

# MAY INCREASE CROP VALUES WITH FERTILIZERS MADE FROM THE AIR

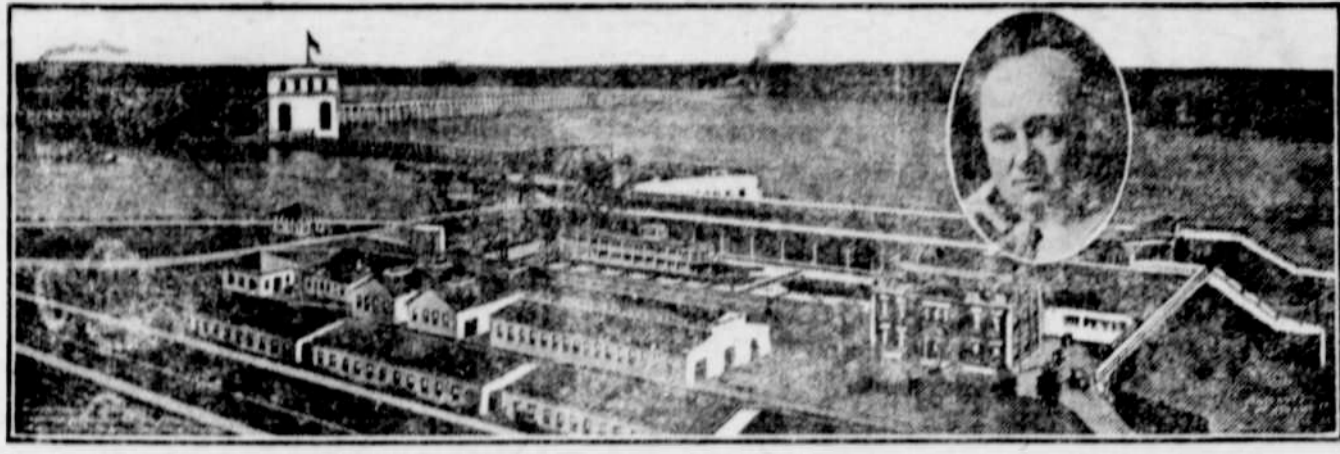


Photo © by Anschutz, Keokuk, Ia.

THE MISSISSIPPI RIVER DAM AND POWER PLANT AT KEOKUK AND THE MAN WHO BUILT IT.

By HUGH L. COOPER, Builder of the Keokuk Dam.

American farmers are going to school. They are learning that farming is a manufacturing business; that every garden, farm, orchard and ranch is a chemical laboratory. The chemists are the agricultural schoolmasters of today. The virgin soil contains certain elements which furnish plant food and grow crops. As these elements are taken from the soil by cropping year after year, its productivity diminishes and the crops fall off. Every intelligent farmer knows now why these vital elements are and in what proportion they must be restored to the soil to keep up his crop yields and make his business pay. With farmer and manufacturer alike the present day problem is to secure an adequate supply of necessary raw materials and labor at prices that will give him a profit on his finished product. The war, for instance, has shut off our potash supply from Germany, and the government experts are almost hysterically seeking to devise processes for converting seaweed into potash or making available the immense supply of this salt locked up in the common rocks of our hills and mountains and scattered broadcast over the earth.

**Earth a Vast Cemetery.** The most important of the plant foods, though, and the most costly, is the nitrogen, which is vital not only to plant life, but to all forms of life. We commonly think of oxygen as the life giving element, but the scientists tell us that were the supply of nitrogen cut off the whole of the earth would soon become a vast cemetery. So lavishly has nature supplied us with nitrogen that four-fifths of the atmosphere is composed of this element.

Agriculturally we must supply nitrogenous plant food in the form of ammonia. Through countless ages a very small part of the nitrogen in the air has been made into ammonia, deposited in the soil by lightning and other natural processes. It is this tiny deposit of ammonia or nitrous acid which gives the virgin soil its plant building properties. These deposits, however, are so small that additional means must be found of changing the form of air nitrogen and putting back into the earth the ammonia consumed by plant life if the soil is to remain fertile. The processes of animal digestion fix some part of the nitrogen consumed by the body in the form of ammonia valuable as plant food. It is these processes which give stable manure its fertilizing qualities. For many years we brought guano from Peru and supplied our ammonia needs from the deposits of bird droppings accumulated there through countless ages. These Peruvian deposits are exhausted, and while there are similar deposits in several parts of the earth they are so remote and inaccessible as to be practically unavailable.

City sewage and garbage waste, very much of which is carelessly drained into the streams and ocean, contain valuable fertilizing qualities because of its ammoniacal content. In our desperate need for nitrogenous fertilizers we are extravagantly using millions of tons a year of cottonseed meal for fertilizer manufacturing. Because of the high cost of chemical fertilizers, farmers in many sections find their use unprofitable and are obliged to lose the use of their land during frequent seasons, planting it in clovers, cowpeas and other plants of the small family of legumes which have the property of extracting nitrogen from the air, converting it into nitrates and leaving these in the soil in the form of small nodules or pimples which form on the roots.

**Costly Makeshifts.** These are some of the cumbersome and costly makeshifts to which farmers resort. **WHY EUROPE GROWS BIGGER FARM CROPS** The European farmer uses 200 pounds of chemical fertilizer per acre of cultivated lands. The average use of fertilizers in the United States is twenty-eight pounds per acre. As a result the comparative crop yields per acre in bushels of European and American farms are:

	Wheat	Oats	Barley	Potatoes
Europe	32	47	38	155
United States	15	29	25	96

We must increase our crop yields per acre if farming in this country is to pay and if we are to continue to feed ourselves without excessively high cost of living. To do so means using more chemical fertilizers, and at present prices or even normal before the war prices of both fertilizers and crops it

ers have been obliged to resort for plant food. Only three other sources of nitrogen supply are known. At present and for many years past the world's greatest supply has been saltpeter or nitrate of soda from the deserts of Chile, where in the course of past ages nature has impregnated great beds of soda with atmospheric nitrogen. Until a few years ago the whole civilized world depended upon these Chilean nitrate deposits for its supply of saltpeter, nitric acid and ammonia. Today the United States relies mainly upon this source, and American manufacturers and farmers pay tribute to the Chilean government, which collects an export duty of 60 per cent on the product, to the tune of upward of \$12,000,000 a year. Even at this cost the Chilean supply is giving out, and we must face the prospect of still higher prices. The total export of saltpeter in 1899 was 70,000 tons. In 1915 it was nearly 2,000,000 tons. Robert Kennedy Duncan, late professor of chemistry in the University of Kansas, says the best deposits of saltpeter in Chile will be exhausted by 1925. Then what are we to do for ammonia and nitric acid? In the process of coking coal some ammonia is obtained as a byproduct, but this is only a drop in the bucket as compared with our national needs, and to burn coal primarily for the production of ammonia means a fuel waste and cost that is unthinkable.

**Nitrogen From the Air.** From where, then, is our future supply to come? Science has answered the question, as it answers most questions. Other civilized nations more progressive than we have accepted the aid of science and freed themselves from the Chilean monopoly, saved their coal, increased their supply of fixed nitrogen and reduced its cost by harnessing their water powers, converting into electricity the energy in flowing waters and using this cheap electricity to burn the oxygen out of the air and change the free atmospheric nitrogen into forms of acids and compounds available for chemical, manufacturing and agricultural uses.

The supply of nitrogen in the air is inexhaustible so far as it can be expressed in human terms. Above each acre of land on the continent there are 34,000 tons of nitric acid in the form of free nitrogen. Europe is using 1,400,000 horsepower of hydroelectricity to capture this nitric acid from the air. Germany is waging war with gunpowder made from the atmosphere and furnishing agricultural fertilizers to her farmers at one-half the price paid by the American farmer. The astounding thing in the United States today is that we do not wake up and take advantage of our opportunities. Our natural resources, the richest in the world, are largely neglected. Of our water powers, which compare favorably with those of any other country, we are using only 10 per cent. It is said that only 5 per cent of our agricultural lands are productive.

**A Waste of Two Billions.** In comparison with the enormous development and use of water powers in Europe not a single large hydroelectric plant has been built in the United States for several years. Not one electrochemical plant has been established in this country. Not an ounce of atmospheric nitrogen is being produced within our borders. In the last ten years we have, by neglecting our water powers, destroyed and wasted more than \$2,000,000,000 worth of fuel and labor that could have been saved.

The only reason the United States is so far behind other civilized countries in this respect is that the federal government controls the use of our best water powers, and for nearly ten years, under a mistaken conception of conservation, they have been locked out of use by inadequate laws relating to the matter, a condition of stagnation exists, and water power resources are not being used. Existing law is not fitted for the uses to which it is put. There is that mystifying miracle of drawing nitrogen from the air for chemical use, which can be done only with great power, but is being done in Germany, Norway, Sweden, France, Switzerland and elsewhere, by which an inexhaustible substitute for the almost exhausted nitrates of Chile has been found. To increase the yield of our farms and to give us an independent and adequate supply of nitrogen for the explosives used in war we must set water wheels at work that will fix nitrogen in lime.—Franklin K. Lane, Secretary of the Interior.

Secretary Lane on Water Power. Under existing conditions, due largely to inadequate laws relating to the matter, a condition of stagnation exists, and water power resources are not being used. Existing law is not fitted for the uses to which it is put. There is that mystifying miracle of drawing nitrogen from the air for chemical use, which can be done only with great power, but is being done in Germany, Norway, Sweden, France, Switzerland and elsewhere, by which an inexhaustible substitute for the almost exhausted nitrates of Chile has been found. To increase the yield of our farms and to give us an independent and adequate supply of nitrogen for the explosives used in war we must set water wheels at work that will fix nitrogen in lime.—Franklin K. Lane, Secretary of the Interior.

ervation, they have been locked out of use by inadequate laws. American capital and investors have sought to develop the water powers and establish the new industries dependent upon cheap power, which would make us free of the Chilean monopoly, but the laws have said "No." To induce investment in these industries investors must have assurance of reasonable security and some hope of fair return or profit, and the laws deny either the security or hope of return. To no class of American citizens does this situation come home so closely, perhaps, as to the farmers. There is absolutely no relief in sight from the high prices of fertilizers or for fertilizers at all, except through development of cheap water powers.

Not only does the water power question affect the future of fertilizer supply and prices, but it is closely related to the labor question. For several years farm labor has been increasingly expensive and hard to secure. Immigration has stopped and is not likely to be resumed for years or generations to come. Europe will need all the men she has left after the war. Conservation of American labor means abolition of unnecessary work and the releasing of workmen for better occupations.

**Our Undeveloped Water Power.** The United States figures show that there is now undeveloped in this country about 25,000,000 horsepower of water power. To develop and use even half of this means conserving the labor of 300,000 men now employed in coal mining. If applied to furnish power for present uses it would relieve the railroads of the United States of the necessity of transporting more than 110,000,000 tons of coal a year, most of it for their own use. Electrification of the railroads means better and cheaper transportation. To bring 300,000 men from the bowels of the earth and put them to work in the sunshine, in factories and on the farms, means not only a new supply of farm and manufacturing labor, but bettering the condition of these men and making this country a better place to live in from every human point of view.

But to get these results, to get any development and use of water power we first must have federal legislation that will open the water powers to use. The United States senate the other day passed the Shields bill by a vote of 48 to 22. This measure gives water power companies the right under careful restrictions to dam navigable streams and build power plants therein. A bill providing for leasing of power sites in the public domain has passed the house and is now being debated in the senate. Certain men and interests are trying to defeat the purpose of this constructive and beneficial legislation by loading it up with unworkable terms and conditions. They are making charges and statements, generally vague and containing more innuendo than argument, intended to create suspicion and mistrust and prevent legislation. It behooves the American manufacturer, the American farmer, the American citizen who has any direct, indirect or patriotic interest in this subject to study this legislation for himself and arrive at his own conclusions.

**A Suggestion to Citizens.** Instead of taking the opinion of somebody else I urge every interested citizen to write to his congressman in Washington for copies of the Shields bill and the Myers bill and read them carefully, thoroughly, impartially and critically. After reading these measures and making up his mind as to their merits, I urge him to write his representative in congress exactly what he thinks of them, demanding their passage if he thinks them good bills, and their defeat if he thinks them bad bills.

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## REPORT NEW BORDER RAIDS ARE PLANNED

General Funston to Study in Detail Proposed Reorganization of Troops.

San Antonio, Texas.—Information indicating a plan for the resumption of raids across the international line near Brownsville, Texas, has reached army headquarters here and will, it is expected, cause considerable strengthening of the force now patrolling that district. General Funston and his staff will study in detail the proposed reorganization of the entire border patrol, and it was indicated that the 13th infantry, coming from New York state, would be sent to Rio Grande city for service between there and Brownsville, the district so frequently raided a year ago.

No apparent anxiety regarding the position of the little force that entered Mexico near Boquillas was indicated at headquarters. Colonel Sibley is commanding only four troops of cavalry and a machine gun company, but army men here believe that he would have no difficulty in withdrawing if menaced by a superior force.

## GERMAN LOSSES AT VERDUN 240,000

Paris.—German losses in the six days of battling at Verdun now reach a total of 240,000, according to estimates made here, a high percentage of the number representing German dead. Since the attack on the fortresses was resumed with thrusts at the French lines on both sides of the Meuse, the Germans have lost nearly 20,000 men. In positions recaptured by the French in a successful counter-attack east of Deadman's Hill, the bodies of nearly 1000 Germans were counted.

On the west bank of the Meuse, northwest of Verdun, the opposing armies apparently are in another deadlock. The French improved their defensive positions by an advance in the direction of Hill 287, the war office announced, the Germans making no infantry attack. On the east bank of the Meuse several heavy German attacks on the Thiaumont-Fort Douaumont line were repulsed.

## PEACE OFFER NOT WANTED

Poincare Says Until Enemies Admit Defeat Conflict Will Go On.

Nancy.—President Poincare, in an address here, responded to Germany's suggestion regarding peace, contained in the German reply to the American note. "France does not want Germany to tender peace," said the president, "but wants her adversary to ask for peace. Neither directly nor indirectly have our enemies offered us peace. But we do not want them to offer it to us; we want them to ask it of us. We do not want to submit to their conditions; we want to impose ours on them. We do not want a peace which would leave Imperial Germany with the power to recommence the war and keep Europe eternally menaced. "So long as that peace is not assured to us; so long as our enemies will not recognize themselves as vanquished, we will not cease to fight."

## Pershing's Lines Safe.

Field Headquarters, via radio to Columbus, N. M.—General John J. Pershing, the expeditionary commander, declared that reports printed in the United States to the effect that his troops were menaced by Carranzistas on all sides were untrue. "Our troops are excellently disposed for defense, but there is no sign of danger," said the general. He added that since the Ojos Azules fight the Villista bandits had a wholesome fear of the American marksman.

"There is no backward movement of the American troops on now," he said.

## Two Killed in Auto Race at New York.

New York.—Carl Limberg, an automobile racer, and R. Pallotti, his mechanic, leading the field in the 15th lap of the 150-mile race for the Metropolitan trophy, were killed when their machine crashed into a guard rail on the Sheepshead Bay track.

## Roanoke Overloaded, Say Men Saved.

San Luis Obispo, Cal.—Three survivors of the steamer Roanoke, which went down and caused the death of 46 persons, testified before a coroner's jury that the vessel was overloaded and listed before she sailed from San Francisco.

## Cavalry Goes After Mexican Bandits.

Marathon, Texas.—Major George T. Langhorne and his flying squadron of the 8th cavalry dashed over the white sand hills in Mexico in a supreme effort to surprise the Mexican raiders of Glenn Springs and Boquillas.

## OREGON NEWS NOTES OF GENERAL INTEREST

Important Occurrences of Past Week Briefly Compiled for Our Readers.

The Interstate Realty Men's convention is to be held in Portland July 17 and 18.

Outcroppings of "cannel" coal have been discovered in Polk county near Crowley station.

Nearly 1200 acres of land and over 100 additional citizens were voted into the city of Burns.

The Baker school board has accepted the final plans for the new \$125,000 high school building.

The annual convention of the Oregon Association of Clerks and Carriers will be held in Oregon City June 24.

The annual rally and industrial exhibit of the Lane county schools at Eugene was the best ever held there.

The northern deanery of the Episcopal church in the diocese of Oregon, held a convocation on Monday at Oregon City.

A new impetus has been given to the dairy industry at Clatskanie by the installation of a cheese factory by the Clatskanie co-operative creamery.

Edward D. Baldwin, secretary of the Oregon state republican committee, has been appointed assistant secretary of the republican national convention.

Grain in Umatilla county has been injured to such an extent that not more than 75 per cent of the normal crop is expected, from present indications.

By a narrow margin of 11 points Oregon defeated Oregon agricultural college in their annual dual track meet at Eugene. The final score was 71 to 60.

Douglas and Josephine county courts have appropriated \$500, which will be used in cutting down the grade at the summit of Wolf Creek hill, near Glendale.

The contract for the construction of the proposed Roseburg high school building has been awarded to John Hunter, of Roseburg, on his proposal of \$57,783.80.

The first Gilliam county field meet was held at Arlington and was won by Arlington high school, with Condon high school second and Arlington public school third.

The Oregon state convention of the Evangelical church closed in Eugene after a three-days' session. Corvallis was selected as the meeting place for next year's convention.

Suit has been filed in the circuit court at Dallas to restrain the Polk county court from carrying out proposed road improvements within the city limits of Independence.

The Libby Coal company of Coos county is arranging to distribute coal in the Willamette valley with the opening of the new Willamette Pacific railway to freight traffic in July.

Fourth place among the militia organizations of the United States in major rifle fire has been won by the Fifth Company, Coast Artillery Corps, Oregon National Guard, of Albany.

Under the auspices of the Oregon Association for the Prevention of Tuberculosis a survey of the prevalence of tuberculosis in the state of Oregon was begun in Lane county Tuesday.

Construction work for the past eight months has been more active in Bend than in any other part of Oregon, according to Harold A. Wilkins, auditor for the state industrial accident commission.

C. L. Jamison, teacher of agriculture and manual training in the Fossil high school, has been appointed agriculturist for Wheeler county to succeed Oren Beatty, who recently resigned because of ill-health.

During the week ending May 11 there were reported to the state industrial accident commission 298 accidents, one of which was fatal. The fatal accident was Andy Valine, killed in logging operations.

The city commissioners of Baker have taken the first steps to do away with the conduct of Sunday "clubs" in Baker, under the guise of which local bowling alleys and billiard parlors have been run lately.

Plans are being made for a Pacific Coast debating league by the forensics councils of the Oregon agricultural college, University of Oregon, University of Washington, University of California and Stanford university.

Pendleton won the Eastern Oregon High School track and field meet at Baker, taking 41 points, while La Grande was second, with 29, and Baker third, with 20. The other high school scores were: Wallowa, 19; Ontario, 8; Enterprise, 5; Halfway, 5, and Union, 4.

The directors of the summer school session at the Oregon agricultural college have announced that the registration day would be June 12 and that 89 regular college courses, in addition to private lessons in music, would be offered. The instruction will be in charge of 53 members of the regular college staff assisted by eight visiting lecturers and instructors.

A good newspaper is a good booster for any good community. If the community is good enough for you and your local paper is good enough for the community, send sample copies to your good friends once in a while. You will be doing good, the paper may do some good, and then we'll all be good fellows. dec22tr

It doesn't cost you anything to advertise an article if you want to take advantage of The Sentinel's new want ad stunt. No sale, no pay; that's the way we do business. mch29tr

Twelve-inch water motor for sale. The Sentinel. mch29tr

## IS IT TRUE?

that high interest oftentimes means low security? Everyday events seem to prove it.

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