minnesota, Mustinka, Watewan, Embarrass, Cedar, Redwood, Stony, Brook, Chippewa, Long Prairie, and Wild Rice. A channel has also been surveyed through several lakes in Martin county, and a complete survey made of Mille Lacs Lake.

The work done by the state commission in the preparation of plans and the making of surveys, indicates a growing realization on the part of the public authorities that the drainage problem is one that can be effectively solved, not with reference to arbitrary governmental divisions such as the county, but with regard to the topography of the land to be drained.

The state commission estimates that the cost of excavation has averaged about ninety percent of the total expenditures for state ditches; culverts, bridges, road-grades, and rights of way, three and one-half per cent;

engineering and administrative expenses (including surveys, maps, plans, estimates, record books, office supplies instruments, court costs, officers fees, superintendence and inspection of work) six and one-half per cent. In the construction of nearly fifty state ditches under the assessment plan, where all expenses were charged against benefited lands, and many thousands of landowners assessed, there were no complaints made to the commission of unjust taxation. There was but one appeal from the court orders establishing the drains, and that was settled out of court. This fact, the low percentage of administrative costs and engineering costs, would indicate that the state drainage laws is giving satisfaction, and is well adapted to accomplish the purposes for which it was enacted.

The policy of the state drainage commission has been to drain only such lands as would immediately become available for cultivation, because requiring little clearing or similar work before being fit for agricultural uses. Its work has, to a large extent, been confined to lands near to railroads and trade centers; it has avoided, so far as possible, the drainage of lands where the life of growing timber might be endangered by the removal of water

from the soil.

In the construction of every ditch, public highways have been built along its sides from the excavated earth wherever such road construction was practicable. When drainage work now under way shall have been completed, there will be 575 miles of graded road along the several state ditches, constructed at but a small cost in addition to that of the ditches themselves. The average cost is not more than half a cent per cubic yard, or \$75.00 per mile of road.

Public drainage works already constructed under the county, judicial, and state-commission statutes, have reclaimed approximately 7,179,767 of the 10,000,000 acres of swamp lands in Minnesota originally too wet for cultivation. This work has been done at a cost of \$13,697,334, or about \$2.00 per acre. Although the assessed benefits amount to \$24,675,071, and show a return of about \$2.00 for every dollar invested, yet the actual direct benefit to landowners has been estimated at from \$5.00 to \$8.00 for every dollar expended in drainage. And of course the

indirect benefits to the state caused by the increase in the value of the yearly crops of the state, betterment of public highways, and the promotion of health, are very great.

Perhaps a few concrete examples will serve to indicate the profitableness of public land drainage in Minnesota. At Island a four-thousand-acre farm was reclaimed from the Floodwood swamp at a cost of two dollars per acre for drainage, and of from three to ten dollars for the clearing of timber, which was sold and considerably decreased the expense of reclamation. Today the land is worth, exclusive of farm buildings, at least \$60.00 an acre. Land in the Gun Lake swamp in Aitkin county prior to the construction of state ditch number sixty-six was offered for sale at prices ranging from \$3.50 to \$5.00 per acre; but as soon as the construction of the ditch was begun, all state land sold as fast as it was placed in the market, and the price of farm land in that vicinity is now from \$16.00 to \$25.00 per acre. In 1912 the state auditor was selling reclaimed swamp land located at about seven miles from the county seat of Roseau county for as much as \$15.00 and \$30.00 an acre; formerly it was almost without any value whatever. And it is estimated

that an investment of \$30,600, in the drainage of 18,000 acres of state land by state ditch number sixty-nine will return to the state treasury approximately \$450,000. For the cost of reclamation will be about \$1.70 per acre, and the land reclaimed will be sold at not less than \$25.00 an acre.

Because of the noneavailability of, and incompleteness of the drainage records of the counties of Minnesota, it has been impossible to secure much information throwing light upon the question of the comparative efficiency of the state and county systems of reclamation. While the writer is of the opinion that any comparison would certainly not be to the disadvantage of the state drainage commission, and believes that it has done and is doing very efficient work and that its reports and figures are correct the reader in drawing his own conclusions from the following figures should note that they are derived from the commission's own report. There have been some critics of that authority, but it is difficult to determine how much their adverse comments have been due to an unselfish interest in the welfare of the state,

and how much to fear that the county system of land drainage may, as a result of comparison with state work be shown to be less efficient than it ought to be. And in connection with the comparative cost of excavation work under the different authorities, it should be noted that the state commission may often secure better terms from contractors than the counties since the contracts of the former are frequently much larger than those of the latter.

Average price paid contractors:

for one cubic yard of excavation:

In state and co-operative ditches ----- 9.7¢

In county and judicial ditches ----- 15.7¢

Average cost per acre of land benefited:

In state and co-operative ditches -----1.17

In county and judicial ditches -----2.07

Average estimated benefit per acre of land benefited;

In state and co-operative ditches -----2.87

In county and judicial ditches -----3.56

Net profit per acre of land benefited:

In state and co-operative ditches -----1.70

In county and judicial ditches -----1.49¹

1. Except where special references are given in the footnotes, this chapter is based upon the 1910 and 1913 Reports of the Minnesota Drainage Commission.

Conclusions.

From the foregoing discussion of the progress that has been made in public swamp reclamation abroad and in the several states of the American Union, it is apparent that the United States has accomplished a considerable amount of drainage work during the comparatively few years which it has devoted to the problem of land drainage; and her experience, as well as that of other countries, conclusively demonstrates the practicability, wisdom, and profitableness of such undertakings. But it is also clear that there is still an enormous amount of land in this country which, in its present state, is too wet for recultivation; and that to render it suitable for tillage will necessitate the solution of many difficult engineering and administrative problems, and the expenditure of millions of dollars. Because of the almost total absence of available public records of the cost and expenditure of work done, and the general lack of interest in the subject it has been difficult and indeed almost impossible to secure reliable or anywhere near complete

information or statistics, from which to make deductions as to the comparative efficiency of the different public agencies that have been employed in drainage work; yet some conclusions of interest or value may be drawn from the foregoing chapter of this thesis.

In attempting to rank the American states with reference to the progress which they have made and are now making in land drainage, Ohio, Indiana, Iowa and Illinois must be credited with having done the greatest amount of work in proportion to their original swamp-land areas. But while their laws as a whole are satisfactory, and they must be given the credit of doing pioneer work in wet land reclamation, yet the absence of state-wide authorities has led to unnecessary expenditure which might have been avoided, especially in Illinois. At the present time, Michigan, Minnesota, and Missouri, are probably doing the greatest amount of effective work; while Florida, Louisiana, and other southeastern states, containing more swamp lands than any others in the Union, have practically given away a large portion of their state lands, and have only just begun to make them dry enough for cultivation.

That Minnesota is taking a leading part in public land drainage in the United States is apparent from a consideration of the simplicity and practicability of her laws, the work of her state commission, her care in retaining the ownership of her swamp lands, and the rapidity, excellence, and low cost of the work done by her up to the present time.

If this study has revealed any general principle it is this: that to attempt to solve the problem of wet land reclamation by agencies strictly confined to artificial territorial divisions, such as the county, or in larger problems, the state, is not only illogical but economically foolish. Statutory provisions for the co-operation of two or more counties in the same or in different states, show that the truth has come to be recognized that successful drainage cannot be accomplished without a consideration of the whole basin or watershed involved. The necessities are not essentially different from those of the sewerage system of a great city. No sensible person would think of building the upper end of the system without regard to the lower end,

nor of dividing the problem up into districts to conform to ward or precinct lines, and the construction of sewers in each district without regard to any other district, the sole object of each being to drain off its sewerage on to some other land, without any consideration of possible effects upon surrounding territory. In planning the sewerage system of a municipality, if we are to be successful, we must at the very outset design each portion from outlet to the highest point, so that when the whole work is completed it will be a single unit, composed of different parts working harmoniously together. And likewise in the drainage of swamp lands, whether the area to be reclaimed include ten acres or a million, it must, if included in a single river basin, eventually be drained. In England, individual holdings and districts were improved independently of each other, as though they had no common interests. As a continually larger part of the land was improved, the work of the several projects came in conflict more and more, and the work of earlier districts was made useless by later improvements. It has been estimated that as a result of this lack of regard for

drainage basins as a whole, more than the present value of much of the fen lands of England has been spent on reclamation work, and the conditions, in some instances are still unsatisfactory. On the contrary, in Holland, the very stupendousness of the problem was indirectly and to a certain extent an advantage to the people from a financial standpoint. For it was impossible for individuals to undertake the task of walling out the waters of the sea, and as a consequence, the interests of all the people, and the topography of all the territory affected, was considered in the solution of the problem, that is to be attributed, to a considerable extent, the success of the Dutch. The fact that a given ditch for the time being gives some relief to a locality, is no indication that it is properly laid out and constructed; it may become useless by the construction of another ditch above it, or, being badly planned, may increase the cost of drainage below. It is the realization of this truth that has been one of the causes leading to the creation of state drainage commissions in a few states other than Minnesota; that in this state led to the enactment in turn

of laws relating to drainage by the successively larger agencies of townships, county, and state; and, together with an increased appreciation of the importance of wet land reclamation in the United States, has led to agitation for the participation of the federal government in the work of land drainage.

Although up to the present time the national government has done nothing further in aid of swamp land reclamation than to make grants of land to the states, and, in view of the successful activity of persons interested in the irrigation of arid lands in the west in that direction there has been surprisingly little agitation on the question. Congress has been memorialized on the subject,¹ and there have been several bills introduced therein relating to the drainage of overflowed lands through federal aid. In 1906 and 1908 Senator Flint of California tried to secure the passage of drainage acts similar to the irrigation laws of the United States; providing for the co-operation of states, corporations, or individuals with the Secretary of the Interior, and the creation of a fund to be loaned in assistance to public

1. 60-2 Cong. Record. Vol. 43, p. 1659. Oklahoma.

ditch projects.¹ A somewhat similar bill was introduced into the Senate in 1912 by John Sharp Williams; but none of these became laws.²

There has been some argument against federal participation in drainage work, on the ground that the whole machinery with reference to the issuance of the necessary bonds and the collection and payment of interest and principal thereof, should be state legislation resting upon the taxing power of the state, or upon the power of assessment for local improvement; that the national government has neither of these sovereign powers within the states; and that national irrigation statutes are to be distinguished from any that might be enacted relating to drainage, in that in irrigation work the powers of the federal government have been exercised as a proprietor of arid lands, and not as sovereign, while in drainage work it would be unable to act in a proprietary capacity, since it owns today very little swamp lands.³

It is not necessary at this time to enter into a discussion as to the constitutionality of a federal law relating to drainage that would be similar in its provi-

1. 60-1 Cong. Record Vol. 43, Sen. Rep. 289. Sci. Am. Vol. 97, p. 390.
2. Rhul, A. Collier's Mag. Vol. 49, p. 22.
3. Perkins, E.T. Acting President of Second Annual National Drainage Congress, Address at New Orleans April 10-13, 1912.

sions to national irrigation statutes the validity of such has been affirmed by the courts. Suffice it to say that there is eminent authority to the effect that such an act of Congress would be constitutional. And without reference to the question of constitutional law involved in the matter, it is certain that there are a great many arguments in favor of a participation by the national government in the work of land drainage through public action.

Practically all the reasons which have been advanced in favor of federal aid in irrigation work, may also be given in support of similar aid to drainage projects. Not only is this work of reclamation of great importance to the health and prosperity of the United States as a whole, and immense sums of money beyond the ability of states or individuals to furnish needed to carry on operations until returns commence to come in from the sale of reclaimed lands; but the drainage problem offers better opportunities from a practical economic standpoint than does that of irrigation. The average cost of irrigation is \$30.00 per acre; that of drainage

is about \$5.00 or \$6.00.¹ Swamp areas are more generally in the midst of more populous territory with already developed transportation facilities, the engineering problems as a rule are more simple, and the land is usually richer in itself than arid land. Then too the federal government is already well prepared to undertake such activities, for the United States Geological Survey as the result of hydrographic and topographical surveys covering nearly a million square miles,² for several years has been gradually accumulating a great mass of maps, charts, statistics, and general information, relating to rainfall, drainage, and watersheds.

But the principle argument in favor of a participation in drainage work by the national government is based upon necessity. The folly of attempting to solve this problem by means of agencies working independently of one another behind artificial governmental barriers has already been indicated, and has been given as one of the reasons for the development of state drainage commissions. It is also a reason for the control of drainage work by the federal government whenever very

1. U. S. Geological Survey estimates 60 Cong. Sen. Doc. 443. Mitchell, G. E. World Today, Vol. 13, p. 777.
2. Mitchell, G. E. World Today, Vol. 13, p. 777. (This was as early as 1907).
Newell, W. D. Address at St. Paul 1910.

large areas are to be reclaimed. Without needlessly depriving any state of its prerogatives or sovereignty, or in the least undermining the principles of local self-government, and disregarding the fact that drainage work is often inextricably bound up with the problem of interstate waterways and irrigation, this important fact should be considered carefully, and given all the weight that it deserves, there are a considerable number of large swamps that lie in river basins extending through more than one state, and they cannot be drained effectively or economically, or with justice to the inhabitants of each state, without the intervention of some interstate authority.

The Dismal Swamp occupies parts of Virginia and North Carolina. The Savannah River on the northern border of Georgia, and the Appalachicola on its southwestern border have great swamp and overflowed areas in South Carolina, Alabama, and Georgia. Between North and South Carolina there are extensive interstate marshes. The Okefinekee swamps of Georgia must have their drainage outlets across the state of Florida. The Tombigbee Valley in Mississippi lies above the same valley in Alabama. The Pearl River

bottoms occupy parts of Mississippi and Louisiana. The St. Francis Basin extends into both Missouri and Arkansas, while the swamp areas of the Red River of the North occupy Minnesota and North Dakota, and those of the Kanakakee, both Indiana and Illinois. In short the greater part of our swamp reclamation problems are interstate.

Not to speak again of the unnecessary waste of time, effort, and money, that results from drainage by arbitrary territorial organs in disregard of topographical considerations, the injustice of such a lack of systems upon landowners concerned may be illustrated by the situation in the St. Francis Basin. On the two sides of the Arkansas-Missouri Boundary line, there are separate jurisdictions, different laws and processes, and engineers and drainage authorities working independently of each other. Missouri has already drained a large amount of land in the Basin, and the people of Arkansas are already taxing themselves to pay for the removal from their lands of this water. And as soon as Arkansas carried on reclamation work on any large scale, its landowners will have to spend a considerable part of their

ditch-money in the proper disposal of the water which the people of Missouri have thrown upon them in draining the Missouri portions of the St. Francis Basin. It is clear that the logical manner in which to solve the problem of the Basin would be to drain it as a single unit, and assess the cost according to individual benefits in complete disregard of state lines or governmental divisions. It may be argued that in such a case the need of concerted action may be conceded, but that the remedy is to be found, not in action by the federal government, but in the co-operation of interested states in interstate drainage. Yet, in the St. Francis Basin there is not the remotest possibility of joint action by Missouri and Arkansas; and up to the present time, there has not been a single successful example of state co-operation in the reclamation of an interstate swamp. Some authority with jurisdiction greater than that of any state is needed, and the longer haphazard work is continued the greater is the economic waste. The federal government is the only authority with powers broad enough or jurisdiction sufficiently extensive to bring about the reclamation of inter-

state swamps; it is prepared to do the work; and its success in the irrigation of arid lands warrants the conviction that it would be a most efficient agent in the reclamation of swamps.

APPENDICES.

Appendix 1. Drainage in the United States.†

Alabama.	1,479,200.	
Arkansas.	5,901,300.	
California.	3,420,000.	700,000 drained - Total 4,120,000.
Delaware.	127,200.	
Florida.	19,800,000.	
Georgia.	2,700,000.	
Illinois.	925,000.	3,496,000 drained- Total 4,421,000.
Indiana.	625,000.	3,358,000 drained- Total 3,983,000.
Iowa.	930,000.	915,000 drained- Total 1,845,500.
Kansas.	358,380.	
Kentucky.	444,600.	
Louisiana.	10,196,605.	120,000 drained-
Maryland.	192,000.	
Maine.	156,520.	
Michigan.	2,947,439.	1,600,000 drained- Total 4,547,439.
Minnesota.*	5,832,308.	1,500,000 drained- Total 7,332,308.
Mississippi.	5,760,200.	
Missouri.	2,439,600.	350,000 drained- Total 2,789,600.
Nebraska.	512,100.	100,000 drained- Total 612,000.
New Jersey.	326,400.	
New York.	529,100.	
North Carolina.	2,748,160.	
North Dakota.	200,000.	150,000 drained- Total 350,000.
Ohio.	155,047.	3,400,000 drained- Total 3,555,047.
Oregon.	254,000.	
So. Carolina.	3,122,120.	
So. Dakota.	611,480.	
Tennessee.	639,600.	
Texas.	2,240,000.	
Virginia.	800,000.	
Wisconsin.	2,360,000.	200,000 drained- Total 2,560,000.

* For note see other side of sheet.

x Footnote (see next)

Footnote X.

These estimates are based on 60th Cong. Sen. Dec. 443, and are somewhat out of date being published in 1910, but they are the latest available figures. It will be noted that it is stated that Minnesota originally contained 7,332,308 acres, and has retained but 1,500,000 acres; while the state drainage commission, in its 1913 report estimates the number of acres originally swamp in Minnesota at 10,000,000, and states that 6,000,000 acres have been drained. This discrepancy no doubt is due in part to the fact that a great amount of work was completed in the state between the years 1910 and 1913, but it is partly due to the fact which should be noted in considering ~~the~~ similar statements throughout this thesis, namely that estimates differ considerably and cannot be depended upon absolutely for their accuracy. This is true because some of the overflowed lands in the United States, particularly such swamps as the Everglades and the Okefinokee, have never been thoroughly ~~surveyed~~ explored or surveyed, others only by unreliable authorities or not at all; and the statements of recognized authorities upon the question, such as Professor Shaler or the officials of the United States Geological Survey, differ widely at times, because one of them in speaking of swamp lands, may include lands that are ~~minimally~~ actually covered with a few inches of water, or are tide lands, or are perhaps wet only during a short season of unusually heavy rainfall, while another person may leave such lands out of his estimates.

Thus it may be noted ~~that~~ by a comparison of the charts in appendix six that in some counties of Minnesota apparently more swamp land has been drained than was originally to be found in such counties. This is to be explained in the same way as other apparent discrepancies in the figures or statements in this thesis; but it seemed best to give such estimates, and leave them to be considered by the reader with this caution.

APPENDIX 2.

ARIZONA. Arizona Laws 1st Session 1912 Chap. 38. (May 16, 1912.) Usual act. Election is held on question of establishing a drainage district, all real property owners in the district who are qualified as electors. The drainage commissioners are in two classes, and rotate in office with two years terms, being elected. Special election is held on question of bond issues. If bonds are insufficient, then an assessment may be levied after the election. Public purpose is required.

ARKANSAS. Kirby's Digest of Statutes 1904. Secs. 1414-1450.-- Act of April 23, 1903 (Secs. 1414-1450 Kirby's Digest) was held constitutional in Beasley vs Gravette, 86 Ark.--- Amended and supplemented by Acts of 1907, acts 111, 432, 49; Acts of 1909, acts 181 and 279; Acts of 1907, act 314; Acts of 1921, acts 221, 54, 49, 136. Mandamus is authorized at various stages to compel action by the boards and commissions concerned in drainage work, and to expedite proceedings. This is a variation from general method adopted in most states to guard against delay, which is to prescribe a fixed time within which a given step in the procedure must be taken or completed. If bonds or interest coupons are unpaid thirty days after maturity, a court of chancery, on suit brought, may appoint a receiver to collect the taxes assessed. Public purpose or benefit is required.

CALIFORNIA. Statutes 1885, 204, Chap. CLVIII, amended by Statutes 1891, 262, Chap. CLXXXII. (Henning General Laws 1905, pp. 370-372.) Statutes 1903, 354, Chap. CCLVIII. (Henning General Laws 1905, pp. 414-417. Very brief act, containing nothing unusual. There are various special laws for draining lands in particular counties such as Statutes 1865-66, 451; Statutes 1877-78, 1037; Statutes 1913 Chap. 99. Especially important of these at the present time are, Statutes 1905, 443, Chap. CCCLXVIII relating to the Sacramento Drainage District, and Statutes 1913 Chap. 170 relating to Sacramento and San Joaquin Drainage District. By Statutes 1900, Extra Session Number 20, Chap. XII, office of Commissioner of Public Works, ap-

pointed by governor for four years, was created, one of his duties being such examination and supervision of drainage works constructed under the laws of the state, as the governor might direct. In general, the California laws are so brief, and several steps in procedure so imperfectly treated, or not at all, that it is doubtful whether it can be cited to support the general text above as to drainage laws in general.

COLORADO. Session Laws 1911 Chap.124, expressly repealing Session Laws 1909 Chap.161. Under certain conditions the county commissioners may dispense with an election; but must order one if so petitioned. In absence of election the county board itself supervises the work of construction; but if there is an election, three directors are chosen, who have charge of subsequent proceedings, such directors having fixed terms and rotating in office. Directors may issue bonds after an election on the question. Legality of establishment of the district cannot be called in question, if one year has elapsed without quo warranto proceedings having been instituted. Voluntary districts may also be organized. In general features and to some extent in phraseology the Colorado statutes are similar to those of Minnesota, though not quite so complete. Public purpose must be found.

CONNECTICUT. General Statutes Revision of 1902 Title 40, Chap.248. (Original acts are of 1861,1862,1864, and 1877.) Secs.4489-4499 and 4513. Acts is very short. Authorizes formation of drainage companies on petition to superior court of county, which fixes bounds of the company, and appoints two "Scavengers" who call first meeting of the company, which thereafter holds annual meetings for the election of clerk, treasurer, collector of taxes, and one scavenger, the last being general manager, and estimator of benefits. The company has power to open, repair, and enlarge ditches, levy taxes etc. (An act of 1862 provides for a similar organization through the justices of the peace.

General Statutes Revision of 1902 Title 40 Chap.

249 (Original acts are of 1711, 1750, 1821, 1732, 1846, 1673, 1728, 1702, 1864, 1853 and 1858) Secs. 4500-4513. Amended by Public Acts of Conn. 1903 Chap. 48. Work may also be carried on under two commissioners of sewers appointed by the superior court of any county on petition of landowners therein, viewers being appointed by the court and proceedings supervised by it. The Connecticut laws on drainage of marsh land are very brief and sketchy in character, not providing for bond issues, nor referring at all to the necessity of any public benefit appearing in either petition or findings.

DELAWARE. Laws of Delaware Volume 13 Chap. 444 (Revised Code of 1852 as amended to 1893, Chap. 59) (The original act is of March 4, 1869.) Amended by Volume 15 Chap. 401; Volume 16 Chap. 90; Volume 19 Chap. 138; Volume 21 Chap. 257. (Volume 20 Chap. 447 is no longer in force having been repealed by Volume 21 Chap. 255.) Act is similar to that of Connecticut in simplicity of proceedings, and absence of any reference to a public purpose for the taking of lands of private persons. County commissioners have charge of proceedings until manager and treasurer are chosen by taxables at their first meeting, such officers being elected thereafter at annual meetings. Before work is commenced damages must first be paid to owners of lands taken or injured. At meetings of taxables each one has one vote for every dollar of taxes paid by him.

Laws of Delaware Volume 17 Chap. 147 (Revised Code of 1852 as amended to 1893 page 570 et seq. in Chap. 30.) Drainage corporations are authorized, and may enter on lands of private owners to do work and build ditches, after paying damages determined by commissioners appointed by the superior court. (The original act was passed March 14, 1883.) Laws of Delaware 1901 Chap. 167 Sec. 71. (Same as Volume 22, Chap. 167.) Similar act relating to drainage corporations. Money for work done is raised by taxation of taxables "according to the nature of their property". (Amended by Volume 22 Laws of Del. Chap. 393; Volume 23 Chap. 154; Volume 25 Chap. 157; and Chap. 394 of

Volume 22 by Chap.156 of Volume 25. Volume 13 Chap.444 is amended slightly by Volume 24 Chap.154; Volume 19 Chap.138; and Volume 25 Chap.139. Volume 26 Chap.168 is amended by Laws 1913 Chap.160. The following acts relate to the incorporations of certain particular named drainage companies, and are therefore special in character, but still in force and effect. Volume 19 Chap.659 and Chap.662; and Chaps.660;663;665;668. Volume 20 Chaps. 46;47;45;48;467-479. Volume 21 Chap.258. (Some of these acts amend special acts concerning named companies originally passed as early as January 22,1831.) The following acts now in force relate to certain specified districts or counties in the state, and are therefore also special in character. Volume 19 Chaps.661;664;669;667. Another special act is Laws 1913 Chap.161. A house joint resolution entitled Laws 1913 Chap.310,named certain persons as commissioners to view the swamps of the state, and report to the next legislature as to method of draining these lands, estimated cost of such work,and the value of such lands when reclaimed.

FLORIDA. General Statutes of 1906 Chaps.15 and 16, Secs. 922-960, added to and amended by Laws 1905 Chap.5378; Laws 1911 Chap.6190; Laws 1913 Chap.6457. (Original Act is Acts 1893, Chap.4178.) Petition to clerk of county by two or more landowners with bond. Proceedings under county commissioners. Anyone filing protest with bond for costs may cause the county board to appoint reviewers. Usual act otherwise; and very similar even in phraseology to Laws Minnesota 1905 Chap.230, except more brief. Public purpose necessary.

General Statutes of 1906 Chap.16, Secs.950-960 (Original Acts are Acts 1901 Chap.5053 and Acts 1903 Chap.5301 Secs. 12 and 13.) On petition by majority of landowners "a public ditch" may be constructed in proceedings similar to those provided in Chap.15, but this act, (Chap.16) does not prescribe that the work must be of public benefit; it may be merely for benefit of owners of private lands drained, unless application of statute is confined or limited by use of phrase "public ditch" in beginning of act as stated above.

Laws 1905 Chap. 5377 creates a board of drainage commissioners composed of governor, comptroller, state treasurer, attorney general, and the state commissioner of agriculture, and authorizes the board to establish drainage systems, exercise the right of eminent domain, organized drainage districts, and levy acreage tax therein not exceeding ten cents per acre per annum to be collected by the county tax collectors. Amended by Laws 1907 Chap. 5709 which itself specifies boundaries of a single drainage district, and levies a tax of five cents per acre per annum on lands therein, the proceeds to be applied to their reclamation. (Apparently the commission now has no longer the power to itself establish drainage districts.)

Laws 1911 Chap. 6297 is a special act creating a drainage district in Putnam county, and is similar to Laws 1905 Chap. 5377, and to Laws 1907 Chap. 5709, except that board of county commissioners and their successors are to be the controlling authority.

Laws 1913 Chap. 6456. Establishes the Everglades Drainage District; levies a tax therein, and places reclamation work therein under the Board of Commissioners of the Everglades Drainage District. This board is composed of the governor, comptroller, state treasurer, attorney general, and commissioner of agriculture, and it is given all the powers conferred by Laws 1905 Chap. 5377 and Laws 1907 Chap. 5709. (This act apparently supersedes prior act and is the statute under which state work is being carried on at the present time.)

GEORGIA. Laws 1911 Number 265. Amended by Laws 1913 Number 169. Usual act except that the court to have jurisdiction of drainage matters in the county is composed of the clerk of the superior court, to whom the petition is first presented, and the board of commissioners of roads and revenues, or if there be no such board in the county, then the ordinary of the county. After the district is established then the landowners in the district elect three drainage commissioners who constitute a body corporate to carry on the work, condemn and acquire property, assess costs, and issue bonds of the

district. (The act is fairly clear, but not marked similarity to the Minnesota statute.) A public benefit is necessary. This is the main act in Georgia.

Georgia Code of 1911 Article 12, Secs. 432-439 and 5235. (Original acts are Acts 1878-1879 p. 171; Acts 1893 p. 112; Acts 1897 p. 34; and Acts 1898 p. 54.) Any county may establish ditches when "it shall judge the same to be proper". But evidently consent of owners of lands taken or injured is necessary, except in case of the "coast counties" which have the right of eminent domain and may proceed to take private property under the general statutes of the state regarding the exercise of that power. The procedure is the same as that for the establishment of public roads, that is, on application to the ordinary, the latter appoints three commissioners who must find road to be of public utility; the amount of damages to any individual owner may be referred to a jury of freeholders for determination. (The statutes relating to road procedure are Code of 1911 Secs. 640-646; 678-689.)

IDAHO. Session Laws 1913 Chap. 16. Usual statute. Petition is presented to clerk of the district court, which court appoints three drainage commissioners to have charge of the work, and continues to appoint them for three year terms. Board of drainage commissioners may issue bonds without any election being required to give them authority for such issues. (Act is not similar to that of Minnesota in arrangement or phraseology; and it might be more clearly drawn.)

The statute of 1913 was passed as an emergency act, the reason given being that there "is no law on the subject now in force in the state". But Session Laws 1911 Chap. 125 (a mere brief paragraph) had authorized the construction of drainage ditches across lands of non-consenting owners under the exercise of the power of eminent domain in proceedings already provided in relation to irrigation works. And Laws 1903 Chap. 256 as amended by Laws 1907 Chap. 98 (Idaho Revised Code 1908 Title 15.) had provided procedure on petition to county commission-

ers, and the election of a board of drainage commissioners. (This act is very similar to the drainage statute of Washington, and apparently modeled upon the latter law. See Ballinger Annotated Washington Code. Title 27.)

ILLINOIS. Hurd's Revised Statutes of Illinois 1913 Chap.42. (original act is Laws 1879 p.120. The principal amending acts are Laws 1885 p.109, and Laws 1913 p.260. For references to the very large number of acts amending or supplementing the statute of 1879 see Hurd's Revised Statutes of Illinois 1913 Chap.42.) The petition is presented to the county court which appoints three commissioners to view the lands in the proposed drainage district, let contracts, and supervise the work. (See Secs.2,5,28 and 38 of Chap. 42.) A jury is impaneled to determine benefits and damages to individual landowners. The usual proceedings by petition require the signature of a majority of the owners of land in the proposed district representing one third of the area of the land, or one third of the number of owners representing a majority of acres; (See Sec.2,Chap.42.) but it is provided that on petition of one fifth of the land owners a special election may be held to decide whether or not the proposed district shall be organized. This election is conducted under the general election laws of the state (See Sec.65 Chap.42.) A public purpose is necessary. Act is typical.

There is also provision in the statutes of Illinois for procedure in single townships under supervision of township officers, commissioners of highways, and justices of the peace. (Laws 1885 p.109. Revised Statutes 1913 Sec.75 et seq.); and an important act of special character is Laws 1913 p.277 which relates to the Kaskaskia Island Sanitary and Levee District.

INDIANA. Burn's Annotated Indiana Statutes 1908 Chap.56 Secs.6140-6174. Amended and supplemented by Acts 1909 Chap.2; Acts 1909 Chap.173; Acts 1911 Chap.208; Acts 1911 Chap.288; Acts 1913 Chap.342. Drainage commissioner is appointed by the board of county commissioners in each county of the state, and is removable by it; the county

surveyor is ex officio the second drainage commissioner; the third is appointed by the court if it deems the initial petition sufficient. The petition is presented to the circuit or superior court. Drainage bonds may be issued only if the cost of the work exceeds \$5,000. If land is wholly in one county, then the petition may be presented to the county commissioners, and procedure through them. Acts 1913 Chap. 331 provides procedure for cases where a drain affects lands in an adjoining state. A public benefit is necessary. (See Burn's Annotated Statutes 1908 Chap. 56, Sec. 6143.)

IOWA. 19th General Assembly Chap. 44; 16 G. A. Chap. 140; 18 E. A. Chap. 85; 21 G. A. Chap. 139; 17 G. A. Chap. 121; 20 G. A. Chap. 186; 22 G. A. Chap. 97; 23 G. A. Chap. 96; 20 G. A. Chap. 188; 21 G. A. Chap. 55; Code 1873 Secs. 1207-1216, and Sec. 1227. Code of 1897 Title X Chap. 2. Secs. 1939-1966. Usual procedure through county board. If claims for damages are made then the auditor appoints the appraisers instead of the board of county commissioners. Bonds may be issued without any election. Before work is commenced the claims for damages must have been paid or secured by persons benefited by the ditch. In case landowner wishes to construct a drain across adjoining land, and cannot agree with its owner as to its construction, appeal may be had to township trustees who may establish the ditch after a hearing, but the petitioner must pay the damages awarded by the trustees and costs of the proceedings before commencing actual construction work.

I~~9~~ General Assembly Chap. 44; 18 G. A. Chap. 85; 16 G. A. Chap. 140; 31 G. A. Chap. 9; 21 G. A. Chap. 139; 29 G. A. Chap. 78; 30 G. A. Chap. 67; 20 G. A. Chap. 186; 31 G. A. Chap. 82; 26 G. A. Chap. 46; 31 G. A. Chap. 83; 32 G. A. Chap. 93; 30 G. A. Chap. 68; 30 G. A. Chap. 69; 30 G. A. Chap. 70; 31 G. A. Chaps. 9, 85, 84, 86; 32 G. A. Chaps. 94 and 95. Code of Iowa Supplement of 1907 Title X Chapters 2 and 2A. (The code of 1897 and Code Supplement of 1907 have been amended by 32 G. A. Chaps. 93-95; 33 G. A. Chaps. 117-122; 34 G. A. Chaps. 85-89; 35 G. A. Chaps. 153-159.) Sub districts may be created within drainage districts for more complete drainage of part of

lands in the district on similar proceedings to those prescribed for the original establishment of a drainage district. Joint action of officials of more than one county is provided for in cases where the proposed ditch extends into more than one county. In case the officials of any county refuse to cooperate or act with others, then on petition the district court of any county concerned may order the ditch to be established.

In the statutes of Iowa a public purpose is a prerequisite to the establishment of a ditch. (See Code 1897 Secs. 1939 and 1941.) The Iowa procedure is typical.

KANSAS. Laws 1911 Chap. 168. Majority in interest of owners of land in any contagious body of swamp may form a drainage district by signing articles of association obligating themselves to pay the cost of drainage works to be constructed, filing the articles in the office of the clerk of the district court of the county. Then summons is issued against non-consenting or non-signing landowners returnable at the next term of the district court of the county, at which time the court may summarily declare such drainage district a public corporation after hearing those who object to having their lands assessed for the work. Landowners then elect five supervisors, each acre having one vote. Annual elections are held thereafter. The supervisors have survey and plans made by an engineer, confirm assessments after hearing, supervise work, issue bonds, and let contracts. The procedure in other respects is the usual one. A public benefit must appear. (See General Statutes 1909 Sec. 2987.)

Kansas Laws 1911 Chap. 168 does not refer to any other or prior acts relating to drainage, but is a complete and separate statute on the subject. There are, however, other drainage laws still in force in the state, which are of the usual character. These provide for (1) township drainage; (2) proceedings through county commissioners with appeals to the probate courts; (3) instead of such county procedure for single ditches, the county board may establish or incorporate permanent drainage districts, the powers of such public corpora-

tions to be exercised by a board of five men elected by all the taxpayers in the district; (This board has usual powers as to supervision, and bond issues.) (4) proceedings through the district court in certain cases. General Statutes 1909 Chap. 34 Secs. 2968-3074. Amended by Laws 1913 Chap. 184.

KENTUCKY. Acts 1912 Chap. 132. Proceedings are under supervision of county judge, who orders establishment of drainage district if no exceptions are taken to the viewers' report. If exceptions are taken then a jury trial may be had on demand. After the drainage district is established and the report of the viewers confirmed by the court, the work is under the control of drainage commissioners appointed for four year terms by the county judge, and reappointed by him as their terms expire. The damages allowed, "shall be considered separate and apart from any benefit the land would receive because of the proposed work". The act is the usual one except that it provides that on petition of one fourth or more of the total number of landowners affected by and owning fifty per cent or more of the total number of acres in a proposed district, the court must permit the district to be organized as a separate and distinct district under the control, not of the permanent drainage commissioners of the county (appointed by the court under the above statute) but of a board elected by the landowners. If the total assessment exceeds twenty-five cents per acre then the board of drainage commissioners may issue bonds for the amount of unpaid assessments, after publication, and any person neglecting to pay his assessment when due is deemed to consent to the issuing of such drainage bonds; and in consideration of the right to pay his assessments in installments he thereby waives his right to any defense against the collection of the assessments because of any illegality, irregularity, or defect in prior proceedings. (The act of 1912 repeals inconsistent acts, and therefore apparently repeals Kentucky Statutes 1903 Secs. 2380-2412A. --Originally act of July 10, 1893 superseded or amended by acts of

March 23, 1900; March 21, 1902; and March 27, 1902.--as amended by act of March 21, 1906, i. e. Acts 1906 Chap. 76, and by Acts 1906 Chap. 150, and by Acts 1908 Chaps. 23 and 73. But the act of 1912 expressly saves from repeal act of March 19, 1894 (Statutes 1903 Secs. 2413-2417) and act of March 24, 1906 (Statutes 1903 Sec. 2417A or Acts 1906 Chap. 151.)

Act of March 19, 1894 (Statutes 1903 Secs. 2413-2417 and still in force by express exception from repealing clause of act of 1912) authorizes counties to drain swamp lands, and pay for such work out of the county levy derived from the taxation of all taxable property in the county, provided that such swamp lands cause sickness in the county.

Acts 1912 Chap. 132 provides that viewers must report as to whether the work will be of public benefit, but there is no express duty on the court to so find.

Act of March 24, 1906, Chap. 151 (Statutes 1903 Sec. 2417A, and also still in force by virtue of exception from repealing section of Acts 1912 Chap. 132) legalizes and continues corporations heretofore formed for drainage purposes under the laws of Kentucky.

LOUISIANA. Acts 1910 act Number 317, amending Act 159 of 1902 and Act 135 of 1906. (The older statute regarding drainage is Act 37 of 1894 for which Wolff's Constitution and Revised Laws of Louisiana 1904 Secs. 1282-1284.) Acts 1906 Act Number 103. The statutes of Louisiana are less typical than those of most states, for example Illinois, Indiana, Minnesota. No petition is provided for, and there is consequently no way for private owners to institute proceedings or compel the public authorities to act, but the police juries must take the initiative in organizing drainage districts. (See act 317 of 1910 Sec. 1.) Three of the five drainage commissioners who have charge of the work in each district are chosen by the police juries; the other two are appointed by the governor of the state. (See act 317 of 1910 Sec. 3.) The drainage commissioners may levy forced contributions or acreage taxes after petition by the owners of

the land in the district, or after an election participated in by all the property-owning taxpayers who have qualified as electors in the district. (See act 256 of 1910. Sec.4.) The drainage taxes are assessed against all property subject to state taxation in the drainage district, and not by special commissioners or drainage assessors, as is usually the case in drainage proceedings, but by the parish officials who make the assessments for state taxes. (See act 317 of 1910 Sec.13.) The board of state engineers is required to make surveys and estimates as to the cost of proposed drainage works, lay off canals and levees, and "perform any and all other services in connection with the drainage and reclaiming of the lands of any district that may be required by the commissioners of said district". But the drainage district must pay all expenses incurred by the board in making surveys. (See act 317 of 1910 Sec. 21.) It is also the duty of the board to give special study to the drainage of swamp lands. (See Act 317 of 1910 Sec.25.) The power and duties of the state board of engineers, and of the governor with respect to the appointment of some of the members of the drainage commissions, give the state government an opportunity to exercise some influence in the direction of better work and the planning of drainage projects with a view to the interests of the state at large.

Constitution of 1898 Article 281 contains detailed provisions relating to drainage. It authorizes municipal corporations, parishers, and drainage districts to issue bonds for drainage works, thereby recognizing their right to construct drainage works as well as the existence of drainage districts, the latter nowhere else in the constitution being referred to. It has been held that the constitution contemplates that drainage districts should be separate entities, but that nevertheless the legislature might authorize police juries to establish drainage districts. See Mayor etc. vs New Iberia, and Bayou etc. District vs New Iberia 106 La. 651. (For amendment to Constitution 1898 Article 281, proposed in 1906, see Act 122 of 1906.)

MAINE. Revised Statutes 1903 Chap. 21 Secs.28-35.

Statute one page in length providing for proceedings on petition through county commissioners, but damages assessed by the board after report from viewers must be paid by petitioners, and there is no provision for organization of a permanent drainage district or the issuance of bonds, or for appeals to the courts. Nothing whatever is required as to public character of the work, and evidently it is sufficient, so far as the statute is concerned, to justify the establishment of a ditch and the taking of lands therefor, merely to find that the work will be of benefit to the lands of the petitioners.

Revised Statutes 1903 Chap. 26 Secs. 42-70. Similar to Chap. 21 Secs. 28-35 except that procedure is by petition to supreme court of the county which appoints three commissioners to act as viewers, and have charge of the work, and appeals may be taken to the courts. Work is paid for out of moneys collected by a collector appointed by the drainage commissioners. After the ditch is constructed the proprietors may prescribe rules for its maintenance at meetings held for that purpose, each owner being entitled to vote in proportion to the number of acres owned by him.

It will be noted that these statutes of Maine are similar in their brevity, general provisions, and early enactment, to the drain laws of several other eastern states, such as Massachusetts, Delaware, Maryland (code of 1911), New Jersey, Pennsylvania, Rhode Island, Vermont and West Virginia. They are so different from such public drainage statutes as those of Illinois, and Minnesota, for example, that they do not support the discussion of drainage statutes in general as given in the text of this thesis, and are merely given to show that the state in which they are in force, are not entirely without drainage legislation.

MARYLAND. Laws 1912 Chap. 656. This is now the principal drainage act of the state, and is typical in every respect. There are the usual provisions for the appointment of a board of drainage commissioners, the issuing of bonds, and the organization of permanent drainage

districts by means of procedure through the county commissioners. Although the statute in its title recites that it is to promote public health, convenience, and welfare, and the viewers are to report as to that matter, yet the county commissioners, in establishing the district have merely to find that the total benefits exceed the total costs. Sec. 27 appropriates \$10,000 to constitute a drainage fund to be loaned, in sums not exceeding \$2,000, for the expenses of any ditch project up to the time of the establishment of the drain.

Bagby's Annotated Code of Maryland 1911 Article 25 Secs. 36-87. (Original acts forming basis of code sections were passed as early as 1858.) Amended by Laws 1912 Chap. 64. This is a brief statute similar to those of Maine and other eastern states, and not typical of drainage statutes discussed in thesis text. (See paragraphs on Maine statutes supra.) Procedure is under control of county commissioners until the taxables, voting in proportion to the amount of taxes paid by each of them, choose a board of managers and treasurer who then supervises the work. The treasurer may by ordinary civil action compel payment by those defaulting in meeting their assessments. There is no provision for bond issues, and nothing as to the necessity of any benefit to the public. (Some counties are expressly exempted from the provisions of the statutes. For an example, relating to Somerset county, see Laws 1912 Chap. 802.)

MASSACHUSETTS. Revised Laws 1902 Chap. 195 Secs. 1-16. (Original acts are Acts of 1702 Chap. 11; 1795 Chap. 62; 1745-1746 Chap. 16; 1885 Chap. 384.) Very brief statutes providing procedure through the superior court of the county which need merely find that the ditch will be "for the general advantage of the proprietors". Commissioners are appointed by the court, and assessments collected by a collector without bond issue or the organization of any permanent drainage district. This statute is of the same kind as those of Maryland and other eastern states referred to in discussion of laws of Maine and Maryland supra.

Revised Laws 1902 Chap.195 Secs.17-25. (Original acts are acts 1855 Chap.104 and Acts 1857 Chap.292.) This is similar to Revised Laws 1902 Chap.195 Secs.1-16, except that procedure is through the county commissioners instead of through the court.

Acts 1913 Chap.759. This authorizes the state board of agriculture and the state board of health, acting as a joint board, with the approval of the governor and council to take wet lands (except salt marshes) under the power of eminent domain, and reclaim them by prison labor, use two years' crops for state institutions, and then sell the lands to form a "wet lands reclamation fund". \$15,000 is appropriated for the work. (See also Acts 1913 Chap.633.)

MICHIGAN. Howell's Annotated Statutes 1912 Title XII Chap. 45 Secs.3366-3477. (Original acts were passed as early as 1857, and are very numerous.) Amended by Public Acts of 1913 Number 249. These statutes are typical. Each county has an official known as a drain commissioner. He is elected for a term of two years, and he lets the contracts and has general supervision of the drainage work. There is provision for the appointment of a special drain commissioner in cases where the regularly elected one is interested in the proceedings. The petition must be approved, and the necessity of the drain and its public character determined, by the township board. In case the drain commissioners of adjoining counties cannot agree as to matters connected with the construction of a ditch extending through more than one county, they may appeal to the highway commissioner of the state for a settlement of their differences.

MINNESOTA. (See Chapter on drainage procedure in Minnesota.)

MISSISSIPPI. Laws 1906 Chap.132. Evidently same as Mississippi Code of 1906 Secs.1682-1727. The code sections are amended by Laws 1908 Chap.173; and by Laws 1910 Chaps. 188-191. This act, which apparently is not

very carefully drawn, authorizes proceedings through the chancery court of the county, and contains the usual provisions, and in addition provides particularly for compensation by upper districts to lower ones. Ten named counties are excepted from the provisions of the statute. There is no reference in the act to any necessity of the public purpose of the work appearing.

Laws 1902 Chap.70. (Code of 1906 Secs.371-391.) Procedure through county supervisors is provided, the viewers being named in the petition, but the supervisors themselves having control of the work throughout the proceedings and the construction of the ditch. Land may be taken under the general laws of the state relating to the exercise of the power of eminent domain.

Laws 1908 Chap.141 expressly provides that drainage bonds shall be exempt from state taxation. And Laws 1908 Chap.147 creates the Tallahatchie Drainage District and incorporates its commission which is appointed by the governor for four year terms, and authorized and empowered to drain the swamp lands of the district.

MISSOURI. Revised Statutes 1909 Chap.41 Secs.5496-5661. Amended by Laws 1911, Acts of March 30,1911, p.205; April 12,1911, p.222; April 12,1911,p.223; April 12,1911, p.225; and by Laws 1913, Acts of March 24,1913,p.233; March 27,1913,p.267; March 25,1913, p.281. (See the last act especially.) These acts are of the usual character, and provide procedure through circuit courts, or county courts. Drainage works may also be constructed by action under the supervision of the latter courts without the organization of any permanent drainage district. (The Missouri laws are very complete, and are, as a rule, well draughted.)

MONTANA. Laws 1905 Chap.106. Amended by Laws 1909 Chap.144. Usual act. One drain commissioner is appointed by the board of county commissioners for a two year term. He receives the petition and examines the lands without the aid of either viewers or engineers, and lays out the ditch. If releases cannot be secured

from owners of land to be used for the ditch, the district court, after hearing and on application by the drain commissioner, appoints three commissioners to assess damages (but not benefits). On filing of their return the fee in land necessary for the drain vests in the county in trust for drainage purposes only, provided no appeal is taken. The county drain commissioner then establishes the drainage district and lets the contracts; and then assesses benefits himself; appeals to the district court may be had from his decision as to benefits. The statute is also slightly different from the usual drainage laws in that it contains an express prohibition of any restraint by injunction of assessment collection, unless the amount of the assessment is first paid into the county treasury as security. In case the drain extends through several counties, and condemnation of private land is necessary, the district court of any county on application of the regular drain commissioners, appoints three special drain commissioners to act together in the matter. The statutes do not provide for bond issues. To justify the establishment of a drain it may be beneficial to the public health or conducive to the improvement of lands, but probably a public purpose is regarded necessary.

NEBRASKA. Laws 1881, p. 236; Laws 1911, p. 453; Laws 1909, p. 504; Laws 1891, p. 360; Laws 1905, p. 608. Laws 1877, p. 160. Laws 1911, p. 466. Laws 1905, p. 616; Laws 1905, p. 529; Laws 1905, p. 633; Laws 1907, p. 474; Laws 1909, p. 511; Laws 1909, p. 531; Laws 1911, p. 485. Drainage is authorized by (1) county authorities; (2) incorporated companies; (3) individual landowners; (4) districts organized by the district courts of the state; (5) districts organized by vote of the landowners.

The county board act is very brief with usual steps, except that the board itself acts as viewers, and determines damages; and failure to make application in writing to the board for damages, before the hearing, shuts off any claim for damages. If more than one county is concerned, action is by joint action of the county boards. Public purpose is necessary.

Drainage may be by individual owners under the supervision of the county board with the customary appraisers, but no bond issues. The work in such cases may be for the public welfare, or sanitary or agricultural purposes. (As to public character of work see *Jenal vs Green Island Drain Company*, 13 Neb.163.)

Evidently the principal act is that relating to the establishment of ditches by means of procedure in the district court, instituted by the filing of signed articles of association. The work is controlled by an elected board of supervisors. Here, as in the case of county ditches, a ditch must be for a public purpose or of public benefit.

NEVADA. Statutes of 1913 Chap. 281. Usual proceedings in general features are provided. Petition is presented to the county board which appoints a board of three commissioners for three year terms to have charge of the work. A special election is required to authorize the issue of bonds. The board of county commissioners, as a condition precedent to the appointment of commissioners, and the latter, as condition precedent to the establishment of the ditch and the making of assessments, need not necessarily find that the work will be of public benefit. It may be sufficient that the benefits to landowners exceed the costs of the drain construction.

Revised Laws 1912, Sec. 5606, Subsections 3 and 5 states that among the public uses for which the power of eminent domain may be exercised, is that of draining and reclaiming lands. Except for this brief statutory provision there was no drainage legislation of a general character until the act of 1913.

NEW JERSEY. Compiled Statutes 1910, pp. 3241-3261. (Original acts were passed before 1878 revision, and amended since then.) These statutes relate to the drainage of tidewater lands, as distinguished from swamp or meadow grass land, the statutes relating to which are treated in the following paragraphs. Public purpose is unnecessary. Application is made to the court of common pleas to appoint commissioners to assess damages and lay out

banks. Then the owners elect men to see to the construction and maintenance of the works. This procedure, and acts providing it, are similar to the statutes of such eastern states as Maine, Massachusetts, and Delaware, already referred to. Corporations may also be organized for the draining or protection and reclamation of tidewater lands.

Compiled Statutes 1910, pp. 3261-3271. (Original acts prior to 1878.) These provide simple procedure without bond issues through highway surveyors and chosen freeholders. Act is not typical. (Managers of geological survey are authorized to examine lands, make surveys, and adopt drainage system, reporting to the supreme court which appoints three commissioners to execute the work, with power to make assessments and issue bonds. Public Laws 1871, p. 25, as amended by Public Laws 1877, p. 662; P.L. 1894, p. 268; P.L. 1877, p. 71; P.L. 1886, p. 342; P.L. 1888, p. 208; P.L. 1906, p. 378. See Compiled Statutes 1910, pp. 3276-3284.)

Public Laws 1890, p. 495 as amended by Public Laws 1903, p. 702; and by Public Laws 1904, p. 239. This is a brief township drainage act.

Drainage is also authorized by the county authorities solely for benefits to public health (See Public Laws 1881, p. 265. Public Laws 1881, p. 195 as amended by P.L. 1885, p. 279; by P.L. 1886, p. 41; P.L. 1887, p. 50; P.L. 1888, p. 465; P.L. 1889, p. 141; 1892, p. 47, and 1898, p. 373); and through the court of common pleas, (See Public Laws 1903, p. 131 as amended by the following public acts: 1908, p. 280; 1906, p. 303; 1907, p. 674; 1908, p. 285; 1910, p. 188; 1910, p. 191.) For further acts in New Jersey see Laws 1911, pp. 128 and 155; Laws 1913, pp. 162, 192, 632, 670.

In general the statutes of New Jersey do not expressly require any finding that a given work will be of public benefit or utility, except that certain acts provide for reclamation for sole purpose of improving the public health. (See paragraphs above.)

NEW MEXICO. Laws 1913 Chap. 84. The procedure is through the district court only. The statute is clearly

drawn, and contains the usual provisions, except that one of the grounds of objection which may be urged at the first hearing, in addition to the usual ones such as the insufficiency of the petition, is "the constitutionality of the law". There is no mention of the necessity of public benefit from the ditch; the court need merely find that it will promote agricultural interests. And at the first hearing the court is confined solely to legal questions such as the sufficiency of the petition, and cannot exercise its discretion as to the possibility of the costs exceeding the benefits from the work, but must appoint viewers if the proceedings thus far are legally valid. To this extent, and with reference to the provision relating to "the constitutionality of the law", the New Mexico statute is very similar to Laws Wyoming, Chap. 95, and probably based upon it.

NEW YORK. Laws of 1909 Chap. 20. Amended by Laws 1910 Chap. 624. Usual statutes. The procedure is through either local courts on petition of the owners of a majority in acres of the land to be drained, or, through a representative of the conservation commission acting on the advice of the state engineer. In the latter case the initial petition need not be signed by more than one person.

NORTH CAROLINA. Laws of 1909 Chap. 442. Laws of 1911 Chap. 67. The drainage laws of the state contain nothing unusual, except that the petition is filed with the clerk of the superior court of the county who may himself order the establishment of a ditch. He keeps a drainage record. Appeals may be carried to the supreme court of the state. After the drainage district has been established three drainage commissioners are appointed by the superior court of the county. One of the viewers must be an engineer. Bondholders may compel the levy of assessments by mandamus on six month's default in the payment of either principle or interest.

NORTH DAKOTA. Laws 1895 Chap. 51. Amended by Laws 1903, Chap. 80; Laws 1899, Chap. 79; Laws 1901, Chap. 39; and

by Laws 1907, Chaps. 93 and 94; and by Laws 1911 Chaps. 124 and 125. The procedure is through the county commissioners, and the ditch must be found to be of public benefit. The laws are rather brief, and contain no unusual feature.

OHIO. Page and Adam's Annotated Ohio General Code 1910, Secs. 6442-6535. Amended by Laws 1913, p. 185. This is a typical public drainage statute similar to those of Illinois and Minnesota. Jury trials may be had on demand. Proceedings under the county commissioners' supervision by this statute.

Page and Adam's Annotated Ohio General Code 1910, Secs. 6536-6563 (48). Amended by Laws 1911, pp. 313-314, and pp. 575-585; and by Laws 1913, p. 185. This statute provides for joint action of the boards of county commissioners in cases where a ditch extends through more than one county. It contains no peculiar provisions.

Page and Adam's Annotated Ohio General Code 1910, Secs. 6564-6595. By this act similar proceedings are provided for in cases where a ditch may extend into a county in an adjoining state and be of benefit to lands therein.

All of the general drain laws of Ohio require a finding that the ditch will be of public benefit as a condition precedent to its establishment.

OKLAHOMA. Revised Laws 1910, Chap. 27. (Original act is act of August 24, 1908.) Amended by Laws 1911 Chap. 132, and by Laws 1913, Chap. 115; and Laws 1913, Chap. 166. This act contains the usual provisions for procedure through the county commissioners, and for joint action of county boards in cases where the drain extends into more than one county. To justify the taking of private property and the establishment of the drain, it is sufficient that the ditch may be of public benefit "or of agricultural interests."

OREGON. Lord's Oregon Laws 1910, Secs. 6126-6146, and 6163-6166. (Original acts are Laws 1889, p. 25; Laws

1891, p.47; Laws 1909, Chaps. 177, 44, and 133.) Amended by Laws 1911, Chaps. 142; 241; and 250. These statutes provide for the customary procedure through the county court on petition of twenty-five of the owners of lands "susceptible of one system of drainage," such petition giving the names of three persons willing to serve as trustees for one year. Petitioners make by-laws signed by a majority of persons owning land in the district, and providing a method for appointing subsequent trustees to carry on the work. The drainage district may bring an ordinary civil action to condemn lands. The statutes do not expressly require any finding that the ditch will be of public benefit or utility. As to eminent domain for drainage purposes in Oregon see Laws 1909, Chap. 216, p. 342 amended by Laws 1911, Chap. 238.

Lord's Oregon Laws 1910, Secs. 5791-5799. (Original act is Laws 1868, p. 21. Amended by Laws 1905, Chap. 149?) Amended by Laws 1913, Chap. 52. Simple procedure through the county court for building a single ditch, without permanent organization or bond issues, without necessity of public benefit appearing, and with damages paid before work commenced.

Lord's Oregon Laws 1910, Secs. 6147-6162. (Original acts are Laws of 1895, p. 117; 1909, Chap. 146; 1905, Chap. 199; 1907, Chap. 146.) Usual proceedings through county court, but adapted to the drainage and protection of tidewater lands by diking districts.

Lord's Oregon Laws 1910, Secs. 5800-5812. (Original act is Laws 1880, p. 53. Amended by Laws 1882, p. 56.) Relates to the organization of a drainage district in Washington county, and is therefore special in character.

Laws 1911, Chap. 172 authorizes the formation of drainage corporations with the power of eminent domain.

Laws 1913, Chap. 11. authorizes the state land board to contract for the drainage of lakes and swamps, and the sale of such lands to the reclaiming contractors. (Evidently similar to policy adopted by Florida for a time. See chapter on work in states other than Minnesota.)

PENNSYLVANIA. Act of April 4th 1863. (See Purdon's Digest, pp. 289-290, volume 1.) Very brief act pro-

viding for petition to the court of quarter sessions, and the payment of damages by petitioners before constructing works, a public purpose not being expressly required, and no permanent organization provided.

Acts of April 5, 1870; May 9, 1871; June 15, 1871; and May 19, 1871. (See Purdon's Digest, pp. 290-292, volume 1.) Similar act not requiring public purpose, but not authorizing the assessment of any benefits against non-consenting landowners. Both statutes are like those in other eastern states such as Massachusetts, Maine, New Jersey, Delaware, Maryland.

RHODE ISLAND. Laws 1896, Chap. 76. Statute similar to that of Pennsylvania, briefly providing for proceedings through township authorities, with costs paid by petitioner, and public purpose ignored.

SOUTH CAROLINA. Laws 1911, 27 Statutes S.C.p. 92. This is the usual act and is similar to that of North Carolina. It provides that the clerk of the court of common pleas of the county shall perform the functions usual to board of county commissioners or county judge. He appoints a board of drainage commissioners to supervise the work, and issue bonds etc. About seven counties are expressly excepted from the provisions of the statute. A public purpose is necessary. This is the principal statute now in force in the state.

Acts S.S. 1912, Number 411. This is a very brief act authorizing procedure through county commissioners who appoint the drainage commissioners who act as viewers and also supervise the work. But some steps are left out; no bonds are authorized; and although the petition may state that the ditch is for the promotion "of public health, or to advance agricultural interests", no finding as to public benefits is necessary.

There are many special acts relating to particular counties, such as Code of 1912, volume 1, Sec. 2196 et seq. but they have been held unconstitutional. See State vs Hammond, 66 S.C. 300. (As to these see also Code 1912 Secs. 2239-2265.)

Laws 1907, 25 Statutes S.C., p. 524. Governor, on petition of the majority of representatives to the state legislature from any county, may appoint with their approval a sanitary and drainage commission for that county, to have charge of public drains already built, and to make surveys. (As to drainage laws of South Carolina see also Acts 1912, pp. 92; 101; 113; 107; 715; 731, and Acts 1913, pp. 65 and 69.)

SOUTH DAKOTA. Laws 1907, Chap. 134. Laws 1909, Chaps. 69; 127; 102; Laws 1911, Chaps. 129, 130; 131. See also Compiled Laws of South Dakota 1909, volume 1, Chap. 25. Usual procedure through county commissioners, but state engineer receives copies of the petitions, and has some powers as to examination, recommendation, and supervision.

TENNESSEE. Public Acts 1909, Chap. 185. Amended by Public Acts 1913, Chaps. 25 and 37. Usual act with authority vested in the county court. Public purpose necessary.

TEXAS. Acts 1895, p. 151. Amended by Acts 1897, p. 95, and Acts 1899, p. 242. Acts 1889, p. 95. Acts 1905, p. 212. Acts 1907, p. 78. Acts 1909, p. 24. See Revised Civil Statutes of Texas 1911, Title 47. Typical acts with action through commissioner's court of the county. And Revised Civil Statutes 1911, Secs. 1261-1267 authorized the formation of drainage corporations. These acts being indefinite and uncertain, however, are evidently superseded by General Laws 1911 Chap. 118, and General Laws 1913, Chap. 36, but the procedure in general is the same. General Laws 1913, Chap. 28 provides a means of winding up the affairs of districts organized under the old statutes. In Texas a public benefit must be found to authorize the work.

UTAH. Compiled Laws 1907, Title 20. Brief act containing nothing unusual. County commissioners may organize a district without finding it of public utility, and then landowners elect the trustees to carry on the work, issue bonds, etc.

VERMONT. Public Statutes 1906, Chap. 182. Not a statute supporting the text discussion, but similar to those of Maine, Massachusetts, New Jersey, Delaware, Pennsylvania, and Rhode Island.

VIRGINIA. Acts 1906, Chap. 188. Acts 1910, Chap. 312, amended by Acts 1912, Chap. 159. Similar to law of North Carolina, except that procedure is through the county circuit court itself instead of its clerk. A public benefit is made necessary by the act. No unusual provisions requiring comment.

WASHINGTON. Laws 1895, p. 271. Amended by Laws 1905, p. 360; 1909 extra session p. 47; 1909, p. 563; 1901, p. 181; 1907, pp. 101, 376, 219, 669; 1903, p. 42; 1909, p. 690. See Remington and Ballinger's Code Annotated. Secs. 4137-4181. Amended by Laws 1913, Chaps. 42 and 86. Proceedings under control of county commissioners who order an election to determine question of establishing drainage district, and to choose drainage commissioners, if they find that the proposed work will be of public benefit. If additional works are desired, the drainage district petitions the superior court of the county, which must find them a public benefit.

Laws 1895, p. 304. Amended by Laws 1905, p. 177; 1899, p. 187; 1901, p. 226; 1907, p. 175; 1909, p. 630. See Remington and Ballinger's Annotated Code Secs. 4091-4136. Amended by Laws 1913, Chap. 89. These are similar statutes relating to diking districts for the tidewater counties.

Laws 1909, p. 789. See Remington and Ballinger's Annotated Code, Secs. 4182-4214. Ditches and dikes in more than one county may be constructed by joint action of county commissioners, notice being given to them by the commissioner of public lands of the state.

Laws 1913, Chap. 60. Creates a state department of agriculture, and by sec. 12, one of its duties is to make surveys of lands affected by drainage projects and a classification of them.

Laws 1895, p. 142 and amendments thereof provides for payment of expenses of work already done under Laws

1890, which was declared unconstitutional in Askam vs King County, 9 Wash. 1, and in Skagit County vs Stiles, 10 Wash. 388, as permitting the taking of private property for a private purpose, and superseded by Laws 1895, p. 271. which requires a public benefit to appear. As a result of similar adverse decisions, Rem. and B.'s An. Code Secs. 4215-4267, as amended by Laws 1911, Chap. 97, is superseded by Laws 1913, Chap. 176.

WEST VIRGINIA. Code Virginia 1860, Chap. 124. See Code of West Virginia 1906, Secs. 3189-3191. Merely two brief paragraphs not requiring public purpose, providing no permanent organization; requiring expenses to be paid by petitioners, and therefor similar to acts of other eastern states such as Maine.

WISCONSIN. Statutes 1913 Secs. 1379(11) to 1379 (31e) (original act is Laws 1891, Chap. 401. Frequent amendments.) The chief act. A permanent drainage district may be formed by petition to the circuit court. A public purpose is necessary. Nothing unusual, except that the petition must contain a report from the college of agriculture as to soil, probable costs and benefits, etc.; and there is provision for a determination of the constitutionality of the law by the circuit court at the first hearing. This however differs from the New Mexico statute, in that in this case the judge must not only find the law valid, but must also find the work of public benefit. This is similar to the Wyoming statute as to constitutionality.

Statutes 1913, Secs. 1372-1379. (Original act since often amended is Acts 1862, Chap. 398.) Typical county board act.

Statutes 1913, Secs. 1359-1367. (Original is Acts 1862, Chap. 398.) Brief law relating to town drains, and containing nothing unusual.

In Wisconsin a public purpose is necessary. (Statutes 1913, Sec. 1379(14).)

(Prof. E. R. Jones of the University of Wisconsin, in a letter to writer April 17, 1912, points out that the

chief objection to the drainage district law is that it is rather cumbersome in its initial steps, so that legal costs are very large, and average 20% of the entire expense of the drain, in once case being 40%.)

WYOMING. Laws 1911, Chap. 95. Usual act through the district court, which, however, must appoint commissioners if it finds that petition, and notice are sufficient, that it has secured jurisdiction, and that the law is constitutional. In this last respect the law is like that of New Mexico (Laws 1912, Chap. 84.) but differs from it and is similar to that of Wisconsin in that a public benefit must appear to the court in Wyoming.

SUMMARY. States without general drainage statutes are two: Alabama and New Hampshire.

States with brief, older, and more private laws are ten: Connecticut, Delaware, Maine, Maryland (Code of 1911), Massachusetts, New Jersey, Pennsylvania, Rhode Island, and Vermont, and West Virginia.

The other states have statutes in general of the type set forth in the text of the thesis.

~~thirty-six~~

Although in some states because of the statutes reading in the alternative as to the necessity of a specific finding that a given ditch will be of public benefit, (e.g. that court shall find that drain will be of public benefit, or increase the value of agricultural lands) the question is somewhat in doubt, yet it is probably safe to say that all the drainage laws require such a benefit to appear, except the following thirteen, which are the same as the ten eastern states named above and New Mexico, Utah, and Mississippi (Laws 1906, Chap. 132.). (Of course some of the New Jersey laws are solely for public health purposes.)

APPENDIX 3.

Drainage Laws of Minnesota.

Year	Chapter.
1858	73.
1866	27.
1867	40.
1874	57
1877	55.
1877	91.
1878	39
1879	38.
1883	108;139
1885	25;51;69;71.
1887	97;98;99.
1889	160.
1893	152;221
1895	81;164;82;84;95;96;293;378;403.
1897	105;180;328;103;318;142;155.
1899	274;323;347.
1901	76;90;258;381.

APPENDIX 3 con't.

1902	38;39.
1903	178;311;315;285;386;188;217.
1905	230;106;157;145;247;180;311.
1907	19;371;366;191;75;330;448;470;367;138;246;363;72;9.
1909	377;469;127;207;336;375;471;422;257;44;83;10;191; 118;119.
1911	113;384;370;278;138;54;292;273.
1913	2;4;463;22;145;179;208;235;335;528;379;567; 568;578;

Acts, special in character, relating to drainage.

Chiefly authorizing the drainage of lands specified in the act, or the lowering of certain lakes for drainage purposes, or making small appropriations to aid in the draining of certain property. All of the following acts are special except those marked "g" which are in the general laws. The numbers are those of chapters.

1875	152,157, 159.
1876	190, 192, 193, 194, 195.
1877	127, 246.
1879	187.

APPENDIX 3 Con't.

- 1883 257, 267, 268, 309.
1885 69, on p. 231, 192, 193, 216.
1887 222, 241, 357.
1889 358, 389, 320, 127, 540, 300, 124, 557, 98.
1891 G. 60, 162, on p. 319, 408, 482.
1893 G. 241 on p. 396.
1895 G. 403 on p. 807.
1897 G. 103 on pp. 171, 176, 139, 187, and c. 155.

APPENDIX 4.

Drainage Cases in the Minnesota Supreme Court.

Bowler vs. Renville County.	105-26.
Moody vs. Brasie.	104-463
International D. & I. Co. vs. Freeborn County	158 Fed. 270
State vs McGuire	109-88
Anderson vs. Meeker County.	46-237.
Dresser vs Nicollet County.	76-290
McMullen vs. Freeborn County	93-16.
Schumacher vs. Wright County.	97-74
Prahl vs. Brown County.	104-227
State vs Isanti County.	98-89.
Billsborrow vs. Pierce.	101-271
Heinz vs. Buckham.	104-389
State vs Posz.	106-198
State vs. Buckham.	108-8
Miller vs. Jensen.	102-391
Jurries vs. Virgens.	104-71
Johnson vs. Morrison County.	107-87
Curran vs. County of Sibley	47-313

APPENDIX 4 con't.

Witty vs. County Commissioners.	76-286
Lien vs. County Commissioners.	80-59
State ex rel Utick vs. Commissioners of Polk.	87-325
Minn. Canal and Power Co. vs. Koochiching County	97-429
State ex real Schubert vs Sups. of Town of Rockford	102-442
Gaare vs. C. Commissioners of Clay County	90-530
State ex rel Johnson vs. Crosby	92-176
County of Lyon vs. Lien et al.	105-55
State ex rel vs. Baxter	104-364
Kipp vs. Dawson.	31-373
Lager vs. County of Sibley.	100-85
State vs. Lindig.	96-419
State ex rel vs. Quinn	108-528
Johnson vs. County of Morrison	107-87
In re Judicial Ditch Number One.	124 N.W.227
County of Meeker vs. Schultz.	110-405
Wheeler vs. Almond .	110-503
Rasmussen vs. Town of Hutchinson.	111-457
Ziemke vs. Hohenstien.	111-542

APPENDIX 4 con't.

State vs. Johnson.	111-255
Township of Martinsburg vs. Butler.	112-1.
Mulgrew vs Boyce Co. vs. County of Freeborn.	112-5.
Bilsborrow vs. Pierce.	112-336
State vs. Tuck.	112-493
State ex rel Haney vs. Clark.	112-516
Slingerland vs. Conn.	113-214
State vs. McGuire.	114-281
State ex rel Hadler vs. District Court.	114-424
Meiz vs. County of Wright.	114-448
State ex rel Kenny vs Nelson.	133 N.W.1010 Jan. 5, 1912.
Kelling vs. Edwards.	134 N.W. 221 Jan. 19,1912.
Van Pelt vs. Bertilund.	134 N.W. 226 Jan. 26,1912.
Lindberg vs. Morrison County.	134 N.W. 126 Jan. 19,1912.
State ex rel Pederson vs Watts.	133 N.W. 971 Dec. 29,1911.

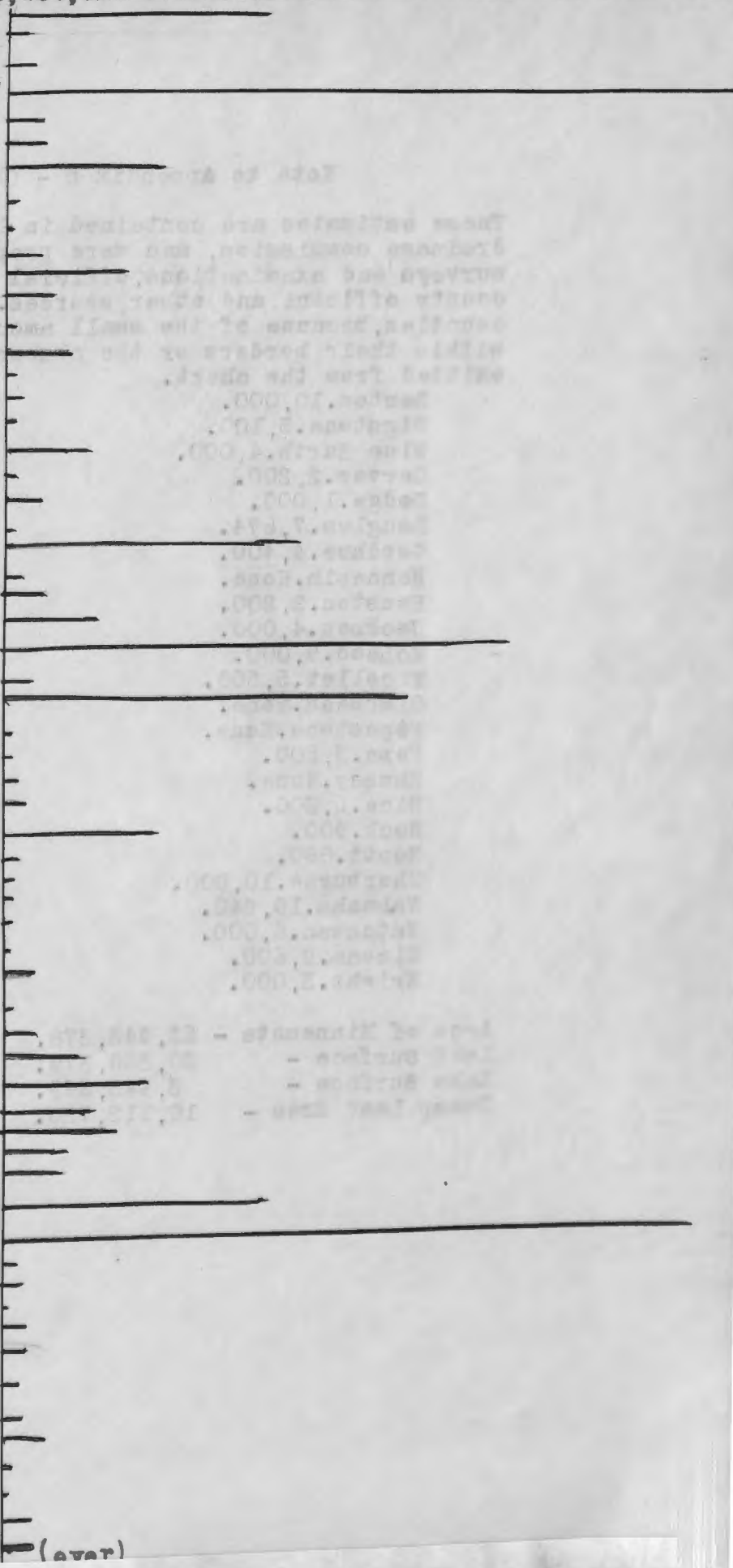
APPENDIX 4 con't.

Kelling vs. Edwards.	134 N.W. 221.
Lindberg vs Morrison County.	134 N.W. 126
In re Madsen.	135 N.W. 1003.
Dahlberg vs. Lundgren.	136 N.W. 742
Gourd vs. Morrison County.	136 N.W. 874
Jacobson vs. Lac Qui Parle County.	137 N.W. 419
In re Judicial Ditch No. 14 of Martin County.	138 N.W. 675
Gieb vs. Morrison County.	138 N.W. 24
In re Morrison County.	139 N.W. 286
State vs George.	142 N.W. 945
Fairmont Cement Stone Mfg. Co. vs. Davison.	142 N.W. 899
In re Judicial Ditch No. 4 of Traverse and Big Stone Counties.	142 N.W. 802.
Clay County vs. Olson.	143 N.W. 970

Appendix 5 - Chart A.

Original Area of Swamp, Wet, and Overflowed Lands in Minnesota Counties.

Aitkin. 529,800.
 Anoka. 50,000.
 Becker. 50,000.
 Beltrami. 1,451,520.
 Brown. 77,480.
 Carlton. 70,000.
 Cass. 316,240.
 Chippewa. 20,900.
 Chisago. 15,000.
 Clearwater. 72,000.
 Clay. 230,000.
 Cook. 102,159.
 Cottenwood. 19,000.
 Crow Wing. 127,000.
 Dakota. 12,300.
 Faribault. 28,000.
 Fillmore. 23,000.
 Freeborn. 154,000.
 Grant. 33,000.
 Hubbard. 77,000.
 Isanti. 20,000.
 Itasca. 590,600.
 Kanabec. 42,000.
 Kandiyohi. 80,120.
 Kittsen. 184,000.
 Koochiching. 1,000,000.
 Lac Qui Parle. 51,000.
 Lake. 798,600.
 Le Sueur. 12,000.
 Lincoln. 12,000.
 Lyon. 18,000.
 Mahanomen. 50,000.
 Marshall. 258,240.
 Martin. 45,180.
 Meeker. 27,120.
 Mille Lacs. 34,000.
 Morrison. 20,000.
 Mower. 20,000.
 Murray. 55,296.
 Nobles. 12,000.
 Norman. 50,000.
 Ottertail. 162,000.
 Pine. 293,000.
 Polk. 174,000.
 Red Lake. 202,175.
 Redwood. 120,000.
 Renville. 120,000.
 Reseau. 533,680.
 St. Louis. 1,392,160.
 Sibley. 36,300.
 Stearns. 40,000.
 Steele. 16,000.
 Stevens. 44,960.
 Swift. 57,000.
 Todd. 45,000.
 Travers. 42,000.
 Wadena. 80,000.
 Waseca. 27,016.
 Washington. 15,360.
 Wilkin. 50,000.
 Yellow Medicine. 51,000



(over)

Note to Appendix 5 - Chart A.

These estimates are contained in 1913 report of state drainage commission, and were prepared from personal surveys and examinations, official records, estimates of county official and other sources. The following counties, because of the small amount of swamp lands within their borders or the absence of any, have been omitted from the chart.

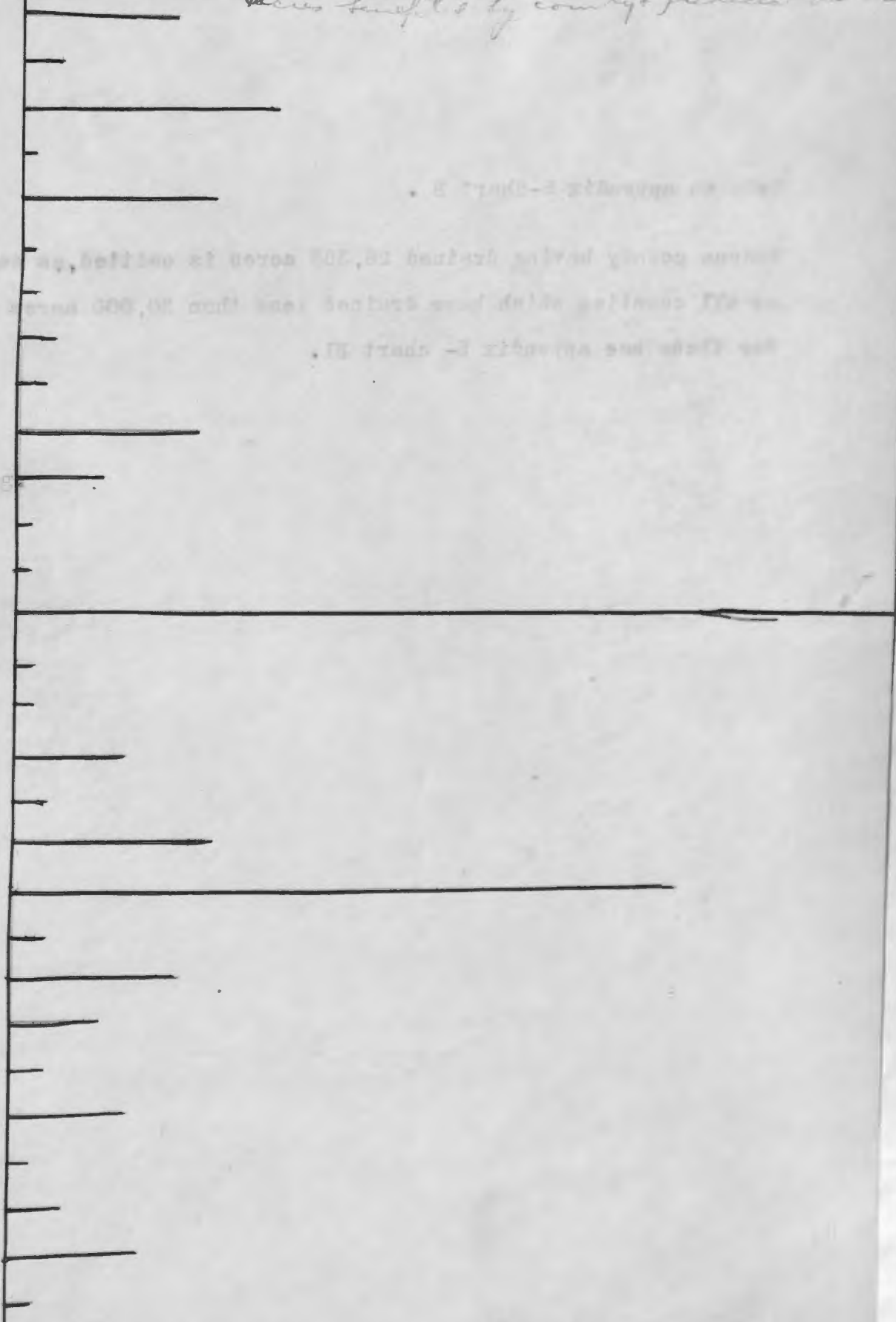
Benton.	10,000.
Bigstone.	3,100.
Blue Earth.	4,000.
Carver.	2,200.
Dodge.	1,000.
Douglas.	7,874.
Goodhue.	4,400.
Hennepin.	None.
Houston.	2,200.
Jackson.	4,000.
- McLeod.	9,000.
Nicoll.	5,500.
Olmstead.	None.
Popestone.	None.
Pope.	3,500.
Ramsey.	None.
Rice.	5,300.
Rock.	900.
Scott.	860.
Sherburne.	10,000.
Wabasha.	10,240.
Watonwan.	6,000.
Winona.	9,600.
Wright.	3,000.
Area of Minnesota -	53,943,378.
Land Surface -	50,355,379.
Lake Surface -	3,943,379.
Swamp Land Area -	10,112,720.

Appendix 5 - Chart B.

Total number of acres of land benefited by county and judicial ditches in Minnesota counties. *

Acres benefited by county & judicial ditches

Aitkin.
226,141.
Anoka.
58,041.
Beltrami.
370,039.
Chippewa.
23,247.
Clay.
284,717.
Clearwater.
23,219.
Freeborn.
29,543.
Grant.
53,621.
Kandiyohi.
44,462.
Kittson.
268,618.
Koochiching.
127,749.
LacQuiParle.
20,823.
LeSeuer.
20,000.
Marshall.
1,349,064.
Martin.
23,827.
Nicollet.
24,216.
Norman.
164,463.
Ottertail.
49,000.
Pennington.
284,945.
Polk.
997,341.
Pope.
46,516.
Red Lake.
241,568.
Redwood.
127,254.
Renville.
48,618.
Roseau.
168,470.
Todd.
31,947.
Traverse.
89,090.
Wilkin.
198,183.
Watonwan.
40,627.
Yellow Medicine.
31,276.



* for note see other side of sheet.

Note on appendix 5-chart B .

Wadena county having drained 28,383 acres is omitted, as well
as all counties which have drained less than 20,000 acres each.

For these see appendix 5- chart B1.

Appendix 5 - Chart B1.

Number of acres drained by county and judicial ditches.

Counties are listed in order as to amounts drained.

1 Marshall -	1,349,064.	41 Paribault - - -	12,337.
2 Polk - - -	997,341.	42 Meeker - - - -	12,310.
3 Beltrami -	370,039.	43 Waseca - - - -	12,295.
4 Pennington -	284,945.	44 Big Stone - - -	12,090.
5 Clay - - - -	284,717.	45 Isanti - - - -	11,094.
6 Kittson - - -	268,618.	46 Sherburne - - -	11,081.
7 Red Lake - -	241,568.	47 Blue Earth - - -	10,659.
8 Aitkin - - - -	226,141.	48 Hennepin - - - -	10,419.
9 Wilkin - - - -	198,193.	49 Cass - - - - -	10,000.
10 Roseau - - - -	168,470.	50 Steele - - - - -	9,091.
11 Norman - - - -	164,463.	51 Stevens - - - -	8,923.
12 Koochiching-	127,749.	52 Wright - - - - -	7,848.
13 Redwood - - -	127,254.	53 McLeod - - - - -	7,842.
14 Traverse - - -	89,090.	54 Kanabec - - - -	7,471.
15 Anoka - - - - -	58,041.	55 Lyon - - - - - -	7,295.
16 Grant - - - - -	53,621.	56 Lincoln - - - - -	7,072.
17 Ottertail - - -	49,000.	57 Wadena - - - - -	6,704.
18 Renville - - - -	48,618.	58 Mille Lacs - - -	6,353.
19 Pope - - - - - -	46,516.	59 Hebles - - - - -	6,500.
20 Kandiyohi - - -	44,462.	60 Washington - - -	6,076.
21 Todd - - - - - -	31,947.	61 Pine - - - - - -	4,886.
22 Yellow Med.	31,276.	62 Itasca - - - - -	4,700.
23 Freeborn - - - -	29,545.	63 Carlton - - - -	4,566.
24 Wadena - - - - -	28,383.	64 Benton - - - - -	4,196.
25 Nicollet - - - -	24,216.	65 Watenwan - - - -	4,062.
26 Martin - - - - -	23,627.	66 Becker - - - - -	3,589.
27 Chippewa - - - -	23,247.	67 Dakota - - - - -	3,381.
28 Clearwater - - -	23,219.	68 Rice - - - - - -	2,717.
29 Lac Qui Parle	20,823.	69 Carver - - - - -	2,403.
30 LeSueur - - - - -	20,000.	70 Hubbard - - - - -	2,179.
31 Stearns - - - - -	19,861.	71 Cottonwood - - -	2,088.
32 Swift - - - - - -	19,420.	72 Ramsey - - - - -	2,019.
33 Chisago - - - - -	19,281.	73 Winona - - - - -	1,487.
34 Brown - - - - - -	18,572.	74 Scott - - - - - -	671.
35 Sibley - - - - -	16,838.		
36 Jackson - - - - -	15,515.		
37 Douglas - - - - -	15,360.		
38 Crow Wing - - - -	15,307.		
39 Murray - - - - -	14,000.		
40 Dodge - - - - - -	13,853.		

* Estimates from 1913 report of Minnesota state drainage commission.

Appendix 5 - Chart C.

Average price per yard paid contractors in Minnesota counties. (In cents)

Aitkin.10.31.	Mille Lacs.15.5.
Anoka.14.25.	Murray.12.
Becker.12.	Nicollet.11.
Beltrami.14.	Nobles.12.
Benton.15.1	Norman.14.
Big Stone.16.71.	Ottertail.14.
Blue Earth.17.23.	Pennington.12.66.
Brown.12.53.	Pine.14.
Carlton.15.55.	Polk.13.18.
Carver.11.2.	Pepe.11.7.
Cass.11.	Ramsey.17.
Chippewa.11.	Red Lake.10.5.
Chisago.15.36.	Redwood.9.6.
Clay.12.90.	Renville.11.
Clearwater.15.98.	Rice.12.
Cottonwood.16.	Reseau.13.63.
Crow Wing.15.	Scott.12.
Dakota.12.59.	Sherburne.13.
Dodge.9.	Sibley.10.*
Douglas.12.4.	Stearns.15.
Faribault.9.	Steele.8.
Freeborn.9.07.	Stevens.12.64.
Grant.10.34.	Swift.11.
Hennepin.19.87.	Tedd.15.
Hubbard.12.76.	Traverse.9.5.
Isanti.11.91.	Wabasha.10.5.
Itasca.22.	Wadena.12.3.
Jackson.11.	Waseca.8.
Kanabec.16.2.	Washington.10.4.
Kandiyohi.10.05.	Watonwan.12.
Kittson.12.6.	Wilkin.13.
Koochiching.25.	Winona.12.
Lac Qui Parle.13.5.	Wright.14.
Le Sueur.15.	Yellow Medicine.14.5.
Lincoln.14.	
Lyon.16.	
McLeod.10.	
Marshall.11.7.	
Martin.12.	
Meeker.17.	

*Report of state drainage commission for 1913, upon which this chart is based, gives Sibley county at .10¢, evidently a clerical error.

In considering this chart as well as others relating to the cost of work done, it should be remembered that in some counties the engineering work is much more simple than in others, the land with such a slope as to be easier drained than in some other counties, or the projects larger, and therefore contractors lowering their prices on account of the size of the jobs let.

Appendix 5 - Chart D.

Average drainage cost per acre of land benefited by county and judicial drainage

The counties in the following list are arranged according to the cost of work done, beginning with the lowest.

Traverse - - - - -	\$.64.	#1	Nicollet - - - - -	\$ 5.60.	#39
Pelk - - - - -	.81.	2	Isanti - - - - -	5.68.	40
Koochiching - - - - -	1.09.	3	Murray - - - - -	5.70.	41
Marshall - - - - -	1.10.	4	Douglas - - - - -	5.90.	42
Norman - - - - -	1.10.	5	Renville - - - - -	6.40.	43
Pennington - - - - -	1.15.	6	Steele - - - - -	6.40.	44
Red Lake - - - - -	1.17.	7	Rice - - - - -	6.45.	45
Kittson - - - - -	1.20.	8	Clearwater - - - - -	6.67.	46
Clay - - - - -	1.25.	9	Sibley - - - - -	6.75.	47
Itasca - - - - -	1.26.	10	Waseca - - - - -	6.80.	48
Roseau - - - - -	1.31.	11	Dakota - - - - -	6.80.	49
Wilkin - - - - -	1.40.	12	Blue Earth - - - - -	6.84.	50
Grant - - - - -	1.45.	13	Stearns - - - - -	7.40.	51
Beltrami - - - - -	1.85.	14	Benton - - - - -	7.50.	52
Hubbard - - - - -	2.00.	15	Meeker - - - - -	7.52.	53
Aitkin - - - - -	2.08.	16	Stevens - - - - -	7.98.	54
Wabasha - - - - -	2.20.	17	Handiyohi - - - - -	8.25.	55
Cass - - - - -	2.50.	18	Wright - - - - -	8.78.	56
Watonwan - - - - -	2.60.	19	Nobles - - - - -	9.50.	57
Pine - - - - -	2.60.	20	Faribault - - - - -	9.83.	58
Anoka - - - - -	2.65.	21	Fraeborn - - - - -	9.86.	59
Carlton - - - - -	2.89.	22	Big Stone - - - - -	9.91.	60
Winona - - - - -	3.00.	23	Lyon - - - - -	10.00.	61
Yellow Medicine - - - - -	3.00.	24	Scott - - - - -	10.00.	62
Becker - - - - -	3.00.	25	Hennepin - - - - -	10.81.	63
Kanabec - - - - -	3.00.	26	Chippewa - - - - -	10.86.	64
Pepe - - - - -	3.00.	27	Le Sueur - - - - -	11.00.	65
Redwood - - - - -	3.25.	28	Carver - - - - -	11.00.	66
Wadena - - - - -	3.30.	29	McLeod - - - - -	11.00.	67
Swift - - - - -	3.31.	30	Ramsey - - - - -	12.00.	68
Todd - - - - -	3.80.	31	Martin - - - - -	13.00.	69
Ottertail - - - - -	3.80.	32	Lac Qui Parle - - - - -	13.75.	70
Chisago - - - - -	3.87.	33	Jackson - - - - -	14.00.	71
Crow Wing - - - - -	3.90.	34	Brown - - - - -	14.80.	72
Dodge - - - - -	4.00.	35	Cottonwood - - - - -	15.30.	73
Washington - - - - -	4.10.	36	Lincoln - - - - -	16.00.	74.
Sherburne - - - - -	4.90.	37			
Mille Lacs - - - - -	5.00.	38			

These figures are taken from the 1913 report of the Minnesota State Drainage Commission.

Appendix 5 - Chart E.

Total cost of county and judicial ditches in Minnesota counties.

The counties are listed in accordance with the amount spent by each.

The figures are taken from the 1913 report of the state commission.

1. Marshall -	\$1,496,302.	38. Waseca -	61,955.
2. Polk -	816,035.	39. Murray -	80,356.
3. Beltrami -	685,235.	40. Grant -	77,432.
4. Aitkin -	470,620.	41. Chisago -	74,676.
5. Redwood -	417,000.	42. Lyon -	74,177.
6. Jackson -	398,195.	43. Blue Earth -	72,968.
7. Kandiyohi -	366,531.	44. Stevens -	71,296.
8. Freeborn -	335,221.	45. Yellow Medicine -	71,238.
9. Pennington -	330,022.	46. McLeod -	69,115.
10. Clay -	328,224.	47. Wright -	68,913.
11. Martin -	327,519.	48. Swift -	64,283.
12. Lac Qui Parle	315,331.	49. Isanti -	63,010.
13. Renville -	311,109.	50. Nobles -	61,894.
14. Kittson -	296,290.	51. Crow Wing -	59,927.
15. Red Lake -	276,731.	52. Steele -	58,525.
16. Brown -	274,956.	53. Traversa -	57,180.
17. Wilkin -	265,690.	54. Dodge -	55,235.
18. Chippewa -	252,777.	55. Sherburne -	54,315.
19. Reseau -	221,344.	56. Mille Lacs -	32,780.
20. LaSueur -	210,450.	57. Cottonwood -	32,096.
21. Ottertail -	182,000.	58. Benton -	31,506.
22. Norman -	172,053.	59. Carver -	28,904.
23. Anoka -	154,190.	60. Washington -	25,033.
24. Stearns -	148,615.	61. Ramsey -	24,994.
25. Koochiching -	139,757.	62. Cass -	24,727.
26. Pope -	139,422.	63. Dakota -	23,060.
27. Nicollet -	136,167.	64. Vanabeo -	22,201.
28. Todd -	124,807.	65. Rice -	17,966.
29. Faribault -	121,349.	66. Becker -	16,267.
30. Big Stone -	120,772.	67. Clearwater -	15,500.
31. Lincoln -	116,776.	68. Wabasha -	14,494.
32. Sibley -	114,938.	69. Carlton -	13,488.
33. Hennepin -	109,600.	70. Pine -	12,658.
34. Watonwan -	106,269.	71. Scott -	6,270.
35. Wadena -	93,725.	72. Itasca -	5,822.
36. Necker -	92,551.	73. Winona -	4,480.
37. Douglas -	90,511.	74. Hubbard -	4,375.

Appendix 5 - Chart F.

Total number of acres benefited in Minnesota by state ditches.

Counties are listed in order as to amounts drained in each.

County.	Acreage.	Cost.
1. Roseau.	487,036.	\$564,727.
2. Marshall.	153,268.	\$140,326.
3. Kittson.	143,619.	\$158,590.
4. Aitkin.	142,257.	\$137,607.
5. Polk.	70,787.	\$72,056.
6. St. Louis.	54,300.	\$53,885.
7. Koochiching.	51,200.	\$52,415.
8. Norman.	29,000.	\$32,018.
9. Itasca.	21,000.	\$24,343.
10. Clay.	20,000.	\$24,854.
11. Traverse.	17,000.	\$19,563.
12. Wilkin.	15,500.	\$19,241.
13. Beltrami.	5,500.	\$7,619.
14. Ottertail.	3,800.	\$4,757.
15. Hubbard.	3,670.	\$9,733.
16. Red Lake.	2,500.	\$3,188.
17. Wadena.	1,600.	\$1,846.
18. Clearwater.	1,000.	\$2,199.
19. Becker.	600.	\$878.

Appendix 5 - Chart G.

Average net profit per acre on lands drained by county and judicial ditches in Minnesota. (i.e. differences between average per acre cost of drainage, and average per acre benefits assessed.) Based on figures in 1913 report of the state drainage commission.

1. Faribault - - -	\$14.26.	38. Aitkin - - -	\$2.50.
2. Freeborn - - -	13.20.	39. Ottertail - -	2.36.
3. Stevens - - -	12.77.	40. Kandiyohi - -	2.27.
4. Swift - - -	11.98.	41. Grant - - -	2.19.
5. Dakota - - -	11.61.	42. Murray - - -	2.18.
6. Winona - - -	11.34.	43. Koochiching -	2.11.
7. Carver - - -	10.84.	44. Chisago - - -	2.06.
8. Nobles - - -	10.16.	45. Wilkin - - -	1.81.
9. Hennepin - - -	10.06.	46. Kanabec - - -	1.66.
10. Waseca - - -	9.92.	47. Traverse - - -	1.62.
11. Sibley - - -	9.65.	48. Anoka - - -	1.61.
12. Steele - - -	9.13.	49. Isanti - - -	1.52.
13. Benton - - -	8.84.	50. Beltrami - - -	1.41.
14. Renville - - -	8.83.	51. Brown - - -	1.35.
15. Cottenwood - -	8.73.	52. Roseau - - -	1.35.
16. Wright - - -	8.49.	53. Kittson - - -	1.03.
17. Lincoln - - -	8.23.	54. Pennington - -	1.03.
18. Lyon - - -	7.75.	55. Crow Wing - -	.93.
19. McLeod - - -	7.33.	56. Marshall - - -	.79.
20. Meeker - - -	7.29.	57. Polk - - -	.65.
21. Stearns - - -	6.94.	58. Cass - - -	.59.
22. Hubbard - - -	6.82.	59. Cass - - -	.54.
23. Nicollet - - -	6.78.	60. Martin - - -	.32.
24. Lac Qui Parle -	6.70.	61. Yellow Medicine	.10.
25. Scott - - -	6.21.	62. Ramsey - - -	.07.
26. Pine - - -	5.60.	63. Washington - -	.01.
27. Blue Earth - -	5.12.	64. Wadena - - -	.00.
28. Jackson - - -	4.01.	65. Douglas --- minus	.01.
29. Rice - - -	3.62.	66. Wabasha - - "	.01.
30. Watenwan - - -	3.40.	67. Carlton - - "	.10.
31. Todd - - -	3.40.	68. Mille Lacs - "	.11.
32. Pope - - -	3.25.	69. Dodge - - -	.25.
33. Sherburne - - -	3.17.	70. LeSeuer -- "	"2.45.
34. Becker - - -	3.02.	71.	
35. Chippewa - - -	2.80.	72.	
36. Redwood - - -	2.74.		
37. Big Stone - - -	2.55.		

1	ALBERTSON	100	100
2	ALLEN	100	100
3	ALLEN	100	100
4	ALLEN	100	100
5	ALLEN	100	100
6	ALLEN	100	100
7	ALLEN	100	100
8	ALLEN	100	100
9	ALLEN	100	100
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93	ALLEN	100	100
94	ALLEN	100	100
95	ALLEN	100	100
96	ALLEN	100	100
97	ALLEN	100	100
98	ALLEN	100	100
99	ALLEN	100	100
100	ALLEN	100	100

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APPENDIX 6.

AUTHORITIES.

A. Outline of Sources.

I. Primary.

1. Statutes of the United States and of the State.
2. State Constitutions.
3. Decisions of Federal and State Courts.
4. Federal Government Publications.
 - a. Reports of Commissioner of General Land office.
 - b. Bulletins of Department of Agriculture.
 - c. Bureau of Experiment Stations Publications.
 - d. The Congressional Record.
 - e. House and Senate Reports and Documents.
 - f. Geological Survey Reports.
5. State Government Publications.
 - a. Reports of State Boards.
 - b. Reports of Wisconsin Legislative Committee on Forestry, Water Power and Drainage.
 - c. Reports of State Treasurers and State Auditors of Minnesota.
 - d. Messages of Governors of Minnesota.
 - e. Opinions of Attorney General of Minnesota.

II. Secondary.

1. Books.

2. Magazines.

3. Miscellaneous.

- a. Drainage Convention Proceedings and Addresses.
 - a. National,
 - b. North Carolina.
 - c. Southern Commercial Congress.
- b. Personal letters. (Approximately 150).
- c. Newspapers.
- d. Newspaper article of George A. Ralph,
former Minnesota State Drainage Engineer.

BIBLIOGRAPHY.

- U. S. Dept. of Ag. Library. List of references to publications relating to imigration and land drainage. Wash, G.P. Off. 1902. Library Bull. No. 41.
- American School of Correspondence, Chicago. Sewers and Drains. 1909. p. 156.
- Ball, S. M. Reclaiming the Everglades. Putnam's Vol. 7, p. 796-802.
- Broward, N. P. Draining the Everglades. Independent Vol. 64, p. 1448-9.
- Broward, N. P. Homes for Millions: draining the Everglades. Colliers. Vol. 44, p. 19.
- Bishop, T. Practical Work in Kentucky. Drainage Journal, Vol. 24, p. 161-64.
- Body, John B. The Drainage of the Valley of Mexico. Engineering Record. Vol. 44, p. 131-4.
- Brown, R. T. History of Drainage in Indiana. Drainage Journal. Vol. 24, p. 275-8.
- California. Engineer Department. Report Scaramento J. D. Young, Supt. State Printing. 1880-81. 2 vols.
- Costin, J. T. Our Drainage System. (In Ear Association of Arkansas. Proceedings 1908, pp.167-188).
- Elliott, C.G. Drainage of the Upper Zazoo Delta. Wash. Govt. P. Off. 1912.
- Elliott, C. G. Engineering for Land Drainage.
- Elliott, C. G. Practical Farm Drainage.

Everglades of Florida. U. S. 62d Cong. 1st Sess. Sen.
Doc. 89.

Florida. Trustees of Internal Improvement Fund Minutes.

Graham, A. W. Drainage in Western New York.
Science. N.S. v. 28, pp. 527-34.

Gray, E.D.McQ. Government Reclamation Works in Foreign
Countries. Wash. J. P. Off. 1909. 115 pp. H. D. 1888,
G. 7.

Hill, J. J. Our Wealth in Swamp and Desert.
Vol. 19, pp. 12595-12617.

Illinois. Coche River Drainage Commission. Report.
Danville, Ill.

Iowa. State Drainage, Waterways, and Conservation
Commission.

Iowa State Drainage Convention, Proceedings.

King, F. H. Irrigation and Drainage.

Kipp, H. A. Report on the Bolsoni Drainage District in
Washington County, Mississippi.
Wash. G. P. Off. 1912. 55 p.

Kirtley, J. S. Land Reclamation in the South.
World Today, Vol. 21, pp. 572-77.

Larned, E. S. The Drainage of Swamps for Watershed
Improvement. New England Water Works Association,
Journal, Vol. 16, pp. 36-50.

Leighton, M. O. Nearly 80,000,000 Acres Awaiting Farmers.
World's Work. Vol. 23, pp. 80-85.

Lupfer, S. L. The Florida Everglades.
Engineering News. Vol. 54, pp. 278-80.

McCallie, S.W. A Preliminary Report on Drainage Reclamation
in Georgia. Atlanta, Georgia.

Matthews, J.L. The Conservation of Water.

- Mitchell, G. E. The National Drainage Problem.
World Today. Vol. 13, pp. 777-784.
- Morehouse, A. D. Reclamation of the Southern Louisiana
Wet Prairie Lands. Sci. Am. Supplement. Vol. 71,
pp. 268-70; 276-278.
- Morgan, A. E. The Drainage of the Mississippi Delta.
Manufacturers' Record, Vol. 58; 47-48.
- Morgan, A. E. The Drainage of the Northeastern Arkansas.
Manufacturer's Record. Vol. 58: 63-64.
- National Swamp Reclamation. Scientific American,
Vol. 97 p. 390.
- North Carolina Drainage Commission. Wilmington, N. C.
1910. Proceedings and N. C. Drainage Law.
- Reclamation of the Friedeburg Peat Bogs.
Scientific American. Vol. 102, pp. 165.
- Southern Commercial Congress. Swamps and Overflowed
Land in Florida. U.S. Cong. 62d Cong. 2d Sess.
Sen. Doc. 734.
- Tatum, S. Reclamation and Drainage in the South.
Am. Acad. of Pol. & Soc. Sci. Annals, Vol. 35, p.
77-80.
- Tennessee Geological Survey 1909. Drainage Reclamation
In Tennessee. The Drainage Law of Tennessee.
U.S. Dept.
- U. S. Dept. of Agriculture. Expenditures for Drainage.
Investigations. (Wash. G.P. Off. 1913) 9 p.
(62d Cong. 2d Sess. House Doc. 466).
- U. S. Dept. of the Interior. Examination of the Drain-
age of Lands. (60th Cong. 1st Sess. Sen. Doc. 151).
- U. S. Geological Survey. Reclamation of Certain Lands
in Minnesota. (59th Cong. 2d Sess. House Doc. 607)

Warren, G. M. Tidal Marshes and Thier Reclamation.
U. S. Dept. of Ag. Off. of Ex. Sta. Bull. 240.

Watts, E. E. Drainage Improvement by Dredging
Engineering News. Vol. 47, pp. 139-140

Will, T. E. The Everglades of Florida.
Am. Review of Reviews. Vol. 66: 451-56.

Willey, D. A. Draning the Everglades.
Scientific American. Vol. 104: 67-69.

Willey, D. A. Draining the Everglades.
Cassier's Magazine. Vol. 39; 418-432.

Wisconsin Legislature. Committee on Water Powers,
Forestry and Drainage. January 24, 1910.

Wisconsin Legislature. Committee on Water Powers,
Forestry and Drainage. Report 1910.

Woodward, S. M. Land Drainage by Means of Pumps.
U. S. Dept. of Ag. Off. of Ex. Sta. Bull. 243. 0