



## Pump Irrigation in Nebraska

(Article begins on page 2 below.)

This article is copyrighted by History Nebraska (formerly the Nebraska State Historical Society). You may download it for your personal use.

For permission to re-use materials, or for photo ordering information, see:

<https://history.nebraska.gov/publications/re-use-nshs-materials>

Learn more about *Nebraska History* (and search articles) here:

<https://history.nebraska.gov/publications/nebraska-history-magazine>

History Nebraska members receive four issues of *Nebraska History* annually:

<https://history.nebraska.gov/get-involved/membership>

Full Citation: Harry E Gantz, "Pump Irrigation in Nebraska," *Nebraska History* 20 (1939): 242-253

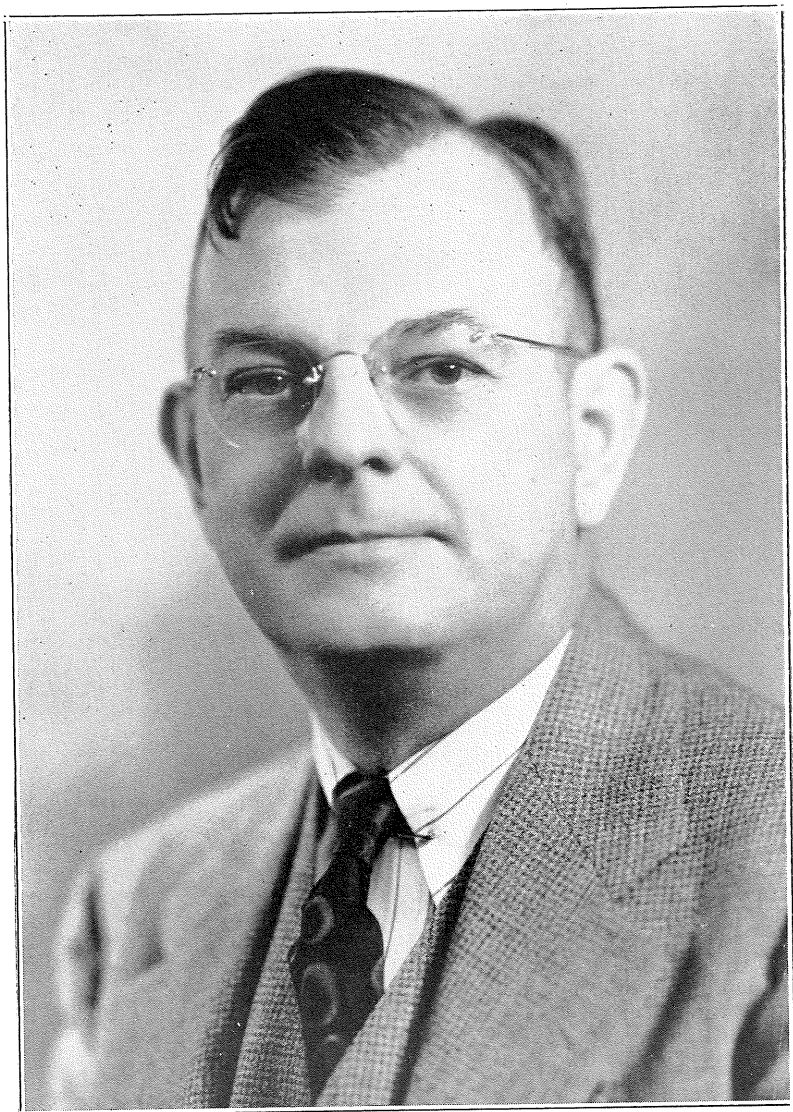
Article Summary: After eight years of drought and crop failures in Nebraska, Gantz saw pump irrigation as crop insurance that could encourage agriculture and prevent migration out of the state.

### Cataloging Information:

Names: O E Meisner, G E Condra, Koester Brothers, W H Brokaw

Keywords: Nebraska Pump Irrigation Association, Federal Land Banks, Water Facilities Administration, Reconstruction Finance Corporation, [pump irrigation] wells

Photographs / Images: Harry E Gantz



SENATOR HARRY E. GANTZ

# Pump Irrigation in Nebraska

HON. HARRY E. GANTZ, Alliance

As president of the Nebraska Pump Irrigation Association and as a member of the Nebraska Legislature, impressed with the importance and possibilities of pump irrigation in this state, I greatly appreciate the invitation of Dr. Sheldon to appear on this program.

The Nebraska State Historical Society is performing a remarkable and worth-while public service. This society, in bringing to us the recorded and interesting history of the past, has reminded us who live in the present that, although times seem hard and full of discouragement, yet our troubles are nothing as compared with the disappointments, sacrifices and uncertainties of those early pioneers, who, with unbounded faith and courage, laid a most substantial foundation for the future building, progress and development of this state. The preliminary work has been done by those who preceded us. Our plain duty is to take full advantage of our heritage, and move on and ever forward in the further development of Nebraska's resources.

Then again I personally appreciate this invitation because I am reminded that in 1896, Dr. Sheldon, as candidate for the Legislature from my district, was elected on a platform of pump irrigation for those western and other parts of Nebraska where it has ever been that the amount of rain and snowfall is usually greatly below that of other parts of the state. Even then, at a time when the state was in the very infancy of its full development, the people realized that if it were to grow and prosper and furnish a decent livelihood for its citizens there must be crops, and that those crops could not be had without moisture.

What I say on pump irrigation is in no sense to be considered a technical or scientific discourse on that subject. I do not pretend to say whether wells should be driven, dug, drilled or bored; neither do I attempt to suggest the type of well

or pump to be used, or manner of irrigation. I recognize only too well my own personal limitations in the discussion of such problems, and I leave it to those of the national and state governmental and educational agencies who have made a study of it to furnish technical data and information to those interested. I refer to the work done in our own state in the co-operative extension service of the Nebraska College of Agriculture, of which Mr. W. H. Brokaw is the very able director. Rather do I want on this occasion to make a report, and, as forcibly as is within my human ability, to focus the attention of the people of this state upon the importance and possibilities of pump irrigation development for their future and permanent welfare, and of the efforts being made to accomplish the objects of the Nebraska Pump Irrigation Association.

Irrigation, flood control and rural electrification are very important subjects in Nebraska. Pump irrigation is, indeed, one of the most important economic questions confronting the people of this state. It is interesting to note that during the period of 1919 to 1929 the total irrigated area in the United States increased only 1.9 per cent. During the same period the area irrigated exclusively by pumping from underground sources increased 62.4 per cent. In the future, water pumped from underground sources is likely to play an even more important part in the irrigation of land. What that part may be cannot be foretold at this time, but it is recognized that the use of water from irrigation wells to supplement rain and snow-fall will play a very important part in Nebraska's future progress and development. Research and tests already available show results almost beyond belief.

Nebraska is solely an agricultural state. The prosperity and welfare of all its citizens, both rural and urban, are entirely dependent upon the success and prosperity of the farmers and stockraisers of this state. It is a matter of common knowledge and regret that for the past eight years no normal crop has been raised any year in every section of Nebraska, due to lack of moisture. The irrigated sections fared well, and have been and are the only green spots in Nebraska today, except in certain scattered sections where there

was rainfall at the proper growing season. The welfare of all the people, in every vocation and walk of life, depends upon a sure harvest of crops, and upon the livestock. The livestock farmer or rancher, especially in the sandhills region, has done well by reason of having sufficient pasture and hay, but the crop farmers have had and are having many difficulties.

And so, after years of drouth and crop failures, and realizing that something would have to be done, discouraged in the past and by the outlook for the future, but imbued with the spirit of the true pioneer, four hundred farmers and others interested in pump irrigation, from all sections of the state, met at Grand Island one stormy, snowy day last January and there formed the Nebraska Pump Irrigation Association, an organization whose objectives are to foster among the people of this state the importance of pump irrigation, to work for financial assistance for well irrigators, to present an organized front on their behalf, and to promote and protect their interests in general. Seven directors of the Association were elected, one from each of the five Congressional Districts and one additional director from Districts 4 and 5 by reason of their large size. This board of directors is a group of representative and public-spirited men from every section of the state. From the First District, Kenneth Wherry of Pawnee City; from the Second District, J. M. Sorensen of Fremont, treasurer; from the Third District, William Luft of Archer; from the Fourth District, Chauncey Krotter of Palisade, and J. G. Kunz of Wood River, vice-president; and from the Fifth District, James Allen of Lexington, secretary, and myself from Alliance.

A campaign for membership was immediately carried on to give the necessary publicity to the aims and objects of the association, and to enlist the attention, encouragement and aid of the citizens of the state. The Association now has enrolled among its members many Chambers of Commerce and other civic organizations, as well as hundreds of Nebraska citizens.

While the main and ultimate purpose of our Association is to encourage and assist in the proper development of pump irrigation, its immediate primary purpose is to obtain federal

financial assistance, through one or more of the present federal lending agencies, in the form of long-term loans (at as low a rate of interest as possible) to the worthy individual farmer for the installation of irrigation pumps and equipment—where such irrigation is feasible. Neither those farmers who formed this organization nor this Association is asking (nor have they ever asked) for a direct gift of money for the purpose of pump irrigation development in this state. All they ask, or have ever asked, is to be given some financial help (through secured loans to be repaid) to assist them in helping themselves.

The problem is one in which the state government is vitally interested. When we consider that the national government has done much to aid in the development of stream irrigation, involving the expenditure of huge sums of money (the benefits of which are now apparent to all and will be more pronounced in the future), it seems reasonable and proper that farmers in those sections of Nebraska not served with the advantages of stream irrigation should be given federal encouragement and financial assistance, and be afforded a like opportunity to further develop and use their natural resources, to the end that sometime in the not too distant future Nebraska agriculture may be made permanently self-sustaining.

At the present time there is no adequate or workable public agency through which pump irrigation projects can be properly or adequately financed. Due to general conditions, the average farmer is unable to finance his own individual pump irrigation project, although many farmers able to do so are now making such development. The Federal Housing Administration will underwrite pump irrigation loans, and has made many such, but this is limited to three years, whereas such loans should be made for a longer period of time to give the farmer a chance to pay it back, much on the same order as amortized loans made by the Federal Land Banks. The Federal Land Bank of Omaha is investigating pump irrigation in this state, and has made some such loans, but its facilities are inadequate.

Under the Water Facilities Administration certain parts of Nebraska have been designated and approved on a water-

shed basis, but this agency is inadequate for general financing of pump irrigation because of lack of scope of designated territory; because it is not broad enough to cover the situation—applying mainly to low-income farmers; and also because of lack of sufficient appropriations by Congress to take care of the situation. The Reconstruction Finance Corporation, under certain conditions, makes loans to legally organized irrigation districts, but makes no loans to individuals.

With the primary purpose of the Association in view, immediately upon its final organization in February a vigorous campaign was inaugurated and has been carried on to obtain federal financial assistance through individual loans. I am glad to say that organization has had the fullest cooperation of every department in Washington, and of each and every member of Congress from Nebraska. Senator Norris and Congressman Coffee have been very helpful in making the necessary contacts from time to time with the proper government officials at Washington to bring about the result we are trying to obtain. Congressman Curtis introduced a bill by which it is hoped that some such financial assistance can be had. It is unfortunate that not more members of Congress from other states are interested in pump irrigation.

Many letters and telegrams have been exchanged between Washington and myself as head of this organization; numerous conferences have been had between Senator Norris and other members of Congress with various departmental heads; recently I was in Washington and had conferences with Senator Norris and Mr. George R. Phillips, director of the Water Facilities Board; Governor Cochran recently made several trips to Washington and contacted our Congressional representatives and departmental heads concerning pump irrigation development in Nebraska; many other persons and agencies, in an effort to assist our program, have urged government officials to interest themselves more actively in the development of pump irrigation in this state.

The sum and substance of the efforts made to obtain federal assistance in long-term loans is that the several agencies of the national government are very much interested in the proposition, are making further studies and investigations of

the many complicated problems of underground waters and their use and control, and have expressed a desire and willingness to assist if and when the result of such further studies proves such assistance feasible. But we have been told by each and every one of these agencies and officials, including our own members of Congress, that unless and until there is some suitable state legislation providing for the regulation and control of underground water by a state board or agency, such as the Department of Roads and Irrigation, probably not much more than has already been accomplished can be expected from the federal government.

It is the policy of our Association to approach the matter with some degree of caution and common sense, realizing the wisdom and necessity of proceeding with care so as to avoid unfortunate results later. It is felt in Washington that the absence of adequate safeguards in the use, control and regulation of underground water is one of the principal reasons for the reluctance of credit agencies (both governmental and private) to make irrigation loans. Our attention has been called to the fact that there are entire communities in this country that are now in a bad way because the irrigation well business was overdone. In some localities it developed that when a large number of wells were put down and operated they lowered the water level to such an extent that not only all of the irrigation wells became useless, but they pumped out the water of stock and other wells, including the water supply of several cities of considerable size. The credit agencies that had loans in these communities, of course, have suffered, usually as the result of excessive development (without any supervision or control) that occurred after their loans were originally made.

It is the consensus of opinion of those in authority that some state legislation for the control and regulation of underground water and the installation of pumps and pumping is necessary if pump irrigation is to be properly and permanently developed with a minimum number of mistakes, and to prevent serious damage to the farmers and to citizens and communities in general. On September 26th I had a long conference at Alliance with Dr. O. E. Meisner, chief of the ground water division of the United States Geological Survey at



Washington, D. C., and Dr. G. E. Condra, our own state geologist, when this entire matter was thoroughly discussed.

The legal status of pumping from wells for irrigation is not as well established as that relating to the appropriation of surface water. Although, by the laws of Nebraska, water for purposes of irrigation has been declared to be a natural want, we do not have any laws in this state covering the use of underground water. Dr. Meisner stressed the importance of state laws governing the use and disposition of underground waters, and both he and Dr. Condra are very much concerned with the problem, which bids fair to become as important as gravity irrigation in this state. The laws of various states were discussed and explained, and it is the opinion of these men, as it is my own, that in the passage of any state legislation the priority rights of all irrigation wells should be fully and completely protected. If re-elected to the Nebraska legislature, and with the assistance and advice of Dr. Condra and others familiar with the situation, I am willing to sponsor such legislation as, in my opinion, will be reasonable and fair to the people of the state. The Nebraska Pump Irrigation Association will continue its vigorous and active campaign for federal loans and the attainment of the other objectives for which it was organized.

Pump irrigation has passed well beyond the experimental stage in most sections of Nebraska. It is a permanent development and will be enlarged and extended, and every year more wells will be put down. Pump irrigation wells in every section of the state are proving their worth and necessity. In my own county of Box Butte, for twenty years prior to 1937 there had been talk of the possibilities of pump irrigation, but not until the drouth played such havoc with crops for several years was the matter given serious consideration. This is true in all sections of the state.

In the early spring of 1937, following five consecutive crop failures, Ben J. Sallows, publisher of the *Alliance Times and Herald*, proposed to put down a test well on some farm near Alliance where the owner would be willing to pay for the well and equipment if it proved to be a success. The Koester Brothers' farm, a mile east of Alliance, was selected after tests

disclosed the presence of water at a depth of 65 feet. A 30-inch hole was put down to a depth of 310 feet. It was cased the full depth with 18-inch perforated casing and back-filled with gravel. A 2,000-gallon pump, powered by a 100 h.p. Diesel engine, was placed at a depth of 125 feet, and this equipment delivered 2,000 gallons of water per minute continuously 24 hours a day through the summer season of 1937. The land owners were well satisfied with the experiment and paid the investment Sallows had risked to start the first well.

Other wells were started soon after by other farmers, and by the end of the year seven wells were completed; the next year saw fifteen in operation and this has now grown to thirty, with many more to be drilled before the next crop season. Koester Brothers irrigated 300 acres from the first well, over 600 acres from two wells; and this year, with a third well in operation, they have more than 900 acres in irrigated crops, including wheat, oats, alfalfa, sugar beets, potatoes and beans.

The wells are going down in all parts of the county, disclosing that the water bed (which is from 250 to 500 feet deep immediately above the impervious Brule clay) underlies practically all of the 900,000 acres in this county. It is easily within the reach of possibility that irrigation wells will increase the value of farm land in Box Butte County at least ten million dollars at a cost of not over \$20 per acre. If this is true in this county, it is likewise true in other counties.

I do not advocate the installation of pump irrigation wells and costly and extensive equipment with the idea of farming a larger number of acres. I cite the Koester Brothers' wells only to illustrate what water, when properly applied, will do for the farmer and agriculture in general. The Association is endeavoring to develop pump irrigation in a conservative and common-sense way, with the idea always uppermost to make as few mistakes as possible and set the whole program upon a permanent and workable basis.

The average dry-land farmer must usually plant 100 acres or more of crop to harvest 50 acres of a normal crop. Pump irrigation does not mean farming more acreage, but farming less acreage in a more scientific and husbandlike manner. It is not a case of raising a surplus or over-supply of crops, but

to insure raising sufficient crops. One well, properly but inexpensively installed, will prove its worth. For example, when a farmer raises no feed he must sell his livestock around which every farmer builds his entire farming operations. When he sells his livestock he is practically out of business. If a farmer does nothing more than put down an irrigation well to irrigate his forage feed he will insure himself a feed crop, and in that way can retain his livestock, which will do more to stabilize that farmer and agriculture in general than any other method yet devised, and he can well afford to take chances with his other crops.

Irrigation, to be successful, must be studied, and proper application of water made according to the best and approved methods. It will take more than three cheers to inaugurate properly and maintain a permanent pump irrigation program in this state, and successful irrigation on any man's farm is something far more than digging a well and pumping the water onto the land. It not only requires study and improvement, but also plenty of hard work, day and night, during the growing season, if irrigation is to be successful. The farmer who thinks that all he has to do is to pump water onto his land is mistaken about the ease with which it can be accomplished, and he has much to learn.

Those interested in pump irrigation will find Director Brokaw and his staff only too willing to cooperate and to furnish necessary bulletins and data, and bulletins can also be obtained from the Department of Agriculture at Washington. Dr. Condra, recognized not only in this state but nationally as an authority on water, has stated that in his opinion Nebraska has better water supplies than any other midwestern state.

Conditions in each part of the state differ so far as underground water is concerned. It is close to the surface in some parts and quite deep in other sections. We have pump irrigation wells in Box Butte County operated by Diesels, by old car engines and electric motors, that range from 310 feet deep at a cost of \$6,640 for installation of well, pump and power plant, and pump 2,000 gallons of water per minute, to a well 122 feet deep, costing \$1,295 and pumping about 800 gallons per minute.

Every well in Box Butte County, no matter what its depth, is proving itself economically sound and feasible. One reason for this is that the subsoil is of such character as to hold moisture and act as a reservoir, thus not requiring the continuous pumping that is necessary in other sections where, by reason of gravel beds, the water sinks back into the ground and thus continuous pumping is required for a good job of irrigating. This proves beyond question that pump irrigation may be economical and a good investment, even where no gravel formations are found, and where water must be lifted a considerable distance. One farmer in my county with a well 265 feet deep, and lifting 850 gallons of water 165 feet per minute, last year raised 29,000 bushels of seed potatoes on 120 acres, which sold for \$1.45 per hundredweight.

In Hall, Merrick and Buffalo counties they are much interested in pump irrigation. The first irrigation wells in Hall County were put down about fifteen years ago; and in Buffalo County, ten years earlier. The first wells were open pit wells, about five feet across and reaching down to water. In these counties wells run from 50 to 60 feet total depth—about 30 to 45 feet of water. The first irrigators did not obtain good results because of failure to apply sufficient water, and because irrigation was started too late in the crop season. Experience has taught more improved methods, and much better results are now being obtained. Some corn yields as high as 100 bushels per acre in fields where, if not irrigated, it is a total failure. Beets run to 18 tons per acre; potatoes commonly yield 400 bushels per acre—and 500 bushels per acre is not exceptional. About four hundred fifty wells are in operation in Hall County and about five hundred fifty in Buffalo County, the number increasing to such an extent that it is feared the large number may lower the water level so much that all wells may become more or less useless. This situation calls attention to the importance of giving proper consideration to the depth of the well.

Pump irrigation in many other counties has grown and expanded in the past few years, notably in Dodge and Colfax Counties. Between the Loup River and the Elkhorn are now about seventy irrigation pumps. In Dodge and Colfax Coun-

ties there are sixty-one of these in the Platte Valley. Much valuable information as to pump irrigation has come from these counties, the costs of installation in some parts being as low as \$350 per well, and operating at a cost of \$1 per acre for fuel and lubricating oil.

The construction and operation of a well and pumping plant for irrigation is more or less of an expensive undertaking. It should not be done until a full test and investigation of the possibility of success has been made. A permanent program for pump irrigation is much more complicated than it appears to the average person. There are many angles to it. It seems, however, very much worth while.

It is the duty of every Chamber of Commerce and other civic organization, as well as every citizen of the state, whether he lives in the city or on the smallest and most humble farm, to become alive and alert to the importance of the part that pump irrigation, properly and sensibly developed and regulated, will play in Nebraska's future. It will be the best crop insurance to be had, will bring a more complete security and independence to the farmers, and will witness the division of many of the larger tracts into farm homes of around 80 to 100 acres. It will encourage agriculture and prevent such migration from Nebraska as has occurred in the past; it will stabilize agriculture and make it permanently self-sustaining; and above all, it will instill new hope and courage into the minds and hearts of all of the people of this state.