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# Calendar No. 297.

64TH CONGRESS, }  
1st Session. }

SENATE.

} REPORT  
No. 325.

## WITHDRAWAL OF WATER-POWER SITES AND CONSTRUCTION OF WATER-POWER PLANTS FOR MANUFACTURE OF NITRATES.

March 30 (calendar day, APRIL 4), 1916.—Ordered to be printed.

*U.S. Cong. Serial*  
Mr. SMITH of South Carolina, from the Committee on Agriculture  
and Forestry, submitted the following

### REPORT.

[To accompany S. 4971.]

The Committee on Agriculture and Forestry, to whom was referred the bill (S. 4971) to authorize the designation and withdrawal of water-power sites and the construction of water-power and other plants by the United States for the manufacture of nitrates, and for other purposes, having considered the same, report thereon with a recommendation that it pass with amendments.

The committee report the bill favorably for the following reasons: First, the necessity for the chemicals produced by these processes. The investigation carried on by the committee developed the fact that modern explosives were manufactured almost entirely from nitric acid as the basis principal. In the testimony before the committee it was stated by Dr. Thomas H. Norton, Ph. D., Sc. D., Bureau of Foreign and Domestic Commerce; Dr. L. H. Baekeland, member of United States consulting board; and Mr. Frank S. Washburn, president of the American Cyanamid Co., that the present European war could not have been possible, in so far as least as Germany was concerned, had it not been for the modern inventions making it possible to extract nitrogen from the air. Outside of this process every country in the world that has need for modern explosives is dependent upon the nitrate beds of Chile for its supply. It was maintained by the witnesses before the committee that the blockade of the Chile supply of nitrates by England, had there not been this process, would have made it impossible for Germany to have prosecuted the war at all. The Chilean Government derives through an export tax on her nitrates a large part of her revenue for governmental purposes. To this must be added the cost of mining, the preparation of the nitrates for market, the freight, the cost of handling, the deterioration that goes on more or less rapidly, for it is comparatively volatile, and the ever-present danger of explosion by coming into contact with heat.

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This country, as the testimony shows, is absolutely dependent for its supply of nitrates for war purposes upon Chile, as well as for the nitrates that are used in the arts and sciences. The price, of course, is practically beyond our control. During the present war the nitrates that have been bought for our country have almost doubled in price, entailing necessarily an increased cost even where our Government is at peace. It can readily be imagined what would be the condition of this country if for any reason the foreign supply of this absolutely essential ingredient should be cut off. No one can tell at what time or from what source this country may be involved in war which will call for a tremendous excess of this all-important ingredient of high explosives.

From the testimony as to the necessity of this ingredient there can be no possible doubt as to its accuracy; neither can there be any doubt as to our present source of supply.

Therefore, the question of its necessity having been established and the only source of supply for our present needs having been ascertained and the danger of this Government having to rely upon foreign sources, the committee next addressed itself to an investigation as to the practicability of the artificial process of obtaining this nitrogen from the air. The testimony of the experts was to the effect that the process had now passed completely beyond the experimental stage and was a commercial fact. Mr. Washburn, who is an inventor and who financially is largely interested in the manufacture of this ingredient, made this statement before the committee:

So the point I wish to make is this, that the nitrogen industry is no longer in the experimental stage.

\* \* \* \* \*

It has taken the greatest scientists in the world, men understanding such things 16 years to bring it to where it is a great, successful, reliable, extraordinarily cheap method of producing the most valuable single substance known to mankind.

Dr. Baekeland, in this connection, says:

The whole situation is a shame to the human race. We know how to get nitrogen from the air; we know how to increase the yields of our acres. We do not do it, although those chemical processes are no longer secrets, and we know all about them. The key to the whole situation is better utilization of our natural resources of cheap power. If you make your nitrogen compounds or your nitric acid at too high prices, you may be able to use it in war time—in war time nothing is too expensive when it comes to murdering each other.

\* \* \* \* \*

This nitric acid is made by a chemical process, which, I am glad to say, the chemists of the United States can duplicate at any time. There is no particular secret about it, and if the chemists of the United States were confronted with this problem I have no hesitation in saying that, if properly supported and given the necessary time, they would make as good a showing for themselves as did the German chemists.

\* \* \* \* \*

The question of the fixation of nitrogen from the air from the chemical standpoint is clear and easy, and is a problem no more difficult than any other chemical problem.

Dr. Norton, on the same subject, states:

The nitrogen derived from the air in that way easily meets in competition Chile saltpeter. It holds its own; the works are being enlarged. That demonstrates to us, with perfect clearness, that we can take the nitrogen out of the air; we can put it into such a form that it is susceptible of utilization for our agriculture, and on even terms with the supplies from Chile.

Furthermore, gentlemen, you must remember that the supplies of Chile saltpeter are limited.

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Other quotations could be made, but these are sufficient, coming from the sources they do, to establish the fact that the processes have been established upon a practical commercial basis.

The committee next addressed itself to the availability of power in this country. It was developed in the hearings that there was ample water power for the manufacture of this chemical. It was stated by the witnesses that the larger the unit of power to a certain degree, the better perhaps it would be for this process. Dr. Norton stated:

You can start in with any amount. You can start with 5,000, 10,000, 15,000, 20,000, 30,000 horsepower. Less than 10,000 horsepower is economically not very advantageous. The industry requires to be mounted upon a large scale in order to produce the highest economic results.

\* \* \* \* \*

I should, from my observation in Europe, especially in Scandinavia, say that we ought not to start any individual plant with less than 30,000 horsepower. I should prefer that as about the minimum figure.

The testimony of other witnesses was to the same effect—that there was ample water power in this country for the production of this essential chemical.

The only question, then, in the minds of the committee was the vesting of the power in the proper ones to determine and locate the power sites, determine the best and most available processes to install and to provide the proper appropriation for carrying the measure into effect. These questions, the committee believed, were properly expressed in the bill as amended and reported.

In addition to the facts above set forth it was also developed that the great question of furnishing an adequate supply of fertilizer ingredients to the rapidly depleting agricultural lands of this country could also be supplied by this same process. It is a curious and happy coincidence that the very ingredients needed for modern explosives are the very ingredients used in the manufacture of fertilizers. In view of the fact that in case the Government establishes these plants in accordance with the provisions of this bill, the capacity of them must be upon the basis of war demands, so that in case war should come we should have the necessary equipment to meet its utmost demands. In times of peace, therefore, these plants would either lie idle or manufacture an excess of what would be needed for the War Department and would be sorely needed by the agricultural interests of this country. The committee was of opinion that without a violation of the spirit of the Constitution, and thoroughly in accord with the needs of the basic industry of the entire country, that provision could be made in this bill for the disposal of this surplus for the benefit of the farmers. The experts who testified before the committee were as greatly impressed with the benefits that would accrue to the agriculture of this country as they were with the necessity of supplying ourselves with the munitions of war.

In this connection, Dr. Norton says:

We have got to face this proposition, not only for our current needs, for the needs of our Government, for the needs of national defense, but we have got to face the possibility of what will happen 20, 30, or 40 years hence for our agricultural interests and for our manufactures, if we do not have such an industry well established, moving along smoothly and easily, ready to engage and enlarge its scope of operations as the American demand increases. All that has to be taken into consideration.

Dr. Baekeland stated in his evidence:

Last evening in my talk on the subject I gave an example with which I am familiar, because it relates to the country where I was born—Flanders, in Belgium. You have probably heard it stated, repeatedly, that the yield per acre in Germany is considerably more than the yield per acre in the United States. That is true. Ordinarily people do not know that the yield per acre in Belgium is still higher than it is in Germany, and it is very significant that Belgium uses more nitrogenous fertilizer than Germany. It is still more significant that the yield per acre for most of those crops is almost proportionate, within certain limits, to the amount of nitrogen fertilizer consumed; in fact, those limits do not seem to have been reached, from the fact that fertilizer costs money and naturally there arrives a point where it does not pay the farmer to use more fertilizer. As soon as you cheapen the cost of fertilizer you give the farmer a chance to realize upon the result of his labors by increasing his yields per acre. If this matter is important in countries like Belgium and Germany, where farm labor is incomparably cheaper than it is in the United States, it is almost self-evident that the matter becomes much more important in a country like the United States where farm labor is scarce and expensive.

This quest or struggle for nitrogen is one of the tragedies of the human race. It is staggering to think that here we are with all our knowledge of all that we can accomplish, knowing what can be accomplished by the aid of science, and that still there should be an insufficient production of food.

In the opinion of the committee, it was as much the duty of the Government to provide for the increased production of our lands as it was to equip properly those who defended it.

Summing up the foregoing, after very careful and thorough investigation, the committee was convinced of the pressing need for the establishment by the Government of these plants and of the practicability and availability of the processes.

The next question was the providing of the necessary appropriation to supply those charged with the execution and demonstration of the work with sufficient means. Upon investigation, the committee ascertained that the sum of \$15,000,000 was the least with which the work could be done upon a sufficiently large scale. We therefore stated the minimum amount, because we were working along the lines of the most practical economy. The manner of providing the means is set forth in the committee amendment, proposing the sale of bonds, for it was the opinion of the committee that this was the proper method for the reason that it needed no further legislation to provide for the issuance of these bonds and also because this bill provides permanent improvement which would be for the benefit of the country at large perhaps for generations to come.

The matter, therefore, having been carefully investigated in all of its aspects by the committee, they recommend the passage of this bill at the earliest possible time. All of the facts in relation thereto have been gathered for Congress and are printed in the hearings before the Committee on Agriculture and Forestry, and the committee feels that any further investigation would not only be a waste of time but a dangerous delay.



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