POTENTIAL ECONOMIC STRENGTH AND WEAKNESS

OF THE UNITED STATES FOR WAR

1937 - 1938

STAFF PRESENTATION

NAVAL WAR COLLEGE
Newport, R.I.
21 April, 1938.

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3654-1987
4-26-38

[redacted]

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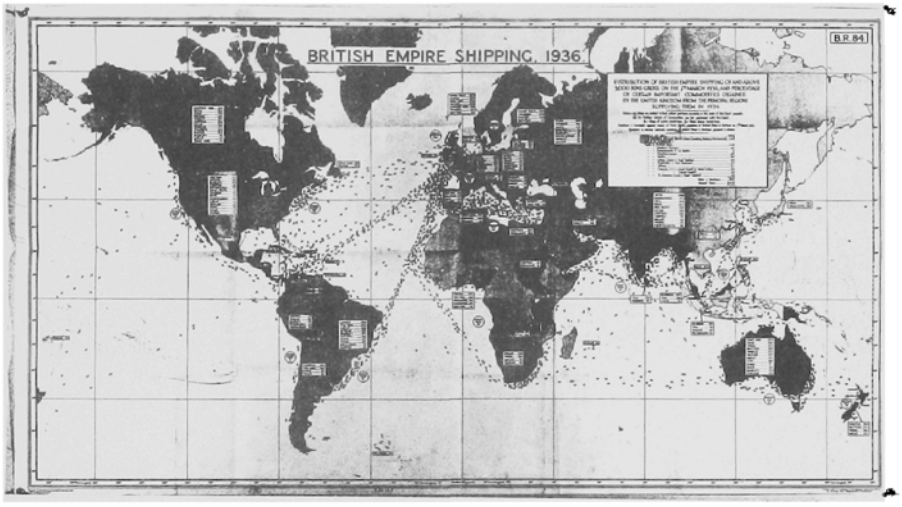
BRITISH EMPIRE SHIPPING, 1936
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I. GENERAL ECONOMIC SITUATION

Economic Needs

The economic needs of a nation, especially for war, cannot be considered as absolute and fixed. The military requirements will depend upon the extent of the national effort, which is governed by the national objective, the enemy's strength, and the theaters of operations. Furthermore, in a nation accustomed to a high standard of living many things are regarded as necessi, ties, which in a coumtry less favored by economic resources are considered extravagant luxuries. Consequently, the morale of our mationals might well suffer by economic restrictions that would not even be regarded as hardships in another country.

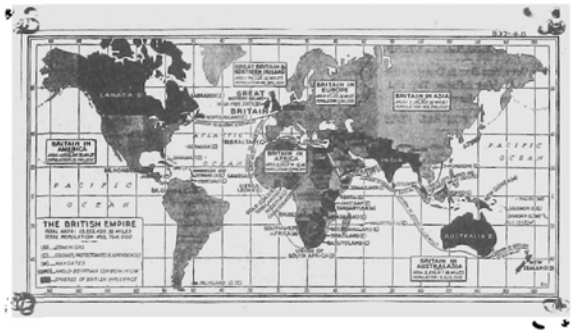
Self-Sufficiency

SLIDE - British Shipping and Sources of Raw Materials

B38-185

The British Empire most nearly approaches this goal. Her wide-flung possessions contain nearly all the essentials, but even she must depend upon certain materials such as petroleum, sulphur, cotton, potach, phosphates, antimony and mercury, from foreign sources.

Russia has nearly every required natural resource within her continental boundaries. She has not yet reached the first rank in industries, but, potentially, she is in a position to do so.


337-60
CANADA
GREAT BRITAIN & NORTHERN IRELAND
GREAT BRITAIN
BRITAIN IN AMERICA
BRITAIN IN AFRICA
BRITAIN IN ASIA
BRITAIN IN AUSTRALASIA
AUSTRALIA
NEW ZEALAND
INDIA
PACIFIC OCEAN
ATLANTIC OCEAN
THE BRITISH EMPIRE

Japan is struggling against great natural limitations to attain maximum possible self-sufficiency. This Empire will be the subject of a separate presentation.

The United States, occupying one of the richest areas of the earth, with abundant reserves of most of the great essentials, is the world's foremost industrial nation. Its deposits of iron, coal, copper, zinc, lead and molydbenum are among the largest in the world. We lead in food and clothing resources. Nevertheless, even the United States is not self-sufficient for either its peace-time or its war-time military requirements, and our deficiencies are of no small importance.

The Geographic Factor

SLIDE: BRITISH EMPIRE B37-48

Geographical position affects the war-time economic strength of a nation.

Although the British Empire contains more required elements of an industrial nation than any other state, she must depend upon long lines of communications, which are daily becoming more vulnerable. The heart of the Empire is always in a position to be threatened by blockade.

On the other hand, practically all of the great natural and industrial resources of the United States are contained within our own continental limits. We have such lengthy coasts on the Atlantic, Pacific and the Gulf of Mexico that

SURVEY OF OPPOSING STRENGTHS

POLITICAL FACTORS	ECONOMIC FACTORS	PSYCHOLOGIC FACTORS	CHARACTER OF THEATER OF OPERATIONS	INFORMATION AND COUNTER-INFORMATION	ARMED FORCES	LOGISTIC SUPPORT
Internal Conditions	Finance	Morale	Hydrography, Topography	Information available to either belligerent	Composition	Availability and Adequacy
External Relations	Industry	Training and Experience	Weather	Means of obtaining and denying information	Type and Numerical Strength	Limitations imposed by Logistics
Alliances	Trade	Racial or National Characteristics	Duration of Daylight and Darkness	Communication Facilities	Material Characteristics	
	Raw Materials	Personal Characteristics of Commanders	Phases of Moon		Armament	
			Relative Positions, Distances		Life	
			Modification of natural formations		Mobility	
					Condition	
					Disposition	

SUMMARY OF STRENGTH AND WEAKNESS FACTORS

it would seem incredible for any nation or group of nations to be able to blockade us effectively. Our geographical position renders us less vulnerable to economic pressure, from outside sources, than any other Power.

Other Factors

Climatic differences, natural resources, soil, topography, skill, and modern systems of transportation are important factors affecting the availability of raw materials. Such factors have made the United States the leading producer of cotton; Japan, of silk; China, tungsten and antimony; Canada, nickel; Malay Peninsula and the Dutch East Indies, tin and rubber; and India, jute.

II. SURVEY OF ECONOMIC STRENGTH FACTORS

SLIDE: Survey of Opposing Strengths -- B37-351

A nation's potential economic strength and weakness is conditioned on four general economic factors: finance, industry, trade and raw materials. Each of these factors is related to and dependent upon the other three. All may be influenced by other strength and weakness factors such as political, psyshologic, etc.

Finance we know is required to turn the wheels of industry; and, to attain the requisite industrial output, raw materials must be available. These in turn, are moved

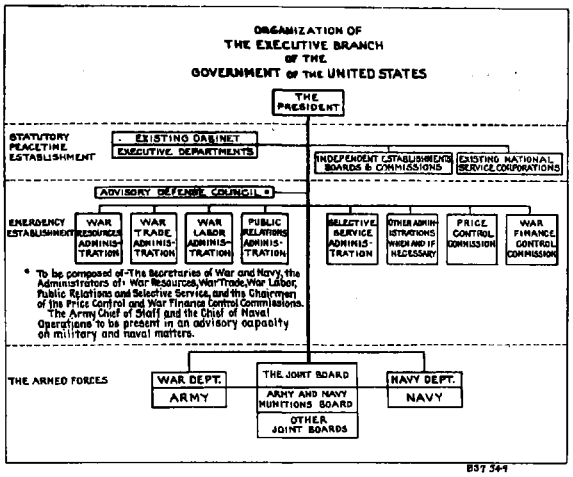
by finance. If the nation's industrial capacity, or its production, or reserves of raw materials are insufficient to supply the requirements of war, imports are essential. Imports cannot be obtained without foreign credits, and such credits are ultimately dependent upon exports. In other words, the nation is dependent upon foreign trade. Our country, however, is less dependent in this respect than either Great Britain or Japan, both of which are insular rather than continental.

I. FINANCE

The question of finance has been thoroughly covered in recent leactures by Professor F. R. Fairchild on "National Finance and National Policy" and by Professor J. H. Williams on "Finance in War". Accordingly, this factor will be but briefly considered today.

The methods used to finance a war and the regulation of the amount of currency in circulation determine the degree of inflation and the general trend in prices.

The direction of the flow and the furnishing of new capital to the support of those industries most essential to the welfare of the country will, according to our present Industrial Mobilization Plan, be secured (1) by a system of priorities administered by the War Resources Administration, and (2) by the creation of a War Finance Corporation, as an agency of a War Finance Control Commission, charged with the loan of Government


ORGANIZATION OF
THE EXECUTIVE BRANCH
OF THE
GOVERNMENT OF THE UNITED STATES
THE PRESIDENT
STATUTORY PEACETIME ESTABLISHMENT
EXISTING CABINET
EXECUTIVE DEPARTMENTS
INDEPENDENT ESTABLISHMENTS BOARDS & COMMISSIONS
EXISTING NATIONAL SERVICE CORPORATIONS
ADVISORY DEFENSE COUNCIL *
EMERGENCY ESTABLISHMENT
WAR RESOURCES ADMINISTRATION
WAR TRADE ADMINISTRATION
WAR LABOR ADMINISTRATION
PUBLIC RELATIONS ADMINISTRATION
SELECTIVE SERVICE ADMINISTRATION
OTHER ADMINISTRATIONS WHEN AND IF NECESSARY
PRICE CONTROL COMMISSION
WAR FINANCE CONTROL COMMISSION
* To be composed of-The Secretaries of War and Navy, the Administrators of War Resources, War Trade, War Labor, Public Relations and Selective Service, and the Chairmen of the Price Control and War Finance Control Commissions. The Army Chief of Staff and the Chief of Naval Operations to be present in an advisory capacity on military and naval matters.
THE ARMED FORCES
WAR DEPT.
ARMY
THE JOINT BOARD
ARMY AND NAVY MUNITIONS BOARD
OTHER JOINT BOARDS
NAVY DEPT.
NAVY
B37 54-1

funds. These measures would be in addition to those which would be employed by such existing agencies as the Federal Reserve System.

SLIDE: ORGANIZATION OF THE EXECUTIVE BRANCH OF THE GOVERNMENT OF THE U.S. -- B37-349

There would also be created, directly under the President, a Price Control Commission.

The Price Control Commission would be quasi-judicial in character and in no sense an operative agency. It would call for information and testimony from governmental and civilian institutions regarding factors of supply and demand. Its decisions and policies would be administered through the regular Government Departments and Commissions, a War Trade Administration, the Securities and Exchange Commission, and the War Finance Control Commission, previously mentioned, as well as a few others.

The purpose of the Price Control Commission would be generally to stabilize prices, keeping them adjusted at such levels as would minimize inflation and enable the Government to make purchases of private property needed in the prosecution of the war without undue profit to the owners. Control would largely be by a system of licensing.

The War Finance Control Commission would direct the flow of private capital into essential uses and curtail the non-essential. No security issue in excess of $100,000 would be permitted to be offered for public or private sale unless

approved by this Commission. Violations would be punished by heavy fines and imprisonment. The Commission would also be empowered to advance necessary funds to any corporation or agency engaged in production essential to the prosecution of the war. Such advancement of funds would be necessary if private capital, in view of excessive risks or poor prospect of reasonable returns on investment, did not make itself available.

Experience gained in the use of such financial controls during the World War showed their necessity and practicability.

During that period, the public subscribed over 24 billions of dollars for emergency loans. We financed not only our own extensive war effort, but made large advances to our Allies, yet there was no question as to the soundness of our national credit.

Though we now have a national debt of over 37-1/2 billions of dollars, the per capita debt is much less than that of any of the other major powers. Furthermore, our per capita wealth exceeds that of any other nation.

The United States Government now possesses gold reserves to the value of over 12-1/2 billions of dollars- over 1/2 of the world's supply.

Not including Government loans abroad, we were, at the end of 1936, a net creditor nation of over 5-1/2 billions of dollars - American investments abroad exceeding foreign investments in the United States by that amount. (1)

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(1) Foreign Investments in the U.S.(1937) - U.S.Dept. of Commerce.

Recently the Government has been experiencing no trouble in floating large issues domestically at very low rates of interest.

Possessing the vast natural resources that we do, and with large gold reserves, at least part of which might be used, if necessary, to pay for needed imports of certain materials (if our exports would not suffice for exchange) it would appear that the United States (in spite of its large initial debt) would not be handicapped financially for waging war -at least as compared with any probable enemy.

2. INDUSTRY

The strength of a nation to wage war is measured as much by "machine-power" as by "man-power" -- in other words, by its industries.

Two of the generally accepted indices for computing the industrial strength of a country are its steel production capacity and the value of its chemical business. By both these yardsticks the United States occupies first place. Our chemical industries are valued at 2,200 millions of dollars,as compared with 1,000 millions for Russia,which stands second in this respect. In 1935 we produced 35% of the world's steel,as compared with half that amount by Germany, the next largest producer. Our steel-ingot capacity in 1937 was 69-1/2 million gross tons.(1) Compare this with a capacity of 6 million tons for Japan,which she does not expect to reach,however, until 1942.(2)

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(1) NEW YORK TIMES, Dec. 18, 1937.
(2) U.S.Naval Institute Proceedings, April 1937.

Speaking in general terms, we normally produce and consume half of the industrial output of the world - this, however, with our industries engaged primarily in meeting the requirements of peace.

Prior to our entry into the World War, war orders on a large scale from the Entente Allies and a few from the Central Powers stimulated American industry in a direction which increased our ability to produce munitions for ourselves. There developed, however, a competition for manufactured articles, for raw materials, and for labor. The result was high prices and inefficient distribution of labor - scarcity in certain localities and actual unemployment in others. Contracts were placed without regard to possible congestion. Thus, new manufacturing plants sprang up in many localities, irrespective of the labor, fuel, power and transportation available.

The outcome of all these difficulties was a slowing down in production of war supplies in the worst days of 1917-1918.

It was to meet these conditions in our industry that the War Industries Board and the other coordinating agencies were set up.

Had it not been for the fact that the Central Powers were being held off by the Allies, our plight might have been a serious one- and this after several years experience in production of munitions for other warring nations.

(a) Facilities

Our present mobilization plans are designed to avoid repetition of such a situation, should we again go to war. Even so, it appears that many branches of our industry would be un-

able to meet the demands for war supplies, promptly.

(b) Optical glass

For instance, the production of optical glass, required for fire control, observation and surveying instruments, cameras and prisms for fire control instruments, could not be quickly expanded. The problem would not be one of material but of pot-making and lack of trained personnel for grinding and assembling of instruments. The pots in which the glass is made must be lined with a particular kind of clay. This clay must be aged several months before the pots are made, and then the pots themselves must be aged about six months after that. It has been estimated that a deficit of 100,000 pounds in production of optical glass would occur during the first three months and this deficit not made up until the ninth to the twelfth month. The answer to this problem, at least in part, is a war-reserve of optical glass to the value of about $75,000, and this is being provided to some extent.(1)

(c) Powder and Explosives

Sufficient facilities do not exist at the present time within our borders to manufacture the powder and explosives which would be required by our armed forces and by our industries. Plans have been made, however, to expand existing facilities and to create new ones in case of war.

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(1) Minutes of Optical Glass Committee (O.A.S.W.) Feb.13,1936.

(d) Machine Tools

The machine tool industry presents a problem which may almost be considered the major one. An accessory to all other industries, though not itself a mass producer, it is absolutely essential for mass production. Machine tools are built practically on a "to order" basis. Many take months to build. The problem is aggravated at the present time by the obsolescence of many tools now in use. This applies particularly to the railroad shops(1) of the country, to our own navy yards and arsenals. Increased freight rates may permit some replacement by the railroads; and Congressional appropriations should rectify in large part this condition in the yards and arsenals.

Machine tool needs of the country in case of an emergency are known, and machine tool facilities have been allocated to the Army and the Navy. The Navy estimates that it alone will require machine tools to the value of $50,000,000 (2) during the first year of war.

(e) Raw Materials

While a nation is dependent on its facilities, its facilities are dependent upon raw materials.

Our War and Navy Departments make a continuous study of those raw materials and commodities considered essential to the nation in war-time for use of the armed forces and the

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(1) Lecture on Machine Tool Industry at Army War College, Nov. 4, 1937.

(2) Minutes of Meeting of Machine Tool Committee (O.A.S.W.) Feb.27,1936.

civilian population.

As a result of these studies, the Army and Navy Munitions Board has listed certain materials in two categories -- "Strategic" and "Critical".

SLIDE: STRATEGIC MATERIALS, U.S. B38-516

SLIDE: CRITICAL MATERIALS, U.S. B38-515

"Strategic Materials" are "those materials essential to the national defense for the supply of which in war dependence must be placed in whole or in large part on sources outside the continental limits of the United States, and for which strict conservation and distribution control measures will be necessary" ; and

"Critical Materials are "those materials essential to the national defense, the procurement problems of which in war, while difficult, are less serious than those of strategic materials, due to greater resources or to a lesser degree of essentiality, and for which conservation and distribution control measures will probably be necessary."

There are at the present time twenty-one raw materials listed as "Strategic",

SLIDE: LIST OF STRATEGIC MATERIALS- U.S.A.(1)
B38-517

- -

(1) Approved by the Army & Navy Munitions Board, Mar.22,1938.

and fifty-four raw materials or commodities as "Critical".

SLIDES: LIST OF CRITICAL MATERIALS- U.S.A.(1)
B38-513, 514.

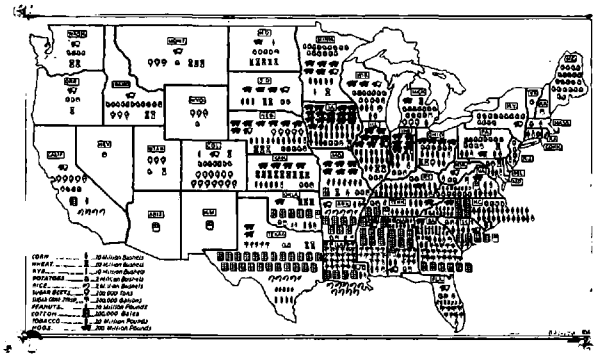
The strategic materials are:

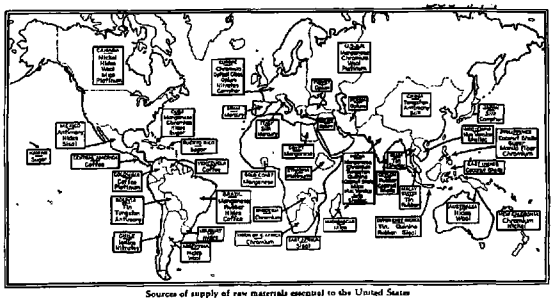
1. Aluminum
2. Antimony
3. Chromium
4. Coconut shells
5. Coffee
6. Hides
7. Iodine
8. Manganese, ferro-grade
9. Manila fiber
10. Mica
11 Nickel
12. Opium
13. Optical glass
14. Quartz crystal
15. Quicksilver
16. Quinine
17. Rubber
18. Silk
19. Tin
20. Tungsten
21. Wool

The critical materials are:

1. Abrasives
2. Alcohol (Ethyl & Methyl)
3. Ammonia
4. Arsenic
5. Asbestos
6. Cadmium
7. Camphor
8. Castor Oil
9. Chlorine
10. Copper
11. Copra
12. Cork
13. Cotton Linters
14. Cryolite
15. Flaxseed
16. Fluorspar
17. Graphite
18. Helium
19. Hemp
20. Iron and steel
21. Jute
22. Kapok
23. Lead
24. Machine tools
25. Magnesium
26 Molybdenum
27. Nitric Acid
28. Nux Vomica
29. Oakum
30. Palm Oil
31. Paper and Pulp
32. Petroleum
33. Phenol
34. Phosphate
35. Picric acid
36. Platinum
37. Potash
38. Refractories
39. Scientific glass
40. Shellac
41. Sugar
42. Sisal
43. Sulphur and Pyrites
44. Sulphuric acid
45. Tanning Materials
46. Titanium
47. Toluol
48. Uranium
49. Venadium
50. Wheat
51. Webbing and duck
52. Wood chemicals
53. Zinc
54. Zirconium

(1) Approved by the Army & Navy Munitions Board, Mar. 22,1938.





Sources of supply of raw materials essential to the United States

Both in peace and in war, food, fuel and clothing are primary requisites for human existence. Let us consider these primary requisites. First, we will take food.

SLIDE: FOOD PRODUCTION IN THE U.S. B37-174

Wheat is, by far, the most important agricultural item in the diet of the Caucasian races. Fortunately it can be grown in large quantities in this country. Our wheat yield in 1937 amounted to nearly 900,000,000 bushels - about one-quarter of the world's supply. Though during the drought years it has been necessary to import some wheat, we may reasonably rely on the United States in war-time being able to raise all the wheat needed for home consumption, especially if acreage restrictions are lifted, which would certainly be done.

This country is also capable of producing an abundance of other foodstuffs, both grains and live stock, as well as fruits, vegetables and fish.

SLIDE: SOURCES OF SUPPLY OF RAW MATERIALS - B36-894

Our principal imports of foodstuffs include sugar, coffee, tea, chocolate and cocoa, and fruits. Of these, only coffee is a "strategic material".

Our annual per capita consumption of coffee is about 14 pounds. Most of this coffee now comes from Brazil (about 64%), but we also import a considerable amount from Columbia

(about 20%), Central America and Venezuela. About 10,000,000 pounds per year are produced in Puerto Rico, and a similar amount in Hawaii.(1) However, as the United States consumes over a billion and a half pounds a year, these amounts are negligible. Unless sufficient coffee can be imported to supply our normal needs, it will be necessary to ration the civilian population. This, however, would not be desirable, as it would tend to weaken the country's morale. Still, if worse came to worse, we would no doubt find some suitable substitute. During the World War the Germans roasted acorns to take the place of coffee. It was said that "it could be made hot like coffee and had the same color, only the taste was different."

The problem will be one of maintaining imports from Brazil and the Caribbean area. A considerable amount can be expected to continue to enter in neutral ships, or by land through Mexico, regardless of closed sea lanes.

Sugar, formerly classed as "strategic" is now considered only "critical".

Most of the 6,000,000 short tons of sugar annually consumed in the United States comes from Cuba, the Philippines, Hawaii and Porto Rico. The United States produces 1-1/2 million tons, including both beet and cane sugar.

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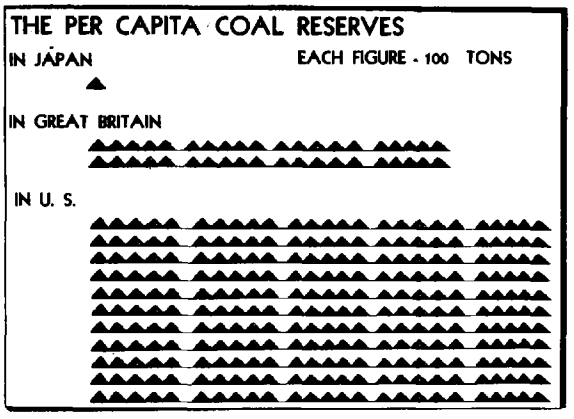
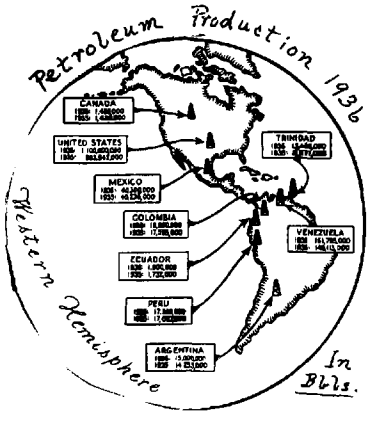
(1) Extracts from "Minutes Commodity Committee No. 23 - Foodstuffs", Oct. 31, 1935.


THE PER CAPITA COAL RESERVES
IN JAPAN
EACH FIGURE - 100 TONS
IN GREAT BRITAIN
IN U. S.


Petroleum Production 1936
Western Hemisphere
In Bbls.
CANADA
UNITED STATES
MEXICO
COLOMBIA
ECUADOR
PERU
ARGENTINA
TRINIDAD
VENEZUELA

B38-502

For a two year emergency, considering normal stock available, it is estimated that we would require about 7-1/4 million tons to be imported, or substitutes used, such as corn-sugar, sugar-cane syrup, maple syrup, honey, and levulose-sugar made from Jerusalem artichokes, whose production could be increased to an unlimited amount. So, under extreme conditions of blockade, there would still be a plentiful supply of refined sugar or healthful substitutes, if prompt measures were taken to increase production of such substitutes.

However, there should be no sugar shortage as long as the Caribbean is under our control. Imports from Cuba alone would be sufficient to meet the deficiency in domestic production.

Taking up the second major necessity - fuel - we have the greatest coal reserves in the world,

SLIDE: THE PER CAPITA COAL RESERVES - B37-143

as well as ample hydro-electric power, and at present we are the leading producer of petroleum.

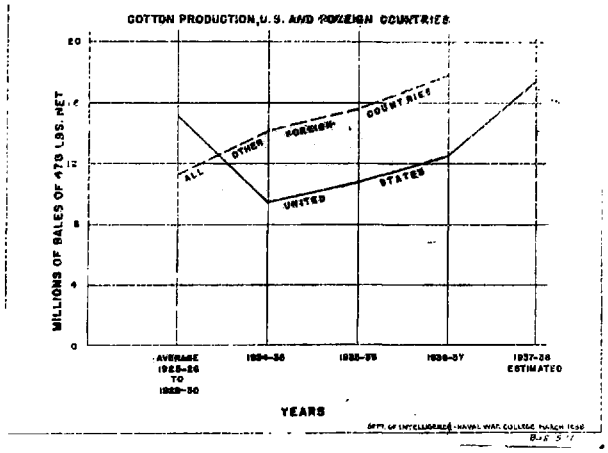
SLIDE: PETROLEUM PRODUCTION IN 1936 IN THE WESTERN HEMISPHERE - B38-502

The United States is exploiting its oil reserves rapidly; and, at the present rate of production, known reserves are considered adequate for only about 15 years. However, increasing efficiency in the use of petroleum and its by-products, especially gasoline, more scientific methods of production, and the probable discovery of new fields, should extend this

COTTON PRODUCTION OF MAJOR PRODUCING COUNTRIES

Country	Production 1936- 37 in Bales of 478 lbs. Net.
UNITED STATES	12,387,000
INDIA	5,278,000
CHINA	3,650,000
SOVIET UNION	2,800,000
EGYPT	1,957,000
BRAZIL	1,808,000

838.518



period.(1) Then, too, we still have large potential supplies of gasoline and oils which can be obtained through hydrogenation of coal, and the distillation of oil shales which exist throughout the West. Plants for this purpose, however, would have to be erected before the outbreak of war.

Though this commodity will have to be watched against the day when domestic production may diminish, it appears for the present that we have ample reserves for any emergency; and additional war-time requirements could be met only by slightly increasing present production.

The main clothing materials, also essential for many other reasons, are cotton, linen, wool, silk, and leather.

SLIDE: COTTON PRODUCTION OF MAJOR PRODUCING COUNTRIES(2) B38-518

SLIDE: COTTON PRODUCTION OF U.S. AND FOREIGN COUNTRIES(2) B38-571

In cotton we are more than self-sufficient, producing almost as much as the rest of the world put together. Cotton is also essential for the manufacture of explosives.

Linen is not an essential. Cotton can be used as a substitute.

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(1) Dr. Frank C. Whitmore, President of American Chemical Society, has stated that we now have more known crude petroleum reserves underground than ever before. N.Y.TIMES, March 8, 1938.
(2) Agricultural Statistics, 1937-U.S.Dept. of Agriculture.

For wool, the most important animal fiber, there is no adequate substitute. We produce more wool than any country except Australia. Australia, however, produces over twice as much as we do. In 1936, we produced 425 million pounds and imported 258 million pounds, mainly from Australia, New Zealand, Argentine and British India. The annual per capita consumption of wool in peace-time is only about 5 pounds. In war time, however, our military per capita requirements for the first year of an emergency is expected to average 20 times that of the civilian requirements, and for the second year 10 times. A deficit of about 428 million (1) pounds would have to be met through importation, limiting use to essential needs, reclamation, and use of substitutes.

Silk is strategic only because its production depends upon an unlimited supply of cheap labor for the unreeling or throwing of the cocoon fiber. Silk has and still can be produced in this country. If and when machinery is developed for unreeling silk from cocoons, all the silk we should require could be produced in the North and Central American countries. At present there is no domestic production of raw silk, though we are the largest consumer, using about 50% of the world's production, in addition to large imports of manufactured silk products.

The world's supply of raw silk comes mainly from Japan and China, with comparatively small amounts from Italy, France

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(1) Minutes of Commodity Committee No. 54-WOOL (O.A.S.W.), Nov. 14, 1935.

and Spain, the Levant, South Russia and India. In 1936, 90% of our raw silk imports came from Japan, which, as a matter of interest, was 85% of Japan's raw silk exports to all countries, or about 15% in value of her entire exports.

Ninety-nine per cent of all silk imported in peace-time is used in the manufacture of wearing material, and therefore cannot be classed as essential. For a two-year emergency, however, the armed forces estimate their requirements as about 30,000,000 (1) pounds, the principal military uses being for the manufacture of powder bags and parachutes. Satisfactory substitutes have, however, been developed, tested and approved, which reduce this amount by nearly 50%. Cotton can be used in powder bags for certain guns and howitzers; and cotton rayon fabrics can be used in parachutes, silk being required only for the thread and shroud lines.

At present the Army has a considerable amount of silk in stock, and the Navy maintains a reserve sufficient to meet the initial requirements in case of war emergency. Considering these reserves, the commercial stock normally on hand in the United States and in transit, and the non-essentiality of silk for civilian needs (rayon can replace this), no vital shortage is apparent.

Our facilities for making leather are adequate. But in spite of the fact that the United States is one of the great

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(1) Minutes of Meeting of Commodity Committee No.44 -SILK (O.A.S.W.), December 19, 1935.

cattle raising nations, we import about 40% of the hides we normally use. About 25% of all hides used annually are normally in storage and would be available in case of emergency.

The use of substitutes for leather is growing rapidly in American industry, and in war-time could be greatly extended. Civilian uses of leather could be considerably curtailed. Requirements for the Army are being reduced by the increased use of motor-vehicles in place of horse-drawn equipment.

It is considered that all munition demands could be met from stocks on hand and from domestic sources of supply; and the really essential civilian requirements provided for by careful distribution of stocks and general use of substitutes.(1) Moreover, the importation of hides and skins from Canada, Mexico, and the countries bordering on the Caribbean appears to be possible under almost any circumstances.

In addition to the fibers already mentioned, there are others, not required for clothing, which we obtain from outside sources, i.e., hemp, manila, sisal and jute. Hemp, chiefly required by the Navy for conversion to oakum for use in calking decks, is considered a "critical" not a "strategic" material. Likewise, sisal, for use in the manufacture of small rope and binder twine, and jute, from which burlap is made for bagging many of our crops, have within the last month been

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(1) Strategic Raw Materials, Proceedings of Special Board convened at the Navy Dept. on 18 August 1936.

dropped to the "critical" list, so only manila fiber will be further discussed.

Manila fiber, obtained from the stem of the abacca plant, floats, resists the corosion of salt water, and stores well with-deterioration - particularly if kept dry. These qualities make it especially adapted for the manufacture of naval cordage and rope in general. Consequently, nearly all rope is now made of this fiber.

Most of this fiber used in the United States (which is about 1/3 d of the world's production) is imported from the Philippines. Very little is produced elsewhere. The Philippine production is concentrated in Davao Province, and both the production and the marketing are controlled by the Japanese.

Substitutes are available in the form of wire-rope and rope made from other fibers; but these substitutes are not suitable for all uses of rope. Control will have to be established to assure the Army and Navy requirements. A reserve stock-pile is being built up by the Navy Department.

Certain drugs form another group of "strategic" materials necessary for the health and well-being of our people. Among these is opium in the form of morphine and cocaine for the relief of pain, and quinine to combat malaria.

Opium is the most powerful pain-relieving agent known and is used in the military service for this purpose. The principal world sources are British India, Turkey in Asia and Yugoslavia. In 1925, authority was granted the Surgeon-General to accept, and store in reserve, stocks of opium found suitable for medicinal use, where they are seized and confiscated, until a total equal to the estimated military requirements for a two-year major effort was obtained. This amount

is now on hand. The amount normally in commercial stocks and in transit would provide for civilian needs for at least one year. Plans call for the use of substitutes wherever possible.

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. Supplies expected to be available, regardless of later import restrictions,would at normal rate of civilian usage last about seven months. But with proper control of supplies and the encouragement of the use of substitutes in tonics and patent medicines,and the possibility of tapping the less important sources in Columbia, Ecuador and Peru through coastal shipping and airways,there should be no shortage in quinine,needed for the treatment of malaria,which is the only essential need.

Iodine is the best of all antiseptics for military use, and is widely used in civil life. Until a few years ago,most of the world's supply was obtained from Chilean nitrate-beds and from Japan,where it was produced from seaweed. Much of our own supply is now produced domestically,the iodine being obtained from the salt brine of our western exhausted oil wells, and from kelp,the seaweed which grows along the Pacific Coast from Alaska to San Diego. There might be some delay in the building up of our own production to take care of our needs, but by taking steps from the first signs of an emergency to conserve stocks,our essential requirements should be met. It would seem that iodine is more "critical" than "strategic".

The military uses of rubber are,for the most part,the same as civilian- tires, hard rubber for machinery,and clothing

being the largest items. Other important strictly military needs are the employment in many types of artillery, arms and ammunition, as well as military balloons and gas masks.

We use over one-half of the world's production, most of which comes from the Malay States, Dutch East Indies and Ceylon.

There is no domestic production of crude rubber. There is, however, a considerable reclaiming industry which, in 1936, amounted to about 50% of our consumption.

We have developed several substitutes for rubber which are superior in some respects, but inferior in others. For instance, the DuPont product "Duprene" is superior as an oil resistant, but inferior for electrical insulation. "Thiokol", put out by the Thiokol Corporation, has also been found to take the place of rubber in oil hose, etc., and for beltings operated under wet conditions.

DuPont has also made a few automobile tires which are now being tested - six sets by the Army. Their cost is of course much higher than that of the usual commercial tire.

With the elimination of rubber from non-essential uses, with increased reclamation and use of substitutes, the two-year requirements of the country could be met without any importations of crude rubber, and with the Caribbean Sea open we could still import considerable amounts from South and Central America.

Though still on the "strategic" list, no attempt is being made to lay up a stock-pile of rubber.

All coconuts suitable for the production of charcoal for use in the canisters of gas masks are grown outside the continental limits of the United States, principally in the Philippine Islands, and the Dutch and British Indies. Certain other nuts and fruit pits can be used as a source of gas mask charcoal, but such charcoal is not entirely satisfactory for use in canisters.

The Army and Navy would require about 10,000 tons of this charcoal [(1)] for a two year war. If civilians should be furnished gas masks, a much larger amount would be required. Commercially, it is used on a small scale in recovering gasoline from natural gas and has some other minor chemical uses.

It is estimated that there are about 500 tons [(2)] of primary charcoal available within this country, or about enough for the first two months of an emergency. It has been recommended by a Special Navy Department Board [(1)] that there be accumulated a stock-pile of approximately 10,000 long tons of primary coconut charcoal. Incidentally, the shell of the coconut is a by-product of the copra industry.

In addition to the items so far discussed, there are ten minerals which are considered to be of strategic nature: alumiun, antimony, chromium, manganese, mica, quartz crystal, nickel, mercury, tin and tungsten.

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(1) Strategic Raw Materials, Record of Proceedings of Special Board on. Convened at Navy Dept. 18 Aug. 1936.

(2) War Dept. Commodity Committee Report, May 4, 1934.

It is believed that there is available in this country enough bauxite and other sources of aluminum to meet all requirements in an emergency. (The question of cost induces the imports in peace-time). Expansion of existing facilities for fabricating aluminum, however, will be necessary. It would seem that aluminum should be classed as "critical" only.

Antimony is used during peace-time in the manufacture of bearing and babbitt metals, solder, storage battery plates, type-metal, rubber goods and paints. Its military uses are in shrapnel balls, bullet alloys, cable coverings, battery plates, and bearing metals.

China is the outstanding producer of antimony, producing about 75% of the world's supply. Other producers are Mexico, Bolivia, Czechoslovakia, and the U.S.S.R. The United States production is negligible, though much secondary antimony is recovered.

Under stimulus of increased prices, the production in the United States and Alaska, including recovered metal, could probably be increased to meet 25% of emergency requirements. The remainder would have to be imported, unless a stock-pile is set up. There are quite a few known substitutes for antimony, but a stock pile of 30,000 short tons of antimony oxide has been recommended to insure non-interruption of many important items for the military services.

There are three general commercial uses for chromite, the source of chromium. About one-half of that mined goes into steel making, for alloy, and so-called "stainless" steels. About two-fifths is used in making refractories, and the remainder is used in the chemical industry. Chromium-steels have a high tensile strength and a high elastic limit. Chromium also increases the resistance of steel to impact and raises the fatigue value, hence its use in armor plate, projectiles and gun carriage steel.

At the present time our ore comes principally from Rhodesia, Cuba, Greece, Oceania, Turkey, and U.S.S.R. Very little is mined in the United States, though we have large domestic reserves of low-grade chromite. High prices would increase home production, but not enough to meet military and civilian requirements. In 1936 there was imported 324,000 long tons. Considering stocks on hand, increased domestic production stimulated by higher prices in war-time, and curtailment of civilian requirements by as much as 40%, it is estimated that with outside sources shut off we would require a reserve of 228,000 tons (short) of chromite for a two-year war.(1) Of this amount the Navy would require about 10,500 short tons, the building up of which has been started.(2)

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(1) Minutes of Commodity Committee No. 19, held in O.A.S.W. Jan. 23, 1936.

(2) Strategic Raw Materials, Record of Proceedings of Special Board on, Convened at Navy Dept. 18 Aug. 1936.

Manganese is perhaps our most important strategic raw material, due to the large tonnage required and its relation to steel making. No substitute has been found. It is used as a desulphurizer and a deoxidizer, and the retention of certain amounts of manganese in the steel gives it strength and toughness. Under present-day conditions, first quality steel cannot be made without it; and without such steel our industries would be paralyzed.

The high-grade ores come from Russia, the Gold Coast, India, Cuba and Brazil. A small amount comes from Montana.

Large reserves of domestic low-grade ores are available, but their conversion into ferro-manganese of proper content is accomplished only by treatment so expensive that their use in steel-making is commercially impracticable in peace-time. And sufficient production could not reasonably be expected to meet demands in war-time.

The Army and Navy Munitions Board Commodity Committee on Ferro-Alloys, after estimating military and civilian requirements for a two-year war, and taking into consideration domestic production, and tonnage normally in stock and in transit, finds an apparent deficit of approximately 550,000[1] tons of high-grade metallurgical manganese ore.

With the Navy commanding the Caribbean, some coast-wise shipping from South American countries would probably be avail-

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(1) Minutes of Meeting of A. & N. Munitions Board Commodity Committee on Ferro-Alloys, O.A.S.W., March 25, 1937.

able. With Brazil an ally or friendly neutral, some imports from this source could reasonably be expected. Brazilian production in 1917 was 524,439 tons of ore. Brazilian ores used in the United States for the years 1926 to 1936 have averaged 130,267 tons a year.

If the possibilities of Cuban and Brazilian production are included in our war supply, little chance of a large deficit can be foreseen, provided ship tonnage is available.

The Bureau of Mines has a process(1) for the electrolytic recovery of manganese from domestic ores and is constructing a "pilot" plant at Boulder City, Nevada, to determine its commercial practicability.

In the meantime, however, the most logical emergency measure to take to meet our war-time needs is to establish a reserve within the United States. The Navy Department had an appropriation last year (1937-1938) for the initial building up of such a reserve; and additional funds have been asked for this year.

Domestic ores are not satisfactory for this reserve, since in open storage they disintegrate to powder in a short time.

Since most of our steel producers (at least those on whom the Navy expects to depend upon) are not now equipped to manufacture their own ferro-manganese from the ore, a special Navy

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(1) Minutes of Meeting of A.&N. Munitions Board Commodity Committee on Ferro-Alloys, O.A.S.W., March 25, 1937.

Department Board has recommended that the Navy reserve stock-pile be in the form of ferro-manganese.(1) Such a stock-pile has been started.

Mica is practically indispensable to the automobile, airplane and radio industries. Mica occurs throughout the world, but the principal sources of commercial production are India, Madagascar and the United States. The United States is self-sufficient in ground mica and punch sizes, but is dependent on importations for sheets and splittings. But these imports are decreasing as substitutes are found for their uses. There is normally in the United States a 12-months supply of mica sheets and splittings. With proper conservation of supplies on hand, restriction of commercial uses, the extension of substitutes and the acceleration of domestic production, no serious shortage of mica sheets and splittings will develop during a war emergency.

Domestic production of nickel is practically nil in peacetime and very little could be produced domestically under emergency conditions. Practically all of the nickel in the United States comes from Canada, though New Caledonia furnishes about 9% of the world's supply. Nickel is essential in the alloy steel industry and is used extensively in alloys of iron, copper,

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(1) Report of 1 Sept. 1937 of Special Board on Strategic Materials on "Manganese Ore - Purchase of Strategic Material by the Navy Dept." to Chief of Bureau of Supplies & Accounts.

chromium, and zinc. It is particularly essential in the manufacture of armor plate, gun steel, engine parts, projectile steel, monel metal, etc.

If Canada is neutral or allied to us in an emergency, there would be no problem in nickel. In fact, the use of nickel might be encouraged to save other alloying minerals not so readily available. If, however, nickel could not be imported from Canada, the situation would be serious and every conservation measure possible would be needed. These would include elimination of nickel plating, making steel without nickel for use where not absolutely required, and a reduction in percentages of nickel used for essential uses. A stock-pile of 25,000 short tons has been proposed.

Mercury is used in drugs and chemicals, electrical and industrial instruments, lamps, boilers and fulminates. Normally about 50% of the mercury used in the United States is produced domestically. Under stimulus of higher prices, production could probably be increased to meet all national requirements. Besides, the use of mercury boilers in the United States is increasing. At the present, about 10,000 flasks of mercury are used in these boilers, and in an emergency could be diverted to more essential uses.

<u>Quartz crystal</u>(1) is used commercially principally for making ornaments, but is also used for pivot supports, for delicate instruments, for frequency controlling elements in radio sets, for lenses, and laboratory vessels.

The military use of quartz crystal is in radio for controlling the output frequency of the transmitters and the response frequency of the receivers.

Though the Navy has not found it necessary to use quartz crystal to the extent that the Army is using it, both services agree that it is essential for their communications, and that there is no satisfactory substitute available.

There is no known production of this material in the United States of the quality required for communication purposes. The only known source at present is Brazil - and present exportations are limited.

An uninterrupted supply in time of war would depend upon Brazil remaining neutral or turning ally, and upon our control of the South Atlantic sea or air lanes.

National requirements for 24 months is estimated at 85,600 pounds of natural quartz crystal. 55,600 pounds of this would be for the Army and the Navy. The Munitions Board has recommended that a stock-pile of this amount be gradually accumulated as a reserve.

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(1) Minutes of meeting of Army and Navy Munitions Board Commodity Committee No. 48, held Jan. 8, 1938.

It is of interest to note that at present Japan imports 73 percent of the Brazilian production compared to 2 percent by the United States.

Tin has become more and more indispensable to American industry in recent years. Our canning and automobile industries use over 40% of the world's production. Other uses are in the production of bronzes, collapsible tubes, white metal, chemicals, etc. The great demand for tin for military and naval uses is in bearings, tinned metals for containers, castings, and solder.

The world's tin is produced mainly in the Malay States, Dutch East Indies, Bolivia, Nigeria, China and Siam. The principal source for the United States has been the Straits Settlements and the United Kingdom. The supply comes in the form of refined pig tin - the United States having no smelters. A considerable amount, however, is recovered as secondary tin from scrap.

Congress in 1936 passed a Bill prohibiting the exportation of tin scrap, in order to keep it available to our de-tinning industry. But even with this restriction, and the use of every available substitute, it is doubtful if the secondary production of tin could meet the essential requirements. At least, the Bolivian reserves should remain available to us in time of war, but a tin smelting industry would have to be re-established within the United States, and that would probably take the entire first year. Bolivia, incidentally, now exports about

27,000 tons of tin a year.

The only satisfactory solution to the tin problem is to establish a stock-pile of 50,000 short tons. The Navy is now building up a reserve to meet its own requirements.

Tungsten in steel gives great hardness and toughness at high temperatures, making it desirable for high speed cutting tools. Over 90% of tungsten normally consumed in the United States is used for that purpose. It is also used in the manufacture of cores for small arms armor piercing ammunition, which contains approximately 4% of tungsten. A large proportion of the remainder goes into incandescent lamps and electrical equipment.

Molybdenum, of which there is an abundant supply in the United States, is being substituted for some of the uses of tungsten in alloy steels, but such substitution has not progressed sufficiently to warrant the assumption that the normal uses of tungsten can be materially reduced.

In a two-year war, our national needs are estimated at about 13,500 tons. (1)

The principal sources of tungsten at present are China, Burma, Malay States and Bolivia, Asia producing 2/3 ds of the world's supply. In an emergency, about 40% of our requirements could be produced domestically, and it is likely that the great potential reserves of Bolivia, together with

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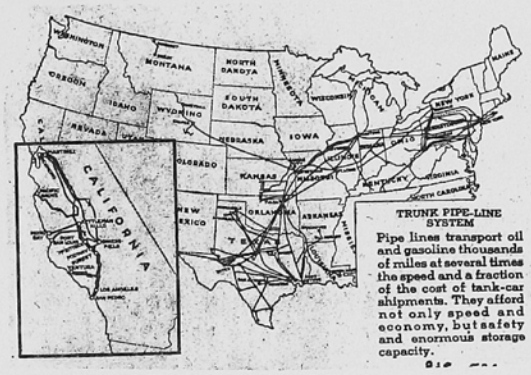
(1) Record of Proceedings of Special Board on Strategic Raw Materials, convened at Navy Dept., 18 August 1936.



TRUNK PIPE-LINE SYSTEM

Pipe lines transport oil and gasoline thousands of miles at several times the speed and a fraction of the cost of tank-car shipments. They afford not only speed and economy, but safety and enormous storage capacity.

the smaller deposits of Mexico and Peru would be open to us. However, a stock-pile of at least 6,000 tons has been recommended. In the meantime, the Navy is building up a reserve of its own.

(f) Transportation and Communications

Unless there are effective systems of transportation to carry products to the places where they are required, Industrial Capacity and Raw Materials are of no significance.

Our continental transportation systems - railway and pipe-line, automobile, and air - are the equal of, or superior to any in the world. Our railroads in particular are of outstanding magnitude.

On the basis of revenues earned and taxes paid, it has recently been estimated by the Interstate Commerce Commission that our railroads comprise 20% of our entire transportation system, our air lines 1/5 th of 1%, and our pipe-lines 3/5 ths of 1%. The various forms of highway transportation make up for the other 75-1/2 %.

SLIDE: TRUNK PIPE-LINE SYSTEM - B38-570

The pipe-line transportation system (1) of the United States, although one of the most efficient of all devices for economical movement of great freight tonnage, is probably the

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(1) Pamphlet - "Petroleum" - American Petroleum Institute, 1935.

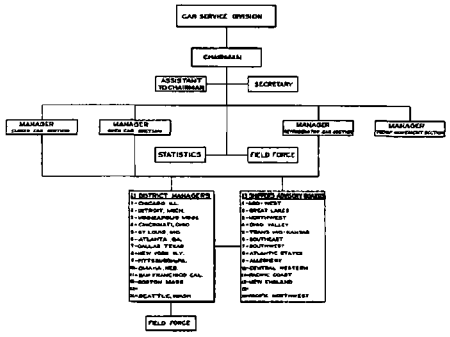
least known of all the transportation systems. This system has a mileage of more than 250,000 miles: about 112,000 for moving crude oil; 3,500 for gasoline; and 150,000 for natural gas. These pipe-lines vary in diameter from 4 to 12 inches, 8 inches being most commonly used. Oil and gasoline are transported by these lines at several times the speed and at a fraction of the cost of tank-car shipments, and more safely.

In the last war, our railroads fell into a state of confusion. This was primarily due to a lack of planning for such an emergency. The carrying capacity of available ocean-tonnage was at all times the neck of the bottle in the delivery of supplies to our armies in France. The system of individual procurement ignored this fact, and resulted in congestion at the ports. This congestion at the ports rapidly developed into a general congestion of railroad facilities, including very serious difficulties in the moving of fuel to essential war industries.

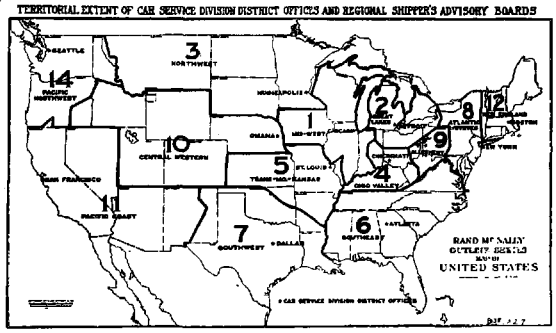
It was impossible to unload cars due to lack of terminal facilities, and much perishable freight was lost. As many as 60,000 cars of war material were tied up at one time. Cars were not available for essential commodities, and material wanted for immediate shipment overseas was frequently inaccessible.

As a result of this experience and the experience gained by the Federal Control Agencies, which finally overcame the

ORGANIZATION CHART- ASSOCIATION OF AMERICAN RAILROADS
CAR SERVICE DIVISION OF THE OPERATIONS & MAINTENANCE DEP'T.



TERRITORIAL EXTENT OF CAR SERVICE DIVISION DISTRICT OFFICES AND REGIONAL SHIPPER'S ADVISORY BOARDS



difficulties, Army, Navy and railroad officials have evolved a plan to locate terminals well back from the ports where incoming freight may be sorted. Supplies not needed at once would be held at these terminals and cars containing commodities desired for immediate shipment would be routed directly to the point of embarkation over clear tracks.

With the addition of these contemplated terminal facilities, and with proper coordination by a centralized control, it would seem that the railroads of the United States should be adequate for any national emergency. This assumes, however, that rolling stock and other equipment, and especially the railroad repair shops, are reasonably maintained.

The Association of American Railroads is now organized to provide centralized control over all railroad shipments through a Car Service Division. The organization of this Division, and the territorial extent of the Car Service Districts are shown on the slides.

SLIDE: ORGANIZATION CHART- ASSOCIATION OF AMERICAN RAILROADS, CAR SERVICE DIVISION
B38-526

SLIDE: TERRITORIAL EXTENT OF CAR SERVICE DIVISION, DISTRICT OFFICES, etc. B38-527

The Association plans to control traffic movements by a system of embargoes. If a congestion threatens at any point, an embargo will be issued against the movement of further traffic to consignees who are failing to unload cars promptly.

Freight consigned to the U.S. Government, its authorized agents or officers, would not be embargoed. The Government, apparently, would be responsible for its own priorities.

If the Railroad Association, under the guidance of the War Resources Administration, should fail to cope with the situation, the Government has plans to set up a separate administration to control it.

At the present time many of our railroads appear to be in serious financial difficulty. This may result in legislation giving financial aid to them, and at the same time may force them to consolidate into a few trans-continental systems. Or the Government may, as a last resort, be forced to take over and operate them.

In automobiles (1) we have no close rival. In 1936 we produced 76 % of the world's production, and approximately 70 % of all automobiles in the world were registered in the United States. We built 4,454,000 cars, compared with 481,000 in England, and 9,600 in Japan.

Though, as previously stated, airways amount to only 1/5 th of 1% of our internal transportation systems, they are nevertheless a vital part, especially considering speed of transport and non-dependence on any road or railway.

In 1936, almost 64,000,000 miles were flown over domestic and 10,000,000 miles over foreign routes. 1,150,000 passengers were flown. 8,350,000 pounds of express and freight

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(1) The World Almanac, 1938.

were carried.

Our big commercial planes might prove very useful in an emergency for transporting strategic materials of small bulk to which, due to loss of control of certain sea areas, we might not otherwise have access.

At the present time there are approximately 12 major companies manufacturing airplanes of all sizes in the United States, and about 20 additional smaller companies manufacturing small commercial planes.

We have only two real engine companies capable of producing fine, high-powered engines such as used by military and large commercial planes. These are the Pratt and Whitney at East Hartford, Connecticut, and the Wright at Patterson, New Jersey. Another company, the Allison, however, has recently started the manufacture of high-powered engines. About 10 companies make engines for the small private commercial planes. (1)

Great Britain has at least 6 large concerns building powerful airplane engines; France and Russia each 5; and Germany, Italy and Japan each 4. (2)

Nevertheless, our aeronautical industry appears to be in sound condition and as capable of rapid expansion as that of any probable enemy. At present this industry is being stimulated by large orders from the fighting services.

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(1) NEW YORK TIMES, March 6, 1938.

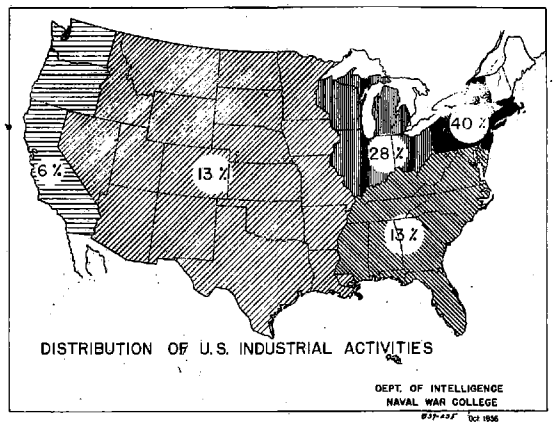
(2) Lecture THE AERONAUTICAL INDUSTRY by Mr.J.H.Kindelberger, President N.A.Aviation, Inc., at Army War College, Nov. 19, 1937.

(g) Labor

During the World War our labor difficulties divided themselves into two main categories: first, a tremendous labor turn over and second, frequent strikes. Both of these were due primarily to attempts to raise wages, but there were also other reasons. The Government "cost plus" contracts tended to make employers careless of expense and some would literally bribe workers from other occupations to come to them. Then, at the completion of the contracts, wages would be cut, causing strikes. Other labor troubles were instigated by racketeer elements, at times deliberately provoked to exact higher prices from the Government.

We have ample man-power, but we lack skilled workers in certain trades. Some industries, notably steel, are taking steps to prepare young men for the skilled trades, and present industrial mobilization plans include provision for intensive training of apprentices where required. These plans also include provisions to bring together the job and the worker and to keep them together, as far as conditions permit. Undue competition for labor and subversive influences would be guarded against.

While on the subject of labor, it is of interest to note that in the proposed selective service measure for the drafting of men for the armed forces in emergency, initially there will be only one category, and that made up of all young men between the ages of 21 and 30 years. It is estimated that


6 %
13 %
28 %
40 %
13 %
DISTRIBUTION OF U.S. INDUSTRIAL ACTIVITIES
DEPT. OF INTELLIGENCE
NAVAL WAR COLLEGE
Oct 1936

3654-1987
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LEADING COMMODITIES IN U.S. FOREIGN TRADE, 1937

B38-579

Exports	Value
Machinery	$479,100,000
Petroleum and products	376,300,000
Cotton, unmanufactured	368,700,000
Automobiles and parts and accessories	346,800,000
Iron and steel products	299,900,000
Chemicals and related products	139,400,000
Tobacco, manufactured	134,500,000

Imports	Value
Rubber, crude	$247,500,000
Cane sugar	166,200,000
Coffee	150,600,000
Paper and manufactures	137,100,000
Paper base stocks	117,900,000
Vegetable oils	112,000,000
Silk	106,600,000
Tin	104,300,000

there are 10,000,000 (1) such men available today and that at least 40 % of them are without dependents and physically qualified for service. If such is the case, the country is in a very fortunate position with respect to man-power not only for the fighting services but also for our industries.

(h) Distribution of Industrial Activities

SLIDE: DISTRIBUTION OF U. S. INDUSTRIAL ACTIVITIES - B37-235

One of the potential weaknesses of our economy in case of war lies in the fact that our greatest centers of industry and finance are closely grouped in a small area, near the Canadian Border and on our Atlantic seacoast. However, we are still less vulnerable in this respect than either England or Japan.

3. FOREIGN TRADE

The United States is the greatest exporting nation in the world and our imports are exceeded only by those of the United Kingdom. Exports and imports combined amounted in 1936 to almost 5 billions of dollars (12-1/2% of the world's trade), and in 1937 to approximately 6-1/2 billions. (2)

SLIDE: LEADING COMMODITIES IN U.S.FOREIGN TRADE, 1937 (3) B38-572

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(1) Army and Navy Register, Dec. 4, 1937.
(2) Economic Survey of the American Merchant Marine by U.S.Maritime Commission, Nov. 10, 1937.
(3) U.S.Trade Information Bulletin No. 837 of 1937

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U.S. EXPORTS OF LEADING COMMODITIES -1936

IN RELATION TO PRODUCTION

B38-578

Article	% of Production
Cotton	56
Phosphate rock	53
Naval stores	45
Oil cake, linseed	44
Borax	42
Greases, lubricating	40
Paraffin wax	40
Pigments, carbon black	37
Sewing machines	36
Tobacco, leaf	33
Copper, refined	32
Pears	30
Aircraft	29
Sulphur, crude	25
Office appliances	23

SLIDE: U.S. EXPORTS OF LEADING COMMODITIES IN RELATION TO PRODUCTION, 1936 (1)
B38-578

Though exports normally amount to approximately 10% of all movable goods produced in the United States, individual items, such as cotton, may account for 50% or more of the entire production. Elimination of the foreign market for cotton would seriously injure the South, and its consequent loss of purchasing power would have serious repercussions on every section of the country. And what is true of cotton in the South is true to a degree for many other commodities of importance in various parts of the nation.

Likewise, the United States, as brought out in the discussion of raw materials, is dependent upon foreign sources for many commodities which either do not exist within the country or can be produced only at prohibitive cost. More than a quarter of our imports are accounted for by five commodities: rubber, sugar, coffee, paper and manufactures,and silk. The numerous other items imported, however, though individually of less value, are nevertheless very important to our economic life - many vitally so.

In time of war our foreign trade should not be disturbed any more than absolutely necessary, since foreign markets lost during war would be difficult, if not impossible,to regain. And this would be true even though we emerged victo-

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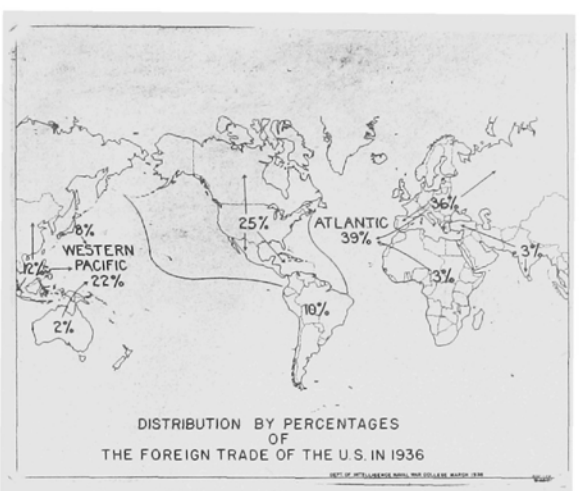
(1) U.S. Trade Information Bulletin No. 837, of 1937.



DISTRIBUTION BY PERCENTAGES
OF
THE FOREIGN TRADE OF THE U.S. IN 1936

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SLIDE: DISTRIBUTION (1) BY PERCENTAGES OF THE FOREIGN TRADE OF THE U.S. in 1936. (1) B38-574

In the advent of an ORANGE war, our trade with that country would cease automatically, and it would probably be inadvisable to risk over-seas commerce with areas in close proximity to ORANGE, at least until we had gained control of the seas in those areas. The Western Pacific area normally accounts for 22% of our commerce.

There would still remain many other highly desirable markets throughout the world. In fact, one of our objectives would probably be to capture certain ORANGE foreign markets.

Should we become engaged in war with RED, trade with Europe, especially via the Eastern Atlantic, would be extremely hazardous. This factor would tend to increase the importance of our trade with other sections of the world, particularly South America and the Pacific areas.

(a) Merchant Marine

The present status of the American Merchant Marine and its relative world standing was discussed here last month by Mr. Alfred H. Haag, Director of the Division of Research in the Maritime Commission.

In peace time it is generally agreed that a Merchant Marine flying the American flag covering the routes to all

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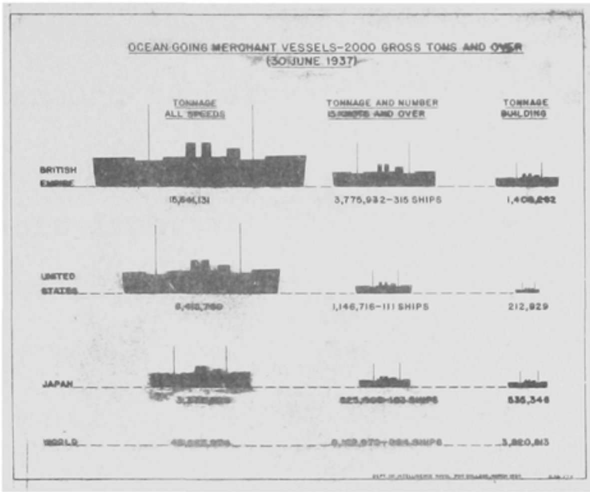
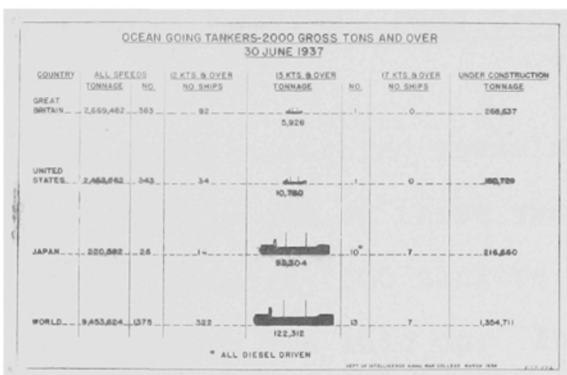
(1) Trade Inf. Bulletine No.837 of 1937. U.S.Dept. of Commerce.


OCEAN GOING MERCHANT VESSELS–2000 GROSS TONS AND OVER
(30 JUNE 1937)
TONNAGE ALL SPEEDS
TONNAGE AND NUMBER 15 KNOTS AND OVER
TONNAGE BUILDING
BRITISH EMPIRE
3,775,932–315 SHIPS
UNITED STATES
1,146,716–111 SHIPS
212,829
JAPAN
536,346
WORLD
3,820,813


OCEAN GOING TANKERS-2000 GROSS TONS AND OVER
30 JUNE 1937
COUNTRY
ALL SPEEDS
TONNAGE
NO.
12 KTS. & OVER
NO. SHIPS
15 KTS. & OVER
TONNAGE
NO.
17 KTS. & OVER
NO. SHIPS
UNDER CONSTRUCTION
TONNAGE
GREAT BRITAIN
2,669,482
383
82
5,926
1
0
268,637
UNITED STATES
343
34
10,780
1
0
JAPAN
26
14
93,304
10*
7
216,660
WORLD
9,453,624
1375
322
122,312
13
7
1,354,711
* ALL DIESEL DRIVEN

the important areas of the world is necessary to the best interests of our foreign trade, and that our Merchant Marine should be large enough to carry at least 50% of our foreign commerce.

But even more important than its role in the development of commerce is its importance to national defense. It is an essential part of naval operations. (1) Our military forces, in the event of war with a major power, would require a minimum of 1,000 merchant ships of all types, aggregating about 6,000,000 gross tons. These would be required in the early stages for military purposes and represent but a fraction of the number that would ultimately be required.

SLIDE: OCEAN GOING MERCHANT VESSELS - 2000 Gross TONS AND OVER - B38-573

SLIDE: OCEAN GOING TANKERS - 2000 Gross Tons and Over - B38-572

We now have some 1,350 sea-going vessels of 2000 gross tons or more. Approximately 400 of these vessels are engaged in foreign trade; 800, including 300 tankers, are in coastwise trade; and approximately 120 laid up. It will thus be seen that the thousand vessels considered necessary for minimum requirements are at present available, although the majority of the ships are old and slow, and many do not meet the requirements as to size.

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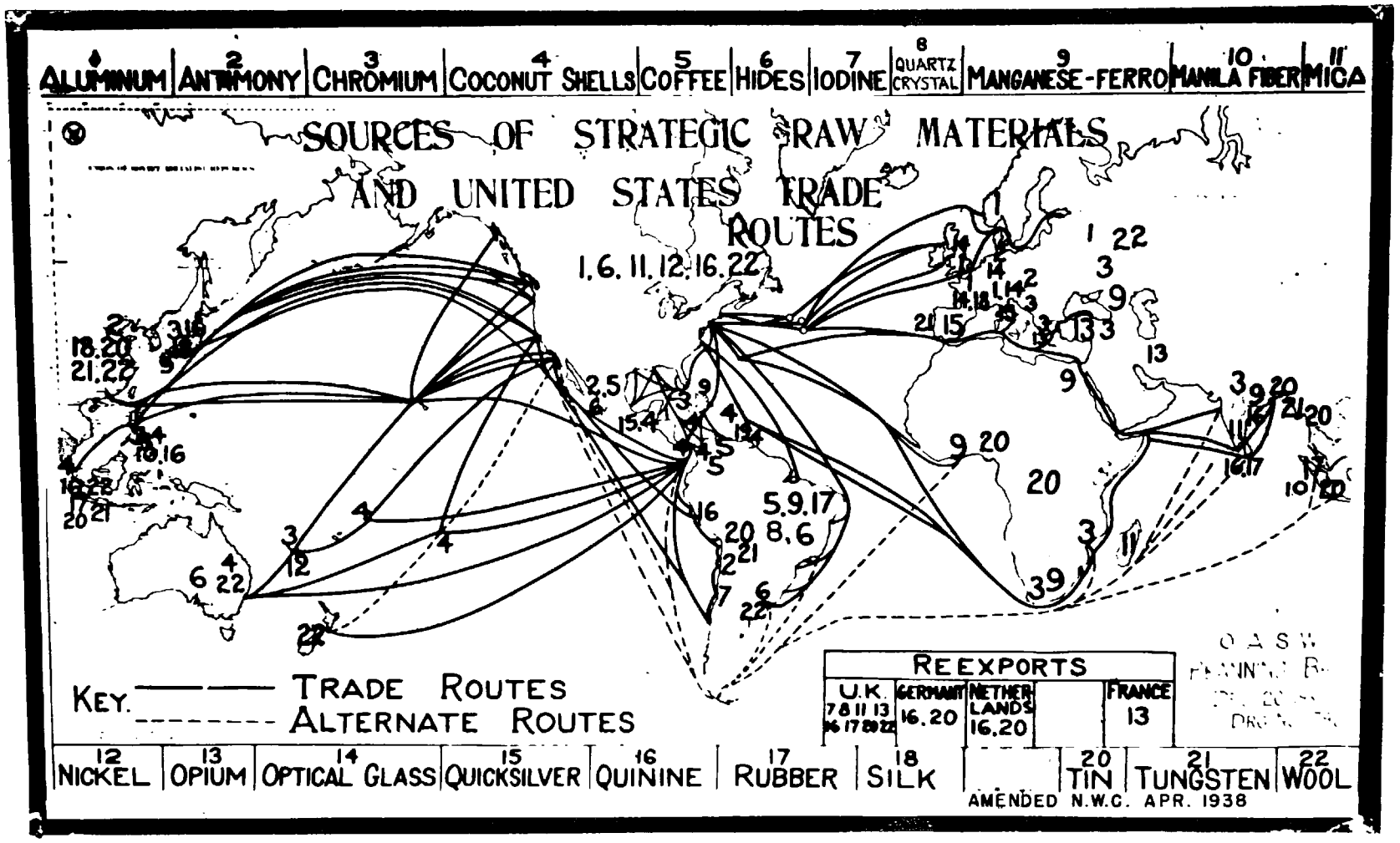
(1) Economic Summary of American Merchant Marine, U.S.Mar.Com. Nov.10, 1937, and Mr. Haag's lecture at the Naval War College,Mar.25,1938.

The laid-up vessels are being maintained by the Maritime Commission for replacing foreign carriers in case of an emergency, when for any reason they should be withdrawn from our trades, as occurred during the World War.

Our shipping industry at present is an outstanding weakness. This weakness, as described by Mr. Haag, lies in the Merchant Marine's relatively small size, its deplorable labor conditions, its high degree of obsolescence - 87% of its tonnage is nearing 20 years of age - and the apparent inability of most of the private lines to finance replacement, even with the Government's financial assistance, as made available by the Merchant Marine Act of 1936.

The Maritime Commission, however, is meeting with some success in its efforts to build up our Merchant Marine. Twelve fast tankers (16-1/2 knots speed and a carrying capacity of 150,000 barrels of oil) are being built by the Standard Oil Company of New Jersey, and four fast steel cargo vessels (15-1/2 knots, 13,900 tons displacement) are being built for the Commission. The Commission has received bids for eight more, but the contracts have not yet been awarded.

It may be that full Government financing of all new merchant ship-building up to the capacity of present facilities will eventually have to be resorted to; but, even then, several years must elapse before we can be in a reasonably satisfactory status in tonnage, speed and age of ships. And, unless inter-union friction can be reduced, the efficiency of the crews


1 ALUMINUM
2 ANTIMONY
3 CHROMIUM
4 COCONUT SHELLS
5 COFFEE
6 HIDES
7 IODINE
8 QUARTZ CRYSTAL
9 MANGANESE-FERRO
10 MANILA FIBER
11 MICA
SOURCES OF STRATEGIC RAW MATERIALS AND UNITED STATES TRADE ROUTES
1.6.11.12.16.22
KEY. —— TRADE ROUTES
---- ALTERNATE ROUTES
REEXPORTS
U.K. 7 8 11 13 16 17 19 22
GERMANY 16.20
NETHERLANDS 16.20
FRANCE 13
12 NICKEL
13 OPIUM
14 OPTICAL GLASS
15 QUICKSILVER
16 QUININE
17 RUBBER
18 SILK
20 TIN
21 TUNGSTEN
22 WOOL
AMENDED N.W.C. APR. 1938

increased, and order and discipline restored, all Government efforts to develop a strong merchant fleet will be futile.

SLIDE: SOURCES OF STRATEGIC RAW MATERIALS AND UNITED STATES TRADE ROUTES.[1] B38-673

III. STRATEGIC IMPLICATIONS

War will necessarily change the peace-time pattern of foreign trade. It is neither possible nor desirable for the Navy in time of war to protect all the normal sea-borne trade of peace. A very large part of our national shipping will be withdrawn from the trade routes to serve as naval auxiliaries. Foreign bottoms, lured by profits, will take up much of our carrying trade. Certain routes will be threatened, and certain imports denied. Exportable surpluses of peace-time will, in some cases, be retained at home for war needs.

In a war with ORANGE, our inter-coastal sea lanes via Panama and our lines to Hawaii would be of the utmost importance, and would have to be protected against raids; also, our shipping to Europe and to South America, lest these valuable markets be lost and needed imports jeopardized. In the Orient, protection of trade would probably follow as a result of major operations aimed not at commerce protection but at the destruction of the trade and Fleet of the enemy.

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(1) Drawing 790 - Planning Branch, O.A.S.W., Dec. 20, 1937.

In a war with RED, the situation would be far more serious. The routes to Europe would be cut. Trade with Asia would be seriously threatened by hostile cruiser squadrons based on Singapore and Hongkong. Our trade with the Caribbean Area and with South America would be vital.

Our problem would be to make the best possible dispositions for the protection of our shipping without dangerously weakening our forces in the main theater of operations. This would involve an estimate based on sound appreciation of the real value of trade in war, the necessity for particular imports, and the detachment of forces worth risking in order to bring the imports home. Certainly the less we are dependent upon imports, the less hampered will be our prosecution of hostilities at sea. The most logical step, therefore, for the United States to take, before a great national emergency is upon us, is to build up adequate reserves of the key strategic materials essential to our industries and armed forces in war. The cost of satisfactory stock-piles for Navy needs has been estimated at 90,000,000. These reserves, as previously remarked, are now being accumulated - $3,500,000 having been appropriated for this purpose during the present fiscal year. A similar item for $3,000,000, however, which originally appeared in the Naval Appropriation Bill for next year has been struck out by the Senate. (1)

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(1) Army and Navy Register, April 9, 1938.

With an adequate reserve of these key strategic raw materials, not only those required for the Navy but for the Army and Civilian population as well, we could face any adversary with the knowledge that the stoppage of imports would not mean industrial starvation at home.

BIBLIOGRAPHY

Naval War College	Potential Economic Strength and Weakness of the United States for War. 1937.
	The Economic Vulnerability of the U.S. 1936.
	The Utilization of Economic Pressure in the Strategy of War. The U.S. 1934.
Office of the Asst. Secretary of War	Commodity Monographs and latest Committee Studies of Strategic Raw Materials.
Army Industrial College	Lectures and Studies. 1937-38.
Army & Navy Depts.	Industrial Mobilization Plan, Revised, 1936.
Navy Dept.	Strategic Raw Materials, Record of Proceedings of Special Board on. Convened at Navy Dept., Aug. 18, 1936.
U.S.Dept.of Commerce	Statistical Abstract of the U.S. 1936.
	World Economic Review.
	Weekly Commerce Reports on Current Foreign Trade News.
	Monthly Summary of Foreign Commerce of U.S.
	Foreign Shipping News.
	Survey of Current Business (monthly).
	Foreign Investments in U.S., 1937.
	National Income in the U.S., 1936.
U.S. Dept. of Interior	Mineral year Book, 1937.
U.S.Dept. of Agriculture	Agricultural Statistics, 1937.
U.S. Tariff Commission	A Graphic Analysis of the International Trade of the U.S. in 1932.
U.S.Maritime Commission	Ocean-going Fleets of Principal Maritime Nations. Report 1100 (semi-annual).
	Economic Survey of the American Merchant Marine.

U.S.National Resources Committee — Technological Trends and National Policy, June, 1937.

League of Nations — Statistical Year Book.

Current Publications — New York Times

U.S. Naval Institute.

Fortune

Books and Pamphlets — World Almanac, 1938.

The Strategy of Raw Materials -Emeny, 1934.

Great Powers and World Politics- Simonds & Emeny, 1935.

The Price of Peace - Simonds & Emeny, 1935.

Peaceful Change- The Foreign Affairs Policy Association. New York, 1937.

Raw Materials and Colonies- Royal Institute of International Affairs, 1936.

Raw Materials in Peace and in War -Staley,1937.

The Distribution of Income in Relation to Economic Progress-Brookings Institute,1937.