

426

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ORGANIZATION AND FUNCTIONS OF THE ARMY AND NAVY MUNITIONS BOARD

by

Commandor Paul Hendren, U.S N.

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AIC 149 (2/19/36) 10

427

ORGANIZATION AND FUNCTIONS OF THE ARMY AND NAVY MUNITIONS BOARD

I believe you all know that the Industrial Mobilization Plan is in the process of quite extensive revision. The tentative draft of the revision has been approved by the Executive Committee of the Army and Navy Munitions Board, and such changes as are made in the present draft before it appears in final printed form will probably be relatively unimportant. Therefore, in this talk the tentative draft of the revision of the Industrial Mobilization Plan will be considered as the final approved draft.

The Army and Navy Munitions Board is the established agency for dealing with procurement problems requiring coordination of Army and Navy interests. It came into being in June 1922, following a recommendation of the Joint Board to the Secretaries of War and the Navy that there be created a board to be known as "The Army and Navy Munitions Board" to be composed of The Assistant Secretary of War and The Assistant Secretary of the Navy, with such assistants, committees or subordinate agencies as in the opinion of the Board may be necessary and advisable. The Joint Board further recommended that the Army and Navy Munitions Board have the duty of coordinating the planning for acquiring munitions and supplies required for the Army and the Navy for war purposes, or to meet the needs of any joint plans, and with evolving a legislative plan which would allow the procurement program to be put into effect. These recommendations were approved by both Secretaries and the organization of the Army and Navy Munitions Board was created. This action of the Joint Board was initiated by a memorandum of The Assistant Secretary of War, dated February 15, 1922.

But even before this we find other studies pertaining to the coordination of joint requirements. In June 1919, the War Plans Division of the General Staff initiated a general study on the subject. In the meantime the National Defense Act was passed in 1920 which charged The Assistant Secretary of War with the statutory obligations pertaining to Industrial Mobilization.

The Army and Navy Munitions Board has passed through different phases of organization. As first organized it consisted of various committees to assist the Board proper. Its present organization consists of The Assistant Secretary of War and The Assistant Secretary of the Navy, assisted by the Executive Committee composed of the Executive to The Assistant Secretary of War, The Director, Planning Branch, Office of The Assistant Secretary of War, one officer from the G-4 Section of the Army General Staff, the Director, Fleet Maintenance Division, Office of the Chief of Naval Operations, Chief of Section, Procurement Planning, Fleet Maintenance Division, Office of the Chief of Naval Operations and the Chief of Purchase Section of the Bureau of Supplies and Accounts, Navy Department, and by various divisions and committees each of which is composed of one representative each from the Army and the Navy. The Army member from the

1

General Staff and the Navy member from the Bureau of Supplies and Accounts were added as a result of a decision made by the Executive Committee in August 1935

The Army and Navy Munitions Board is authorized and directed (as published in Joint Action of the Army and Navy) to -

- "a. Formulate and keep up to date such pertinent plans and policies as in the opinion of the two departments should be adopted by the Federal Government for coordinating and controlling national industrial effort in an emergency.
- "b. Assure the necessary coordination in the procurement war plans of the two services, and in all plans, studies, and appendices thereto intended to facilitate the Government's efforts in an emergency to promote orderly mobilization of industry
- "c. Form and direct the activities of such joint committees as may be necessary to consider, investigate, and make recommendations concerning pertinent subjects falling within the purview of the Board's responsibilities.
- "d. During the period between the declaration of a war emergency and the organization of a War Resources Administration, to coordinate industrial activities incident to the requirements programs of the Army and Navy, and in general coordinate the procurement program so that the War Resources Administration can take over its functions under circumstances favorable to future control.
- "e. After the full development of the War Resources Administration as a national industrial superagency, the Army and Navy Munitions Board will continue as an industrial policy coordinating agency for the Army and Navy.

Approval of action taken by the Munitions Board is not required, except that any plans prepared by it that affect joint war plans and joint Army and Navy policy relative to the national defense are required to be referred to the Joint Board for consideration before submission to the Secretaries of War and Navy "

426

The Executive Committee is charged with -

- "a. Coordinating the work of the divisions of the board.
- "b. Developing and recommending policies pertaining to procurement, in time of war, of supplies in which the Army and the Navy have joint interest.
- "c. Submitting annually on May 1, a schedule of proposed subjects for future consideration and study.
- "d. Preparing and submitting on May 1 of each year an annual progress report of joint procurement planning.
- "e. Causing a joint study to be made annually of the several parts of the National Industrial Mobilization Plan, and submitting as of May 1, each year, a report on the status of the "Industrial Mobilization Plan", together with any recommended changes.
- "f. Studying methods in use in the War and Navy Departments for determining data on which procurement plans are based and making recommendations leading to the simplification and coordination of methods in order to reduce the time required for the presentation of total material requirements under any specific plan of operations.
- "g. Adjusting conflicting requirements arising in plans for war procurement. Any deficiencies which may develop in a war procurement plan supporting a joint plan of operations which may affect the execution of the joint plan are referred to the Joint Board for a military priority decision.
- "h. Recommending the personnel to be assigned from the Army and Navy Munitions Board and other qualified officers of the Army and the Navy to the office of the administrator of resources, as provided for in the Industrial Mobilization Plan in case of the establishment of such superagency.
- "i. Considering such other matters as may be referred to it by proper authority "

"A secretary for the executive committee is selected by the Army and Navy Munitions Board from the permanent personnel of either service with the approval of the appropriate department. The Secretary is charged with the following functions

"a. Keeping records and minutes of the executive committee.

"b. Performing such other duties as may be assigned "

The Navy is now furnishing an officer for part time duty in the office of the Secretary of the Army and Navy Munitions Board.

The divisions of the Army and Navy Munitions Board closely parallel the divisions of the War Organization of the Office of The Assistant Secretary of War and the proposed organization of the Administrator of War Resources

"Guiding principles -

"1. It is a continuing duty of the Army and Navy Munitions Board to further war procurement planning in those phases wherein a joint Army and Navy interest arises.

"2. The procuring agencies of the War and Navy Departments are charged with full responsibility for the timely procurement of the supplies assigned to them for procurement. The Army and Navy Munitions Board, in coordinating plans, will continually recognize the responsibility of the procuring agencies and in formulating plans will leave to the established procuring agencies the greater freedom of action and initiative consistent with the necessary interdepartmental coordination in time of War

"3 Shortages and delays in the procurement of supplies in time of war will be minimized by peace-time studies of Army and Navy requirements and the resources and facilities available to the Nation in war and by the preparation of plans to adjust discrepancies between Army and Navy requirements and national resources.

"4 It is vital that material requirements be determined with rapidity in order that allocations and priorities may be made to meet changes in the military or naval situation.

"5 Procurement plans must be currently revised to conform to approved plans of military operations

"6 It is essential for the successful launching of a war procurement program that the War and Navy Departments keep available for procurement work at the outbreak of war qualified personnel conversant with the problems involved.

4/27

"7 The personnel required to cope with problems involved in procurement planning and war procurement must receive a high degree of training.

"8 In the coordination of procurement plans of the Army and the Navy, due consideration must be given to the essential needs of the civil population "

When a procurement problem arises in either service it is referred to the Army and Navy Munitions Board. The Secretary forwards it to the Senior member of the Executive Committee of the other service for comment and recommendation. The Executive Committee then considers the problem endorsed by the views of both services, or, if necessary, it may be referred to the proper division of the Board for study and recommendation before final action is passed by the Executive Committee. Action having been taken by the Executive Committee and approved by the two Assistant Secretaries, it becomes an approved joint procurement plan, policy or allocation, as the case may be, and stands as a policy for future problems of a similar nature.

The Army and Navy Munitions Board has experienced periods of activity and inactivity. In 1924, and continuing later, a complete impasse resulted on the fundamental issue between the Army and the Navy on the question of requirements. The Army was working on the basis of a War Department General Mobilization Plan. The Navy was working on a color plan. It was difficult to adjust these differences.

As a result of this situation, the Army and Navy Munitions Board reported to the Joint Board the existence of difficulties relating to the fuller development of joint material procurement plans.

On September 14, 1933, the Joint Board outlined in a letter to the Army and Navy Munitions Board certain clarifications of existing directives, (MacArthur letter) under which the Planning Branches of the Army and Navy are now working in complete cooperation.

Among the results that have been accomplished by the Army and Navy Munitions Board, the following deserve particular mention

1. A working cooperation with the Navy has become an accomplished fact.

2 The study of "Strategic Raw Materials" sent to the President and placed before the Cabinet

3 A decision obtained from the Joint Board on priority, from which progress can be made in the allocation of facilities or outputs in cases where combined requirements cannot be met.

4. A recent revision of the Industrial Mobilization Plan provides for interdepartmental supervision of war procurement problems through the agency of the Army and Navy Munitions Board until such time as the super-agency is set up and is ready to operate. This revision provides for the augmentation of the personnel of the Munitions Board by the addition of several regular, reserve and retired officers from the Army and the Navy.

In the future it can be foreseen that one of the major functions of the Army and Navy Munitions Board will be coordinating the allocation of facilities and materials.

In this connection one of the major difficulties in the solution of procurement planning problems is the size of the combined requirements of the Army and Navy based on the four Army mobilization plan and the Navy color plan. If it becomes feasible to compute Army requirements on color plans many of the problems in regard to procurement will disappear due to the consequent scaling down of combined requirements. At present, however, a directive issued by the Joint Board requires that procurement plans be based on maximum mobilization demands.

However, there is much yet to be done. The Industrial Mobilization Plan gives an outline of the duties of the various divisions of the War Resources Administration and from whence they can expect to get a helpful start, it specifically states

"Commodity annexes which are detailed plans for the procurement and control of strategic and critical materials are prepared and currently revised by the Army and Navy Munitions Board and are on file in the records of that Board

"Copies of all data on facilities in the allocation Sections of the Army and Navy Departments should constitute a nucleus of information for the Facilities Division

"The Power Annex is the detailed plan for the control of power and its use, and is prepared and currently revised by the Army and Navy Munitions Board. It is on file with the records of that Board

4/20

"The preparatory measures set forth on the mobilization of transportation will be accomplished by the appropriate personnel of the Army and Navy Munitions Board functioning in the manner prescribed for peace time

"The Labor Division of the Army and Navy Munitions Board will, in the event of an emergency and until the Administrator of War Resources is appointed, carry out the functions of mobilization of labor, and upon the creation of the Administration of War Resources, officers from the Army and Navy Munitions Board, with the pertinent records and data, will be made available to the administrator in organizing the Labor Division of the War Resources Administration "

The divisions of the Army and Navy Munitions Board whose definite responsibilities have just been outlined are composed of a Navy representative and an Army representative. The Army representative is the chief of the corresponding division in the Planning Branch, Office of The Assistant Secretary of War. The vital question is what data and plans could be turned over to this superagency, if called for, if M-day is next week or next month? 'Would you have an actual plan? Would the plan work? How much would it help the superagency? I think it would be advisable for us to think this over, because, after all, that will be the final test and the measure of value of all these years of planning since the passage of the National Defense Act.

The Board has on its schedule of proposed subjects for future consideration and study the following

"The continued development of joint requirements and joint procurement plans for items of equipment and supply, and for the strategic and critical materials entering into the construction of these items.

"Proceed with the development of a Unit Plan for the Army and Navy Munitions Board showing the detailed steps to be taken on M-day

"An analysis and evaluation of the progress in the various elements of procurement planning and the expedition of the allocation of facilities to the Army and Navy.

"Develop specific agreements for interdepartmental procurement plans to include procurement of propellants and explosives.

"Make the annual joint study of the Industrial Mobilization Plan "

I quote here a paragraph from the Industrial Mobilization Plan -

"The Army and Navy Munitions Board, although not exercising any control over civilian industry, coordinates the efforts of the Army and the Navy and, until the War Resources Administration is created and ready to function, clears requirements for the fighting forces, allocates facilities, assigns priority of production and delivery to meet the military situation, and in general coordinates the procurement program so that the War Resources Administration can take over its functions under circumstances favorable to future control."

Just what will be those circumstances favorable to future control by the War Resources Administration? It will be a reasonably accurate knowledge of requirements, facilities, materials, power, labor and transportation for not only the Army and the Navy, but civilian needs, balanced against existing sources of supply, together with plans of procedure, in order that the War Resources Administration can start its operations with a tangible foothold.

It should be well understood that the Army and Navy Munitions Board is not subordinate to the Joint Board, but parallels it. The Joint Board is concerned with the study and development of policies, projects and plans pertaining to national defense, in other words joint war plans, whereas the Army and Navy Munitions Board is concerned with the study and development of policies, projects and plans pertaining to industrial mobilization to meet the needs of those joint plans. Approval of action taken by the Army and Navy Munitions Board is not required, except that any plans prepared by it that affect joint war plans and joint Army and Navy policies relative to national defense are referred to the Joint Board for consideration before submission to the Secretaries of War and the Navy. Thus you can see that the joint agencies of the Army and the Navy are clearly defined, the Joint Board on the command side and the Army and Navy Munitions Board on the industrial and procurement planning side.

Let all remember the functions of an advanced guard in a meeting engagement - to take over, develop, and hold the situation in hand in the early phase of the crisis until the main body can take it over. It is then absorbed into the main body and becomes a part of it. Just so will the personnel of the Army and Navy Munitions Board augmented by other officers from the Army and the Navy step in on M-day following the President's proclamation, and take charge in the early moments of the emergency, assist in the development of the War Resources Administration which will hold the situation intact until the other superagencies are in position to carry on.

4/31

Since the War Resources Administration, during the transition phase, will probably be the only superagency organized it should make the effort to cover all problems which would normally be handled under full superagency operation.

In other words, during the transition phase use the War Resources Administration as far as possible as a complete superagency and later on, as the full superagency organization under the Industrial Mobilization Plan is developed, take away from the War Resources Administration those functions which properly belong in the other administrations as provided for in the Industrial Mobilization Plan.

(Charts explained).

See chart in Post no 11  
1936-1937 (Allocation)

Since all planning requires one to project oneself into the future and utilize a fertile imagination, let us take for example the actions taken, if we suddenly found that W-day had arrived. The steps in sequence would be somewhat as follows

- 1st The President would be asked to issue a proclamation creating the War Resources Administration under authority of Section 120, National Defense Act
- 2nd The newly appointed Administrator of War Resources would be given a copy of the Industrial Mobilization Plan and the Operation Plan pertaining to it, together with its joint annexes prepared by the Army and Navy Munitions Board on Commodities, Facilities, Transportation, etc. He will be advised that these two plans represent the best thought and years of planning by the Army and the Navy on Industrial Mobilization, and that the organization can be set up immediately.
- 3rd The Army and Navy Munitions Board would turn to its Unit Plan. It describes the steps to be taken on W-day to bridge the transition phase and to form the working machinery of the superagency. It prescribes the number of officers from the Army and the Navy that go over to the superagency, where they come from and to which divisions of the superagency they go, and what they do when they get there.

When the War Resources Administration is organized on M-day and starts its operations, the Army and Navy Munitions Board will continue to function as an industrial policy coordinating agency for the Army and Navy.

In conclusion let me state that it is my belief that there exists among the personnel of the Army and Navy Munitions Board an entire unity of purpose regarding the aims and functions of that agency and a thorough coordination of effort in working toward a satisfactory solution of mutual procurement planning problems. Every effort is being made by that body to establish policies, foresee difficulties in war time procurement and perfect, during peace time, plans for solving or minimizing such difficulties.

I think that you will agree that if the Industrial Mobilization Plan and its Operation Plan are complete in detail and sound in principle, they will greatly assist the Administrator of War Resources in taking over his functions under circumstances favorable to future control and the peace time mission of the Army and Navy Munitions Board will have been accomplished.

DISCUSSION FOLLOWING LECTURE BY COMMANDER HENDREN, USN

"ARMY AND NAVY MUNITIONS BOARD"

February 19, 1936

Q - ,I would like to ask a question about allocations. You said you expected in the future the A & N Munitions Board would have much more to do with allocations. Does that envisage making all allocations in the future? Have they made allocations to the Navy previously? Will they make them to the Army, as well as joint allocations?

A - No, you are undoubtedly familiar with the directory of allocated facilities which listed a great number of firms, most of which were allocated to the Army and a very few to the Navy. The Executive Committee sometime during the past year decided that that directory would become a pool for both the Army and Navy, in other words, that if the Navy computed its requirements for some particular item and wanted to get a part of the productive capacity of a facility already assigned to the Army, then when that request came in to the Army and Navy Munitions Board that facility might become reserve for the use of both the Army and Navy. If the facility was not totally loaded down with allocations to the Army and if there was enough productive capacity remaining to give the Navy what they wanted, the A & N Munitions Board would act on the request and grant the allocation requested by the Navy. The technical phraseology was "capacity credit" - credit for a certain capacity of item. The same thing applied to the Navy. It is visualized that a great many of these facilities will eventually end up in that reserve status and both the Army and Navy will have an interest in these facilities. Such

435

allocations are approved by the Army and Navy Munitions Board. In cases where the Navy requests the allocation of a facility in which the Army has any interest the Navy is granted that allocation - whatever they request from that firm. The same thing applies to the Army. It is only when a conflict arises that the A & N Munitions Board comes into the picture for joint allocation. The records are kept in the A & N Munitions Board but it is not necessary for the Army and Navy to step in and adjust any differences. The Navy has a great many firms which make purely naval material. We hope in the future to make our own surveys of a good many of those firms and request the A & N Munitions Board for those to be allocated to us. They are practically all firms in which the Army has no interest. The same thing applies to many firms allocated to the Army. Does that clear up the situation?

Q - Along the same line, doesn't the new plan state that the A & N Munitions Board will allocate in all cases? Don't they allow the Army to take what it wants when there is no conflict?

A - No, the function of the A & N Munitions Board in allocation is really to handle the bottle neck. Where a conflict arises and it appears that both the Army and Navy are interested, then it becomes a question for the A & N Munitions Board. If there is a productive capacity in industry in excess of four production to one of capacity, the present policy of the A & N Munitions Board is that it is not necessary to allocate. The decision has been made not to allocate raw materials in most cases. We are trying to clear up the bottle necks - things like explosives, propellants, machine tools, shoes and blankets, - things of that sort where there is bound to be conflict for the reason that we both get into the

434

field.

Q - The wording says that the A & N Munitions Board will allocate. I understood it to mean in all cases.

A - Perhaps I can clear that up by reading some of the paragraphs of this directive for allocations. "Every effort will be made to reach a just and equitable decision which will be satisfactory to both Services. Such factors as requirements, capacity, and priority within each service must be considered. Allocations will be made under the following conditions

- a - Where the ratio between the estimated productive capacity and estimated combined Army and Navy requirements is four or less.
- b - Where a strategic material is involved to any considerable extent.
- c - In special cases not covered above where allocations are considered desirable on account of some special problem. (Reasons to be stated.)"

These are the highlights covering the cases in which the allocations are to be made. If the Army or Navy requests allocation of facilities for the production of a certain item and they consider that they want to earmark those facilities for their own use, then in the case of the Army they submit a request to Colonel Skelton's office and he keeps a record of it as an Army allocation, notifies the interested arm or service, and that constitutes allocation to the Arm of that facility. It is simply a traffic signal for the other arms and services and for the Navy that that facility is earmarked for Army use. Where conflict arises and both are interested in the facility, then the requirements are brought to the A & N Munitions Board and a sub-committee for allocation is appointed and they match requirements and after

4135

discussion of the circumstances try to reach an equitable decision in the division of facilities.

Q - Along the same line and injecting the matter of priorities also, as I understand it, in your talk you stated three policies first, regarding that paragraph you read from the Me \_ \_ letter in which it is stated that the Functions Board has adopted recommendations, the statement was made that in considering allocations and priorities the Orange situation will govern, that is, a Navy maximum effort but an Army <sup>not up to the maximum</sup> effort/required by the General Mobilization Plan, second, that the directive from the Joint Board states that the requirements of the Army will be based on the General Mobilization Plan, and third, the question of supplying the fleet in being. Will you straighten me out on just how these three policies work in a case where the joint requirements exceed the potential capacity?

A - The idea of the Joint Board in that was that in a good many cases the requirements could be met for both services based on the Army General Mobilization Plan and the Navy color plan, and in a good many cases they can be met. The Joint Board suggested in cases where they could not be met that the Army recompute their requirements based on the color plan, and then if they could not be met that the Navy be given priority for the fleet in being. That was the suggestion from the Joint Board. As I think I said at the time, that has not worked out so very well because the Army has not found it possible to recompute on a color plan in cases where conflict arises. Perhaps the color plan is not ready, perhaps the requirements are still being worked on the General Mobilization Plan, but at any rate, there has been very little computation of <sup>Army</sup> requirements based on a color plan.

436

Therefore, the A & N Munitions Board decided that, taking the Army requirements on the Four Army plan and the Navy requirements on the color plan, where they could not be met the Navy should be given priority for the fleet in being. In other words, the A & N Munitions Board policy is broader than that suggested by the Joint Board.

Q - Then the Navy will be given facilities to meet their total requirements for the fleet in being and the Army will get just so much of their requirements as are left?

A - It is all subject to the circumstances of the case. We are trying to work out the allocation of shoe facilities now and I think that will serve as a good example. The Army surveys the shoe productive capacity so that enough shoes of suitable types will be forthcoming to meet requirements but the A & N Munitions Board hit upon a figure of 85% for the Army and 14% for the Navy in dividing up these facilities. There were about 117 facilities. In the preliminary attempt to allocate these companies it developed that the productive capacity assigned to the Navy left the Navy short about 400,000 pairs of shoes so the Army conceded to the Navy a 25% interest in the four largest shoe producing companies for the first three months. That met our initial requirements and after that the Navy's requirement for shoes dropped down to such an extent that we reverted to 14% interest in those companies and in the other companies which were totally allocated to us. The shoe question has not been entirely settled but I think it will be on that general basis so ~~that in the next~~ that in cases where there are not other circumstances that are more im-

157

portent, the policy of the A & N Munitions Board is to allocate to the Navy enough facilities to meet their initial requirements for the fleet in being and leave the Army with a deficit until the requirements of the fleet in being are met.

Q - Relative to the creation of the merchant fleet for emergency purposes, the Navy as I understand it has no legal obligation regarding the creation of a merchant fleet but as a matter of hard common sense we are very much interested in a merchant fleet. There are nebulous plans to obtain such a fleet by first taking the existing American merchant fleet and foreign ones that may be in our hands at the outbreak of war; also to build new ships as soon as we can. Apparently new construction is based on the assumption that it will be fabricated construction - parts built all over the country and assembled at assembly plants on the coast. Steel for 200 such ships is included in the steel plan but practically all the shipbuilding facilities are allocated to the Navy for combatant ships and there are no allocations made for fabricating merchant ships; neither are there any existing facilities for assembling them. Neither is there any provision made in the steel plan to creating such facilities. The question is, is the Navy looking out for the interests of the merchant fleet for emergency purposes?

A - You have injected several technical aspects of that question which I am not prepared to answer. The Bureau of Construction and Repair has an extensive conversion program. The Navy has been allocated by the A & N Munitions Board practically the entire shipbuilding industry of the country. As to the fabrication of steel, whether or not the steel for constructing and

1/32

rehabilitating these shipbuilding plants is included I do not remember.

I think that next week when you go over to the Navy Department and go to the Bureau of Construction and Repair, Commander Vickery will be able to clear up all of these questions. They have in their possession current surveys of the shipbuilding facilities both for combatant ships and merchant vessels but I can't enlighten you very much on it.

Q - In general, does the Navy or anybody else look out for the interests of the merchant fleet, which will be the emergency fleet, in the Munitions Board?

A - The Navy has allocated to it all the shipbuilding facilities which ~~it~~ it asked for. All existing ones are allocated to the Navy, that was done in August 1929. There was quite an extensive list of shipbuilding facilities submitted to the Board at the time and they were allocated outright to the Navy.

Q - Is there a provision in the Mobilization Plan or has the Munitions Board under consideration any item where the total requirement will be procured by one service for both? Take fuel oil or gasoline as an illustration. Will those items be procured through the Procurement Division of the Treasury Department or will it come into the picture at all?

A - The question of procuring by one service items for both services has not been definitely settled; the question of Chemical Warfare materials is the only exception to that. Some time in 1934 the A & N Munitions Board decided that the Army Chemical Warfare Service would procure all chemical warfare materials for the Navy. That proposition was submitted to the Joint Board, was approved and became an established policy of the A & N

Munitions Board. There is in existence an agreement whereby the Army is to obtain for the Navy small arms and machine guns, small arm ammunition, and certain other items, certain things for the Marine Corps, light trucks. That was an agreement between the Army Quartermaster General and the Major General Commandant of the Marine Corps. An allocation was made for light trucks for the Marine Corps which will be obtained by the Army and turned over to the Marine Corps. At the last meeting of the Army and Navy Munitions Board the question was taken up of establishing a definite policy on that subject of just what the Army was to obtain for the Navy and the Navy was to obtain for the Army. It has not been definitely settled at this time but it is a live issue in the A & N Munitions Board and I think very soon a decision will be reached as to joint procurement in certain items. As to whether <sup>or not</sup> the Treasury Department will come into the picture I do not know. Is it not the present policy that the Navy buys fuel oil for the Army?

Captain Wilterdink To some extent. In the Philippines they get all their fuel oil from the Navy

Q - On the question of allocations, when I read over the new plan it seemed to me that a very vital question had been settled by this paragraph on allocations, considering that the Army had gone out and practically demanded every factory they wanted without considering the Navy at the beginning, and now I find that the Navy comes in and their requirements overlap facilities. This states that after requirements for the Army and Navy had been computed request is made on the A & N Munitions Board for allocation of suitable plants for production of their respective requirements. It seems to me now that all requests for allocation should go to the A & N Munitions

440

Board but in questions where there may be conflict these joint committees are appointed.

A - In straight allocations the Army presents its request to the A & N Munitions Board through Colonel Skelton's office. In the question of the Navy, they go direct to the A & N Munitions Board. In either case if the facility is not overlapped the request is granted.

Q - Then all requests should go to the A & N Munitions Board?

A - Yes. The great advantage of that is visualizing the superagency. When the superagency is in process of taking over control, every bit of information that can be furnished to that agency as to surveys, or capacity, who has an interest in the company, what items they make and in what amounts - I think all that information will be extremely useful to the superagency and the natural inertia that has to be overcome in war-time will be tremendous. Colonel Skelton's office particularly has a lot of valuable information and I think it will certainly enable the superagency to start off with its feet on the ground when all this information is turned over to it. Personally I think that people who have been working on that question of allocations very much are inclined to consider them in too permanent a status. Conditions change and all these allocations made either to the Army or the Navy are subject to change upon request and upon changing conditions. If you give the superagency this information - the Army surveys as to productive capacity and what has been allocated to the Army and what to the Navy - and the purchasing agent goes out and finds a set of circumstances entirely different from those visualized when the allocation was made, the A & N Munitions Board can immediately change the picture. It can direct the flow of productive

1121

capacity to the agency which needs it most. The agency will have information on which it can act in making a priority decision, and if it should develop that we have computed requirements and made allocations based on the Four Army plan and the Navy color plan and can get along with a lesser effort, the agency can change the order of priority for any item that comes up. The question of allocation is not static by any means, it is subject to change ~~with~~ in accordance with changing conditions.

Q - In case of failure to agree on allocations or capacity credits, to whom is the matter referred?

A - The A & N Munitions Board, Executive Committee.

Q - Still if they did not agree?

A - They are not supposed to disagree. They are there to work out solutions.

Q - Coming back to the proposition of giving priority to the Navy for the fleet in being, it occurs to me that the A & N Munitions Board in adopting that policy is recognizing the fact that the Navy is presenting a real concrete proposition whereas the Army's presentation is a nebulous thing and not concrete. I can't visualize any situation where in an actual emergency the Navy would be allowed to get material it did not need while the Army did need it. There would be delay and confusion. Do you believe that if the Army should compute requirements on a color plan that the situation would be more realistic and that time and confusion might be saved upon the declaration of an actual emergency?

A - I think it would be more real and concrete and the problems

4/12

much easier to solve, but I would not envy The ASW if he had computed on a color plan and had to mobilize on a Four Army plan. I think that is the gist of that situation.

As to the policy of the Joint Board, I don't know but I believe its decision was based upon the basic war plan - the Joint Plan.

Q - We have heard here recently from an officer on the General Staff that it was planned to mobilize on the General Mobilization Plan - that it would furnish an emergency pool of men. Another officer stated mobilization would ~~not~~ be on a color plan.

A - There is a lot of decided personal opinion on the possibility of mobilizing on the Four Army plan or a lesser plan, and I don't know; I haven't given the subject enough study to venture any worthwhile opinion but the present directive under which the A & N Munitions Board is operating visualizes mobilization on the Four Army Plan, and the Army, I believe, is computing all its requirements on that basis. I did hear the first officer, Colonel Kreuger, talk, but I did not hear the General Staff officer who said he thought it would be better to mobilize on a lesser plan, but whatever might come out of that in the future, the present situation is that the Army's computation of requirements is based on the Four Army plan and the Navy's on a color plan, - the color plan that is the maximum effort for the Navy.

Q - It seems to me there are three questions holding up progress of the A & N Munitions Board. The first is requirements - all Navy requirements are not in but the Army requirements have been computed; the second is that this directive of the Joint Board, which is a command decision

113

has not been carried out. The third is whether the A & N Munitions Board has authority to enforce decisions.

A - It has the same authority for its existence that the Joint Board has.

Q - If the A & N Munitions Board makes allocation for shoes to the Bureau of Supplies and Accounts, do they have to accept that?

A - A member of the Bureau of Supplies & Accounts is on the committee working on the allocation of shoes, and we run into certain conflicts with that Bureau. After all the Bureau of Supplies & Accounts is the responsible procuring agent and they feel they have to iron out certain discrepancies that appeared in that allocation. They are making an investigation of the shoe situation and that can soon go to the Executive Committee of the A & N Munitions Board for decision. We think it will be solved. There must be an effort on the part of members of the Allocations Committee to give and take on the proposition and I think it is better to have the thing settled and definite allocations made in any case even if they are not correct than to let the decision go until M day. In other words, let it go subject to change rather than put off the decision. As to the other question - the computation of Navy requirements, I think that is going along in fairly satisfactory shape. It has not proceeded as rapidly as it should but we are getting our requirements consolidated as rapidly as we can and for the first time in the history of our procurement planning we are setting up a procurement outfit which we hope will give us the information we want on purely naval items. The various bureaus of the Navy Department have submitted to the procurement planning office in the

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Navy Department their requirements on their first priority items for each bureau. We are waiting until we get some information from our inspection service on a good many of those because they are items of purely naval material and the facilities for it have been surveyed by the Army. I don't think we can say that the progress made along that line is thoroughly satisfactory and I think it would be very unfortunate if we had M day next month or in the next six months. I hope it will not come for considerable time.

Colonel Harris With reference to the authority of the A & N Munitions Board, it must be borne in mind that the <sup>I.M.P.</sup> ~~plan~~ was approved by the two secretaries and that is the authority of the A & N Munitions Board to coordinate procurement. Until that support is withdrawn the A & N Munitions Board has authority to coordinate procurement. Another point - the capacity of American industry in peace is large; it is only in the early stages of an emergency that there will be acute shortages in the commercial items. The purpose of this planning is to adjudicate the placing of these orders and utilize this tremendous industry we have. With reference to the fleet in being, that principle has been adopted but it does not mean we blindly accept this. Every one of these things will come up for adjudication and will be settled on its merits.

With reference to approval of allocations, the A & N Munitions Bd does approve all programs and finally there will be a large reservoir of <sup>production credited</sup> ~~productive credit~~ to the Army and <sup>a similar</sup> ~~a small~~ reservoir for the Navy, and a small <sup>one</sup> one in which they both share. That will have the support of the A & N Munitions Board.

445

Q - There are just one or two things that occurred to me. The progress made in planning work is, I think, to be judged by the goal rather than the completeness of a plan. Two or three years ago on this platform I had the pleasure of presenting, with a committee, the subject of the Army and Navy Munitions Board. It was probably the first presentation after the reorganization so the committee was rather "on the spot". Since that time I have seen many goals passed and there are certain goals being passed every day and every week on which we can look back and be satisfied that we have accomplished something. Two or three years ago a Department of National Defense was being talked about and many thought that was the solution. Due to the composition of this Board I think we are drawing away from that rapidly. There is an old saying that a good compromise is better than a lost law suit, and that brings up the point of who is going to be the reviewing authority and who will decide. If the Army and Navy Munitions Board can't decide then a superagency is going to give a decision probably to the benefit of one and the disappointment of the other. I can't conceive there is no solution to Army and Navy needs, therefore Army and Navy men trading across the table can, if they will make a solution and put it away, keep us from a lot of friction in war.

Q - There is one point Commander Hendren might clear up. Navy requirements are figured originally on the Army plan but then they figure on the fleet in being. What is the relation roughly of requirements for the Orange plan and the fleet in being? Would that be less?

446

A - The fleet in being is called into being as a result of the Orange plan. The fleet in being supports the Orange plan. There is no difference.

Commander Buck: There will be a difference in certain requirements; the color plan has no construction program in it. There would be some drop in requirements from the total of Orange requirements but you could not figure on percentage; you would have to figure on each item.

A - I don't think that would effect our initial requirements very much. The construction program takes considerable time and we hope that by the time new construction comes into the picture we would be geared up to a point where all requirements could be met by industry that existed on M day.

Commander Buck: There are numerous orders to be placed for lots of things like construction gears, heavy machinery, etc. that take as long to produce as it does to build ships.

I have one comment to make on Commander Scott's question. I think it is well for the class to give some thought to those requirements of the emergency fleet. Our normal planning procedure is that estimates of requirements are prepared by assigned agencies for everything for which the War and Navy Departments are responsible. Then we leave 50% to take care of civilian requirements. The war situation may be such that we need a large emergency fleet to take care of trade and estimates for requirements are not met by any assigned agency

1147

and are not considered in the allocations of the Army and Navy Munitions Board. The assignment of ship-building facilities we have is for conversion of facilities, not for construction of an emergency fleet and I think in that respect the planning programs are perhaps inadequate. There will be large steel requirements incident to the construction of an emergency fleet and no one is estimating those requirements.

44c

THE ARMY INDUSTRIAL COLLEGE  
Washington, D. C.

Course 1935-1936

STRATEGIC AND CRITICAL RAW MATERIALS

by

Major William H. Crom, A.C.  
Planning Branch  
O A.S.W.

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1147

## STRATEGIC AND CRITICAL RAW MATERIALS

I will give some facts about strategic and critical raw materials, discuss the method of war-time control it is planned to use in an emergency, and then be glad to answer any questions that I can.

The United States, with a generous supply of raw materials within its borders, still imports from all over the world other raw materials it needs in its manufacturing operations, and pays for these materials with finished articles. With about seven per cent of the people of the world we do about one-half of the world's work. We can do this because our daily output of power is about thirteen and one-half horse-power hours per capita, as compared with less than one for Brazil and Peru, and less than two for Chile and Argentina. Another factor which enables us to accomplish so much is that about twenty-two per cent of the people of the Nation can raise the food and vegetable fibers to feed and clothe the whole Nation, thus leaving seventy-eight per cent free to take part in commerce or industry, or fight a war, if necessary. This compares with about sixty-five per cent to feed Italy, forty-five per cent for France, about eighty per cent for Russia, or forty per cent for Germany, which must be "on the land", or working in industry and exchanging their products for food and fibers. Due to the horse-power helping an American workman, and to his own training and skill, he is equal to two Frenchmen or three Italian workmen, or nearly two Germans, or three and one-half Russians, as measured by the actual work accomplished.

These conditions cause the United States to use about one-half of the raw materials of the world. This Nation is the most self-contained of all nations, but there are many materials we do not have, and these we must import, if our production, our war effectiveness, and our high standard of living are to continue. In this respect, we are somewhat like the British Isles, except that we have within our boundaries many more of the essentials than they have. Unlike them, we are self-contained in the eight "great essentials", that is, food power, iron and steel, machinery, chemicals, coal, iron ore, and petroleum. No other nation is so fortunately situated.

When you hear that we are going to meet competition in South America, or elsewhere, in our industrial activities, you should remember that certain raw materials are necessary

to establish an industrial area. The first of these is fuel, and we have about one-half the world's supply. The world's work is done by the following agencies: Six per cent by animals, twelve per cent by humans, nine per cent by water power, seventeen per cent by petroleum, and fifty-six per cent by coal. South America has no large coal supply, except some poor coal in Brazil, so must continue to take our manufactured goods in payment for their raw materials.

The next essential is a supply of the useful minerals, with iron and steel first. Our capacity to make steel has increased during the depression, so that it is now given by the Iron and Steel Institute as over 71,000,000 tons. For comparison, the world produced 118,000,000 tons in 1929. Last year, 1935, we produced 33,500,000 tons, which was about 35% of the world's total. We have also the common minerals, such as copper, lead, and zinc, which may have to be controlled in an emergency, but should be sufficient for our needs.

Now let us speak of materials we do not have, or do not have in sufficient quantities. They are divided into two classes by the War Department. Critical raw materials are those we produce in quantities just about equal to our needs, but which will require control and supervision during an emergency, to prevent local shortages, to prevent waste, or to stimulate production. They include such things as alcohol, aluminum, arsenic, cadmium, cotton linters, etc. Strategic raw materials are those for which dependence must be placed on importation from abroad, and of which domestic production can supply only a small part. They are twenty-six in number, and include such materials as ferrograde manganese, tin, chromium, tungsten, and wool.

In addition to these materials, which threaten a shortage in a major emergency, there are many others, of which we have plenty, such as wheat, corn, lime, iron ores, etc., but whose full use is dependent upon such factors as transportation, labor, power, or fuel. They, therefore, require planning, to avoid delays and confusion. Few people realize that the larger part of our iron ores passes through the Soo Locks, which are not under our control.

The United States has the greatest production capacity the world has ever known, and uses raw materials in enormous quantities. During an emergency, it is not expected that there will be any large increase in the total amounts of materials used in prosperous times, but the purpose for which they are used will be different. Instead

450

of supplying our people with the comforts and luxuries of life, and their products being exported to pay for our imports of materials, they will be used for war purposes. We have found that, in general, the amounts used in 1929 can be taken as our total requirements per year in an emergency.

The creation of superagencies during the last War was due in large part to the uncertainty about the supply of raw materials. After their creation these agencies gave a large part of their attention to the control, conservation, importation, and stimulation of the production of raw materials. There was a Raw Materials Section in the Council of National Defense early in the War, and, later in the War Industries Board, a Commodities Division was created, which became the most active of the divisions of that Board. The Commodities Division, with its sixty-odd Commodity Sections, was the point of contact with Industry, as each section had its War Service Committee. These Commodity Sections appear to have dominated the activities of the Board, and to have formed the framework of its structure. Mr. Clarkson's book, "Industrial America in the World War" headed the chapter on them, "The Backbone of the Board, the Commodity Sections". The following quotation is from that book

"Mr. Baruch used to visualize them (the Commodity Sections) as sixty-odd, neatly labeled taps, from which he and the various Boards, Committees, and Divisions that functioned between the sections on the one hand and the governmental departments, the Allies, the public and the industries, on the other hand, could draw all the facts, figures, ideas, and contrivances for any situation. They tapped some three hundred and fifty industrial reservoirs, represented ultimately by the War Service Committees of the Chamber of Commerce of the United States.

"These taps were duplex and reversible. Turned one way, they poured into the Board the controlling information in regard to all American industry that was not controlled by those two independent commodity bodies, the Fuel Administration and the Food Administration. Turned the other way, they promptly transmitted to all industry the behests and requests of the Board."

Another quotation from the same source explains the Commodity Sections

"Imagine a business enterprise composed of sixty partners (these are the Commodity Sections) \*\*\*\*\* each experienced in a particular field but not lacking in knowledge of some other fields \*\*\*\*\*. Now, put them under a loose central control, whose purpose is not to dominate but to coordinate them \*\*\*\*\* and you have the Commodity Sections of the War Industries Board, and, practically, the Board itself."

Among Mr. Baruch's parting words, which are quoted almost as much as is Washington's Farewell address, is the following:

"There could perhaps be no more valuable measure of 'preparedness' than the establishment in peace-time of a bureau of planning and statistics (a fact-finding body), organized into about 60 commodity sections, whose function it would be to maintain current data on the productive capacity of the country.

"In some cases it was next to impossible to get vital facts accurately compiled and to get them in time for greatest usefulness in understanding and solving the problem. It is in this feature of the work that a peace-time bureau functioning continuously, watching with studious care the development and condition of each industry having a war value, could be of extraordinary significance if it should ever be necessary again to direct the industrial forces of the country to the support of a great war."

The Assistant Secretary of War in 1925 set forth the duties of the Commodities Division and of the Committees, as follows:

#### Commodities Division

"It is the mission of the Coordinator of the Commodities Division to coordinate the efforts of the committees and direct their general action in accordance with the policies laid down by the Director of Procurement."

#### Commodity Committees:

"The mission of each of the War Department Commodity Committees is to collect, collate, and evaluate all available data pertinent to the items assigned to them. The Chairman is the advisor to the War Department in all matters affecting his commodities."

451

You will note that the head of the Commodities Division was a "coordinator", which explains his war-time duties.

The peace-time set-up for commodity control is composed of commodity committees of the Army, under the Commodities Division. These committees have a Chairman from the Supply Arm and Service which is the greatest user of the commodity, and its members are drawn from those branches which use the commodity. This chairman is expected to be the advisor to the War Department on his commodity. This Commodities Division is a unit of the Planning Branch of the Office of The Assistant Secretary of War, which carries out the legal mandate of the National Defense Act, to prepare plans for the mobilization of industry.

A similar, but less elaborate organization, within the Navy Department takes care of their requirements and presents their side of the picture. These two Chairmen, one from the Army and one from the Navy, form the Commodity Committee of the Army and Navy Munitions Board, to coordinate the requirements of the two services, and present the picture for armed forces. When war is imminent, it is planned that the President will create the War Industries Administration, which will take over the whole problem for the Nation in arms. Then the Joint Committee will act as a coordinating agency, and the Army Committee will act as a contact agency.

The general procedure for each Commodity Committee will be as follows: To freeze the stocks of materials in place, and to prohibit trading in them except by licenses or warrants, to be issued by the committee concerned. This is to be done by presidential proclamation. Warrants, which permit the purchase of a given amount of the material at a fixed price or at the market price, will be issued to the one who wishes to buy, if the use to which the material is to be put justifies its expenditure. Reports will be required from the dealers, showing stocks on hand and amount sold since last report, so that the committee concerned can exercise its judgment as to the amount of conservation required. In general, these materials which require close control will be treated like money in the bank, and checks drawn against the bank balance as the materials are needed.

There are fifty-six critical raw materials, and twenty-six strategic raw materials. These latter, which are the most important, I will discuss briefly.

MANGANESE ore, for use in making steel, is normally imported. Our country can produce low grade ore and chemical ore but has no large deposits of the richer ores. It is impossible to make sound steel without this high grade ore, and without sound steel our industries and our war efforts would be paralyzed. The world's supply of high grade manganese ores is found in Russia, India, the Gold Coast of Africa and Brazil. All of these sources are distant from our steel industry and ocean shipping is required to bring this essential material to us. It appears that nothing short of a physical reserve of this material will make us safe from interruption.

TIN is one of the minerals which nature left out of our soil. It has become indispensable in the preservation of food, since it furnishes a protective coating on the steel with which our so-called tin cans are made. We use it in the manufacture of automobiles, for the making of bearings, solders, bronzes and gun metals. It can be hammered into foil and has many uses as a chemical. The world's sources are the Straits Settlements and Bolivia. The entire smelting industry is in the hands of foreign nations and a war which interrupted our supply (for we use about one-half the world's production) would cause industrial disruption and serious hardships. Our detinning industry can supply a part of our needs, perhaps one third, as long as we have the necessary tin scrap from which we can recover tin.

CHROMIUM is one of the indispensable metals and its use is constantly increasing, since it is used as the important ingredient in rust resisting and the so-called stainless steels. In addition, chrome ore is one of the best refractory materials and you find chrome brick in the steel furnaces, where it stands the intense heat incident to the melting and making of steel. Chromium is also an important ingredient in tanning leather, furnishes colors for paints, and is used in electroplating and dyeing. Southern Rhodesia is the world's great source. Cuba, Russia, New Caledonia and India are some of the other sources. All of them, except Cuba, are distant from our shores and shipments are subject to interruption. The United States is the world's largest user of chromium, and produces only a minor quantity.

RUBBER is a vegetable material, which grows in the tropics, and we are dependent upon outside sources for our supply. We use over one-half the world's production, which

42

comes from the Malay States, the Dutch East Indies and Ceylon. We have developed several substitutes but our production capacity for these is small and the cost of producing them is higher than is the natural crude rubber. At present these substitutes are being used by industry only in the special cases where they are better than crude rubber for some purposes. Again, as in the case of tin, we have an industry which can reclaim a percentage of our rubber needs, but without the imports to which we are accustomed our industry and our people would suffer serious hardships.

TUNGSTEN is used as an ingredient of tool steel, since this material in steel enables a cutting tool to keep its edge even when hot. For production during an emergency, when speed is essential, it is hard to see how we could keep the pace required without this valuable mineral. Smaller quantities of this material are used in steel which has to stand excessive heat. The world's major supply comes from China, with lesser amounts from India and Bolivia. We have a metal (molybdenum) which serves in part as a substitute for this material, but we would have difficulty in meeting our needs for the rapid production of war materials without tungsten. Large low grade deposits in the West make it possible for us to secure our requirements by paying a high price for them, with some delay.

NICKEL is necessary to toughen steel, and the armor plate of the world is made of nickel steel. Many alloys are made of this valuable metal with copper and other metals. The greatest world's source is in Canada, with which we have always been on excellent terms, but our domestic supply is practically nil. In making heat-resisting steels and many of the electric heating units, nickel is indispensable. Even our soap industry finds nickel desirable in hardening its fats and oils. For national defense, our guns and gun carriages and our armor plate use this material freely. It would be more difficult to cut us off from the Canadian source, although the British Empire at war might require the greater part of the Canadian production.

ANTIMONY is the material which is used by our newspapers and printing houses in their type metal, and it is used in anti-friction bearings, in enameling metal ware, glass making, vulcanizing rubber, safety matches, paints, in the building and paper trades and as a wood preservative. The

outstanding world source is China, although Mexico and Bolivia and some of the European countries produce it. We have one smelter in this country which smelts Mexican ores at Laredo, Texas, but this single source is entirely inadequate to supply us with our needs. The other sources involved require transoceanic shipment. The military uses are for hardening bullet cores and shrapnel balls.

CAMPHOR is normally imported into the United States from two sources--the natural camphor from Formosa, under Japan's control, and the synthetic camphor from Germany. Under the policy of protecting our infant industries, the manufacture of synthetic camphor is being built up in this country, but is not yet adequate for our needs. Camphor is the component of many medicines and in the military services is used in the manufacture of smokeless powder. It has many other uses--in photographic films, toilet articles, scientific instruments, pyrotechnics and lacquers. If our imports from abroad were shut off, there would no doubt be a considerable period when the essential needs of this material would have to be seriously curtailed. This was true in the last war and would be true again.

HIDES are the raw materials from which leather is made. Our domestic facilities for making leather are adequate, but we are accustomed to importing part of our supply of hides from abroad. The uses of leather are numerous and well known, and cannot yet be entirely cared for by the manufacture of artificial leathers. Argentina, Brazil, Northern Europe and China furnish us with the necessary hides to augment our supply for the production of leather. The interruption of any of these sources would cause shortages in the different varieties of leathers, each of which has its own special use.

MERCURY is a metal of many uses. It is a drug and a chemical and necessary in many of our industrial activities, from the production of gold to the disinfection of seeds. In the military art, it is an ingredient of certain explosives and a minute quantity serves to start on their way many of our projectiles. The greatest world's sources are Italy and Spain. Our own production has been decreasing in recent years and our capacity to produce is being retarded by flooded mines and stagnation of manufacturing capacity. If we become entirely dependent upon foreign sources for mercury, we may expect serious difficulties if conflicts abroad deny us access to world markets.

MICA is a crystal which is unique among minerals in the number of useful properties it contains. The automobile, airplane and radio industries find this material indispensable for insulation. It occurs throughout the world, but the principal commercial sources are India, Madagascar and the United States. Domestic production has been confined largely to the types and sizes which require the least hand labor. In general, we can supply ourselves in the smaller sizes, but the sheets and splittings required by our industry continue to come from abroad. In an emergency it will be necessary for us to conserve our stocks on hand until domestic production can be increased to furnish our needs.

NITRATES are known to the layman as fertilizers, but to the military they are the basis for high explosives. They are also used in artificial leather, photographic films, dyes, glass, household ammonia, and many chemicals. The great world source of natural nitrate is Chile, but all nations have made an effort to make themselves self-sufficient by the development of air fixation of nitrogen. Our own production is affected by the amount of our steel production, since nitrogen is a by-product in the making of coke. With care and stimulation, we could be self-sufficient although imports will be secured from Chile if it is possible to do so. Substitution is possible among the various forms in which nitrogen is used, but there is no substitute for nitrogen itself.

PLATINUM is one of the rare and precious metals which has many uses in industry. It is necessary in the making of sulphuric and nitric acids and is used in many laboratory instruments, electrical contacts and in the dental and jewelry industries. The world's sources are Russia, Colombia, South Africa and Canada. All, except Canada, are separated from us by great distances. It is possible that in time of great emergency our people would turn in their jewelry to the Nation, if it were badly needed, as one outstanding thing in all past wars has been the patriotic support of the Government by the people.

COCONUT SHELLS are included in the strategic raw materials, because this material produces the best charcoal for use in gas masks. This purely defensive equipment may be required in the next war for the civilian as well as the military population. The world sources for coconut shells are Ceylon, India, the Philippine Islands and tropical countries generally where the coconut tree grows. Water transportation

over long sea lanes is necessary to bring this material to our shores.

SILK is a material usually regarded as a luxury, but it has many uses in industry. The insulation of wires and cables is an example and in warfare it is used for the powder bags for our big guns and for parachutes for our flyers. There is no domestic production of raw silk. The world's supply comes from China and Japan in the Orient, and to a lesser extent from Italy and France. The United States uses more than one-half of the world supply of silk.

WOOL is the most important animal fiber and the health and well-being of both the civilian population and the armed forces depend to a considerable extent upon the supply of this material. In normal times we import a considerable supply from the countries of Europe and from Argentina, Uruguay, Australia, South Africa and Canada. In time of war, both our Army and Navy are clothed in wool. Without imports there would be serious shortages of this material.

SHELLAC has a variety of uses in industry among which are: as a binder in the production of buttons, phonograph records, imitation ivory, and sealing wax. It is used in making electrical instruments, as an insulator in fireworks and explosives, and as a binder for grinding wheels. It is used in varnishes for quick drying, for stiffening hats, waterproofing leather and as a polish. The world's supply comes from India, Indo-China and Siam. The United States uses about one-half the world's production. Our production of synthetic resins is increasing, but our use of shellac is also increasing, since it is a remarkable material with many valuable uses.

FOOD for the American people is principally homegrown, but much comes from the other nations of the world. Many of these imported articles are luxuries and could be eliminated without serious hardship to the people, but some of them have become essentials. Among these may be listed coffee, from Brazil and Colombia, and sugar, from the tropical countries of the world. We have the largest per capita consumption of these two foods, and would resent bitterly being forced to curtail our consumption. It is easy to see how disturbances of the world's peace abroad might force us to accept such a curtailment.

4/34

VEGETABLE FIBERS form a group of materials which is not produced within the United States. The United States will always be dependent upon countries in the tropics for such things as manila fiber for rope, jute for bagging, and sisal for binder twine. Manila fiber comes from the Philippine Islands and furnishes the world with its rope, since it floats and resists the corrosive action of salt water. Jute (from India, Southern China and Southern Japan) makes the burlap of the world and many of our crops are bagged and shipped in this material. Sisal is from the Dutch East Indies, with a similar material from Yucatan in Mexico. This material gives us our small ropes and binder twine, without which our wheat crop could hardly be harvested.

DRUGS form another group of materials for which we are entirely dependent upon foreign nations, and which are so necessary for the health and well-being of our people. Among these is opium in the form of morphine or cocaine for the relief of pain, quinine to combat malaria, and nux vomica or strychnine, which is widely used in tonics. Opium is the most powerful pain-relieving agent known and is used in the military service for that purpose. The principal world sources are India, Turkey in Asia, and Jugoslavia. The world's supply of quinine is produced in the Dutch East Indies, although much of it is taken to Europe for preparation into the finished drug. Nux vomica is produced in India, Ceylon, Australia and China. In addition to its uses as a medicine, it is used in the extermination of vermin, and its popularity as a tonic is well known. Iodine is the best of all antiseptics for military use, and is widely used in civil life. It is used in the arts as an ingredient of certain dyes and also as a fertilizer. It is employed in photography and in many chemical industries. The world's supply comes from Chile, although there are two domestic sources--from the burning seaweed and from the salt brine of exhausted oil wells. It is possible that with some delay our own production could take care of our needs if the stocks were conserved until that production was available.

These materials are simply the things we need to import in both peace and war to maintain our high standards of living and provide for the needs of the Nation. They are indispensable. For many of them substitutes can be used in part. However, if these substitutes are not accepted and used by industry in normal times, their introduction during an emergency will cause confusion and delay. To attempt to solve our problems by the use of substitutes may delay

production at the time when every productive effort of the whole Nation will be needed to equip the armed forces and provide for the civilian population. This method of providing for our needs must be accepted with caution.

There is an increasing tendency to impose tariffs on materials which we can produce, but not in competition with foreigners, to build up our own supply. However, any country which deliberately uses inferior sources of supply, protected by tariffs or subsidies, will find itself at a disadvantage in the world market. Minerals are a one-time crop, and, once mined and used, do not replenish themselves. In the last quarter of a century the world has consumed more minerals than in the whole period of its existence before that. Production is now about two billion tons a year, with two-thirds of this controlled by the English speaking nations. As the earth weighs about 6,600 billion billion tons the supply should last some time yet.

455

DISCUSSION FOLLOWING LECTURE BY MAJOR CROM

STRATEGIC & CRITICAL RAW MATERIALS"

February 21, 1936

Q - You have among the various services a war reserve of these materials. What would a war reserve of those <sup>four</sup> materials cost? (The materials manganese, tungsten, pig tin and chromium.)

A - Taking the market price of the week before last, which is subject to a small variation, and putting them into short tons, it ran something like this. 1 million or 50% ferro-manganese ore, 10,000 tons of tungsten ore; 100,000 tons of pig tin and 300,000 tons of 48% chrome ore. As I recall, it ran around 140 million dollars. The greatest cost was the tin, which runs around 83 million dollars.

Q - Was this bill introduced as a War Department project or did it receive its impetus from other sources?

A - It was introduced by a member of the Military Affairs Committee of the House, the War Department cooperated unofficially before it was written.

Q - For how long a period of time would that reserve last?

A - For a two year war.

Q - Did I understand you to say that a great deal of iron ore passed through the Soo locks which are not under the control of this country?

A - Yes, they are under the control of Canada.

Q - They are under the control of the U.S. One or two locks are on the Canadian side but the other locks are on the American side.

A - Only one would have to be blown to destroy the proposition. The situation is still the same. The bottle neck of our shipments from the Mesaba Range to the place where it is melted is through that canal

and it is, of course, right in the Canadians hands if they choose to make it so. The movement is toward coal and we are no exception to the rule They bring down iron ore from the Mesaba Range to eastern Ohio and other places and the bottle neck is up there on the lake and it could be interrupted unless we made provision to prevent it. I am sure it is not going to be interrupted.

Q - Did I understand you to say that the amount of critical and strategic materials used in this country in 1929 were enough in time of war?

A - The difference between our present production and the 1929 production would fight a war. We are satisfied that the U.S. has capacity to fight a major war. During the depression we have been surprised at the similarity of figures between what we needed and what 1929 produced. It is just a general statement that indicates that if we would use materials as we are using them now and take the 1929 level, we could fight a nice war with the surplus.

Q - Are the holders of low grade manganese going to try to prevent us from getting that reserve?

A - The Manganese Producers Assn., headed by Mr. Atchison will try to kill this bill. The Committee has been warned about that and will be prepared to prevent it. We know that low grade manganese ores can be concentrated at a price. However, the steel industry does not desire to use domestic ores - they are not uniform. It will be attempted but may be prevented.

Q - Has any cognizance been taken of the development of resources

in Manchukuo?

A - We know something of what Manchuria has in the way of raw materials. Last year General McCoy talked to us soon after he returned as a member of the league of investigation. At that time Japan had not gone into Reho<sup>?</sup> but we assumed they would because there were coal and coke there. Up at Mukden there is a type of silica (that is not specially desired in steel as it makes it too hard but it is used in glass making). You probably remember that Doctor Furness said there were six places in the world where the steel industry could operate, two of them are in the U. S., - the lakes and Birmingham; the British Isles; the Saur<sup>?</sup> Basin; the interior of India, and the sixth was possibly a place like Mukton using good ore from Siberia. If Japan is successful in taking the maritime provinces of Siberia there may be a steel industry there. Unless they do, they cannot have an industry. ~~Japan~~ <sup>China</sup> has antimony and tungsten and it can raise cotton but, contrary to popular conception, China is not very greatly endowed with the raw materials of the world. Its coal is scattered and not especially good, its iron ore is scattered and not especially rich or pure, so Japan is going to have a great<sup>deal</sup>/of trouble organizing and mobilizing China's resources and a lot of time and money will have to be spent before they are ready to fight a really modern war. We have not made a special study of that situation; we have simply compiled what data we can on world sources. It used to be considered that China was a great reservoir but that is not quite true. Japan has a big job and will probably collapse financially before she is through, and will probably undergo a change in Government. When a country is about to lose

out she fights a war.

Q - Is it anticipated that the coal in Manchuria will change the picture?

A - There will be some changes; the coal will certainly be increased. Their food situation will be improved; they are teaching the people to eat soy beans and are giving the fighting troops a more varied diet. They may be in the same shape as Italy going into Ethiopia - they are not going to find the various raw materials they need there.

Q - If we assume the possibility of going into Cuba, are the deposits there sufficient to take manganese off the strategic list?

A - No. The Cuban ore has to be blown in special furnaces, but if the Cuban companies can do what they claim they can do, they might. They have chrome ore but it is better for refractories than for ferro-chrome. For refractories we can use something else. Cuba is a nice source to have at hand; she produces sugar and molasses for alcohol, chrome of a quality, and ferro-manganese. It is very fortunate she is at our door where we can continue to use her products.

Q - What is the source of raw material for the Japanese Imperial Steel Works? They are just across the river on the Inland Sea down on the south side of the Straits - built about 17 years ago.

A - The Island of Shikoku has coal, it is steaming coal. The Japanese have subsidized their industries and they bring in ores from everywhere they can. A large part of their ore comes from south, around Singapore. I imagine they are bringing ore from Singapore and coal from <sup>?</sup>Rehoe.

Q - As I understand it, that is the only source of steel in Japan?

459

A - I understand they are getting some from the inside of Korea.

Q - Do you care to speak about what material Germany expects to get in the Ukraine?

A - We do not have any very good surveys on that; I did get hold of a Russian survey which showed they had some low grade iron ore in the Ukraine and probably some oil, but we don't have a survey made by competent people that would tell us just what to expect. When Germany lost a part of her territory to Poland she lost her best zinc and zinc smelters and she has tried to remedy that by building zinc smelters in what is now Germany, and importing ore. In the case of iron and steel it looks like Germany has definitely made her plans on the assumption that Sweden will be benevolently neutral. All the Swedish mines are operating and the ore is going to Germany. A recent study indicated that without neutral Sweden Germany would be in a bad way. They are, however, making it advantageous for Sweden to remain neutral. The Ukraine is the black belt of Russia and is the storehouse of agricultural products but Russia was never developed industrially until the five year plan, and just what is going to be found I don't think they know. In this study the ores were listed by the square mile which is unheard of in mineralogy. They had taken samples and assayed them and they had in many cases a high silica content that is undesirable. A man going there to invest money would have to get an ore that would enable him to compete in the world markets. In Russia that is not true, everything is a Government monopoly and the cost is not important as long as they get the material.

Q - Can you tell us a little about the chrome situation in the Philippines?

A - In Zambales they have discovered a vein of chrome ore, 48 or

4/60

or 50% stuff and a shipment was sent to San Francisco where it was sent to Niagara Falls to make ferro-chrome. Niagara Falls is the only place where it is made because of the power situation. The development is in the hands of gold mining people who don't know chrome in the ordinary sense of the word, and for that reason I have not been willing to accept all the claims they have made. They do claim it will be one of the great sources of the world. Rhodesia is the place you expect chrome to come from - and New Caledonia, but they add the Philippines as a source. That material will probably go to Japan before we get through. The tonnage has never been estimated, no one knows how much is there but it is of suitable quality.

Q - If we were cut off from a supply of manganese what percentage of our needs could be obtained by developing our low grade ore resources? and how long would it take?

A - We are self-sufficient in commercial ore for making batteries, etc., and in ore suitable for spiegel. During the last war we used 40% ores. We were glad to get it but the steel was cheapened thereby and not of as good quality. We can do that again - use more spiegel and less ferro-manganese. You might say there is always eight months' supply for current needs on hand. It varies and it comes from a long distance but for that reason they keep more on hand. We know of a supply in Butte Montana of 300,000 tons of suitable ore. There are no doubt other supplies available. If we take out the best ore and leave the other - strip ourselves clean of ferro-manganese ore we could get some. During the last war Honduras produced a few thousand tons and Cuba could still produce some; also Canada and Mexico. If we started stripping the northwestern hemisphere of all of

461

its ferro-grade ore we might cut the war off a year but there would be a big time delay and it might be serious to us. When you make a piece of machinery like an airplane engine you can have no bad metal in that. When you make a gun carriage you have to have steel that is complete<sup>ly</sup> de-oxidized and de-sulphurized and to do that without ferro-manganese is impossible commercially. In the laboratory you might do it with titanium oxide but there is no commercial way to do it. Of course we need thousands of tons and it is quite possible that our steel industry would operate at a sixty million tons per year basis. Every ton of steel produced has 14 pounds of manganese used to de-oxidize it. Some of that remain in the steel but very little. I can't give you an estimate of the time that would be lost but it would be<sup>very</sup> serious.

Q - In view of the fact that we have about 90% of the world's production in Molybdenum now (of course, it is realized that it is not as good as manganese steel) could you say definitely that we could use that steel for the manufacture of guns?

A - The Navy Department says that when they make a heavy cut in their gun factory they want tungsten steel - not molybdenum. The Ordnance Department has found that a 50 - 50 molybdenum-tungsten gives a very fine steel and there is no question but that molybdenum steel is increasing in use. There are other substitutes, industrial diamonds have a place. There is one other factor that is interesting; if you take a machine tool that is over five years old and not of the high quality now secured, it will vibrate enough to destroy a tungsten carbide or break a diamond if you take a heavy cut with it. If you have complete<sup>ly</sup> modern equipment you can use molybdenum

steel and industrial diamond better than on the old tools but the Army and Navy are stocked up with old tools and they need tungsten steel. If we could not import tungsten ore, we have in the West some very low grade deposits. Tungsten is not a difficult metal to separate, and at a price, say at \$60. we could take that low grade stuff and perhaps get enough, but we don't want that delay. When it comes to concentrating those ores, it can be done on an ordinary jig table. These ores are not complex so I think it is possible to get along without tungsten but I would not want to do it because of the delay.

Q - How complete and how authoritative a test of the vast mineral resources of the Philippines has been made? Have ~~we~~<sup>they</sup> gone into it sufficiently to know what is there?

A - I am under the impression they have not. When I was there we found traces of oil but were unable to find information as to the geological structure that would justify paying 50 thousand pesos for a well. Much more work has been done in recent years than ever before and I think there is some chrome in Zambales. When you first prospect a country you look for gold and those people don't do much with special metals. Gold has run to 8 or 9 million dollars worth a year. My answer to that question is "No". The United States is not complete either for the really industrial metals. Last year they found in Florida a clay that could be treated with acid and used to filter petroleum to get this fine grade lubricating oil. That material had been imported and no one who knew that kind of clay had ever been there to look for it. The South has never been searched by people who know rare industrial materials. When TVA got going, they found a nice material no one knew was there, I refer to small deposits of chrome Feldspar, and

463

metallurgist was not able to identify it. The place has been thoroughly searched for gold, however; that comes first.

Colonel Harris With reference to Colonel Barnes' question as to what domestic sources we have for <sup>manganese</sup> ore, there was a conference held about a year and a half ago at which there were present representatives of U. S. Steel, of the University of Wisconsin, and others, and we tried to evaluate our <sup>domestic</sup> sources of manganese for war. We figured <sup>The U.S.</sup> we could provide 25% of our requirements; Cuba likewise could furnish 25%, and the stock on hand might be relied on for 25%. That would leave a 25% deficit with no factor of safety. We figured on a 25% factor of safety and we would <sup>thus</sup> require a 1 million ton stock pile reserve for the next war. The records of the Commodities Division are kept in duplicate so one set could be given the superagency. I would like to say that in the Planning Branch the course of the Commodity Division has been most tranquil and the progress most satisfactory. The Division has been ~~under~~ <sup>steadily progressed</sup> ~~constant pressure~~ and the results are quite gratifying. Major Cron is finishing his tour <sup>of duty</sup> and with his departure the Planning Branch will suffer a very severe loss.