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GENERAL REMARKS, POWER SITUATION DURING
THE WORLD WAR IN U.S.

(Colonel Chas. Keller.)

*Probably
1st course
on 12-11-24?*

Colonel Ferguson and Gentlemen of the Army Industrial College:

Colonel Ferguson has already, in his introductory remarks, given you some idea of the subject matter with reference to which I am going to talk to you, and I know you will be reassured when I say that I will talk briefly. I merely came to Washington on private business for my company. Not having prepared a talk, I am going to talk to you as if we were discussing this matter together with the idea of understanding how the power situation developed at the beginning of the war, and how a very serious problem finally arose. I cannot, without speaking almost entirely in the first person, make you understand how it was that I - a comparative insignificant member of the administrative body then assembled in Washington, should have happened to be regarded as having more information with regard to this problem than others.

I shall tell you, in very little detail, how the thing came about. Many years ago I was stationed in Detroit in charge of one of the works of the Engineer Corps called the Lake Survey. At that time public agitation had just begun with reference to Niagara Falls. Many people felt that the power development of that locality had already injured the scenic beauty of the Falls and a movement was begun by the American Civic Association with a view to getting legislation to protect the Falls from further harm. They got that legislation in the so-called Burton Act of 1905. The Lake Survey was called upon to furnish the expert guidance necessary to carry out the provisions of the Act limiting the use of water for power purposes on the American side and limiting the importation of power from Canada. Incidentally, the limitations as to the Canadian side seriously embarrassed us when we entered the war.

As the head of this body giving expert advice to the Government, I came into direct contact with the Niagara Falls situation and I kept in touch with it for a good number of years after I left Detroit. When later, just before we entered the war, I came to Washington for duty, I had a very intimate acquaintance with one of the major problems confronting the Engineer Corps, I think -that of the situation at Niagara Falls.

I came here in April, 1916. I was very much surprised, at that time, by having ushered into my office the President of the Buffalo General Electric Company who came for the purpose of making inquiries in regard to the construction of a steam power plant at Buffalo. Up to that time all power in Buffalo had been derived from Niagara Falls. My surprise was occasioned by the fact that within twenty-five

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miles of the greatest hydro-electric site in the world, officers of a well managed and successful public service company were thinking of investing a large amount of money in a steam power plant. Up to that time no doubt had arisen as to the availability of Niagara Falls power but here was one of the ablest men in the power business who was seriously contemplating the construction of a steam power plant. What he wanted from us was a very trivial privilege in regard to condensing water, etc. From the discussion, however, I learned that a very serious power shortage had developed in that part of the United States a year before we entered the war, and that not only was there not enough water power to go around, but that there seemed to be no way of obtaining power from the American owned plants in Canada. Part of the supply of power of the Buffalo General Electric Company had theretofore come from Canada and had been taken away for Canadian war uses. We extended help to the Company and in a year I think they had a 60,000 KW steam plant installed.

This incident set me to thinking so that when we actually entered the war it was a matter that I had given a little thought to - not only the power shortage at Niagara Falls, but the remedies for it. Like all the rest of us, I had not realized the magnitude of the war, nor had I had an opportunity to learn the lessons that had been forced upon the nations of Europe in respect to manufacturing and power problems, but it was plain to me that the interference of the Government would be necessary when the proper time came.

With this introductory statement, I will go on as to what actually happened.

In the fall of 1917, the Secretary of War, Mr. Baker, began to receive complaints from the manufacturers of electro chemicals of one kind or another at Niagara Falls; that their power supply was being curtailed as a result of the operations of the Canadian Government; that there was not enough power to enable them to operate normally and supply the war orders of the United States. Mr. Baker could not, of course, personally find out what the facts were and designated a man to investigate the situation for him. Those who have read my report probably remember that Mr. Baker selected Mr. Bulkley to look into the situation. Mr. Bulkley, before starting for Niagara Falls, came into the War Department to get such information as he could. Eventually he was sent to my office, and I discussed the matter with him, telling him what had been in my thoughts for more than a year. He suggested that I go with him and see what was actually the situation of affairs, so I accompanied him.

The result of our visit to Niagara Falls convinced us that there was a serious shortage. Mr. Bulkley did not know what to do, and I suggested that while we had a good many facts there were not enough to arrange a definite program, and that it seemed desirable to hold a hearing with the principal electro chemical manufacturers in

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regard to their existing and prospective needs and with representatives of the power companies present so that we could check up on information received. In addition, I suggested that we obtain an accurate statement of the uses to which the power available was being put so as to have the data necessary for the establishment of a priority schedule of some kind.

As a result of this conference, we found that while only a small portion of the Niagara Falls power was being used for other than war industries, no special stress had been placed on the things most important and urgently needed. There was no idea of priority in connection with the commodities manufactured and yet something of that sort was plainly needed, since the Government program was being seriously crippled by the non-delivery of power from the Canadian side.

When we returned to Washington after this hearing, we reported to the Secretary of War. From what we already knew it was evident that this was merely the beginning of an accumulation of troubles of the same kind - that it would not be long before the shortage would extend to other industrial centers where war orders were concentrated. I suggested that the situation could best be controlled by men who understood the power industry; that an organization and personnel would be necessary for effective control, and this was authorized. This personnel was taken principally from Engineer Reserve officers whose record cards showed them to be experienced and qualified. At the head of the organization it seemed wise to place some man who was prominent in the industry, so as to insure the approval and cooperation of the industry itself. My idea was to decentralize it as much as possible - to have a representative in every manufacturing center to handle the questions arising therein.

The Secretary of War authorized us to go ahead and we had no sooner organized than similar trouble arose at Pittsburgh, primarily because the street car company was giving unsatisfactory service to the factory workers. This was another power shortage, poor service being given to the factory workers, thus retarding the war program. We handled this quite successfully, as at Niagara Falls, by the establishment of a priority schedule and the elimination of non-essential industries.

With this outline you can see that we came to an early realization of the nature of the problem - partly because I had been thinking of the matter beforehand - and that without any intimate grasp of the details of the situation I assisted, first, by finding the facts and, second, by getting experts from the industry to help us in applying the only possible solutions.

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The situation which confronted us required that some person in authority give us a priority schedule; based upon such a schedule we allotted power to consumers in accordance with war time needs. After all, the best that can be done in any particular case is a compromise; because the power situation does not stand by itself. One of our greatest obstacles was the law which gave the Secretary of the Navy and others the right to commandeer. I mention the Navy particularly because their commandeering led to a very exasperating situation - when they commandeered more than they actually needed.

It seems to me that this is one of the points that ought to be emphasized for our future guidance. There should be only one agency for the commandeering of anything - that is the only way in which we will ever get coordination. We did not have that in the late war, speaking only of power.

Another lesson from the experience of the Power Section was, I think, that we should avoid placing too much authority in the hands of subordinates. War is so serious a disturbance of national life that authority should be concentrated and the man to whom the power is given should exercise it. It was only when our Power Section had complete authority that we were really efficient.

The experience of the World War indicates that in any future major war there will be a power shortage. War calls for production at an increased rate, and the greatest increase is likely to be in those industries which require a large amount of power in proportion to the value of volume of their output. I do not see how we can arrive at any complete solution of the difficulty beforehand, for there are too many unknown factors in the problem. Shortages were experienced in regions where it was thought a surplus existed. What happened in the last war will probably happen in the next war. We can, however, apply one lesson of the World War - the great value of interconnection not only of power plants but of power systems. Interconnection places at the service of the community as a whole a surprisingly great addition to the power otherwise commercially useful.

There need be no increase of installed capacity in a given locality, but by interconnection and by transfer of power one is able to take advantage of diversity of use, and of a temporary slacking in one locality and a speeding up in another. Advantage may also be taken of reserve capacity, ordinarily not used at all, for with proper interconnections the amount of reserve required can be largely decreased. This is realized by the industry itself and interconnections are being made not only because of the savings affected, but because of the value of dependable power to the industries.

Before we had interconnections, there were times when an entire system would be put out of service and all the customers would

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suffer. Today we are so largely interconnected everywhere that as a rule there is no single community entirely dependent upon a single source. This is another great benefit of interconnection.

These interconnected plants are now called "super-power" systems. The term "super-power" plant was used during the war to describe modern large steam plants with units of 25 to 30,000 KW, frequently near coal mines. To some extent the name is unfortunate since it has diverted attention from the desirability of interconnection from a national as well as from a commercial standpoint, for a great many newspapers and individuals have assumed that "super-power" systems represent an attempt to establish monopolies or trusts and they have therefore antagonized them.

It takes time to accomplish results. I hope that I have helped you to realize that among the other important problems which confront you is the fundamental one of where and how to get the energy necessary for war purposes. You have more time for deliberate thought along this line that I had. We paved the way in this and other war problems and we look to you with confidence for worth while results.

I will sum up my conclusions with reference to the power situation. Possibly you may think that I am getting the cart before the horse. Before you can do much in connection with the control of power resources for war purposes, you must have an idea of the war industrial program, which must be as definite as possible; a program setting forth in units of measure, weight, etc., if possible, the quantity of articles needed for the next war; the designation, in general terms, of localities for production with a definite idea of the rate of production. The next step must be the preparation of a tentative schedule indicating the relative order of importance of these articles. You should then be able to find whether the power resources will be sufficient to carry out the industrial program in accordance with requirements laid down, and, if not, you will have time to make the necessary adjustments.

It has given me pleasure to stand before you and to tell you the little I know about one important problem. I think that we have been able to make your way a little easier. I know that studies have been made by you along the general lines indicated above and you now have more facts available for your guidance than we had in the last war. Furthermore, the big men of industry itself are now thoroughly aware of the nature of war problem and are cooperating in obtaining the fundamental data for coordination of resources in case of a future emergency. This is of great value because the next control ^{that} may be set up should consist more largely of men who are actually engaged in the industry. We did not know enough about the job before,

and did not in all cases utilize such industrial talent as might have been available. In any future central organization we should make the greatest use not only of the industry, but of the best men in the industry.