Proposed Text of Cable to Sayre from
Secretary of the Treasury.

re your telegram of December 19, 1941 on enemy property:

On December 18, 1941 the President approved the First War Powers Act, 1941 (Public No. 354, 77th Congress). Sections 301 and 302 of Title III of such Act read as follows:

[Here take in text of Sections 301 and 302 of attached Act]

You will note that these sections amend section 5(b) of the Trading with the enemy Act of October 6, 1917, as amended, pursuant to which freezing control has been administered.

With the approval of the President, and for the purpose of dealing with the Philippine situation, all of the powers and authority conferred upon the President under the above-quoted provisions of law are hereby delegated to you in so far as the Philippines are concerned.

In addition, I am allocating $100,000 from the appropriation entitled "2020120, Salaries and Expenses, Foreign Exchange Control, 1942" to cover your initial expenses in carrying out this program. Please forward to me at once an estimate of the amount of funds (by

- - -

month) that you feel you will need during the next three months.

It will of course be necessary for you, in cooperation with the military and Commonwealth Government authorities, to formulate a program for dealing with this emergency situation. We will be glad to cooperate with you and offer advice and suggestions on any points you may care to raise but we do not want you to feel that you must wait for instructions from Washington. You will be advised from time to time as plans are developed for dealing with enemy property.

The powers conferred by the statute are very broad. Congress expects that complete records will be established and maintained with respect to property seized or otherwise received in your custody. Please be guided accordingly.

You are authorized to take any steps you deem appropriate to make public the authority herein conferred on you.

BBinrd - 12/22/41.

December 22, 1941

Dear Jack:

A copy of Sayre's cable was furnished to your office earlier today.

I am attaching a proposed memorandum to the President and a proposed cable to Sayre to which I would like to get your reaction before it is submitted to the White House.

If you could telephone me in the morning after you have had a chance to go over the papers, it will help materially.

Sincerely,
(Signed) E. H. Foley, Jr.

Hon. John J. McCloy,
Assistant Secretary of War,
War Department,
Washington, D. C.

Enclosures

EHFJr.:vls - 12/22/41

December 22, 1941

Dear E. K.:

A copy of Sayre's cable was furnished to your office earlier today.

I am attaching a proposed memorandum to the President and a proposed cable to Sayre to which I would like to get your reaction before it is submitted to the White House.

If you could telephone me in the morning after you have had a chance to go over the papers, it will help materially.

Sincerely,

(Signed) E. H. Foley, Jr.

Hon. Ebert K. Burlew,
First Assistant Secretary of the Interior,
Room 5116, Interior Building,
Washington, D. C.

Attachments

EHFJr.:vls - 12/22/41

December 22, 1941.

Dear Mr. May:

The Secretary has signed the enclosed copy of the new rules for the custody of Defense Progress Papers, and I am returning it to you herewith.

You will note that Mr. Fitzgerald has also signed as the authorized agent to accept material delivered at his desk for the Secretary.

Sincerely yours,

(Signed) H. S. Klotz

H. S. Klotz,
Private Secretary.

Mr. Stacy May,
Chief, Bureau of Research
and Statistics,
Office of Production Management,
Social Security Building,
Washington, D. C.
Enclosure.

nmc

GEF/dbs

# OFFICE OF PRODUCTION MANAGEMENT

SOCIAL SECURITY BUILDING
WASHINGTON, D. C.

December 17, 1941

The Honorable Henry Morgenthau, Jr., Secretary
Treasury Department
Room 2[illegible], Treasury Building
Washington, D.C.

Dear Mr. Secretary:

Beginning with Issue Number 63 of Defense Progress, the confidential weekly report of the Bureau of Research and Statistics of the Office of Production Management, we are adding your name to our list of recipients. Up to the present we have regularly been sending one copy of this report to Mr. George C. Haas, a recipient in your agency.

More severe restrictions have recently been placed upon our distribution. It is felt that Defense Progress can only continue to serve its most useful purpose by analyzing and reporting data which must be regarded as confidential. To safeguard properly the confidential nature of this material, a rule has been adopted that distribution of the report should be made only to the responsible heads of departments and independent offices. Hence, this report is being sent to you in order that you may distribute it most usefully within your agency and may see that proper safeguards are exercised to keep it filed in accordance with rules prescribed for confidential data. We regret exceedingly the need for restrictions which have been placed upon distribution and the resulting inconvenience for members of your staff. We trust however, that the arrangement here proposed will prove satisfactory.

There is attached hereto 2 copies of the "Rules for the Custody of Defense Progress", one of which we should like you to keep. Will you sign the other and have your authorized agent who may sign for receipt of Defense Progress also add his or her signature and return it to us.

Sincerely yours,

Stacy May

Stacy May, Chief
Bureau of Research and Statistics

Enclosures - 2

## AGREEMENT TO ABIDE BY RULES FOR CUSTODY OF 'DEFENSE PROGRESS'

As a recipient of Defense Progress, the undersigned agrees to act as the custodian of all copies delivered to him and to abide by the following rules which have been adopted to aid in enforcing the Espionage Act:

(1) Not to permit information from any copy in his custody to become available to anyone except Government employees under his immediate supervision who will be bound by the restrictions hereby agreed to and who require access to Defense Progress in connection with their official duties.

(2) To keep all copies IN A SECURELY LOCKED CONTAINER ~~adequately safeguarded~~ when not actually in use.

(3) Not to incorporate information from Defense Progress in any record unless the use of such record is restricted as if the record were itself a copy of Defense Progress.

(4) To give prior written notice of any change of address to the Bureau of Research and Statistics.

(5) On written request from the Bureau of Research and Statistics, or before separation from the Government position which entitles him to receive Defense Progress, to return all copies charged to his account.

Signed_____

_____
Date

## AUTHORIZATION OF AGENT

The undersigned authorized agent agrees so far as lies in his/her power to aid his/her principal in abiding by the rules for the proper custody of copies of Defense Progress as set forth on the reverse side of this form.

Signed _____

_____
Date

Mr.
Miss
Mrs. _____, whose signature is given above is authorized in my absence to sign for and receive copies of Defense Progress addressed to me.

Signed _____

_____
Date

## AGREEMENT TO ABIDE BY RULES FOR CUSTODY OF 'DEFENSE PROGRESS'

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(5) On written request from the Bureau of Research and Statistics, or before separation from the Government position which entitles him to receive Defense Progress, to return all copies charged to his account.

Signed A. M. Smithan Jr.

_____
Date

## AUTHORIZATION OF AGENT

The undersigned authorized agent agrees so far as lies in his/her power to aid his/her principal in abiding by the rules for the proper custody of copies of Defense Progress as set forth on the reverse side of this form.

Signed Edward J. Fitzgerald

_____
Date

Mr.
Miss
Mrs._____, whose signature is given above is authorized in my absence to sign for and receive copies of Defense Progress addressed to me.

Signed_____

_____
Date

# The United States of Europe

## By WINSTON CHURCHILL

*Former British Chancellor of the Exchequer*

I[illegible]n as the sparks fly up[illegible]de from their own weak[illegible] are whirled away by the [illegible] lost in the smoke; they vanish in the [illegible] night. Someone throws on another log of [illegible] effort, and fresh myriads of sparks stream [illegible] the air. Men have always tended these [illegible] them the fruits of their toil—indeed, all [illegible] after keeping body and soul together. [illegible] at rare intervals something exciting results from [illegible] activities. Among innumerable sparks that flash and [illegible] there now and again gleams one that lights up [illegible] the immediate scene but the whole world. What [illegible] that distinguishes the fortunes of one of these potent [illegible] or explosive ideas from the endless procession of [illegible]? It is always something very simple and—once the surroundings are illuminated—painfully obvious. In fact we may say that the power and vitality of an idea result from a spontaneous recognition of the obvious.

For instance, not far from the fire there is a rubbish heap, and as the weather has been very dry for some time and the night breeze is blowing in that direction, one single spark out of all the millions has suddenly acquired enormous importance. It has fallen glowing upon the rubbish; and there is the heap beginning to smolder, smoke and break into flame; and already there is a blaze and everyone can see for himself the rubbish heap and that the spark has set it alight. No one knows how far the flames will go, whose buildings will be threatened or what will happen next. There is no lack of excitement and bustling about and running around, and no one—not even the slowest—has any doubt but that something unusual has happened, or that it all arose from the spark and the rubbish heap coming together in this way. But what to do about it is quite a different tale.

So when the idea of The United States of Europe drifted off upon the wind and came in contact with the immense accumulation of muddle, waste, particularism and prejudice which had long lain piled up in the European garden, it became quite evident that a new series of events had opened.

To quit a metaphor before it becomes a burden, never before have some four hundred millions of the strongest, most educated and most civilised parent races of mankind done themselves so much harm by their quarrels and disunion as have the great nations of Europe during the present century. Never had they more reason to be discontented with the condition to which they have reduced themselves, and never could they see more clearly at once the cause of their misfortunes and its remedy. They have only to look around to see the fair regions they inhabit starved and impoverished by the greatest of all wars, disturbed by hatreds and jealousies which the conflict has only aggravated, and hampered and burdened at every point by fetters and barriers they have themselves created and must spend a large part of their income to maintain.

Then comes science, gathering power every day, and stimulated by the stress and fury of the great war. New possibilities of profitable cooperation in industry, compulsive need for wider and more reasonable distribution of productive effort are apparent to the humblest unbiased intelligence. White coal from mountain torrents readjusts the disparity of mineral deposits. Electric cables transmit, or offer to transmit, new sources of energy and wealth in directions and to areas hitherto unconsidered. Aircraft fly in a day across half a dozen frontiers. Lastly there is the economic and financial portent of the United States. Here is a region little larger than Europe and occupied by only a fraction of its population. Here, too, are regions of vast resources and educated inhabitants, but they are progressing, and prosper at a speed and in a degree never before witnessed, and still increasing. Their resources, although better distributed and disposed, are not so much greater than those of Europe; their population is far smaller.

What are the causes which are favoring the New World and hindering the old? The demand of the masses in all countries is for higher economic well-being. Science and organization stand ready to supply it. Knowledge is not confined to one side of the Atlantic Ocean. Why, then, is the contrast between American and European conditions so cruel and their rates of material progress so unequal? To find the answer, we have only to look at the rubbish heap upon which a brisk flame has already begun to crackle.

We must regard this heap a little more closely in the growing light. It has been the growth of centuries, and

(Continued on Page 48)



One End of Pennsylvania Avenue—and the Other

# THE UNITED STATES OF EUROPE

(Continued from Page 26)

[illegible] have passed since some [illegible] building materials were deposited. [illegible] is made up of the bones and [illegible] of uncounted millions who [illegible] unscathed to violent deaths long [illegible]. Upon these, three or four centuries [illegible] masses of rotting vegetation, and [illegible] an increasing discharge of waste [illegible]. But in it, mixed up with all this litter, scattered about and intermingled, are [illegible] of the most precious and dearly loved treasures of the strongest races in the world. All the history books of Europe are there; [illegible] household gods; all the monuments and records of wonderful achievements and sacrifices; the battle flags for which the heroes of [illegible] generation have shed their blood; the sediments of religions still living and growing in the minds of men; the foundations of the jurisprudence still regulating their relations one with another—all flung and blended together.

Finally the burning of the rubbish heap is not so small a matter as it seemed at the first glance. Should Europeans let it all burn away and start afresh, or must the conflagration be promptly extinguished and the rubbish heap preserved for the sake of the precious relics and possessions it contains? Certainly if this is the choice, and the only choice, there will be two opinions about the burning, and men and nations and interests and social organizations of all kinds will range themselves on opposite sides. But is there no other course? Is there not a more complicated, but more scientific method of dealing with this pile which cumbers the earth? Has not Europe the wisdom, the strength, the patience, by the same process to rescue its treasures and incinerate its rubbish?

Continuing to inspect the burning dump, we observe that it is overlaid with a tangled growth and network of tariff barriers designed to restrict trade and production to particular areas. This network is the product of modern times. It has markedly increased since the Great War. In fact, every improvement which science has given to European communications has been tripped up and rendered largely nugatory by this new and immense apparatus. Nothing like it is to be seen in the United States.

### Real Barriers to Unity

An English member of the House of Commons, an impeccable Conservative—Sir Clive Morrison-Bell, has had the wit and ingenuity to construct a model of the tariff walls of Europe. He mounted a large-scale map and built in imitation brickwork and at their relative heights around the frontiers of the different states the tariff walls which exist in Europe today. The governor of the Bank of England invited him to place it on view in the bank parlor. Since then it has been exhibited in the parliaments and conferences in most of the great capitals. The exhibition has now reached Washington. Sir Clive Morrison-Bell claims that the model enables people to "visualize the idea" and that "its presence does not make a fleeting but a lasting impression," giving "an advantage over the written or spoken word." This is no doubt true. No European can gaze upon the astonishing spectacle of these internal tariff walls of Europe without being amazed at the embarrassments and difficulties in spite of which the people of Europe get their daily bread. This lively impression is stimulated by a glance at the map of the United States and by observing that throughout the whole of that vast territory, possessing within its borders almost every commodity necessary to modern life, there is no obstacle or barrier of any kind except those which Nature has raised and which science is overcoming. Certainly it would seem that the free interchange of goods and services over the widest possible area, or over very wide areas, is a dominating factor in the rapid accretion of material wealth.

But this idea of European unity, so novel to untutored ears, is no more, in fact, than a reversion to the old foundation of Europe. Why should it appear startling to its inhabitants? Europe has known the days when Rumanians lived on the Tyne and Spaniards on the Danube as equal citizens of a single state. She has dwelt in nearer centuries in the catholicity of Christendom. She has rested her emaciated body upon the venerable structure of the Holy Roman Empire. She has seen, as if it were but yesterday, the sword of Napoleon uplifted in a cause which, evil how you may, meant and could only mean, in the terms of political science, a revival under Gallic forms of Roman solidarity. And even in the lifetime of living men she has enjoyed the spectacle of united Italy and endured the overflowing strength of united Germany. Everywhere, in every age, in every area however wide, over every grouping of peoples however diverse, unity has made for strength and prosperity for all within its circle. Why should Europe fear unity? As well might a man fear his own body.

### The Extreme in Nationalism

Upon the petty states, principalities and tribalisms of Europe each intermediate organism had to grow. The majestic Roman scene had passed away. The skimmy bonds by which medieval Christendom had mastered anarchy must be torn asunder. The fierce youth, nationalism, was born for this peculiar task. But nationalism is an agent and not an end. It is a champion and not a breadwinner. It is a ladder and not a story; a process and not a result.

The Treaty of Versailles represents the apotheosis of nationalism. The slogan of self-determination has been carried into practical effect. The weaker or less fortunate competitors in the struggle of races have been set free. The old imperial organizations within which they had been compressed have been disbanded or burst. The Treaties of Versailles and Trianon, whatever their faults, were deliberately designed to be the consummation of that national feeling which grew out of the ruins of despotisms, whether benevolent or otherwise, just as despotism grew out of the ruins of feudalism. All the inherent life thirst of liberalism in this sphere has been given full play.

Europe is organized, as it never was before, upon a purely nationalistic basis. The scissors of treaty making and boundary drawing have cut sharply through the fringes and across disputed border lines. But in the main the Treaties of Versailles and Trianon represent the fullest expression of national and racial feeling which Europe has ever known.

But what are the results? First of all, there is a gasp of relief and expansion, and immediately thereafter a sense of weakness. The organization of Europe today is at once more onerous and less economically efficient than it was before the war. More than seven thousand miles have been added to her customs barriers. Every new frontier has increased the cost in time and money of the transport of goods. A traveler is forced to descend at stations whose names he cannot pronounce and to justify himself to states of which he has never heard. Professor de Madariaga complains that a journey from Paris to Stockholm—although the distance is less than the diameter of many American states—requires no fewer than six different kinds of coins and stamps, the passage of seven different frontiers and the use of five different languages.

The empire of the Hapsburgs has vanished. That immense, unwieldy, uneasy, but nevertheless coherent entity has been Balkanized. Poland has escaped from her eighteenth-century dungeon, bristling with her wrongs and dazzled by the light. The whole zone of Middle Europe, from the Baltic to the Ægean, is split into small states vaunting their independence, glorying in their new-found liberty, acutely self-conscious and exalting their particularism. They must wall themselves in. They must have armies to defend the ramparts. They must have revenues to pay the armies. They must have foundries and factories to equip them. They must have national industries to make themselves self-contained and self-supporting. They must revive old half-forgotten national languages just to show how different they are from the fellows across the frontier. No more discipline of great empires; each for himself and a curse for the rest. What a time of jubilee!

In this vale of tears nothing is more disappointing than getting one's own way. The peoples of Middle Europe, famished by the privations of the Great War, have indulged in a banquet of Dead Sea apples. Even our own pet Ireland has found the task of rejoicing over freedom regained strenuous and bleak. Nationalism throughout Europe, for all its unconquerable explosive force, has already found, and will find, its victorious realization at once unsatisfying and uncomfortable. More than any other world movement, it is fated to find victory bitter. It is a religion whose field of proselytizing is strictly limited, and when it has conquered its own narrow world, it is debarred, if it has no larger aim, by its own dogmas from seeking new worlds to conquer.

The stages of human development press upon one another's heels and, now here, now there, block or trample down one another. Loyalty to the tribe is overtaken by loyalty to the nation; loyalty to the nation obstructs loyalty to the continent; and some day we may see loyalty to the continent a danger to mankind. But nothing is gained by cutting out the intervening stages. Each must find its place in the procession. Each will have its part to play in the assembly, and from every man will some day be required not the merging or discarding of various loyalties, but their simultaneous reconciliation in a complete or larger synthesis.

I am always twitted with using warlike metaphors. But in my life I have been brought in contact with many wars, small and great, and ever since Armageddon the world is familiar with military modes and phrases. In that harsh school pupils received lifelong impressions. Under the pressure of war, men and nations learn to discard unessential things. They reach out in thought and grasp realities. They raise and counterraise among fundamentals. The ordeal is over. Lessons as well as scars have been received. Necessity is the mother of invention, and military organization is the result of intensely concentrated thought. Everyone knows a lot about it. Battalions and brigades are gathered together in a division, and the division forms part of a corps or army. The armies are grouped under a commander in chief, and finally the commander in chief is subordinate himself to the allied generalissimo.

### Wisdom Learned in War

Imagine the ruin which would overtake the army, if there were nothing but battalions and brigades and divisions; if divisional generals sought to meet together in a council of war to settle on every plan, arrange for all the supplies and give their views upon the strategy and policy to be pursued. Imagine, on the other hand, a supreme command which had nothing between itself and the numerous divisions, all marching and maneuvering independently. Either method has but to be considered to be found manifestly absurd. Why cannot Europe in time of peace utilize a little of the wisdom she has bought so dearly in the crunch of war? Why cannot the civilian realize himself as French, German, Spanish or Dutch, and simultaneously as a European and, finally, as a citizen of the whole world. The flame of war has passed, its hideous losses have been written off. Europe might at least gather such experience from that time of trial as has been left upon the ground.

The remediation of the Pan-European idea is largely identified with Count Koudenhove-Calergi. He has conducted his campaign from Vienna. The headquarters are well chosen. The plight of Vienna since the Great War constitutes the bitterest example of the waste and folly of the present system. This forlorn capital, for centuries the seat of an empire, now merely the nodal point of severed or strangulated railways, a London walled in by hostile Irelands, makes its unanswered appeal. It is right that that appeal should be no longer mute. The form of Count Calergi's theme may be crude, erroneous and impracticable, but the impulse and the inspiration are true.

### The Economic Sink

We have, further, a manifesto issued by the bankers in 1927, stating in effect that Europe is slowly strangling herself and that if her economic policy is not reversed she may find herself utterly impoverished and bankrupt. The report of the Consultative Committee of the League of Nations, published last May, supports the bankers. Finally, M. Briand, one of the most powerful, and certainly the most eloquent of European statesmen, has, with all the deft vagueness of an experienced parliamentarian, proclaimed to the Assembly of the League of Nations his adherence to the cause of a United Europe. He would like to see some "federal link" established between all these different states. "The most important component" of that "federal link" should be "economic agreement." He branded the European customs barriers as "mountain chains that divided one state from another." He gained the support of Herr Stresemann and of Doctor Benes. Whereupon the Assembly appointed a committee, under directions to report as soon as may be.

Thus we may exclaim with Eole, "Truth is on the march," but the time has certainly not come when we can complete the quotation—"and nothing will stop her." Let her, then, march forward, and let us aid her march. The farther she can get, the better. We may be quite sure she will not get far enough in the immediate future to do anything but good.

The reflections of European nations upon the need of unity must be stimulated by the financial relations of Europe to the United States. Under the arrangements which have now been agreed to by all parties, practically the whole of the reparations paid by Germany to the countries she has injured will flow by one channel or another to the least harmed and most prosperous member of the victor combination against her. For sixty years to come an immense flow of wealth must roll outward from Europe across the Atlantic. It cannot go in the form of merchandise, for the United States tariffs, rising ever higher, bar the payment of a debit in such a form. It is the declared economic policy of the United States to run at an excess of exports. Therefore, on the one hand, the United States is entitled to these immense prolonged payments and, on the other, will not receive them in any form in which they can be conveyed across the ocean. From this there has followed and, whatever temporary checks may intervene, there must continue to follow, a process of reinvestment of American capital in Europe. This process is cumulative from year to year; ostensibly through the excess of American exports, almost unconsciously, perhaps, by the subtle and surprising manifestations of profits and compound interest.

Sir Josiah Stamp—perhaps the most eminent of practical economists—has made calculations which show that before the

(Continued on Page 30)

[illegible]

[illegible] to the [illegible] "Washington, Washington and Lincoln will together [illegible] of the entire pantheon [illegible]

[illegible] the States of [illegible] by [illegible] with [illegible] they approach a [illegible] of [illegible] liberality. The [illegible] and there is solid [illegible] the German saying: "The [illegible] to be grow up to the sky."

### Two-Way Traffic

[illegible] not to blame the policy of the United States; will lose to language [illegible] and constitutional rights. Another [illegible] may, with blunt justice and [illegible] point out that Europe [illegible] against the United States. The [illegible] of the men and women who [illegible] the American continent took little [illegible] that some they quitted Europe. They [illegible] and [illegible] to [illegible] constitutions. All that they [illegible] and their descendants have made [illegible] by toil and science, and the [illegible] of those natural resources which they had the courage to go out and find. If the New World has grown rich, it is not at the expense of the Old. The Government and people of the United States were in no way responsible for Armageddon. They did not create or foment the intrigue and quarrels which led to that supreme catastrophe. They were drawn into the war against their will, against their tradition, because they were jostled and knocked about by the combatants and forced to take a side and take a part. The movement of soldiers, of warships, supplies, and of treasure, was solely eastward. The traffic was "one way only"—from the United States to Europe. And this ought never to be forgotten by Europe, and will never be forgotten by the rest of the English-speaking world.

Nevertheless, American statesmen and leaders of public opinion in every part of the United States should ponder carefully, and as realists, upon the chains of connection which have now been forged. For sure and certain it is that Europe will not continue for a generation to be an almost bottomless debtor sinking deeper and deeper into the morass of foreign mortgage, without intense internal stresses and the birth of new factors.

Even if she had no such gray and dreary economic prospect, she will be driven anonymous of due to question the monstrous absurdity of her own organization. The peace of the human world was maintained in the age of Augustus by eight hundred thousand armed men. After two thousand years of Christianity and of the accumulation and diffusion of knowledge, after the immense advance in science and the undoubted improvement in culture and morals, on the theme of "the war to end war," more than twenty million soldiers or trained reserves, armed with instruments of inconceivable destructiveness, are required to guard the upper frontiers of twenty-six jealous, impoverished and disunited states. No one can suppose that this is going to last.

From all these causes and others that together fill volumes, the conclusion may be drawn with much confidence that the movement towards European solidarity which has now begun will not stop until it has effected tremendous and possibly decisive changes in the whole life, thought and structure of Europe. It does not follow even that this progress will be gradual. It may leap forward in a huge bound of spontaneous conviction. It may even prove to be the surest means of filling the mind of European nations out of the ruck of old feuds and ghastly revenges. It may afford a rallying ground where socialists and capitalists, where nationalists and pacifists, where idealists and business men may stand together. It may be the surest of all the guarantees against the renewal of great wars.

The League of Nations, from which the United States have so inexplicably—considering their vast and increasing interests—allowed themselves, has perhaps because in fact, it was in time, primarily a European institution. Count Kondenhove-Coleroy proposes to consolidate European forces, interests and sentiments in a single branch which, if it grew, would become the trunk itself, and then inspire obvious predominance. For think how mighty Europe is, but for its divisions! Let Russia slide back, as Count Coleroy proposes, and as it already so largely is fact, into Asia. Let the British Empire, extended to its glorious realities, be now world-spread (that), even so, the mass of Europe, more unified, more federal-less or partially federalized, more continentally self-conscious—Europe, with its Africans and Asiatic possessions and plantations, would constitute an organism beyond compare.

It is evident that up to a certain point the developments now in actual progress will be wholly beneficial. In so far as the movement towards European unity expresses itself by the vast increase of wealth which would follow from it, by the enormous distribution of goods which would attend it, by ever-increasing guarantees against the renewal of war, it bodes no ill to the rest of the world. On the contrary, it can only bring benefits to every nation whose interests are identical with the general interests of mankind. But clearly there are limits, now unknowably to be reached in our lifetime, beyond which a United States of Europe might revive on a scale more vast, and in a degree immeasurably more terrible, the rivalries from which we have suffered so cruelly in our own age. A day of fate and doom for man will dawn if ever the old quarrels of countries are superseded by the strife of continents. If Europe, Asia and America, living, coherent and potentially armed entities, come to watch one another through the eyes with which Germany, France, Russia and Italy looked in the twentieth century. Conflicts of countries are, we trust, ended. They must not be succeeded by the antagonisms of continents. But surely, after all they have gone through, men will have the wit and virtue to take the good and leave the bad; to walk along the high road which leads to wealth and power, without being drawn down the fatal turning to shame and ruin.

### *With Europe But Not of It*

The attitude of Great Britain towards European unification or "federal links" would, in the first instance, be determined by her dominant conception of a united British Empire. Every step that tends to make Europe more prosperous and more peaceful is conducive to British interests. We have more to lose by war than any human organization that has ever existed. The peculiar structure and distribution of the British Empire or Commonwealth of Nations is such that our safety has increasingly been found in reconciling and identifying British interests with the larger interests of the world. The prosperity of others makes for our own prosperity; their peace is our tranquillity; their progress smooths our path. We are bound to further every honest and practical step which the nations of Europe may make to reduce the barriers which divide them and to nourish their common interests and their common welfare. We rejoice at every diminution of the internal tariffs and the martial armaments of Europe. We see nothing but good and hope in a richer, freer, more contented European commonwealth. But we have our own dream and our own task. We are with Europe, but not of it. We are linked, but not [illegible]. We are interested, and we [illegible], but not absorbed. And should European statesmen [illegible] in the world which more need of us—"Washington there to quotation for to the king, or the [illegible] of the land?"—we should reply, with the Shunamite woman, "I dwell among mine own people."

But even this compulsory [illegible] must be reconciled with other forces of British interest. The policy of Chamberlain has endeared us with holdings and connections in South America, and notably the Argentine, which, although in no way affecting the sovereignty of independent states, are of valid and durable importance to us. The alliance of a British Empire [illegible] self-consciousness, is tremendous and, even perhaps a final fact, one never to be wholly [illegible] in calculative terms.

### *The Role of Canada*

Here, then, is an aspect of the British Empire which the people of the United States would do well to study. The King's dominions circle the globe. We can never lend ourselves to any arrangement, however unlikely or remote, [illegible] of wealth, between continents or hemispheres. We belong to no single continent, but to all. Not to one hemisphere, but to both; as well to the New World as to the Old. The British Empire is a leading European power. It is a great and growing American power. It is the Australasian power. It is one of the greatest Asiatic powers. It is the leading African power. Great Britain herself has for centuries been the proved and accepted champion of European freedom. She is the center and head of the British Commonwealth of Nations. She is an equal partner in the English-speaking world.

It is at this point that the significance of Canada appears. Canada, which is linked to the British Empire, first by the growing importance of her own nationhood, and secondly, by many ancient and sentimental ties precious to young and strong communities, is at the same time intimately associated with the United States. The long, unguarded frontier, the habits and intercourse of daily life, the fruitful and profitable exchanges of business, the sympathies and even the antipathies of honest neighborhood, make Canada a binder-together of the English-speaking peoples. She is a magnet, exercising a double attraction, drawing both Great Britain and the United States towards herself, and thus drawing them closer to each other. She is the only surviving bond which stretches from Europe across the Atlantic Ocean. Her power, her hopes, her future guarantee the increasing fellowship of the Nordic races of the East and of the West; in fact, no state, no country, no band of men can more truly be described as the linchpin of peace and world progress.

It is possible to set forth the final conclusions of this brief examination of these deep and long-flowing tides.

The conception of a United States of Europe is right. Every step taken to that end which appeases the obsolete hatred and vanished oppressions, which makes easier the traffic and reciprocal services of Europe, which encourages its nations to lay aside their precautionary panoply, is good in itself—is good for them and good for all.

It is, however, imperative that as Europe advances towards higher internal unity there shall be a proportionate growth of solidarity throughout the British Empire, and also a deepening self-knowledge and mutual recognition among the English-speaking people.

Then, without misgiving and without detachment, we can watch and aid the unsuagement of the European tragedy, and without envy survey their sure and sound approach to mass wealth; being very conscious that every stride towards European cohesion which is beneficial to the general welfare will make us a partner in their good fortune, and that any sinister tendencies will be restrained or corrected by our united strength.

# TREASURY DEPARTMENT

## INTER OFFICE COMMUNICATION

DATE December 22, 1941

TO Secretary Morgenthau

FROM Mr. Kamarck

Subject: Plane Shipments to British Forces

1. In the week ending December 16, a total of 62 planes of all types (43 combat planes) were shipped to British forces.

2. Twenty-three Douglas and Boeing Boston bombers, or more than half of the total shipment of 43 combat planes, went to Russia.

3. For the first time in the period that we have been receiving these statements (since February 1), there were no deliveries of American airplanes to the United Kingdom.

Table A -- Shipments by Area
(From February 1, 1941)

| | Week ending November 25 | | Total Reported to Date | |
|---|---|---|---|---|
| **To the United Kingdom** | | | | |
| Light and medium bombers | 0 | | 1,022 | |
| Heavy bombers | 0 | | 98 | |
| Naval patrol bombers | 0 | | 82 | |
| Pursuit | 0 | | 235 | |
| Army cooperation | 0 | | 21 | |
| Total to the United Kingdom | | 0 | | 1,458 |
| **To the Middle East** | | | | |
| Light and medium bombers | 3 | | 299 | |
| Heavy bombers | 0 | | 5 | |
| Pursuit | 9 | | 748 | |
| Trainers | 8 | | 142 1/ | |
| Total to the Middle East | | 20 | | 1,194 |
| **To the British Pacific Forces** | | | | |
| Light and medium bombers | 0 | | 36 | |
| Naval patrol bombers | 0 | | 12 | |
| Pursuit | 0 | | 119 | |
| Trainers | 0 | | 93 | |
| Total to Pacific Forces | | 0 | | 260 |
| **To the Forces in Russia** | | | | |
| Light and medium bombers | 23 | | 44 | |
| Total to Russian Forces | | 23 | | 44 |
| **To the Canadian Forces** | | | | |
| Light and medium bombers | 0 | | 38 | |
| Naval patrol bombers | 0 | | 13 | |
| Pursuit | 8 | | 42 | |
| Trainers | 11 | | 1,097 | |
| Total to Canadian Forces | | 19 | | 1,190 |
| **Totals** | | | | |
| Light and medium bombers | 26 | | 1,439 | |
| Heavy bombers | 0 | | 103 | |
| Naval patrol bombers | 0 | | 107 | |
| Pursuit | 17 | | 1,144 | |
| Army cooperation | 0 | | 21 | |
| Trainers | 19 | | 1,332 1/ | |
| Total | | 62 | | 4,146 |

1/ Shipment of trainers not previously reported to us are included in this week's cumulative total. Aug. 23, 18 planes; Sept. 6, 24 planes; Sept. 13, 12 planes. (All shipments were to Southern Rhodesia).

Table B -- Shipments by Types
(From February 1, 1941)

| | Week ending Dec. 16 | Total Reported to Date |
|---|---|---|
| Bell Airacobra | 0 | 154 |
| Boeing B-17 | 0 | 21 |
| Boston III | 15 | 39 |
| Brewster Buffalo | 0 | 119 |
| Cessna T-50 | 11 | 544 |
| Consolidated Catalina | 0 | 107 |
| Liberator I | 0 | 22 |
| Liberator II | 0 | 60 |
| Curtiss Kittyhawk | 17 | 382 |
| Tomahawk | 0 | 416 |
| Douglas Boston II | 0 | 29 |
| Boston III | 8 | 449 |
| Fairchild-24 | 0 | 12 |
| Glenn Martin Baltimore | 3 | 68 |
| Maryland I | 0 | 114 |
| Maryland II | 0 | 1 |
| Grumman Martlet II | 0 | 9 |
| Lockheed Hudson II | 0 | 1 |
| Hudson III | 0 | 297 |
| Hudson IV | 0 | 9 |
| Hudson V | 0 | 380 |
| North American Harvard II | 8 | 788 |
| Mustang | 0 | 64 |
| Pitcairn Autogiro | 0 | 5 |
| United Chesapeake | 0 | 52 |
| Vultee Stinson - 049 | 0 | 4 |
| Grand Total - All Types | 62 | 4,146 |

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Table C -- Plane Shipments to the British by Weeks*
(From February 1, 1941)

| Week Ended | Light and medium bombers | Heavy bombers | Naval Patrol Bombers | Pursuit | Army Cooperation | Trainers | Total |
|---|---|---|---|---|---|---|---|
| 35 Weeks (February 1-October 7) TOTAL | 1,241 | 47 | 95 | 741 | 6 | 916 | 3,046 |
| 35 Weeks (February 1-October 7) WEEKLY AVERAGE | 35 | 1 | 3 | 21 | 0.2 | 26 | 87 |
| October 14, 1941 | 45 | 9 | 1 | 68 | 0 | 44 | 167 |
| October 21, 1941 | 21 | 9 | 1 | 50 | 0 | 57 | 138 |
| October 28, 1941 | 10 | 12 | 3 | 38 | 4 | 19 | 86 |
| November 4, 1941 | 19 | 2 | 3 | 45 | 0 | 31 | 100 |
| November 11, 1941 | 13 | 1 | 2 | 34 | 2 | 42 | 94 |
| November 18, 1941 | 5 | 7 | 1 | 67 | 0 | 38 | 118 |
| November 25, 1941 | 6 | 5 | 0 | 23 | 3 | 28 | 65 |
| December 2, 1941 | 19 | 6 | 1 | 47 | 0 | 64 | 137 |
| December 9, 1941 | 34 | 5 | 0 | 14 | 6 | 20 | 79 |
| December 16, 1941 | 26 | 0 | 0 | 17 | 0 | 19 | 72 |
| February 1-December 16, 1941 - Total | 1,439 | 103 | 107 | 1,144 | 21 | 1,332 1/ | 4,146 |

1/ Shipments of trainers not previously reported to us are included in this week's cumulative table. Aug. 23, 18 planes; Sept. 6, 24 planes; Sept. 13, 12 planes. (All shipments were to Southern Rhodesia.)

* Since we do not have a breakdown by weeks of the deliveries to Canadian forces prior to October, no statement of deliveries by weeks is given for this period.

Treasury Department
Division of Monetary Research

Date Dec. 22, 1949

To: Miss Chauncey

I think the Secretary would like to see this. Copies have been sent to Messrs. Bell, Sullivan, Paul, Foley, and Blough.

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MR. WHITE
Branch 2058 - Room 214½

# TREASURY DEPARTMENT

## INTER OFFICE COMMUNICATION

DATE December 22, 1941

TO Secretary Morgenthau

FROM Mr. White

Subject: British Excess Profits Tax.

Advice received in the appended cables indicates the following to be the views of Lord Beaverbrook and Mr. Bevin:

Lord Beaverbrook's views:

1. The excess profits tax affects production adversely through (a) discouraging maximum efficiency, (b) encouraging wasteful expenditures not needed at the present time, and (c) putting a premium on evasive accounting practices which cannot be effectively stopped.

2. Although the 100 percent rate is a political necessity and cannot be lowered, increasing the 20 percent post-war rebate to 30 percent or 40 percent would overcome most of the objections to the tax.

3. He believes that in the United States a 60 percent excess profits tax would be preferable to the English system.

Mr. Bevin's views differ from those of Lord Beaverbrook:

1. In his opinion, any tendency of the tax to cause managerial inefficiency has been more than offset by other wartime measures which place a premium on efficiency. For example, labor cannot be laid off and must be paid at the standard rate. This has stimulated management to increase efficiency and prevent interruptions and delays.

2. In his opinion, criticism comes from financial rather than industrial sources, because the tax is part of a general stabilization scheme which leads to less buying and selling of securities. He expresses the view that Secretary Morgenthau can safely ignore such criticism unless he is forced to pay more attention to Wall Street than the British Government does to financial groups.

3. Many large British business concerns consider the excess profits tax as insurance against socialization, which might be impelled by reaction against war profiteering.

4. He would not object to higher post-war rebates to give larger reserves for post-war purposes, but believes this to be politically not feasible.

PARAPHRASE OF TELEGRAM RECEIVED

FROM: American Embassy, London, England

DATE: December 16, 1941, 9 p.m.

NO.: 6125

THIS TELEGRAM IS IN STRICT CONFIDENCE FROM MR. LAUREN , CHARGE FOR THE SECRETARY OF THE TREASURY.

Reference is made to telegram no. 5169, sent by the Department on the 13th of November 1941.

The following view concerning the excess profit tax was expressed by Lord Beaverbrook. Immediately and with emphasis he made the statement that the present tax effects production adversely. It encourages expenditures which are wasteful or which are not needed at the present time and discourages maximum efficiency. It puts a premium on devising doubtful practices in accounting to evade the tax and at the government's expense to benefit business. It seems as if the chartered accountants who serve industry, whom Lord Beaverbrook sardonically referred to as the largest single class of employees in England or some similar words, can always move a little more rapidly than those who serve the Inland Revenue Bureau, and the result is that no effective stop can be applied to these evasive practices.

The

The statement was made by Lord Beaverbrook that industry is being stripped naked really by the combined effect of the income tax and the tax on excess profits. The public, he said, has never really learned what a real burden on business these combined taxes are and the effects of them are not appreciated by the public.

It is Lord Beaverbrook's belief that most of the difficulties referred to would be overcome by a tax rate of 60 or 70 per cent in spite of the fact that the other 30 or 40 per cent might be blocked or restricted as to use until after the war in some way. The point was clearly made that a lowering of the present tax rate is not advocated by Lord Beaverbrook. It is his belief that politically the tax is a necessity and that there is a political advantage of having a tax rate of 100 per cent in that it is easily understood and rather simple. He even made the statement that were it possible to begin all over again, and have the whole problem of war taxation reconsidered, a 100 per cent tax on excess profits would be advocated by him. He stated that it was his belief that for Britain it was a necessity but for the United States he would not advise it. For our picture he thought a tax of 60 per cent would be better.



WINANT

PARAPHRASE OF TELEGRAM RECEIVED

FROM: American Embassy, London, England

DATE: December 18, 1941, 6 p.m.

NO.: 6119

THIS TELEGRAM IS IN STRICT CONFIDENCE FROM MR. LAUREN W. CASADAY FOR THE SECRETARY OF THE TREASURY.

Reference is made to telegram no. 5169, sent by the Department on the 13th of November, 1941.

It has been denied by Mr. Bevin, with as much emphasis as it was affirmed by Lord Beaverbrock, that the present tax on excess profits leads to inefficient management. He conceded that it might have tended to result in this way if it were not that the operation of other wartime measures have placed a premium on the greatest efficiency. Among these measures most important are the essential work orders which give a standard pay and a standard work week to labor, restrict the right of employers to hire, fire, or lay off men, and restrict labor's free movements. Numerous examples were given by Mr. Bevin which included mining, docking, railroad, iron and steel industries. In these most strenuous efforts have been made by the managements to attain the highest efficiency in spite of several wartime shifts, dispersals and similar readjustments, because it was realized that

labor

labor could not be laid off, and whether used or not, had to be paid at the standard rate.

He gave the explanation that managements were induced by the incentive to use the labor force fully not only to have the workers kept busy in a superficial sense but also to devise within the industry and even on an inter-industrial scale a system of timing and organization by which expensive delays and interruptions would be prevented. Mr. Bevin made the statement that the production in mining is greater now that it was before the war irrespective of the fact that there are now employed over 100,000 fewer men. Improvements within the mines were involved in this as well as greater care in coordination of production with the facilities of the railway and trucking industry. He said that the turnaround period in shipping which was greatly shortened was attained in like manner.

The statement was made by Mr. Bevin that although he is constantly dealing with and meeting representatives of management, no complaint against the present tax on excess profits has been heard by him from such representatives. It is his opinion that from financial rather than industrial sources come the criticism because this tax is a part of a system which was designed to keep the country's economy and profits stablized. This causes

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less buying and selling of industrial securities which is a development the financial community does not accept cheerfully. He made a statement to the effect that Mr. Morgenthau can ignore criticism of this sort safely unless he is forced to attend to Wall Street more than we do to the city.

He also stated that he was sure that the tax was considered a form of insurance against the nationalization of industry by many of the largest business concerns in Britain who were not the least desirous of having it either greatly lowered or removed. He said that it was almost certain that the result of many signs of war profiteering would be an immediate clamour for the socialization of war industry which would be so strong that the Government could not ignore it.

The only criticism Bevin had of this tax was that some firms might be left with reserves which would not be enough to meet readjustments of the post war period. He stated that he would make no objection to a proposal to have the post war tax rebate increased somewhat, but it was his belief that owing to political considerations there was little chance that such a proposal would actually be introduced.

Emphasis

Emphasis was placed by Mr. Bevin on the fact that the tax on excess profits must be considered as a factor of a stabilization scheme which is general and includes stabilization of wages and prices. Monetary deflation and an economic slump will, otherwise, be brought by the post war period. Such a situation after the last war caused directly in 1926 the general strike. Notwithstanding the recent increases in wages, labor is as anxious as government and business to avoid events of this type, he said.

WINANT

December 22, 1941

Mr. White

Mr. Southard

Subject: Renewal of $50,000,000 Stabilization Agreement of 1937 with the Central Bank of China.

1. Paragraph 6 of this agreement provides for notice thirty days prior to the expiration date. The agreement, last extended in July 1941, now expires December 31, 1941.

2. On December 17 the Central Bank of China requested that the agreement be extended for a further six months. Apparently the Central Bank usually is tardy in requesting extension.

3. You have initialed the letter prepared for the Secretary's signature instructing the Federal Reserve Bank of New York to extend the 1937 agreement to June 30, 1942.

4. At the present time, under this agreement, the Stabilization Fund is holding 65,000,000 yuan valued at $19,112,500 and collateralized by $19,379,000 in gold. Prior to the two repayments, totaling 100,000,000 yuan, which occurred in February 1939, the purchases of yuan under this agreement totaled 165,000,000 valued at $48,487,500.

FAS:lap-12/22/41

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DEPARTMENT OF STATE
WASHINGTON

December 22, 1941

In reply refer to
FD 840.51 Frozen Credits/3960

The Secretary of State presents his compliments to the Honorable the Secretary of the Treasury and encloses a copy of confidential despatch No. 1025, dated October 8, 1941, from the American Consulate General, Hong Kong, China, concerning the effect of Hong Kong's entry into the sterling bloc and of the American and British Orders "Freezing" Chinese assets.

Enclosure:

Despatch No. 1025,
from Consulate General,
Hong Kong, China,
October 8, 1941.

1025

Hong Kong, October 8, 1941

CONFIDENTIAL

Effect of Hong Kong's Entry Into the Sterling Bloc and of the American and British Orders "Freezing" Chinese Assets

The Honorable

The Secretary of State,

Washington, D.C.

I have the honor to supplement this office's despatch No. 998 of August 23, 1941, et ante, regarding the recent American and British orders freezing Chinese assets and the action of the British authorities in placing Hong Kong in the Sterling bloc. The following additional comment has been prepared by Consul Bruins.

While there is still a considerable amount of uncertainty and confusion both among bankers and business men as to the details under which these financial measures are being administered, the Colony of Hong Kong is gradually getting down to a working basis.

The only subsequent official enactment has been the order of the Hong Kong Exchange Control issued on September 23, 1941, restricting the withdrawal and conversion of Chinese National dollar deposits. For example, it was possible to withdraw National dollars from local banks or exchange brokers and take them surreptitiously to Shanghai at a profit of twenty percent. The order in question was aimed at stopping this leakage. It apparently had the immediate effect of taking it out of the hands of the more reputable banks and exchange dealers, while Japanese agents and others continued the activity by smuggling notes to Macao effecting telegraphic transfers from there. However this activity is now understood to have declined materially.

The principal matter of interest to the local community is whether the foregoing orders have actually resulted in a material diminution of trade through Hong Kong into Free China, which trade of necessity has to be "smuggled" through the Japanese lines which surround the Colony. The last trade figures available are for August 1941 and do not show any diminution in value. The placing of Hong Kong in the Sterling area is also likely to benefit its trade with Singapore. Several prominent local businessmen and bankers have just been interviewed on this subject. The general opinion is that the increased trade with Singapore will only offset to a small extent the

possible loss in trade with Free China. The extent of the decline in the latter is not readily determinable. Some decline in trade is attributable to the shortage of shipping space rather than to the foregoing financial measures. Thus far the administration of the Sterling bloc restrictions by Mr. D. Kelvin-Stark, Hong Kong's Controller of Exchange, has been notably more liberal than the policy followed in Singapore. Several shipments of trucks and gasoline have received exchange permits and although this has not been admitted as a long-term policy, it appears that the pressure of local business interests (which in this instance coincides with the national policy of granting all possible aid to China) have caused the Controller of Exchange to adopt a definitely more liberal administrative attitude for the time being than is the case in British Malaya. Consequently, it seems unlikely that the actual value of import transactions will undergo any material reduction in the near future. However, it is understood that some restrictions are to be made on "luxury" items.

The important remittance business from United States to China by way of Hong Kong encountered temporary difficulties. On the original issuance of the freezing orders, arrangements were made under special permission from the Hong Kong Government to transfer seventy-five percent of the amounts formerly transmitted. The new instructions of September 23 to local banks restricting the withdrawal and conversion of Chinese National dollar deposits, interrupted such payments temporarily. Foreign remittances to this area can still be paid out in Hong Kong dollars. The Stabilization Board of China has just made arrangements for the local banks to issue drafts in unlimited amounts covering remittances, payable in Chinese National dollars to persons in Free China. Some Hong Kong banks have continued to pay out small amounts in Chinese currency, regardless of the regulations.

As previously reported, the Hong Kong Government recently broadened the requirement under which British subjects had to report their foreign holdings for later conversion into sterling at the official rate, so that it included persons of all nationalities. No steps have been taken to enforce this feature as regards holdings of Americans outside the Colony although the local government immediately prohibited the sending of messages regarding trading in such assets. This immediately stopped the activities of the American brokerage concerns in Hong Kong as reported September 30th. The Chase Bank subsequently applied for special permission on behalf of one of its important clients to effect a stock transfer but was refused. Reference is made to the Department's telegram No. 285, of September 5, 1941, to Hong Kong on this subject, indicating that the Hong Kong authorities will doubtless receive instructions from London to treat American citizens in a manner similar to the practice established in Great Britain in this respect, namely, that Americans residing in Hong Kong will not be required to report their foreign holdings

which were in their possession prior to the effective date of the order. The substance of this telegram was brought to the attention of the Hong Kong Controller of Exchange. He stated that no enforcement had yet been undertaken, that he had received instructions from London of similar tone although not in sufficient detail for him to take positive action. He expressed his appreciation for the information and stated that in due course a corresponding order would probably be issued. He expressed a desire to phrase such an order so that it would not appear discriminatory in favor of Americans and stated that it would probably be made to apply to all aliens not subject to freezing control orders.

The recent enactments appear not to have had any adverse effect on the exchange rate between Hong Kong dollars and American dollars. The former continues to be equivalent to US$0.25.

The American banks are still critical of the action of the Stabilization Board of China in offering sterling and American dollars in Shanghai beginning August 18th at rates below the open market for financing certain imports destined to Free China or to the Shanghai International Settlement. The criticism is based mainly on their assertions that the action was not fully enough considered and upon the extreme difficulty of the banks in ascertaining exactly which import orders were destined to the International Settlement. They further assert that importers in Shanghai are in many cases under Japanese influence and may even unknowingly sell to Japan-agents or to Japanese controlled accounts. The point is that there is no sure way to determine, for example, whether an importation of cotton will actually be imported, spun, woven and sold in such a manner as not to accrue in some indirect fashion to Japanese interests. American banks further assert that their authority is not adequate for them to take the necessary responsibility in this matter, that the British banks, at least the one large British bank having headquarters here, can take such responsibility and, therefore, the British banks are gaining great trade advantages through the present arrangement. One prominent American banker also expressed his opinion that a continuance of the present method of operation will probably necessitate a far larger stabilization fund than is now available in order to produce the desired effect both in import trade and upon confidence in the Chungking currency.

The foregoing summarizes the situation upon the eve of the arrival
1/ in Hong Kong of Mr. H. Merle Cochran and Sir Otto Niemeyer. Enclosed is a copy of an editorial from the usually reliable "Hong Kong Telegraph" of October 6, 1941, entitled "China's Currency" describing the popular interest in the attempt now being made to "make the official Fund watertight."

SUMMARY: From the foregoing, the following conclusions may be drawn:

(1) Much confusion and uncertainty in the administration in Hong Kong of the new financial regulations still exists;

(2) Steps have been taken to reduce the leakage of Chinese National currency from Hong Kong at which large profits were being made;

(3) The expected reduction in the trade of the Colony as a result of its inclusion in the Sterling bloc has not thus far materialized, due to the relatively liberal administration of this order;

(4) It appears probable that the importance of the Colony as a shipping point for supplies into Free China will continue to cause a liberal administration of the Sterling bloc regulations, which would otherwise materially curtail such trade;

(5) The main difficulties in effecting payment at Hong Kong of remittances from the United States to Free China have been overcome;

(6) The Hong Kong Government is adopting a reasonable administrative attitude on the recent requirement that all persons in the Colony must report their foreign holdings for possible later conversion into Sterling at the official rate;

(7) American bankers are still highly critical of the action of the Stabilization Board initiated August 18, 1941, making Sterling and dollar exchange available in Shanghai at advantageous rates for payment of certain imports;

(8) The Hong Kong currency continues to be steady at approximately US$0.25 per Hong Kong dollar;

(9) The operation of the Stabilization Fund appears to be resulting in undue advantage to the British Banks, partly because of the fact that the statutes under which they operate give them greater freedom of action than is the case with American banks;

(10) The American order freezing Chinese assets has caused no adverse criticism in the Colony, nor any observable ill effects beyond the inevitable delays and inconvenience;

(11) Many competent observers still believe that the disadvantages of the inclusion of Hong Kong in the Sterling bloc far outweigh the advantages.

Respectfully,

Addison M. Southard
American Consul General

800
JHB:bp
Enclosure
1/ Editorial from the
Hong Kong Telegraph.

Distribution

In quintuplicate to the
Department - by air mail;
Copy to the Embassy,
Chungking;
Copy to the Embassy,
Peiping;
Copy to the Consulate
General, Shanghai.

Enclosure No. 1 to despatch No. 1025 dated October 8, 1941, from Addison E. Southard, American Consul General at Hong Kong, on the subject of "Effect of Hong Kong's Entry Into the Sterling Bloc and of the American and British Orders 'Freezing' Chinese Assets."

HONG KONG TELEGRAPH
Oct. 6, 1941.

CHINA'S CURRENCY

FINANCIAL experts representing China, the United States and Britain are to meet in Hong Kong this week for the purpose of discussing Anglo-American financial aid to China. The august group will include Sir Otto Niemeyer, the prominent British monetary and economic expert, Mr. H. Merle Cochrane, representing the United States, and members of the China Currency Stabilisation Board, comprising Messrs Manuel Fox, Z. L. Hall-Patch, K. P. Chen, Tsu Yee-pei and Hsi Teh-mou. Naturally enough, considerable secrecy surrounds the mooted parleys, but it is generally conceded that they will cover not only the general subject of British and American financial aid to China, but the many interrelated issues such as the effective operation of the freezing orders, the official bolstering of Chungking's currency in the face of persistent attempts in Shanghai to undermine it, and the development of Free China's economic potential, both as a means of meeting the extensive credits advanced by Washington and London, and as a postwar asset in the rebuilding of China.

The Stabilisation Board has already made quite considerable progress in the fulfilment of its task, notably towards elimination of the Shanghai "black market", but the freezing orders imposed by the ABCD Front have introduced new factors which make Shanghai's position vis-a-vis the democracies extremely complex. To-day the ABCD Front is in a position to confine the whole of its trade with Shanghai to operations financed through its 14 banks, specially licensed for legitimate exchange operations at the Fund's rates. All other trade between Shanghai and the ABCD countries can be cut off entirely, apart from outright smuggling, and this in time would leave Shanghai foreign traders no choice but either to cooperate fully with the Fund, or withdraw from all business with the democracies. The Fund, if it is to be at all effective, must be in a position to set its exchange rates against U.S. Dollars and the Pound Sterling and to see to it that all foreign trade operations are carried out at those rates and not at rates below the official marks.

It has long been known that the Stabilisation Board has experienced great difficulties in making its currency policy effective in operation, due partly to differences of opinion in methods to be applied, but chiefly because of lack of complete cooperation by several of the banking institutions in Shanghai which has permitted the "black market" considerable freedom in its manipulations. This situation has now changed, but doubtless there are other ways and means of making the official Fund watertight, and it is probably to discuss these that the financial experts are meeting in Hong Kong this week. The results of their deliberations will be watched with unconcealed interest.

Copy:bj:12-23-41

THE SECRETARY OF STATE
WASHINGTON

December 22, 1941

Dear Henry:

Thank you very much for your letter of December eighteenth enclosing a memorandum of the same date for the President concerning information furnished you by Mr. Knoke of the Federal Reserve Bank of New York relating to a request of the Lisbao e Azores Bank at Lisbon.

Sincerely yours,

Cordell Hull

The Honorable
Henry Morgenthau, Jr.,
Secretary of the Treasury.

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DEPARTMENT OF STATE

Washington

In reply refer to
FD 894.515/98

December 22, 1941

The Secretary of State presents his compliments to the Honorable the Secretary of the Treasury and encloses a copy of despatch No. 2270, dated November 27, 1941, from the American Embassy, Lima, Peru, concerning shipments of gold bullion from Japan to Peru.

Enclosure:

Despatch No. 2270
From Embassy, Lima,
November 27, 1941.

eh:copy
12-23-41

No. 2270

Lima, November 27, 1941.



Subject: Shipments of Gold Bullion from Japan to Peru.

STRICTLY CONFIDENTIAL

The Honorable

The Secretary of State,

Washington, D. C.

Sir:

I have the honor to refer to the Department's strictly confidential instruction No. 737 of November 18, 1941, with reference to shipments of gold bullion from Japan to Peru.

The statements that the shipments were effected through the Yokohama Specie Bank and consigned to Mr. N. Kobayashi are confirmed by statements of officers of the Central Reserve Bank. Those regarding the purposes of the shipments are more ample than the explanations given at the Central Reserve Bank, although we have no reason for questioning the statements of the latter at the present time, since the value of the bullion received is in line with the volume of recent and current exports to Japan. The appropriation of a part of the shipments for paying the salaries of Japanese officers in Peru would appear to be a natural method of procedure. So far the Embassy has obtained no concrete information nor heard remarks by persons of responsibility to the effect that the funds are destined for other uses. It is quite possible, however, that such is the case and any details which may be obtained will be forwarded promptly.

The Embassy's telegram No. 616 of November 15, 1941, in reply to the Department's circular telegram dated November 14, 1941, 6 p.m., re-

ferred to the Embassy's despatches, No. 1819 of September 26, 1941 and No. 1892 of October 3, 1941, wherein details were given regarding two shipments of gold bullion.

I wish to make particular reference to the first three paragraphs at the top of page 2 of Despatch No. 1892, dated October 3, 1941, which informed the Department that the Central Reserve Bank of Peru requested the opinion of the American Government with reference to these shipments of gold. One of the directors of the bank, under instructions from President Gazzani, made a special point of consulting the Embassy on this matter. He stated that such shipments might possibly conflict in some way unknown to the Peruvian Government with the program or policy of the American Government. He stated further that it is the desire of the Central Reserve Bank to cooperate with the United States and that consequently it would be desirable to know if the American Government would like to have the second shipment of gold bullion rejected and returned to Japan. He said that the Peruvian Government was entirely willing to do so if the American authorities gave the least indication that such action would be considered as a cooperative measure.

The Director has inquired on two occasions since our initial conversation as to whether any reply had been received from Washington. It was necessary to inform him that so far none had been.

Judging from the facts in the case, it occurs to me that we have here an example in which the Peruvian authorities have expressed a willingness to cooperate with us without receiving any favorable reaction on our part. However, I fully realize that Washington may be in possession of adequate reasons unknown to the Embassy for leaving the matter in abeyance.

Nevertheless, if the failure to reply to that portion of Despatch No. 1892 was due to an error or oversight I should be pleased to transmit to the Central Reserve Bank whatever reply the Department considers appropriate in the case.

Respectfully yours,

For the Ambassador,

Julian Greenup,
Commercial Attache.

A true copy of
the signed orig.

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JG-mc

eh:copy 12-23-41

# TREASURY DEPARTMENT

## INTER-OFFICE COMMUNICATION

DATE December 22, 1941

TO Secretary Morgenthau

FROM Mr. Dietrich

CONFIDENTIAL

Registered sterling transactions of the reporting banks were as follows:

| | |
|---|---|
| Sold to commercial concerns | £85,000 |
| Purchased from commercial concerns | £19,000 |

Open market sterling remained at 4.03-3/4, and there were no reported transactions.

The Canadian dollar moved off to close at a new current low of 13-3/4% discount, as against 11-3/4% a week ago. During the past few days, New York banks have placed the daily turnover in this currency in the neighborhood of $50,000 to $100,000.

In light trading, the Argentine free peso declined 10 points to close at .3360.

In New York, closing quotations for the foreign currencies listed below were as follows:

| | |
|---|---|
| Brazilian milreis (free) | .0516 |
| Colombian peso | .5775 |
| Mexican peso | .2065 |
| Uruguayan peso (free) | .5310 |
| Venezuelan peso (free) | .2690 |
| Cuban peso | Par |

We sold $4,988,000 in gold to the Central Bank of the Argentine Republic, which was added to its earmarked account.

The State Department forwarded a cable to us reporting that Samuel Montagu & Company, London, shipped $22,000 and $14,000 in gold from England to the head offices of the National City Bank and the Bankers Trust Company, respectively, for sale to the New York Assay Office.

In London, spot and forward silver were unchanged at 23-1/2d and 23-9/16d, respectively. The U. S. equivalents were 42.67¢ and 42.78¢.

The Treasury's purchase price for foreign silver was unchanged at 35¢. Handy and Harman's settlement price for foreign silver was also unchanged at 35-1/8¢.

We made no purchases of silver today.

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S E C R E T

COORDINATOR OF INFORMATION

*REPORT*

# *SUPPLY ROUTES*

FROM

*THE UNITED STATES*

TO THE

*RUSSO-GERMAN WAR ZONE*

December 22, 1941

SECRET

# SUPPLY ROUTES
# FROM THE UNITED STATES
# TO THE RUSSO-GERMAN WAR ZONE

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PART I

## GENERAL SUMMARY AND CONCLUSIONS

In terms of practical action, Russia's allies cannot now provide an adequate answer to the problem of Russian supply. Apparently the need is extreme, while the only means available for satisfying it are fractional and only half-satisfactory. A realization of the acute difficulty of this situation is the first essential step toward any practical attack upon the problem.

The two outstanding facts are these:

by depriving Russia of a considerable share of her productive capacity, the war has created a critical and drastic need for foreign supplies, and at the same time,

by closing all of Russia's best avenues of foreign communication, the war has made it extremely difficult for friendly countries overseas to act effectively to meet the Russian shortages.

The question of Russia's loss of productive capacity has been treated in some detail in two reports previously prepared in the East-European Section.[1] The industry of the country has been seriously

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[1] "Losses of Russian Industrial Production Resulting from the Eastward Movement of the War Front," 19 Sept. 1941; "Lines of Communication between the United States and the Russo-German War Zone," 16 Oct. 1941 (Part II, "The War Losses of Russian Industry.").

damaged, while Germany's superior productive power is reported to be largely intact. Hence, in spite of the present successes of the Russian armies, it is not improbable that their need for supplies will soon be increasingly acute.

The task of the present report is to explore the routes still available for the shipment of foreign materiel to Russia. When this work was first undertaken, it was conceived of, mistakenly, as the task of selecting the most satisfactory route from among a number to be examined; in the end, it turned out to be the task of assessing the possibilities of a number of rather unsatisfactory routes, all of which will have to be utilized and developed if substantial deliveries are to be made.

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During the preparation of this report, it did not occur to anyone engaged in the work that the results to be presented, as to the capacity of the several supply routes, might be used as a check upon actual performance in the delivery of American goods to Russia. If any attempt should be made to compare actual American (and British) deliveries with the estimates of capacity here submitted, it ought to be remembered, above all, that in most instances these estimates show an extremely wide range of variation. Again, the estimates are stated almost always in terms of tonnage, and the inclusion in current shipments of large amounts of light but bulky cargo (for example, crated airplanes) would tend to reduce very materially the value of

any comparison, on the basis of tonnage, between estimated capacity and actual deliveries. Finally, it must be said that in this report no attempt whatever has been made to enter into the problems of planning, procuring, assembling and loading the required cargo in America, and of providing shipping space for its transportation overseas.

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In normal times the main avenues of Russia's foreign trade run by way of the Black Sea, the Baltic, and the land frontier between those two seas. These avenues are now closed, of course, just as they were during the First World War. But Vladivostok, wide open in 1914-18, is now denied to the ships of countries that are at war with Japan. Murmansk, opened late in the other war to break the blockade of the European frontier, is not used currently for forwarding shipments to the interior of Russia because of the great vulnerability of this route to enemy attack. The Archangel route is threatened, as always, by Arctic ice, but now it is also threatened by the enemy. The Northern Sea Route to the Siberian river mouths is open for a brief season only, in summer. The chief routes through the Middle East are probably occupied very largely with the provisioning, not of the Russians, but of the growing British forces in Iran and Iraq -- though the two roads from India across Afghanistan may perhaps become new "Burma Roads" to Russia. Such are the available transport lines to Russia and the Russian battle front.

*THE NORTHERN ROUTES*

The routes via Archangel and Murmansk are by all odds the shortest between the Eastern industrial centers of the United States and the Russo-German war zone; the distance from New York to Archangel is 4,673 nautical miles. In the ice-free season the port of Archangel can perhaps handle as much as 300,000 tons per month of imports -- by far the largest capacity of any Russian port still open to American ships. Unless the season is exceptionally severe, icebreakers and other aids to ice navigation will in all probability serve to maintain a considerable flow of goods to the small ports nearby, during the current winter, when Archangel is closed by ice, though it is almost certain that the tonnage just mentioned will not be equalled during the winter months. Like the capacity of the port, that of the Archangel-Vologda railway (partly single-track) is the subject of many varying estimates; the line may be able to handle as much as 300,000 tons of southbound freight per month -- or only 135,000 tons. The capacity of the railroad is almost completely available for imports, since it carries scarcely any southbound freight of domestic origin. Archangel has two southeastward connections, one via the Northern Dvina River, and the other by way of a newly constructed railroad branching off from the Archangel-Vologda line north of Vologda. The chief disadvantages of the Archangel route are the ice conditions in the White Sea, and the danger of enemy attack by sea, land and air. Ships bound for Archangel travel under naval convoy a part of the distance; but the

chief danger is that of air attack upon the icebreakers. The number of these indispensable escorts is limited, and without their help merchant vessels cannot navigate the White Sea in winter.

The port of Murmansk is never closed by ice, and has a year-round capacity of perhaps as much as 100,000 tons per month of imports. Its railway connection with Leningrad has been cut by enemy action, but north of the area of enemy occupation there is a new railway connecting the Murmansk line with the Archangel-Vologda railroad. In spite of the obvious advantage offered by the ice-free port, the Murmansk route is not now used for shipments to central Russia; for the present, at least, the danger of attack is considered too serious.

If the transportation of goods to Russia were not beset with so many difficulties, no one would think of mentioning the Northern Sea Route and its river connections to the Trans-Siberian railway. The mouth of the Ob is almost equally distant from New York and from Seattle—about 5,500 nautical miles in either case. The northern seas are open to navigation for a brief season only; and even then the assistance of icebreakers is likely to be required at certain points — a fact that might possibly have some bearing upon American construction programs. Long in miles and short in season, the Northern Sea Route has the advantage of being comparatively safe from enemy attack.

*THE EASTERN ROUTE*

With Japan's declaration of war against the United States and Great Britain, it became impossible for American and British ships to reach Vladivostok (the eastern terminus of the Trans-Siberian railway)

or the neighboring Pacific ports of Russia. Yet as long as Russia remains neutral in this conflict, Soviet vessels and those of other countries not at war with Japan will probably be able to carry cargo of American origin to the Pacific ports of Russia. If Russia and Japan become involved in hostilities, the whole fate of the trade route will then hang on the outcome of the general Far Eastern war. If Japan should be defeated while Germany and Russia are still at war, the Eastern route would be of great significance once again.

Vladivostok is 4,570 nautical miles from San Francisco -- a hundred miles less than the distance from New York to Archangel. But this comparison is deceptive, for the reason that the distance from Vladivostok to the war zone is several times the distance from Archangel to the same region. Also industrial freight from the Eastern states of America, destined for Vladivostok, would travel some additional thousands of miles before it reached the American loading-port on the Pacific. The port of Vladivostok, with a record of 168,000 tons per month in its best post-Revolutionary year, apparently stands somewhere between Murmansk and Archangel (summer average) in freight-handling capacity.

It is impossible to estimate the extent to which the demands of the war have increased the tonnage of Siberian foodstuffs and industrial products moving westward over the Siberian railways, and thus competing with foreign imports for haulage capacity; yet the added burden of such domestic freight is undoubtedly heaviest in Western Siberia, where there are four roughly parallel trunk lines leading to European Russia. Another factor of uncertainty, also undoubtedly affected by the war, is

the amount of rolling stock available on the Trans-Siberian. Leaving aside the indeterminable factor of rolling stock, it seems probable that the Trans-Siberian railway can move westward as much as 250,000 tons of imports per month -- or considerably more than the estimated capacity of the port of Vladivostok. Through four small ports on the Pacific, with their connections by river or road-and-river, a limited amount of freight can reach the Trans-Siberian railway, but hardly enough to affect the supply situation very materially.

*THE SOUTHERN ROUTES*

From the United States to the Russo-German war zone, the Northern Route by way of Archangel (or Murmansk) is by all odds the shortest, the Eastern Route (via Vladivostok) comes next, while the Southern Routes by way of the Middle East are very much the longest. From New York to Archangel the distance is 4,673 nautical miles; from New York via Cape Town to the head of the Persian Gulf is 12,010 nautical miles; from San Francisco via Singapore to the same destination is 11,242 miles. But with hostilities actively under way in the area of Singapore, it is probably necessary, for the time being, for ships out of San Francisco bound for the Persian Gulf to sail by way of the Torres Straits, or even to pass around Australia -- making the total voyage 12,643 miles in one case, and 13,208 in the other. The passage by way of Cape Town or Melbourne is probably comparatively safe, but the sea distance in the latter case is nearly three times as great as that to Archangel, and the subsequent trip from the port to central Russia is also a much longer one.

The Southern system of supply routes is very much more complex than either of the other systems. The routes through Turkey, Iraq and Iran, may be classed as the Western Group of Southern Routes. By the spring of 1942, the routes through eastern Turkey might be expected to forward about 21,000 tons per month (if the Turkish Government would permit their use). From the Persian Gulf via the rivers, roads, and railroads of Iraq and Iran, the deliveries to Trans-Caucasia and to the Iranian Caspian ports may amount, by the same date, to about 100,000 tons per month.

The Eastern Group of Southern Routes is based on the modern port of Karachi in India. One road across eastern Iran, and two across Afghanistan, connect the railways of India with those of Russian Central Asia. After minor improvements — which can best be undertaken, in Afghanistan, by an American agency — these roads should be capable of delivering about 15,000 tons per month each, at the Russian railheads.

As a means of delivering supplies to the main Russian armies, the routes of the Western Group have two conspicuous disadvantages: first, there is probably a tendency to monopolize their capacity for the benefit of the increasing British force in Iraq and Iran; and second, this tendency would be increased, and at the same time the communications of these roads with central Russia would be cut off, if the Germans advanced to the Caucasus and Astrakhan (an event not now so imminent as it appeared to be a short time ago). In other

words, the roads of the Western Group appear well suited to the supply of the British in this area, but not particularly well suited to the supply of the main Russian armies.

The East Iranian Road, connecting with Karachi, may also be required to serve chiefly British needs, but the two roads through Afghanistan would seem to be free for development as supply lines to Russia. The one qualification upon their usefulness is this: in the event of a German advance to the Caspian, the Russian railway through Central Asia would be obliged to transport a large tonnage of Caucasian oil over the long, roundabout line from Krasnovodsk through Tashkent to Chkalov (Orenburg); and this would certainly limit the capacity of the railroad to handle supplies delivered by way of the Afghan roads.

G. T. Robinson
Chief
East-European Section

PART II

THE NORTHERN SUPPLY ROUTES FROM THE UNITED STATES

TO THE RUSSO-GERMAN WAR ZONE

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SEE MAPS I AND II

# THE NORTHERN SUPPLY ROUTES FROM THE UNITED STATES TO THE RUSSO-GERMAN WAR ZONE

## A. *SUMMARY AND CONCLUSIONS*

The northern routes to the Soviet Union run by way of Archangel (on the White Sea), Murmansk (on the Barents Sea, at the extreme northwest corner of Russian territory), and the Arctic mouths of the great Siberian rivers.

*The Route via Archangel*

The chief factor in favor of the route via Archangel is its large capacity in the ice-free season -- a capacity that can in all probability be maintained in a substantial degree this winter. The chief unfavorable factors affecting this route are the uncertainty as to the effect of winter conditions, and the vulnerability of the sea lanes, the port, and the inland connections to enemy attack.

To what extent can the navigation of the White Sea be maintained during the winter months? In an attempt to answer this question, a number of different subjects have been examined: the complex ice conditions of the White Sea, the past performance of icebreakers in other north-Eurasian waters, the drive to bring ships through the ice to Archangel during the First World War, and the means available for the ice campaign of the current winter. There is no common measure for all the factors that must contribute to the solution of this problem; but the tentative conclusion of this study is, that unless the present winter is one of very exceptional severity, navigation on a considerable scale can be maintained. The conditions are so variable and so difficult to measure that the ice-campaign has much of the uncertainty of a naval war.

but the chances seem to be rather definitely on the side of a limited success.

Just how limited, it is quite impossible to say. Official foreign and Soviet estimates of the capacity of the port vary greatly, even for the summer months when the ice is out and this major factor of uncertainty is eliminated; but the record of the past performance of the port suggests that in the ice-free season it might perhaps handle incoming freight totalling as much as the highest recent foreign estimates of 300,000 tons per month. A British representative in Russia believes that some 24 vessels per month can be discharged at two smaller neighboring ports when Archangel is closed by ice; an American representative there puts the figure at 36 to 39 ships. The Soviet authorities expect on their part, to maintain this winter a considerably larger inflow and discharge of freight.

Archangel is connected with central Russia, via Vologda, by a railway that has for some distance south of the port only a single track. An American railway of this type would handle something more than 300,000 tons per month in each direction -- that is, more than the highest estimate for the monthly import capacity of Archangel in summer. However, nearly all the current estimates of the capacity of the railway fall very much below this figure, and a recent cable from an official American source in Russia says that the line can carry, southbound, a total of only about 135,000 tons per month. Besides the Archangel-Vologda railway, there is a good southeastward connection from Archangel by river (utilizable by tractor-and-sled trains in winter) and then further on by rail; and there

is also a new railway connection eastward from Konosha, a point north of Vologda on the Archangel line.

The chief military danger to the route is probably the threat of air attack upon those indispensable escorts of all cargo vessels -- the icebreakers. The freighters at sea, the port, and the railway are likewise vulnerable. However, the capture of Vologda -- now less probable than it appeared to be a short time ago -- would not leave the situation entirely hopeless, for there would still be two southeastward by-passes (the Northern Dvina River and the Konosha Railway) to the Volga valley and central Russia.

*The Murmansk Route*

This route was developed to meet the needs of the First World War, but in those days there was no German-Finnish front stretching beyond the Arctic Circle and constantly threatening the sea approach, the port, and the connecting railway. In favor of the use of Murmansk, is its considerable year-round capacity (the port is never closed by ice and it may be capable of handling as much as 100,000 tons per month of imports). Also, a new railway leading from the Murman line to the Archangel railway provides a by-pass around the area occupied by the enemy. But unless the local military situation is radically improved, the Murmansk route will continue to be the extremely vulnerable to attack.

*The Northern Sea Route*

The one advantage of the Northern Sea Route, for American shipments to the Soviet Union, is that it is much less exposed than are the other northern routes to attack by the enemy; the chief unfavorable factors

are the great length of this round-about way, the extreme brevity of the navigation season, and the limitations on the total tonnage than can be handled.

The river system of the Ob, up to the capacity of its seaports, its channel, its river fleet, and its railheads, is the most useful one in Siberia for the freighting of supplies from the United States to central Russia and the war front; the Yenisei comes next, and the Lena is a very poor third.

G. T. Robinson

B. *THE ROUTE VIA ARCHANGEL*

1. *The Problem*

The first problem set for this division of the study was to determine, under assumption of peace-time conditions, the extent to which the port of Archangel (and the smaller neighboring ports) could be utilized for the shipment of American supplies to the Soviet Union. This required an examination of the sea approaches, the facilities of the ports, and the inland connections by rail, by river, and (potentially) by tractor-and-sled train. The factor that is hardest to measure, here, is the influence of the Northern Winter -- most particularly upon the navigation of the White Sea.

The second major problem involved is that of the vulnerability of this route to attack by sea, by air, and by land. If it is difficult to determine, even within wide limits, the peace-time capacity of the Archangel route (especially in winter), it is far more difficult to measure the military factors in the situation. Yet it is obviously unrealistic to present a report that takes no account of military conditions that impinge upon the subject at so many points and with such a powerful influence. The best that can be done, under the circumstances, is to mention some of the military problems as they arise, without pretending to measure in any definite way their effect upon the situation.

2. *The North Atlantic and the Barents Sea*

The sea route from the port of New York to Archangel is approximately 4,673 nautical miles in length, and ships are not likely

to encounter difficulties from ice west of Sviatoi Nos Point, near the mouth of the White Sea. The length of the voyage would be considerably increased if a northerly course were chosen in order to diminish the danger of attack by airplanes and submarines based on the northern coast of Norway or of Finland. Another and more limited hazard is the possibility of attack by surface raiders. Ships sailing from the United States for Archangel are probably compelled to travel in convoy, thus entailing demands on the Navy for escort vessels, and involving delay through slow steaming.

3. *Ice Conditions in the White Sea and its Western Approach*

a. *Types of Ice in this Area: Definitions*

Many types of ice appear in the White Sea and its western approach, and several different terminologies have been used in describing them. For purposes of convenience, the terminology used in this report is that employed by the Hydrographic Administration of the Soviet Union in its various publications.

The main types of ice which offer obstruction to navigation in the White Sea and its western approach during the winter months are the following:

1. *land ice* (or shore ice) - compact, stationary ice attached to the shore and extending into the open sea or between two points of land;

2. *drift ice* - unattached to the land, and consisting of the following main types;

a. *small-floe* - small pieces of ice produced by the break-up of large sheets, and never attaining complete, continuous

coverage of a given area;

b. *large-floe* - like small-floe ice, except that the broken pieces are larger;

c. *field ice* - large compact sheets of ice that have broken off from land ice or have been formed by the freezing together of small-floe ice, large-floe, or masses of water-soaked, frozen snow;

d. *floebergs* - more or less isolated floating heaps (not fields) of ice formed by the piling up of small-floe or large-floe ice;

3. *hummocks* - heaps formed in land ice or field ice by the crushing pressure of winds and currents, and consisting of several floe masses (large and small) piled one upon another and compressed and frozen into one mass.

4. *pack ice* - "an immense accumulation of ice of all types, particularly of broken pieces of solid ice and icebergs, which have been forced together again and frozen once more into a single mass."[1]

b. *Ice Conditions in the Western Approach*

The Barents Sea extends from the North Cape and Spitzbergen to Novaia Zemlia. Because of the influence of the Gulf

[1]Glavnoe Gidrograficheskoe Upravlenie, *Rukovodstvo dlia Plavaniia vo L'dakh Belogo Moria* (Chief Hydrographic Administration, *Guide to Navigation in the Ice of the White Sea*) (Leningrad, 1921) pp. 13-18. V. Stefansson says, "We have pack ice often (in fact usually) without icebergs."

Stream, vessels eastbound from the Atlantic are not likely to meet with any difficulty from ice west of Svyatoi Nos Bay, near the mouth of the White Sea. It is planned that in the ice season, large convoys shall anchor here in connecting Yukonga Bay, and that between this point and Archangel the cargo ships shall proceed in small groups under the escort of icebreakers.

Navigation in Svyatoi Nos Bay is very rarely obstructed by ice.[1] As Table I (below) indicates, in the average year ice appears at Svyatoi Nos Lighthouse on February 5 and disappears May 8; and in some years between 1891 and 1920 no ice appeared at all. In 1927-1928, ice appeared in the Bay for only two days, and in 1928-29, no ice appeared at all.[2] The density of the ice, observed from Svyatoi Nos Lighthouse, as Table II (below) indicates, is relatively low, and the land ice that forms along the Bay does not extend far out. Because of winds and shoals, however, the anchorage at Svyatoi Nos is not as satisfactory as in the connecting Yukonga Bay (Roads) when the latter is ice-free.

Ice conditions in Yukonga Bay (Roads) are highly uncertain. Land ice may form at the end of December or in January; and it may last, with intervals of interruption, until some time in the period from March to May.[3] The thickness of the ice is not ascertainable

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[1]Great Britain. Hydrographic Department, *Arctic Pilot* (London, 1933), I, p. 177.

[2]*Ibid.*, I, pp. 176-7.

[3]*Ibid.*, 173-75.

from available sources. During the intervals of interruption,[1] the ice may be cleared completely, or there may appear large-floe ice

[1]The following comment was written 13 Dec. 1941 by Vilhjalmur Stefansson:

"In the last paragraph under "b" is a reference to interruptions when "the ice may be cleared completely or there may appear large-floe ice dangerous to navigation.

"These "interruptions" are referred to in English language terminology as the ice "going abroad." It results from a main cause, and from one or more subsidiary causes.

"The main cause is that a strong wind, perhaps a gale, is blowing over a large area that may be so distant that the wind itself is not felt locally. But this wind builds up a "tide" which, in places like the eastern part of the north coast of Alaska, is 5 or 6 feet higher than the maximum lunar tide. This rise of water tears the landfast ice loose from its shore moorings.

"If the local wind happens to be such as to blow towards the land, the shore ice so loosened will remain and will not be broken up materially. But there may be (a) a current which has been created in connection with the rise of water or (b) an offshore wind or one parallel to the shore in either direction. The current or local wind may carry the landfast ice out into a region that was previously open water or moving ice, whereupon this drifting land ice will gradually break up in floe and field ice.

"Surely there must be available somewhere for the White Sea information on what kind of wind it is that creates the high tide which in turn may bring about the loosening of the land ice, and its fracture into cakes and floes — the mentioned "interruption". It is of great importance to get this information, if possible; for with it the captains of incoming ships, and local people on the shore of the White Sea, can forecast (by knowledge of what wind is blowing, and where) the probabilities of stability or instability of the shore ice. This forecast might be for anything between 6 and 18 hours — ample time for removing supplies and machinery from the land ice, preventing their loss by being carried out to sea.

"On the western section of the north coast of Canada and on the north coast of Alaska it is southwest and west gales in Bering Sea and over the polar sea west of Barrow that create the "tides" that pry loose the land ice, which begins to rise from 8 to 12 hours before the gale arrives. If there is, locally, a wind that will take ice away, the land ice may actually move out before the strong wind arrives, so that a heavy sea can be whipped up in the newly opened water, the area which has been vacated by the land ice."

dangerous to navigation. These intervals usually last only a few days. Yukonga Bay is believed preferable to Svyatoi Nos as a shelter for vessels waiting for ice breakers to appear, or for ice conditions to improve farther south.[1]

c. *Ice Conditions in the White Sea*[2]

On the average, the period in which ice is a menace to navigation, to and from the port of Archangel, is 189 days in length--a figure arrived at by almost two centuries of observation.[3] In the average year the ice stops navigation

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[1]Great Britain, Hydrogr. Dept., *Arctic Pilot*, 1933, I p. 172-7; Glavnoe Gidrograficheskoe Upravlenie (Chief Hydrographic Office), *op. cit.*, p. 63

[2]The master of each American ship navigating these northern waters might well be provided with a copy of Stefansson's *Arctic Manual*, Washington, Government Printing Office.

[3]The data for ice conditions in the White Sea are taken from Gidrograficheskoe Upravlenie, *Svedenii L'dov na Moriakh S.S.S.R., Zima 1926-27, 1927-28, 1928-29, 1929-30, 1930-31, 1931-32* (Hydrographic Administration, *Information on Ice Conditions in the Seas of the U.S.S.R., Winters of* 1926-32) (Leningrad, 1928-36); Gidrograficheskoe Upravlenie, *Lotsiia Belogo Moria* (Hydrographic Administration, *The White Sea Pilot*) (Leningrad, 1932) pp. 167-169; Great Britain, Hydrographic Department, *Arctic Pilot* (London, 1933), I. pp. 41-43, 173; Glavnoe Gidrograficheskoe Upravlenie, *Rukovodstvo dlia Plavaniia vo L'dakh Belogo Moria* (Chief Hydrographic Administration, *Guide to Navigation in the Ice of the White Sea*) (Leningrad, 1921), pp. 32-42, 51; Glavnoe Gidrograficheskoe Upravlenie, *Zapiski po Gidrografii* (Chief Hydrographic Office, *Annals of Hydrography*) (Leningrad, 1923), XLVII, pp. 24-31. Some information was also obtained from Danske Meteorologisk Institut, (Danish Meterorological Institute), *Isforholdene i de Arktiske Have. Almindig Oversigt, Gennemsnitsgraenser m.m., (The State of the Ice in the Arctic Seas. Summary, Average Limits, etc.)*, (Kjobenhavn, 1917).

(of vessels without the aid of icebreakers) during the last half of November, and prevents navigation until the first half of May. Occasionally, navigation without the aid of icebreakers cannot be resumed until June. For the Bay of Archangel (Dvina Bay), upon which the port of Archangel is located, the average date of freezing during a forty-year period was November 9; the earliest date of freezing in this period was October 22, and the latest date was December 5. The average date of the break-up of the ice in the Bay of Archangel during this forty-year period was May 6; the earliest date was April 24 and the latest was May 22. The complete disappearance of the ice follows the break-up by a few days. The following table gives the dates for the ice conditions at various observation points in the White Sea.

The areas where the greatest difficulties for icebreakers are likely to be encountered are the Northern Zone at the mouth of the White Sea, the Gorlo (throat) of the Sea, and the Gulf of Archangel (Dvina Gulf). As Table I indicates, the Northern Zone and the Gorlo do not freeze over completely from shore to shore.[1] Hence, the serious obstacle to navigation in these areas is not continuous land ice, but drift ice of various sizes, densities and thicknesses.

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[1] A publication of the Danish Meteorological Institute states: "In some winters, however, the fixed ice may stretch all over the sea and every winter the mouth of the White Sea freezes up as far as can be seen from the Coast." Danske Meteorologisk Institute, *op.cit.*, p. 2. If this statement is meant to imply that the Northern Zone and the Gorlo freeze over completely, it conflicts with the results of apparently much more complete observations.

TABLE I

*DATES FOR APPEARANCE OF ICE, COMPLETE FREEZING OVER AND DISAPPEARANCE OF ICE IN THE WHITE SEA*

(Glavnoe Gidrograficheskoe Upravlenie, *Rukovodstvo* ..., pp. 34-36.)

| Location and Period of Observation | | Appearance | Complete Freezing over[1] | Breakup | Disappearance |
|---|---|---|---|---|---|
| Sedlovati Lighthouse (1919) | Average | III/17 | Does not freeze over completely | | III/19 |
| | Earliest | | | | |
| | Latest | | | | |
| Semiostrovski Lighthouse (1911-1916)[2] | Average | III/17 | " | | IV/23 |
| | Earliest | III/2 | | | |
| | Latest | | | | V/22 |
| Svyatoi Nos Lighthouse (1891-1920)[2] | Average | II/5 | " | | V/8 |
| | Earliest | I/11 | " | | |
| | Latest | | " | | VI/20 |
| Gordetski Lighthouse (1909-1920) | Average | I/19 | " | | V/17 |
| | Earliest | I/4 | " | | III/31 |
| | Latest | II/2 | " | | VII/6 |
| Orlovski Lighthouse (1888-1920) | Average | XII/19 | " | | VI/1 |
| | Earliest | XI/10 | " | | IV/24 |
| | Latest | I/22 | " | | VII/14 |
| Morjovski Lighthouse (1889-1920) | Average | XI/29 | " | | V/28 |
| | Earliest | X/24 | " | | IV/22 |
| | Latest | I/10 | " | | VI/20 |
| Abramovski Lighthouse (1911-1920) | Average | XI/6 | " | | VI/1 |
| | Earliest | X/18 | " | | IV/24 |
| | Latest | XI/21 | " | | VI/22 |
| Istni Lighthouse (1910-1920) | Average | XI/21 | " | | V/12 |
| | Earliest | X/11 | " | | IV/6 |
| | Latest | XII/28 | " | | V/21 |
| Sosnovets Lighthouse, (1888-1920) | Average | XI/21 | " | | V/22 |
| | Earliest | X/15 | " | | IV/18 |
| | Latest | XII/31 | | | VII/8 |
| Zimnegorski Lighthouse (1888-1920) | Average | XI/22 | " | | V/12 |
| | Earliest | X/18 | " | | IV/5 |
| | Latest | I/10 | | | VI/9 |
| Mudyugski Lighthouse (1888-1920) | Average | X/26 | " | | V/20 |
| | Earliest | X/11 | | | V/6 |
| | Latest | XI/18 | | | VI/9 |
| Mudyugski V Towers Line (1888-1920) | Average | X/27 | I/14 | IV/16 | V/17 |
| | Earliest | X/15 | XII/19 | III/1 | IV/26 |
| | Latest | XI/20 | II/19 | V/14 | VI/29 |
| Archangel (1881-1920) | Average | X/28 | XI/9 | V/6 | V/12 |
| | Earliest | X/10 | X/22 | IV/24 | IV/28 |
| | Latest | XI/20 | XII/5 | V/22 | V/28 |
| Jijginski Lighthouse[3] (1889-1918) | Average | XII/1 | I/14 | IV/28 | V/26 |
| | Earliest | X/24 | XII/20 | IV/12 | V/1 |
| | Latest | XII/22 | II/11 | V/21 | VI/21 |
| Solovetski Lighthouse (1888-1893, 1911-1916) | Average | XI/25 | Does not freeze over completely | | V/25 |
| | Earliest | X/27 | | | V/16 |
| | Latest | XII/24 | | | VI/15 |
| Letni Orlovski Lighthouse (1910-1920) | Average | XI/11 | " | | V/20 |
| | Earliest | X/14 | | | V/5 |
| | Latest | XII/2 | | | VI/16 |
| Chesmenski Lighthouse (1908-1920) | Average | XI/22 | " | | V/21 |
| | Earliest | XI/2 | | | V/5 |
| | Latest | XII/11 | | | VI/18 |
| Jujmuiski Lighthouse (1890-1920) | Average | XII/3 | " | | V/20 |
| | Earliest | XI/11 | | | IV/17 |
| | Latest | XII/24 | | | VI/26 |

[1] "Complete freezing over" means that ice covers the given area from the point of observation to the horizon.

[2] During some years in the period under observation, no ice appeared at the Svyatoi Nos and Semiostrovski Lighthouses.

[3] The data for the complete freezing over and the breakup apply to the straits between Jijginski Island and the mainland.

Sometimes the drift ice attains a high degree of density. The following table indicates this density at various points and at various times of the year.[1]

It may be noted in connection with the density of ice that, according to one authority, sailing ships can navigate when one-half of the visible area is covered with ice (5 points in Table II); and steam ships can navigate when three quarters of the visible area is covered (7½ points in the Table).[2]

In the Northern Zone (the location of the Morjovski and Orlovski lighthouses), the drift ice occupies a large proportion of the area, and makes navigation without the use of icebreakers a very hazardous enterprise. The ice encountered is usually small-floe, large-floe, and field. The field ice is composed of fused masses of water-soaked frozen snow and of land ice which has broken off and has drifted into the Northern Zone. These fields usually reach a thickness of 1½ to 2 feet; they rarely go beyond 2½ feet, although a field from 5 to 6 feet thick was once observed.[3] Ice hummocks and floebergs may also be encountered. These usually attain a thickness of from 6 to 9 feet above water and from 18 to 27 feet below water; sometimes, however, they may extend as much as 70 feet or more below the water line. Such ice must, of course, be avoided rather than penetrated.

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[1] *Ibid.*, p. 51.

[2] *Ibid.*, p. 53.

[3] *Ibid.*, pp. 39-40.

TABLE II

*DENSITY OF ICE BY SEMI-MONTHLY PERIODS, 1914-1920 (by points).*

The point system for measuring ice density is based on the following plan:

0 represents the complete absence of ice within the visible area;
10 represents the complete coverage of the visible area (from the observation station to the horizon);
The figures between 0 and 10 represent the number of tenths of the visible area covered with ice.

| | Nov. | | Dec. | | Jan. | | Feb. | | March | | April | | May | | June | | The Highest Degree of Density |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | I | II | I | II | I | II | I | II | I | II | I | II | I | II | I | II | |
| Svyatoi Nos Lighthouse | 0 | 0 | 0 | 0 | 4 | 4 | 3 | 4 | 5 | 6 | 4 | 4 | 4 | 5 | 4 | 2 | 6 |
| Orlovski Lighthouse | 1 | 1 | 2 | 3 | 6 | 7 | 7 | 8 | 8 | 7 | 7 | 7 | 7 | 5 | 5 | 3 | 8 |
| Morjovski " | 1 | 4 | 6 | 6 | 8 | 9 | 9 | 9 | 9 | 9 | 9 | 8 | 8 | 6 | 5 | 3 | 9 |
| Sosnovets " | 1 | 1 | 4 | 4 | 8 | 8 | 8 | 9 | 9 | 9 | 8 | 9 | 8 | 6 | 6 | 4 | 9 |
| Istsi " | 2 | 3 | 4 | 5 | 7 | 8 | 9 | 9 | 9 | 9 | 8 | 7 | 4 | 4 | 4 | 1 | 9 |
| Zimnegorski " | 2 | 2 | 4 | 5 | 8 | 9 | 9 | 9 | 9 | 8 | 8 | 6 | 4 | 2 | 1 | 0 | 9 |
| Nudyugski " | 3 | 4 | 4 | 6 | 8 | 9 | 8 | 9 | 9 | 8 | 7 | 6 | 4 | 3 | 1 | 0 | 9 |
| Nudyugski V Towers Line | 4 | 5 | 6 | 8 | 9 | 10 | 10 | 10 | 10 | 10 | 10 | 9 | 7 | 6 | 4 | 0 | 10 |
| Abramovski Lighthouse | 3 | 5 | 6 | 7 | 7 | 8 | 7 | 7 | 8 | 8 | 6 | 6 | 6 | 3 | 7 | 5 | 8 |
| Jijginski " | 0 | 1 | 4 | 6 | 8 | 8 | 9 | 8 | 9 | 9 | 8 | 7 | 6 | 4 | 3 | 2 | 8 |
| Letne-Orlovski Lighthouse | 1 | 1 | 3 | 6 | 8 | 8 | 8 | 8 | 7 | 7 | 6 | 5 | 5 | 4 | 1 | 0 | 8 |
| Chesmenski " | 1 | 2 | 3 | 7 | 8 | 9 | 9 | 9 | 8 | 8 | 8 | 6 | 5 | 3 | 2 | 0 | 9 |
| Jajmuiski " | 0 | 4 | 5 | 6 | 7 | 7 | 7 | 7 | 7 | 8 | 8 | 8 | 4 | 3 | 0 | 0 | 8 |

The Gorlo (the location of the Intsi and Sosnovets lighthouses) is filled with the various types of ice mentioned in the above paragraph. The Gorlo, although narrow, is prevented from freezing over completely by the presence of strong currents. Much of the ice that is carried from the north can be cleared temporarily by strong southwest winds; but a northwest or northeast wind may bring a return of the ice. Occasionally, ice hummocks become so extensive in the Gorlo that they halt icebreakers for several days; that is, until they are removed by winds.

In the Basin (a small part of which, near the Zimnegorski Lighthouse, is crossed on the way to and from Archangel) the formation of thick ice is prevented by the presence of tidal currents that break up the ice soon after formation. In the White Sea, as a whole, borders of land ice of varying width form along the shores, in the narrows, and between the islands.

Since the problem of winter navigation in the Northern Zone, the Gorlo and the Basin is caused by the drift ice, the direction of winds and currents has a very great influence upon the ice conditions at any given time and place. An intensive study of winds and currents, coupled with land and aerial reconnaissance, can therefore facilitate the passage of icebreakers and thin caravans through the ice. It may be noted, in this connection, that ice fields in the White Sea have been known to drift at the rate of from eight to twenty-five miles in twenty-four hours.[1]

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[1] *Ibid.*, p. 52

d. *Ice Conditions in the Gulf of Archangel*

The head of the Gulf of Archangel becomes filled with drift ice, as Table I indicates, about the end of October. Later, usually about the middle of November, a large part of the Gulf becomes filled with land ice, which at the head of the Gulf attains a thickness of 24 feet. When the Northern Dvina and Mezen Rivers begin to thaw, usually about the middle of May, the ice emerging from the rivers completely stops navigation - even with the aid of icebreakers -- for a few days. Over a period of 184 years, the average date for the break-up of the Dvina River was May 12, six days later than the average date for the break-up of the ice at the head of the Gulf of Archangel.[1]

H. R. Weinstein

4. *The Past Performance of Icebreakers in Other North Eurasian Waters.*

a. *Types of Icebreaker Craft*

By the time of the First World War, navigation in ice had been revolutionized by the introduction of craft specially built to deal with ice conditions of various types. Such craft are indeed indispensable if navigation is to be maintained in any area in which heavy freezing takes place. There are many types of ships designed to deal with ice of different kinds. Since in the remainder of this report there will be repeated references to different types of icebreaking craft, it may be well at this point to define these types

[1] *Ibid.*, p. 35

*Port Icebreakers* are ships of comparatively small size, power, and tonnage. They are designed to maintain navigation inside a port and to a certain extent to keep open the approaches to the port. An example of such craft is the *Gor* used at Archangel in 1917--a vessel of 1300 H.P.

*Icebreaking freighters are freighters of small size* and limited power with some capacity for cargo. They are essentially very strongly built ships, especially reinforced at points of strain. An example of this type is the famous Russian ship *Sedov* of 1300 tons displacement and 2200 H.P.

*Icebreakers* (called *ledokoly* in Russian) are ships generally of greater capacity and power than either port icebreakers of icebreaking freighters. They are equipped to deal with severe ice conditions and to steam a long distance and a long time through the ice. They crush the ice by pushing down on top of it with their prow, which action is sometimes assisted by a fore-propeller which draws out the water from under the ice. An example of this type is the Russian *Yermak* of 10,000 tons displacement and 10,000 horsepower.

*Icecutters* are ships whose prow is designed to cut the ice. They do not operate very effectively in stationary ice although they are satisfactory in drift ice. An example of such is the old *Lithe* (ex-*Kanada*, ex-*Lord Grey*), still in use in Russia.

b. *Factors Controlling the Performance of Icebreakers.*

The speed that an icebreaker (or an icecutter) can make is a function of many variables. The power and construction

of the ship obviously are very important. Just as significant are external, uncontrollable factors. In the first place, the thickness of the ice naturally affects the speed of an ice-breaking craft. More important, however, than the thickness of the ice is its nature. The reaction of pack ice of a given thickness to the pressure of an icebreaker is very different from that of level land ice of the same thickness. The mode of freezing influences greatly the structure and resistance of the ice. Ice which breaks under an icebreaker into big pieces offers less skin resistance to the forward progress of a ship than does ice which breaks into many small pieces. Baltic hummocks one or two feet high above water may be more troublesome to a heavy ship like the *Yermak* than polar ice floes fourteen feet thick. Again, it is one thing for a ship to navigate through ten-point ice (covering the entire surface of the water) and quite another, of course, for it to push through ice of the same thickness with only a five point density; the technique differs and the speed differs. Also (and this factor is especially important in the White Sea) tides, constant sea currents, and winds react with and against one another, at one time to compress the ice fields or floe ice and at another time to decompress them. In a period of compression it may be almost impossible for an icebreaker to move either forward or backwards. In a period of decompression, on the other hand, the ship may be freed with no effort of its own. Also, of course, it is one thing for an unencumbered icebreaker to smash its way through ice fields, and quite another for the icebreaker to have to make a path for other ships and also to

have to be sheep dog for many weak-walled freighters that must be kept out of trouble. Another factor in icebreaking is that icebreakers do not ordinarily follow a straight course. They go in and out and roundabout to avoid ice, and when actually breaking they more or less have to follow their own noses--that is, they have to go down the crack they have opened regardless of whether it takes them exactly along the course they wish to travel. The weather also affects greatly the speed of an icebreaker. Fog and night (and the Arctic nights are very long)[1] often force a convoy to stop entirely; and storms may be exceedingly troublesome.

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[1]The following comment was written 13 Dec. 1941 by V. Stefansson:

"While it is true that Arctic nights are very long it is equally true that they are never very dark, if compared with tropic nights. Bernacchi, astronomer for the Borchgrevink and the first Scott Antarctic expeditions, and Poulter, chief scientist for the second Byrd expedition, have endorsed the statement that all references to pitch darkness in polar literature are unjustifiably inaccurate.

"If ships are in very thick ice during the period of nights which have no daylight, then almost necessarily they are in snow-covered ice. It is probably true that amid snow-covered ice, the very greatest darkness produced by absence of moon and a thickly overcast sky during a period of complete absence of daylight will still permit one ship to see another at a quarter of a mile without night glasses, and of course farther with them. If one ship cannot see another at a quarter of a mile the reason must be fog or some other form of precipitation.

"One of the things most necessary for inexperienced navigators of the White Sea, or any similar region, is to have with them a graph which they understand and from which they can read off the probable light for any night of winter at any latitude."

Aside from all these physical factors, there is also the human factor in icebreaking--particularly the skill of the pilot. In the past there have been instances of icebreakers having been held up or turned back by ice, whereas small, frail sailing vessels have passed around the troublesome point with ease because they were guided by pilots who had ice sense and knew the White Sea thoroughly.

Even if all the details of the construction and power of an icebreaker and all the details of the ice conditions were known, it would still be difficult to estimate the length of time it would take to make any particular trip. Since the human factor, which is at least as important as any other, is an imponderable, it is not possible to predict the performance of a given icebreaker, say the *Stalin*, in the White Sea.

c. *Instances of Icebreaker Performance.*

There are many factors that must be considered in any attempt to estimate the probability of success of the attempt to maintain a considerable sea traffic to Archangel throughout the present winter; one of these is the past performance of icebreakers under various conditions elsewhere. In the first place, it should be said that the recorded instances of the performance of icebreakers are widely scattered in time and place, and that the accounts of these instances are nowhere systematically collected, so far as is known. Moreover the case records are usually very incomplete: the thickness of the ice is often reported, but temperature, the composition of the

ice, and other important factors are usually not mentioned at all. The omission of factors of such importance renders many of the accounts of past performance almost useless. With this preface, a few individual cases may be reported here.

The *Sampo*, a Finnish icebreaker of 3,000 H.P., was able to steam through pack ice five to eight feet thick at the rate of two knots. Runeberg, the authority describing this feat, states that level land ice is never thick enough in the Baltic (it is little thicker in the White Sea) to offer any obstacle to an icebreaker of 2,500 H.P. or more. He states that such an icebreaker ought to be able to go through Baltic ice 18 to 24 inches thick without stopping if the ice is clear of snow, or by charging if there is snow on top of the ice. He states that the real problem of icebreaking is that of making headway through pack ice.[1]

The *Yermak*, an old Russian icebreaker of 10,000 tons displacement and 10,000 H.P. with propellers fore and aft, was the wonder of its time when it was launched, and it is still being used regularly after 43 years of service. Admiral Makarov of the Russian navy, on whose initiative the boat was built, wrote of its early performance. He stated that in the Baltic compact ice with hummocks no more than one to two feet in height (above the water, presumably) offered great difficulty to the *Yermak*, obliging her to move back and charge the ice repeatedly, with the result that

[1]Runeberg, *On Steamers for Winter Navigation and Icebreaking*, London, 1900, p. 299.

she made very slow progress. The smallness of the pieces making up the hummocks in the Baltic made for a very great skin resistance to the ship. But in the polar regions the ice was not compact and it was a simple matter, the Admiral says, to steer one's way between the ice floes, or in case of necessity, the breaker did not hesitate, in this region, to charge floes of a thickness as great as fourteen feet, provided there was room to nose aside the broken pieces. The speed of the *Yermak* was greatly reduced whenever the ice was in a period of compression.[1]

The new ship, *Stalin*, pride of the Soviet icebreaker fleet, is a vessel of 11,000 tons displacement. She is modern and powerful, and is even equipped with facilities for airplane reconnaissance from the ship. The following is a record of one of her performances in the far north, under difficult ice conditions: "Moving forward to the 137th meridian, between latitudes 78° and 80°, the icebreaker cut across a broad field of ice. In places there was encountered here heavy, hummocky, ten-point ice. Turning to the East the icebreaker entered four-point ice and moved forward at a speed of eight miles an hour. Between the 142nd and 144th meridians the ship climbed to longitude 82°, meeting on the way four to eight-point ice. Amidst the old ice there

[1]Makarov, "The *Yermak* Icebreaker", *Annual Report of the Board of Regents of the Smithsonian Institution, for the year ending June 30, 1900*, Washington, 1901; pp. 455-457. The following comment was written by V. Stefansson, 13 Dec. 1941: "The statements by Makarov about the performance of the *Yermak* which he made in 1900 or before are perhaps more optimistic than others that he made after his actual trial when he attempted to "steam to the North Pole."

was encountered newly-formed ice of a thickness of 10 to 20 cm., all of which was easily crushed by the body of the ship. Immense fields of ten-point ice were encountered at 83° longitude. Their thickness was two meters. Heavy ice was visible in northern and eastern directions. The ship's speed fell to a mile an hour. No other ship has attained so high a latitude so late in the year."[1]

In a letter of the Commander of the United States Naval forces in Northern Russia during the year 1918, the icebreaker *Sviatogor* (now the *Krassin*) was credited with the ability to steam at six knots through four feet of ice not covered by snow (the type of ice and other conditions are not specified), and also was said to be able to make her way through eight to twelve feet of ice. It was said that the *Minin* and the *Pozharskii* could break through four to five feet of ice (type of ice and other conditions not specified in the memorandum), and that the *Vaigach* and the *Ivan Susanin* could break three feet of ice.[2]

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[1]Nazarov, V., "O Ledovykh Usloviakh Navigatsii 1938 g.", ("On the Ice Conditions for Navigation in 1938") in *Sov. Arktika*, June, 1939 p. 20. The following comment was written by V. Stefansson, 13 Dec. 1941: "This summary is apparently for the performance of the *Stalin* during summer. This ship has a much better achievement to her credit in the latter half of December 1939 and the first week of January 1940 when she penetrated at about the coldest time of year (only February is colder than January) to a point northwest of the northwestern corner of Spitsbergen -- see English-language account in *Moscow News*, Russian language in Russian newspapers."

[2]Commander U. S. Naval Forces in Northern Russia, U.S.S. Olympia, 28 Nov., 1918, File 74-56.

In April 1919 General Richardson, commanding the American Expeditionary Force in North Russia, made the trip from Murmansk to Archangel aboard the icecutter *Kenada* in three days. This is a distance of nearly 400 miles. He states that "at no time during the winter preceding had the ice been sufficiently heavy to prevent the *Kenada* from making the journey within a reasonable limit of time."[1] During the same winter, Commander Riis took two weeks to travel from Svyatoi Nos to Archangel on an icebreaker.[2]

As we have already said it is one thing for an icebreaker to travel alone and quite another for it to escort a convoy. We shall include some instances of icebreaker performance with convoys, largely taken from ice campaigns of the early twenties in the Leningrad area. These instances therefore took place in areas covered, for a distance not exceeding 160 nautical miles from the port, with stationary land ice not more than 28 inches thick--and beyond that partly covered with floating ice (large and small-floe) extending a maximum of about 200 nautical miles beyond the land ice. Here for seven days (January 19-25, 1923) the icebreaker *Yermak*, escorting three ships, made a speed for the whole period, including all stops, of .65 miles per hour. Between February 1st and 4th the icebreaker *Lenin* escorted three ships through 160 miles of ice at an average speed, including all stops, of 1.75 miles an hour. Between February 27th and March 11th the *Yermak*, the *Lenin* and the *Sviatogor*, escorting four steamers, made an average speed for the

[1]General Richardson's "Notes on War", W.D. G-3, File.

[2]Commander Riis (U. S. Navy, Retired), interview, Nov. 24, 1941.

entire period, including all stops, of 1.05 miles an hour.[1]

In another source there is an account of a convoy of twelve ordinary merchantmen that were escorted from Leningrad to Reval in December and January of 1923 (this same year) by two icebreakers, and completed the last part of the journey in clear water.

There is no statement as to what speed this convoy made but at this period of the year the ice would be comparatively thin.[2]

One Russian writer on the subject recommends that convoys be made up of not less than three or more than twelve merchantmen, plus icebreakers.[3] But another estimates that it takes two and one-half times as long for an icebreaker to escort two ships as to escort one, and four times as long to escort three ships as one. The strength

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[1]These instances of performance are extracted from *Izuchenie Ledokolnogo Dela v Morskikh Portakh U.S.S.R., Trudy Nauchno-Tekhnicheskago Komiteta Narodnogo Kommissariata Putei Soobshcheniia (A study of Icebreaking in the Seaports of the U.S.S.R. Works of the Scientific Technical Committee of the People's Commissariat of Ways of Communication)*, issue 5, 1925.

[2]*Torgovyi Flot (Commercial Fleet)*, Oct.-Nov., 1923, p. 221

[3]*Idem*

and condition (loaded or unloaded) of the freighters making up the convoy also influence greatly the speed that can be maintained.[1]

T. P. Whitney

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[1] *Izuchenie Ledokolnogo Dela* etc., p. 122

On 13 Dec., V. Stefansson wrote the following note on one form of icebreaker attack -- "changing" or "bucking" the ice:

"This means that the vessel continues ahead until stopped, when she backs up and charges again, the aim being to get a little farther each time than the time before -- using momentum to supplement the direct power of the engines. When this has to be done, it frequently happens that vessels trying to follow the icebreaker are not successful. The very need for bucking usually indicates that the ice is in a compression phase rather than in a spreading or scattering phase, and that openings will close gradually.

"There are few icebreakers that can move backward with the same effectiveness as forward. It is therefore in connection with ice-bucking that they are most often beset; the ice closes in behind them so that they can no longer back up to secure momentum for a charge."

5. *Past Experience in Winter Navigation in the White Sea*

a. *The Traffic Needs of the First World War and the British-American Intervention*

No winter navigation of significance for the purposes of this investigation was carried on in the White Sea before the years of the First World War. Inasmuch as other much easier trade lanes to Russia were always open, there was never any incentive, until the period of the war, to maintain navigation to and from the port of Archangel in the winter season. And no real icebreakers were used on the White Sea till the First World War.[1]

In 1914 Russia went to war with the Central Powers. With the single exception of Archangel, all the great seaports of European Russia were closed to Russia's western allies. Thus it became necessary to increase the capacity of the port of Archangel and to keep the port open in winter in order that the Russian armies might receive desperately needed munitions.

In January, 1917, with the completion of the railway to Murmansk, an ice-free port at the extreme northwestern corner of the country, a new avenue of shipping was opened between Russia and western Europe. However, the new railroad to Murmansk was only a single-track line, and there would still have been a considerable incentive to maintain the inflow of supplies through Archangel, as well as Murmansk, if the Revolution had not reduced and then finally terminated Russia's part in the War with the Central Powers. In

[1]Morozov, N. *Rukovodstvo dlia Plavanisa vo L'dakh Belogo Moria (Guide for Navigation in the Ice of the White Sea)*, Gidrograficheskoe Upravlenie, 1921. Introduction.

1917-18 there was no ice campaign in the White Sea, and in 1918-19 it was the British-American Expeditionary Force in Northern Russia that kept the very limited traffic going.

The years 1914-19 witnessed the only serious attempts ever made, before the current winter, to maintain active communication by sea to and from Archangel in the winter months, and an analysis of the *effort expended* and the *results obtained* must necessarily be of use in connection with any attempt to measure the likelihood of success in the ice campaign of 1941-42.

b. *Measures to Maintain Winter Navigation, 1914-19.*

For one thing, measures were taken to improve the port facilities and to widen the gauge of the Archangel-Vologda Railway. (The latter enterprise was completed in 1916.) These measures do not concern us just here. In the second place, action was taken to keep the port of Archangel open for the entire winter. This latter goal was to be attained by effort of three different kinds. First, an advance-port was to be prepared farther out toward the Gulf of Archangel, so that ships would not have to come up to the city itself through the hazardous and heavily-frozen channels of the Northern Dvina estuary. Second, an information service was to be organized for the prompt reporting and communication of information on the state of the ice in the approaches to the White Sea and the port. Third, a fleet of icebreakers and other icebreaking craft of various sorts was to be assembled to keep the lanes to the port open for cargo vessels.

The following is an authoritative statement of 1918 regarding the advance-port set up near Archangel to handle winter traffic:

"Due to the fact that Port of Archangel closes earlier than Entrance to the Delta, the British in 1917 established a Winter Port at Economia, on the Northern end of Povrakulski Island, at Junction of Maimaksa and Kuzretchikha Channels, and about 20 miles from City of Archangel. This port is usually accessible for a month after Archangel is closed up.

"At Economia are one coal berth and five cargo berths capable of discharging vessels of 26 to 28 feet draft. One of the berths at present is not available, the icebreaker *Semon Selushka,** being sunk there. There are 6 store houses and two movable cranes of 10 and 15 tons, with one fixed crane of 6 tons. For approaching winter it is intended to bring down to Economia one of the 50 ton floating cranes from Archangel.

"In 1916 a section of railway was completed from Port Economia to Archangel crossing Povrakulski River, and Kuzretchikha Channel on permanent bridges. During Winter temporary tracks are laid across the ice of the North Dvina, between Archangel and Archangel Station, so connecting Economia with railway system of Russia. Throughout Winter of 1917-1918 channels were kept open from White

*Probably refers to the small icebreaking freighter, *Semen Cheliuskin*.

sea to Economia, but ice of the Entrance to White Sea or Gorlo was impossible after March 1, 1918."[1]

Another type of facility for handling winter traffic at Archangel is represented by the two portable conveyors that were used for unloading on the ice. These are described as follows.

"Martens' Co. ..... also have the two largest portable conveyors ever made, and built especially for the Archangel trade. They will convey weights of 15 cwt. are in 25 ft. sections and about 1,000 feet long. One is for coal. When ice breakers could no longer reach Archangel, these conveyors could be set up on the shore ice and on one or both tugs, and so reach steamer. As ice extends outward, whole apparatus could be moved forward. Communication and transport of material could thus be continued until spring jam of ice, probably at least ten months out of twelve."[2]

The cited memorandum does not state clearly whether the portable conveyors were located regularly in the winter at Ekonomia or at Archangel itself.

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[1]Memorandum from the Commander of U. S. Naval Forces in Northern Russia to the Force Commander, from U.S.S. Olympia, Flagship, dated November 28, 1918, on the subject of "The Port of Archangel, Russia." This description varies slightly from that of a memorandum from the files of O.N.I., undated (but apparently from the same period) and entitled "The Port of Archangel." In this the statement is made that Economia (or Ekonomia) was completed in 1916-17 instead of 1917 as above and the further information is given that there were berths for up to six ships of up to 10,000 tons each. Kuzretchikha Channel is called in this latter report Kuznetchikha Channel. Correct spelling is Kuznechikha; it is a small stream and not a channel.

[2]Memorandum from the Director of Military Intelligence to the Director of Naval Intelligence, dated Sept. 11, 1918, on the subject of "The Offer of Martens and Co. of Their Conveyors, Tugs etc. at Archangel for Prolonging Period of Navigation at That Port."

On the subject of measures taken in these same years to collect and distribute information on ice conditions in the approaches to Archangel, another authority may be cited:

"In order to obtain information on ice, fourteen stations were established on the Gorlo of the White Sea. This net was so dense that the horizons of neighboring points almost overlapped. To the observers special instructions were given, much more detailed than those which had served up to this time. The condition of the ice was described not only in terms of quantity and type but also in terms of the proportion of the visible area that it occupied as seen from a given point. All observations were made at 10 A.M. This time appeared to be the most suitable because of local conditions. On the one hand it was desirable to conduct the observations as early as possible, in order to compile the general summary of ice conditions in the Gorlo; and on the other hand observations earlier than 10 A.M. in winter would have been impossible because of darkness.

The results of observation from all points flowed into the Hydro-Meteorological Service by 11 to 12 A.M. For convenience this information was transmitted by means of a special cipher, which at one and the same time greatly shortened the length of the telegram and forced the observer to reply to a series of questions as to the type, quantity and extent of the ice, the difficulty of passage through it, etc. On the basis of this information a general summary was compiled by the Hydro-Meteorological Service in two forms: a map of ice conditions and a radiogram for vessels at sea.

"On the map, by means of symbols, there were pictured the type and quantity of ice,... These maps were reproduced in 40 - 50 copies and distributed to different offices of the city of Archangel. Customarily they were delivered about 4 - 6 in the afternoon. In war time when the movement of vessels was of great significance, these maps had great importance. But obviously the maps could be useful only to offices located on land; and for punctual information for navigators at sea, the Hydro-Meteorological Service issued summaries giving detailed information on the ice conditions, winds, and weather prospects for weather in the near future. These summaries customarily were delivered by radio.... Such in general outlines was the organization for providing information on the condition of the ice in the Gorlo of the White Sea."[1]

c. *Icebreaking Craft Employed, 1914-19*

This ice information service was important in the maintenance of navigation to and from Archangel in the winter, but of still greater importance was the assembly at Archangel of a fleet of icebreakers, for without the help of such craft, Archangel would have been closed to ordinary freighters for over four months of the year.

Tables III and IV give specific information on the icebreaking craft that participated in the winter service at Archangel during the years 1914-1919. Several facts emerge clearly from this

[1]Berezkin, V. "Usloviia Zimnego Plavaniia v Gorle Belogo Moria" ("Conditions of Winter Navigation in the Gorlo of the White Sea") in *Zapiski po Gidrografii (Notes on Hydrography)* v. XLVII, pp. 34-35.

compilation of data. In the first place it is obvious that during the period 1914-18 the fleet of icebreaking craft expanded greatly. From a quite negligible number of 2 vessels in the winter of 1914-15, it had increased by 1917-18 to 9 vessels, according to a British source, or 15, according to the Russians. Thus the maximum strength was attained at the very time when Russia was making peace with Germany. In the second place one may say that the fleet of icebreakers (as distinct from icebreaking freighters and port icebreakers) was quite modest in size until the winter of 1917-18. In the third place it ought to be noted that not until 1917-18 or 1918-19 did any large (10,000-ton) icebreakers go into service at Archangel, and then only one such ship entered this service.

TABLE III

*ICEBREAKING CRAFT USED AT ARCHANGEL 1914-1919*

| Name in 1917 | Dvinagor | Sollanskorich | Sovetii | Sagudo | Ninin | Pushorskii | Kuromata | Vista | Chelinskin | Sokho | Kosmin | Dodatkovskii | Kosnaw | Dostaw | Sibiriakow | Sudor | Gor | Tolmar | Tsignock | Ships known by numbers 5, 6, 7, 8, 9 | Sisiner |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Earlier Name | | | | Lord Grey | | | | | Iceland | Listrana | | Brana | Kamchrs-tura | Adventura | Sellinkrs-tura | Dostkic | | | | | |
| Later Name | Kosmin | ? | Lenin | Lilim | | Kakurov | | ? | | | | Malygin | | | | | | | | | |
| Date Launched | 1917 | 1917 | 1917 | 1909 | 1916 | 1916 | 1915 | | 1908-10 | 1908-10 | 1909 | 1911 | 1900 | 1906 | 1908 | 1909 | 1906 | 1908 | 8 | 1910 | 1908 |
| Type of Ship | Ice-breaker | Ice-breaker | Ice-breaker | Ice-cutter | Ice-br. | Ice-breaker | Ice-breaker | | Ice-breaking Freighter | Ice-breaking Freighter | Ice-breaking Freight- | Ice-breaking Freighter | Ice-breaking -Freighter | Ice-breaking Freighter | Ice-breaking Freighter | Ice-breaking Freighter | Fort Ice-breaker | Ice-break-ing Dummy | a a | Fort Ice-breaker | |
| Length (feet) | 225 | | 221 | 250 | 245 | 2 | 211 | | | | 235 | 254 | 249 | 205 | 241 | 241 | 230 | | | 230 | 4b |
| Beam (feet) | 72 | | 62 | 67 | 57 | a | 56 | | | | 51 | 56 | 56 | 50 | 56 | 56 | 57 | | 7 | 51 | 57 |
| Draught (feet) | 25-28 | | 23 | 26 | 26 | a | 20 | | | | 20 | 18 | 18 | 19 | 18 | 19 | 17 | | a | 14 | 14 |
| Power (hp) | 10000 | 2000 | 7500 | 7000 | 5400 | 2 | 4500 | | 3000 | 3000 | 2200 | 2200 | 2200 | 2000 | 2000 | 2000 | 1320 | 1300 | 1 m | 1300 | 400 |
| Displacement (tons) | 10000 (?) | | 6000 | 3400 | 3150 | 1 | | | | 2000 | | 970 | 754 | 1500 | 600 | 2000 | | 1200 | a | | |
| Speed in open water (knots) | 18 | | 18 | 16 | 14.5 | a 1 | 14.5 | | | | 16 | 14 | 15 | 15 | 15 | 13 | 16 | | r | 11-15 | 9 |
| Service at Archangel: Known | 18-19 | 18-19 | | 1915-1919 | | a | | 15-16 | 15-16 16-17 | 15-16 16-17 | 16-19 | 18-19 | 15-19 | 15-19 | 15-19 | 16-19 | | 18-19 | | 18-20 | 18-19 |
| Unknown, but possible | 17-18 | 16-17 17-18 | 17-18 18-19 | | 1917-1919 | | 1915-19 | 16-17 | | | 14-18 | | | 18-19 | | | 14-19 | 18-17 17-18 | | 18-17 17-18 | 1914-18 |
| Other comments | Capable of 8 knots thru 4' ice (on coast) | Best in Canada, 1919 | | Not satis-factory in sta-tionary ice. | Sister ships | | | Nation-alized | Back at Kronstadt in 1917. Raised. Lost in famous episode in early thirties. | Arrived 8/15. Too weak 1917. Raised 1920 | | | | | | | | Sister ships | | Five sis-ter ships for the same task. | |

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Table III

Icebreaking Craft Used at Archangel, 1914-19,9.

*SOURCES*

This chart was compiled with the assistance of various publications and memoranda. In those few cases in which evidence conflicted, the discrepancies were not serious and the figure for presentation was drawn from the source that seemed the most reliable. The following material was consulted:

Anufriev, "Ledokolnaia Praktika i Poliarnye Ledovye Plavaniia v Severnom Ledovitom Okeane" (Icebreaker Technique and Navigation in Polar Ice in the Arctic Ocean"), in *Zapiski po Gidrografii*, v. L, (1925), pp. 144 - 146.

Berezkin, "Usloviia Zimnego Plavaniia v Gorle Belogo Moria" (Conditions of Winter Navigation in the Gorlo of the White Sea"), in *Zapiski po Gidrografii*, v. XLVII, p. 32.

*Izuchenie Ledokolnogo Dela v Morskikh Portakh SSSR ( A Study of Icebreaking in the Seaports of the U.S.S.R.)*, in *Trudy Nauchno-Tekhnicheskago Komiteta Narodnogo Kommissariata Putei Soobshcheniia. (Works of the Scientific-Technical Committee of the People's Comissariat of Ways of Communication)*, 1925, Vyp. 5.

Memorandum from the Commander of the U. S. Naval Forces in Northern Russia, to the Force Commander, dated November 28, 1918, on the subject of "The Port of Archangel, Russia."

Undated Memorandum from the files of O.N.I. entitled "The Port of Archangel."

*Jane's Fighting Ships 1940*, issued January 1, 1941, Sampson Low, Marston and Col, Ltd., London, MCMXL. The figures given in this manual on the displacement of the *Krassin* and the *Yermak* are lower than those uniformly given in Russian sources. The figures which we have quoted are from the Russian sources. Jane's manual states that the *Krassin* displaces 8700 tons and the *Yermak* 7875 tons; the Russian sources give 10,000 tons for each.

TABLE IV

*NUMBER OF ICEBREAKING CRAFT AT ARCHANGEL EACH WINTER DURING THE PERIOD 1914-1919*

| *Winter* | *British Sources* | *Russian Sources* | *American Sources* |
|---|---|---|---|
| 1914-15 | 2 Unclassified | | |
| 1915-16 | 6 Unclassified | 3 Icebreakers<br>7 Icebreaking freighters | |
| 1916-17 | 9 Unclassified | 3 Icebreakers<br>7 Icebreaking freighters | |
| 1917-18 | 9 Unclassified | 1 Icecutter<br>7 Icebreakers<br>7 Icebreaking freighters | |
| 1918-19 | | | 1 Icecutter<br>6 Icebreakers<br>5 Icebreaking freighters<br>7 Port ice-breakers<br>1 Icebreaking gunboat |

Table IV

Number of Icebreaking Craft at Archangel Each Winter
During the Period 1914-1919

*SOURCES*

A. British Source: Letter from Wm. O. Hart of the British Merchant Shipping Mission, dated November 17, 1941, in answer to questions submitted to him by G. T. Robinson, O.C.I. Mr. Hart does not state the source of his information.

B. Russian Sources: *Izuchenie Ledokolnogo Dela v Morskikh Portakh S.S.S.R.*, as previously cited, p. 22, data for 1915-16 an and 1916-17. For 1917-18, Anufriev, *op. cit.*, p. 145.

C. American Source: Memorandum from the Commander of the U. S. Naval Forces in Northern Russia to the Force Commander, dated November 28, 1918, on the subject of "The Port of Archangel, Russia."

The figures cited from the American source for 1918-19 are taken from the memorandum mentioned just above, and represent *anticipations* as to the size of the icebreaking fleet for the coming winter. Indications that there may have been some difference between anticipations and reality were given, in a recent interview by Commander Riis, U.S.N. Retired, who was stationed at Archangel during the winter in question; according to his recollection there were four "first-class" icebreakers and one icecutter (Kanada) in service during this winter, instead of six icebreakers and one icecutter.

To sum up, it may be said that during the winters when icebreakers were most urgently needed at Archangel to open the way for the transport of war materials into Russia, the icebreaker fleet was small in size and possessed no icebreaker of the largest and most effective type. During the winters when icebreakers were needed much less urgently a fair sized flotilla of these craft was available including one 10,000 ton ship, the *Sviatogor*.

d. *The Extent of Winter Shipping, 1914-19*

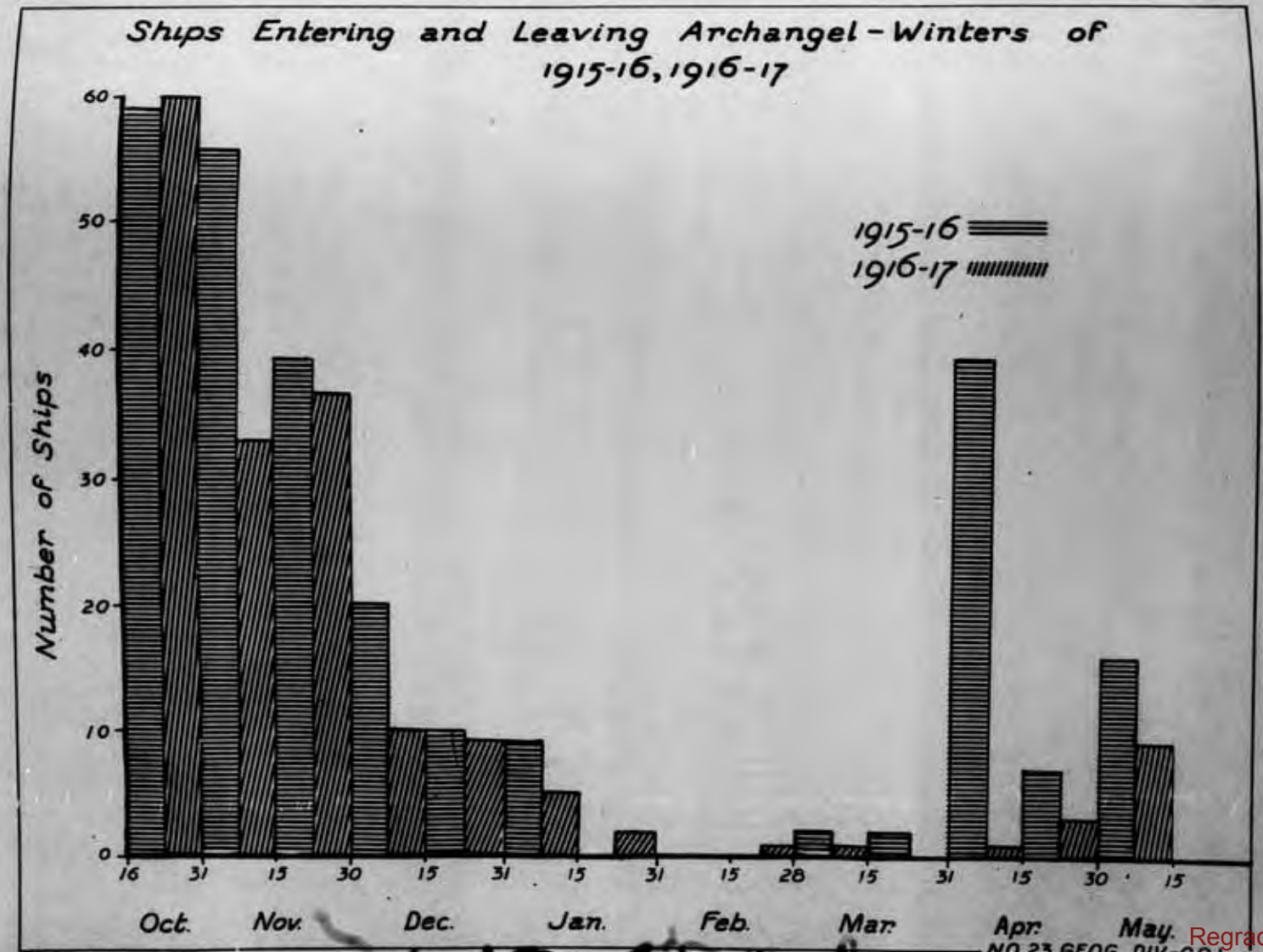
This then was the effort expended in 1914-19 to maintain winter communications to and from the port of Archangel. What results did this effort obtain? Table V presents figures on the number of ships entering and leaving Archangel between October 15 and May 15 during the winters of 1915-16 and 1916-17. Corresponding figures for the winter of 1914-15 are not available. These figures on ship movements reveal several notable facts. During the period between October 15 and May 15 in the two years in question, 430 inbound or outbound voyages were recorded. A very large portion of these vessels would not have been able to make this trip without the various aids to ice-navigation which we have described. Secondly, even with this assistance the movement of ships was very limited indeed in February and March. In these two years only six ships entered or left Archangel during February and March. The movement of ships was very limited also in January of both years and in April of 1917. The winter of 1915-16 is reported to have been the most severe in 20 years; many ships were frozen in, several were damaged by the ice, and one was sunk.

TABLE V

*SHIPS ENTERING AND LEAVING ARCHANGEL DURING THE WINTER MONTHS OF 1915-16 AND 1916-17*

| | | October 16-31 | November 1-15 | November 16-30 | December 1-15 | December 16-31 | January 1-15 | January 16-31 | February 1-15 | February 16-28 | March 1-15 | March 16-31 | April 11-15 | April 16-30 | May 1-15 | Whole Period |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1915-16 | IN | 24 | 30 | 14 | 9 | 10 | 9 | 0 | 0 | 0 | 2 | 2 | 0 | 3 | 7 | 110 |
| | OUT | 35 | 26 | 25 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 4 | 9 | 149 |
| | TOTAL | 59 | 56 | 39 | 20 | 10 | 9 | 0 | 0 | 0 | 2 | 2 | 29 | 7 | 16 | 259 |
| 1916-17 | IN | 19 | 5 | 13 | 3 | 6 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 6 | 57 |
| | OUT | 41 | 28 | 24 | 7 | 3 | 4 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 3 | 114 |
| | TOTAL | 60 | 33 | 37 | 10 | 9 | 5 | 2 | 0 | 1 | 1 | 0 | 1 | 3 | 9 | 171 |

Source: *Izuchenie Ledokolnogo Dela v Morskikh Portakh S.S.S.R., (Icebreaking in the Seaports of the Soviet Union)*, Moscow, 1925. p. 22. The source says, "This information was supplied to us by Professor B. N. Kandiba on the basis of the accounts of the Chief of the Commercial Port of Archangel." From the text it appears that icebreakers are not included in the above figures.



Thus we may conclude that in the winters of 1915-16 and 1916-17, the ice campaign at Archangel attained only a limited success. For although it greatly assisted the movement of ships, it did not succeed in maintaining any large volume of traffic in the months of January, February and March of 1916 and 1917, or in April of 1917.

During the winter of 1917-18 there was no ice campaign: "No attempt was made to use the port . . . . owing to the political situation."[1] For the winter of 1918-19, the testimony varies. On the one hand, from the British source just cited there comes the statement that "In the winter of 1918-19 the only ships to arrive were the Wardown of 3500 tons deadweight, which arrived in March assisted by several icebreakers, and a few special small Russian ships." On the other hand we have the statement from Commander S. M. Riis (Retired) of the U. S. Navy, who was stationed at Archangel in 1918 and 1919 that a number of cargo ships arrived every month during this winter. Most of the ships entering, states Commander Riis, were reinforced ships or icebreaking freighters, but at least two were simple cargo ships without reinforcement or special power. All went out again in winter, and none were icebound for more than a few days.[2]

Commander Riis also stated that during the winter of 1918-19 the need to bring in supplies for the British and American forces was not particularly urgent, since most of the necessary stores

[1]Letter from W. O. Hart of British Merchant Shipping Mission to G. T. Robinson, O.C.I., dated November 17, 1941.

[2]Commander S. M. Riis, United States Navy (Retired), interviews with G. T. Robinson, O.C.I., Nov. 24, 25, 28.

had been accumulated before the ice season; if it had been necessary, a considerably larger traffic could have been maintained.

It does not appear that ice conditions produced any unusual number of wrecks during the years 1914-19. One Russian writer says: "During all the years of the war there was not one serious wreck that might be attributed to carelessness or lack of foresight in relation to the conditions of ice navigation. There were wrecks, but their causes were not connected with the specific conditions of winter navigation."[1] From a British source comes the following statement: "The number of ships lost through ice conditions is only known for the winter of 1915-1916 when one was actually sunk and several others were damaged."[2] Commander Riis has stated that during the winter of 1918-19 only one ship was damaged, and that not badly enough to prevent her leaving Archangel under her own power.

Such, then, was the experience of the years from 1914 to 1919. For a considerable amount of effort expended, a moderate success was achieved, though normal commercial traffic was not maintained during the months when the ice conditions were worst. Whether greater success can be obtained in 1941 depends at least partly on how well the lessons of 1914-1919 have been learned.

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[1]Berezkin, *op. cit.*, p. 33.

[2]Letter from British Shipping Mission, W. O. Hart to G. T. Robinson, dated November 17, 1941

e. *Winter Navigation Between Two Wars.*

With the end of the First World War and the subsequent period of Allied intervention in Northern Russia, Archangel reverted to its former status among Russian ports. That is, it was one among numerous ports suitable for foreign trade. And there was little need to keep it open during the winter months. Moreover there was now available in North Russia a good port that was never closed by ice, and had a railway connection with the interior. This was Murmansk. In addition, the vicissitudes of war, civil war, and intervention had to a certain extent depleted the Soviet icebreaker fleet, the chief means for the maintenance of winter navigation.

Under these circumstances no all-out attempt was made under Soviet guidance to keep Archangel open the entire winter. A plan was indeed considered by a committee of techincal experts that met under the auspices of the Ministry of Ways of Communication to consider the matter of icebreaking in general. These experts decided, on the basis of the experience of the World War and their own general knowledge of the subject, that the port of Archangel could be kept open up to January 1 and reopened again on April 1 if the following aids to ice navigation were provided:

1. An advance port (Ekonomiia) with workshops and a floating dock,

2. A system of providing ice information,

3. A base for icebreakers near Svyatoi Nos, at the entrance to the White Sea,

4. The use of reinforced or very strongly built cargo ships only. (Ordinary vessels could be used if their bows were reinforced with timber.)

5. The use of two icebreakers of the *Poskarskii* type (3150 tons displacement, 5500 h.p.) for escorting ships through the Gorlo and the Northern Zone, of two icebreakers of the *Odessa #3* type (2000 h.p.) for further escorting purposes, and of two port icebreakers of the "No. 5" class (1200 h. p.) as port icebreakers. (See Table III, above.)[1]

So far as is known, no attempt was made to put this recommendation into effect. It is interesting, however, as indicating the opinion of Russian experts in the middle 1920's respecting the practicability of maintaining winter navigation of the White Sea to a limited extent for strictly commercial purposes. In 1930 and 1931 the icebreaker *Lenin* was assigned to Archangel, where she kept the the port open for several weeks beyond the ordinary closing time, and opened it earlier than the ordinary opening date. Apparently this was about all that was done along this line at Archangel for some years.

On the other hand a great interest in the more remote regions of the Russian Arctic grew with official encouragement during the Soviet period. The project of the Northern Sea Route from Russia via Arctic waters to the Far East, led to much exploration, a great amount of scientific investigation, and the acquisition of much

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[1] *Izuchenie Ledokolnogo Dela v Morskikh Portakh S.S.S.R.*, as previously cited, M., 1925, pp. 56-58.

practical experience of navigation through ice, with and without icebreakers. Airplanes and radio were used to a large extent in guiding ice navigation. In other words, although the Russians were not trying to keep the White Sea open in the winter, they were acquiring just the sort of experience and equipment that would be necessary if thes project should ever see the light of day again. Moreover, the port of Archangel itself, being one of the main termini of the Northern Sea Route and a great center for the export of lumber, was developed in many ways that would be useful in the realization of such a project. (The population of the city increased from 77,000 in 1926 to 281,000 in 1939).[1]

Most important of all, however, during the thirties the Soviets devoted great attention to the modernization of their existing icebreaker fleet and the construction of new icebreakers. Many of these ships of the present fleet, including some of the largest, were built before 1918, but some of the older vessels have been rebuilt or otherwise drastically modernized. The new large icebreakers are all equipped to carry with them airplanes for ice reconnaissance. In general, it seems fair to say that the fleet of icebreaking craft which the Soviets could mobilize at Archangel in 1941 is definitely superior to that which was used there during and shortly after the First World War.

T. P. Whitney

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[1] *Gidrograficheskoe Upravlenie, Svedenii L'dov na Morskh S.S.S.R. Zima 1929-30.* (Hydrografic Administration, *Information on Ice Conditions in the Seas of the Soviet Union*, Winter of 1929-30), Leningrad, 1932, p. 43; *Zima 1930-31 (Winter 1930-31)*, Leningrad, 1934.

6. *Aids to the Winter Navigation of the White Sea Route in 1941*

a. *Air Reconnaissance, etc.*

The beginning of hostilities between the United States, Great Britain and Japan has greatly increased the necessity -- already extremely urgent -- that a large inflow of supplies shall be maintained through Archangel during the current winter. In this situation, it may be expected that the Soviet authorities will make the fullest possible use in the White Sea of all the aids to ice navigation that they have developed so extensively (on the Northern Sea Route in particular) in recent years: weather and ice reporting from observation stations and reconnaissance planes, the preparation and distribution to ships by radio of forecasts and sailing directions, and the employment of the maximum number of icebreakers in the convoying of cargo ships.

The Soviet authorities advised the recent American Mission in Moscow that ships that were to ply the White Sea between the the middle of December and the end of April should be provided with steel propellor blades, and should have their hulls braced and strengthened.[1] The British Ministry of War Transport has ordered that the bows of all vessels engaged in the winter trade to Archangel shall be strengthened and that barrels of cement, tarpaulins, and baulks must be carried for the temporary repair of damage done by the ice.[2]

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[1]Moscow Conference. Report on Proceedings of Transportation Committee of Moscow Conference, prepared by the British and American Delegations.

[2]Memorandum from W. O. Hart (British Merchant Shipping Mission) to (U. S.) Maritime Commission, Ralph Keating, 6 Nov. 1941. Regarding the strengthening of ships for northern voyages, see also *Arctic Pilot*, 1933, vol. I, p. 58 ff.

b. *Icebreakers*

The two principal requisites for maintaining the flow of goods to Archangel in winter are icebreakers to open a path for the freighters, and adequate port facilities for the handling of their cargo. In *Jane's Fighting Ships, 1940*, the Soviet icebreaker fleet is described as follows (Table VI):

TABLE VI

*SOVIET ICEBREAKERS 1941*

| Name and Date of Construction | Kirov<br>Kuibyshev<br>Khabarov<br>Building 1938-39 at Leningrad. Completed? | Kaganovich 1937<br>Stalin 1937<br>Molotov 1939<br>Schmidt 1940 | Engels<br>Jaures | Sevmorput 1937 | Nikitich 1916 | Davidov 1897 | Truvor 1896 | Krassin, Lenin, Makarov, Sadko, Malygin, Litke, Sibiriakov, Sedov, Rusanov, Ermak |
|---|---|---|---|---|---|---|---|---|
| Length | 357 ft. | 351 ft. | 347 ft. | | 311 ft. | 184 ft. | 165 ft. | For those older ships still in service, see Table III above. |
| Beam | 69 ft. | 75 ft. | 48 ft. | | 50½ ft. | 48 ft. | 40 ft. | |
| Draught | 23½ ft. | 22 ft. | 20 ft. | | 20 ft. | | | |
| Displacement (tons) | 12,000 | 11,000 | 4,[illegible]95 | 6,000 gross | 2,460 | 1,525 | 1,450 | |
| Horse Power | 12,000 | 10,050 | 1,800 | | 4,000 | 2,200 | 1,900 | |
| Speed (Knots) | | | | 11.5 | 14 | 13 | 13 | |
| Airplanes | 2 | 2 | none | | none | none | none | |

SOURCE: *Jane's Fighting Ships 1940;*

London; January 1, 1941.

According to information supplied by Mr. W. A. Harriman, of the Moscow Mission, there are several ships in the Northern service that that are not mentioned in Jane's manual. The following are the ice-breakers reported by Mr. Harriman to be available for service at Archangel:

| | | | | | |
|---|---|---|---|---|---|
| STALIN | 11,000 | tons | completed | in | 1938 |
| ICE BREAKER #6 | 1,200 | " | " | " | - - |
| ICE BREAKER #8 | 1,200 | " | " | " | - - |
| TAIMIR | 1,290 | " | " | " | 1908 |
| SIBIRYAKOV | 1,140 | " | " | " | 1909 |
| MUROMETS | - - | " | " | " | 1938 |
| DEZHNEV | 6,500 | " | " | " | " |

In addition, he reported that the following icebreakers were in the service of the Northern Sea Route Administration (their exact location is not given):

| | | | | | |
|---|---|---|---|---|---|
| RUSANOV | 1,140 | tons | completed | in | 1909 |
| SADKO | 1,616 | " | " | " | 1913 |
| SEDOV | 3,000 | " | " | " | 1909 |
| LITKE | 2,660 | " | " | " | 1909 |
| LENIN | 5,700 | " | " | " | 1913[1] |

Considering how urgent the desire is to keep traffic moving in the White Sea, it seems probable that several of the vessels in the second group have already been put into service at Archangel. According to a telegram from the British Ministry of War Transport, dated 30 October, Admiral Kharlamov had given "renewed assurance" that the Russians guarantee to provide from eight to ten of these craft for the White Sea ice campaign.[2]

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[1]Letter from Rear Admiral R. R. Waesche, United States Coast Guard to Captain James Roosevelt, O.C.I., 6 Nov. 1941. The letter says "This information was supplied by Mr. W. A. Harriman after his recent visit to the Soviet Union." Compare O.N.I. Intelligence Report, Serial 46-41, 22 Oct. 1941.

[2]Information from British Merchant Shipping Mission, W. O. Hart.

c. *Can the Freighters be Kept Moving?*

Papanin, the commander of the Northern Icebreaker Fleet, believes that until the end of January the large icebreaker *Stalin* can bring ten ships at a time, in a single convoy, through the ice of the White Sea; after that date, the number of ships in each convoy must be reduced. Other ice experts believe that the estimate for January is much too high, if ice conditions are severe. Two British representatives at Archangel were reported a month ago as agreeing that only two of the icebreakers at Archangel (the *Stalin* and the *Lenin*) were suited to the task of convoying ships through the difficult Gorlo (Neck) of the White Sea; they considered the other breakers serviceable only in waters nearer to the port; and they believed that from the early days of January onward, the *Stalin* and the *Lenin* could convoy only three freighters each, on each trip.[1] Rear Admiral R. R. Waesche of the United States Coast Guard believes that "each large icebreaker could handle not more than three cargo vessels in convoy at a time, when heavy ice conditions prevail." Admiral Waesche would include the *Deshnev* with the *Lenin* and the *Stalin*, as ships qualified for this heavy duty.[2]

During the ice season, incoming convoys from the Atlantic will anchor at Yukonga Bay near the mouth of the White Sea to await the arrival of icebreakers or the clearing of any congestion of ships or cargos that may exist at the ports near Archangel. Yukonga Bay is

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[1]Memoranda from the British Merchant Shipping Mission, dated 17 and 18 November, 1941.

[2]Letter from Rear Admiral R. R. Waesche, United States Coast Guard, to Captain James Roosevelt, O.C.I., 6 November, 1941.

not always free from ice obstructions (see p. 8 above), and it can offer anchorage to only a limited number of ships.[1] From Yukonga Bay to Archangel, the distance is about 280 nautical miles. The Soviet authorities told the American Mission to Moscow that an icebreaker could bring a small convoy from open water to the bar at Archangel in from 12 to 36 hours, depending on ice conditions.[2] But inasmuch as these conditions vary so greatly, and have such a powerful influence upon the progress of any convoy that attempts to meet them, it hardly seems worth while to quote this or other estimates of the time required to bring a convoy through the ice.

Finally, the Russians told members of the Moscow Mission that in a winter of extreme severity the whole ice campaign in the White Sea would collapse[3] — a statement that one might accept without reservation from witnesses naturally so unwilling to admit the possibility of defeat, were it not for the fact that in the winter of 1915-16, with the severest weather in twenty years and with icebreakers and other ice aids very much inferior to those now available, a few ships actually did bring their cargo into port.

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[1]Memorandum from British Merchant Shipping Mission, 18 November, 1941.

[2]Moscow Conference. Report of Proceedings of Transportation Committee of the Moscow Conference: Prepared by British and American Delegations.

[3]Interview with Captain Thomas and Captain Brame of the Moscow Mission, 24 October 1941.

7. *Facilities and Capacity of Archangel and the Neighboring Ports*

If the degree of success to be expected in the ice campaign is highly problematical, the capacity to handle cargo in port is hardly less so. The capacity of the port of Archangel in the ice-free season will first be discussed, for purposes of reference, and the more immediate problem of winter port facilities will then be presented.

a. *The Port of Archangel in the Ice-free Season*

It is only during the season of moderate ice, or of none, that ships use the quays of Archangel proper and the main dock at Bakaritsa on the west side of the Dvina about four miles upstream from Archangel. At high tide at Archangel the channel is 23 ft. 6 in. deep at the pier, and at low tide the depth is 20 ft. The quays here will accommodate simultaneously 8 or 9 ships not exceeding 500 ft. in length: 4 or 5 with a draft of 20-22 ft. 2 of 18 ft.; and 2 of 16-18 ft. There is also a dock at Archangel that will accommodate 6 ships of 2,000 tons, while the anchorage space is extensive and some cargo is taken from the ships' side by barges. The cranes reported by O.N.I. to be at Archangel are:

| | | |
|---|---|---|
| One | 150 | Ton rotating floating crane |
| Two | 25 | Ton rotating floating cranes |
| One | 15 | Ton railway crane |
| One | 7 | Ton railway crane |

The supply of ships' stores and fuel at Archangel is not considered dependable. At Bakaritsa there is a dock 2,000 ft. long with accommodation for nine ships.[1]

[1] O.N.I. Intelligence Report, Serial 57-41, 28 Nov., 1941.

Respecting the facilities of this port, there is hardly one item that is not the subject of wide disagreement. To illustrate this fact, one may present certain data received about two months ago by O.N.I. from the American Military Attache in London:

*Port of Archangel*

| | *Source of Data*[1] | |
|---|---|---|
| | *British Admiralty* | *British Ministry of War Transport* |
| Maximum number of ships that can be berthed simultaneously at wharves | 33 ships of 22 ft. draft | 4-5 ships of 22 ft. draft<br>2 ships of 18 ft. draft |
| Cranes | 1 - 100 T. floating<br>1 - 50 T. "<br>6 - 30-50 T. "<br>4 - 8-20 T. "<br>10 - 3-8 T. " | 1 - 150 T. Floating<br>1 - 25 T. "<br>1 - 10-20 T. Gantry<br>2 - 7½ T. rwy. |

When there are such variant reports as to simple, measurable details, it is not surprising that there is wide disagreement respecting that complex resultant of many factors -- the tonnage capacity of the port. According to the source just cited, the Admiralty estimated the rate of discharge at 8-10,000 T. per day, while the Ministry of War Transport set the figure at 2,500 - 3,000 T.

A British War Office report of 18 August, 1941 estimated "that the port could handle 8,000 T. of military stores per day"; but subsequently the War Office fixed the figure for the port and the connecting railway at 3-4,000 T. of general stores, with an increase to

[1]Information received from O.N.I. by O.C.I. 22 Oct., 1941.

6,000 T. per day in the spring.[1] After personal observation, two American Assistant Military Attaches estimated the daily capacity at 3,000 tons,[2] while the figure given by O.N.I. in a report dated 28 November 1941, is 2,260 T. per day.[3]

In October the Soviet authorities were reported as asking for much larger deliveries than this at Archangel -- 300,000 T. per month (10,000 T. per day) according to one cable, 270,000 T. per month (9,000 T. per day) according to another.[4] On the same day that the Soviet estimate of 270,000 T. per month (9,000 T. per day) was telegraphed from London by the American Moscow Mission, another Soviet figure of 120,000 T. per month (4,000 T. per day) was wired from Kuibyshev by the American Assistant Military Attache.[5]

In the presence of such a variety of current estimates, from Russian, British and American sources, it may not be inappropriate to ask what has been the past performance of the port. The most significant data on this subject are perhaps these:

*Trade of Archangel in the Ice-Free Season*[6]

| | *Exports* | *Imports* | *Total* |
|---|---|---|---|
| Average monthly tonnage for the best year between 1918 and 1937 (1935) | 331,735 T. | 19,360 T. | 351,000 T. |
| Average monthly tonnage for latest year available (1937) | 294,000 T. | 185 T. | 294,000 T. |

[1]Papers transmitted under cover of a letter from Intelligence Branch, British Army Staff, Washington, to War Department G-2, dated 18 Nov., 1941.

[2]Radiogram from Kuibyshev, 1 November 1941.

[3]O.N.I. Intelligence Report, Serial 57-41, 28 November 1941.

[4]Telegram from Steinhardt, Moscow, 6 October, 1941; telegram from Harriman (Winant), London, 10 October 1941.

[5]Telegram from Michela, Kuibyshev, 10 October, 1941.

[6]*The port is normally open about 6½ months per year, and the monthly average above was produced by dividing the total for the year in question by 6½.*

Thus the best monthly turnover recorded since the First World War (of exports and imports combined) is considerably above the highest Soviet estimate of current import capacity, and the turnover for the latest year for which data are available is only a few tons short of this Soviet estimate.

The trade turnover of Archangel consisted chiefly of exports, and lumber and other forest products made up a very large part of this export tonnage:

*Freight Turnover of Archangel*

| | 1932 | 1933 | 1934 | 1935 |
|---|---|---|---|---|
| Total Exports | 1,488,401 T. | 1,651,353 | 1,876,422 | 2,156,274 |
| Forest Products exported | 1,396,444 T. | 1,476,191 | 1,396,444 | 1,958,695 |
| Total Imports | 46,484 T. | 65,270 | 71,118 | 125,849 |

It remains an open question, how much of this considerable capacity to handle exports of lumber is realizable as capacity to handle imports of military and general stores.

b. *Winter Facilities and Winter Capacity*

In winter the port of Archangel and the nearby wharf at Bakaritsa are closed by ice, and ships must unload at Ekonomiia, about ten miles down-river from Archangel in the delta of the Dvina, or at Molotovsk, a few miles west of the delta on the shore of the Gulf of Archangel. Ekonomiia was established as a winter port by the British in 1917 and is connected with Archangel by rail. Archangel proper is on the eastern side of the Dvina, and every winter a railroad is laid

across the ice to connect with the Archangel-Vologda line on the east bank.[1] A recent radiogram from the American Naval Attache in Moscow states that there is no railway connection with Molotovsk; however it is probable that track-tractors and sleds will be used as a substitute during the winter season.[2]

These winter ports are kept open by icebreakers, but during recent months, estimates of the number of ships that can be unloaded each month at Ekonomiia and Molotovsk have varied considerably. The Soviet authorities informed the Moscow Mission that 12 vessels could be berthed simultaneously at Ekonomiia.[3] British representatives at Archangel believe that there will be accommodation for a convoy of six ships every sixteen days at Ekonomiia and for five dry-cargo ships and one tanker every sixteen days at Molotovsk.[4] An American representative now in Russia estimates the capacity of Ekonomiia at eight ships for each convoy, and that of Molotovsk at three or four non-tankers and one tanker, with a turn-around of ten days for each convoy. British instructions are that all ships must be able to discharge their cargo with their own gear -- thus indicating that there is little or no lifting equipment at Ekonomiia or

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[1]Letter from Commander U. S. Naval Forces in Northern Russia, to Force Commander, 28 November 1918; also other sources of later date.

[2]Naval Intelligence Report of radiogram of 5 November 1941.

[3]Moscow Conference. Report of Proceedings of Transportation Committee of Moscow Conference: Prepared by British and American Delegations.

[4]Memorandum of 17 November 1941, accompanying letter from British Merchant Shipping Mission, W. O. Hart, to O.C.I., G. T. Robinson, dated 18 November 1941.

Molotovsk.[1] The Soviet authorities believe that they can maintain a large freight handling capacity by unloading some of the ships directly on the ice, and by putting into operation the large amount of new port equipment ordered in the United States.[2]

Respecting the possibility of unloading directly on the ice,[3] Vilhjalmur Stefansson suggests that large platforms can be

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[1]Cable from Ministry of War Transport, London to British Merchant Shipping Mission, Washington, 8 November 1941.

[2]Interview with Douglas Brown of the Moscow Mission, 1 December 1941.

[3]The following very interesting comment on the changing thickness of the ice, in relation to the problem of unloading on the ice, was written by V. Stefansson, 13 Dec. 1941:

"The thickness of ice in a given place varies directly with the cold but inversely with the snowfall. It may occur, in any time of winter that, following a heavy snowfall, the ice actually gets thinner during a week or two of extreme cold. You may measure it at three feet on January 15, and find it two feet or less February 1. Indeed, there are cases where ice more than two feet thick has completely disappeared from beneath the snow without the cooperation of any incoming warm water current, the whole explanation being that the ice has been so effectively insulated by the snow from the chill of the atmosphere that a very slight above-freezing-point water temperature, which was being constantly defeated by the atmospheric chill before the snowfall, now becomes successful in producing melting.

"This situation is seldom of material importance to an incoming ship; but it is important to guard against the danger that when you are freighting supplies over the ice towards shore an area that carried heavy tractors safely before the snowfall may not support them two or three days later, men and equipment falling into the water.

"People who live in any given neighborhood will know whether these things occur there. Accordingly, they should always be questioned. The occurrence is likliest off a promontory, between an island and the mainland, or between islands. In this connection, remember that a shoal is to be looked upon as if it rose above water and were a promontory or an island."

used on the ice to distribute the load of shore cranes and of heavy articles of cargo. He also suggests that where the land-fast ice is not heavy enough to serve as a temporary quay, it may be crushed at the edge by icebreakers, and the broken pieces nosed back to form a ridge of any desired height; in a short time the pieces will be bonded by freezing. Mr. Stefansson says further:

"At any time when the wind is offshore or when there is a calm, you can tie a ship to the ice broadside, and unload upon the ice as if it were a dock. Cranes mounted on large sledges can be brought to the ship. The motor power towards shore is often caterpillar, but could be teams of horses or even manpower.

"By studying the topography of the Bay carefully, you could probably have a choice of unloading places so that there would practically never be a wind that wasn't offshore from one of these places.

"If a ship has not unloaded when the wind changes you simply move it to another point and start unloading again. In a really terrific gale the ship might have to go out into free water and heave to for the duration.

"Since there are fewer rains in mid-winter, and since dry snow is injurious to few commodities, you do not have as much need for storage buildings abreast of the unloading places during winter as you would have in summer."[1]

G. T. Robinson

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[1]Note written 13 December 1941.

B. *The Rail and River Connections of Archangel*

a. *The Archangel Railway*

The port of Archangel is connected with the Soviet rail system by the line which runs due south to Vologda, and thence via Danilov, Yaroslavl and Alexandrovsk to Moscow, a distance of 1134 km. Vologda, where the Archangel line crosses the main line from Leningrad to the Urals and Siberia, is 634 km. from Archangel.[1] From Moscow to Filino, just north of Yaroslavl, the line is part of the Yaroslavl Railway; from Filino to Archangel it is part of the Northern Railway.

The railway was opened in the early part of the present century as a narrow-gauge line, but was converted to the Russian standard gauge during the last war. The line has been double-tracked from Moscow to Danilov, 361 km., for some time and work on double-tracking the rest of the line is now in progress.[2] A report recently received from a reliable American source in Moscow states that double-tracking has been completed as far as Konosha, a distance of 712 km. from Moscow, leaving 422 km. of single-track between Konosha and Archangel.[3] The double-track section between Moscow and Alexandrovsk, 113 km., is electrified.

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[1]Distances from *Ofitsialinyi Ukazatel Passazhirskikh Soobshchenii, 1937*. Moscow, Transzheldorizdat, 1937.

[2]The cut-off to Bui, east of Vologda on the Leningrad-Urals line, branches off from the Archangel line at Danilov. The Trans-Siberian Express runs out of Moscow over the Archangel line as far as Danilov, turning east here.

[3]An unconfirmed report from a Soviet source states that double-tracking is completed to Archangel. A representative of the British Ministry of War Transport, at Archangel, has reported that the double tracking has been completed to Plesetsk, 200 km. south of Archangel.

There appear to be two bottle-necks limiting the capacity of the Archangel Railway in addition to the shortage of rolling stock and motive power which affects all Soviet railways: 1) in summer, the lack of a bridge across the Northern Dvina at Archangel, and 2) the single-track section from Archangel to Konosha. In winter a track is laid across the river on the ice, and goods reaching Archangel by way of the winter port of Ekonomiia are routed across this ice-bridge and down the main railroad to the interior of the country. The lack of a bridge means that in the ice-free season goods landed on the east shore of the river, where the city is located, must be lightered over to the west bank where the railway terminates. Since most of the dockage is on the east bank (located there to handle the lumber export, in which the railway is not significantly involved) the lack of a bridge is a handicap particularly in the handling of imports. The Third Five Year Plan provided for the needed bridge, but there have been no reports of one under construction.

The single-track from Archangel to Konosha sets a definite limit to the amount of supplies that can be moved south from the port. Sidings on this stretch average 11.8 km. apart, judging from the stations shown in the Schematic Album.[1] According to information from a generally reliable American source in Moscow, the maximum capacity of this single-track line at present is 15 south-bound trains daily, with a capacity of 300 tons each -- but this is probably too low an estimate.

[1]Narodnyi Komissariat Putei Soobshcheniia SSSR, *Al'bom Skhem Zheleznykh Dorog SSSR*, Moscow, Transkartografiia NKPS, 1937, pl. 6.

Recently, according to the same source, only 9 trains were being dispatched southwards daily, and these trains were made up of only 15 cars of 16 tons capacity, making a total per train of only 140 tons, a daily total of 1,260 tons. Information is not available which would indicate whether this low capacity, if it is actually a fact, is due to the condition of the track or to a shortage of rolling stock. In a recent memorandum of the British Merchant Shipping Mission, the capacity of the road is rated at 2-3,000 T. per day, while the British War Office estimated last summer that the line could carry 15 south-bound trains of 500 T. each per day -- a total of 7,500 T.[1] An American railway with a similar spacing of sidings should be able to handle 10,500 tons of freight in each direction, daily.

In this region there is no year-round motor road capable of carrying a heavy truck traffic from Archangel southward.[2]

Unless the locomotives operating on the line are equipped to burn wood, the difficulty of obtaining coal may prove to be a considerable handicap. It is believed that the Archangel line formerly got much of its coal from the Soviet mines in Spitzbergen. These mines were destroyed in the recent British raid, and in any case it is unlikely that much coal was sent from there to Archangel after the outbreak of hostilities between Germany and Russia.

In time of peace, a major southward connection in the ice-free season is the large White Sea Canal, but this important system of

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[1]Memorandum from British Merchant Shipping Mission, W. O. Hart, to U. S. Maritime Commission, D. E. Scholl, 6 November 1941. British War Office Report on Allied-Soviet Communications, 13 August 1941.

[2]Telegram from Yeaton, American Military Attache, Kuibyshev, 23 October 1941.

communication with Leningrad was cut some time ago by the enemy.

In view of the danger that Vologda may be captured and the direct rail connection of Archangel with central Russia thus cut off, special importance attaches to the more-or-less hypothetical railway extending from Konosha, on the Archangel-Vologda line, some 350 km. eastward to Kotlas, from which point there is a railway connection with the Volga basin. The line from Konosha to Kotlas is one of the many mysteries of the Soviet railway map; a Soviet chart of 1937 shows a part of this railroad under construction, and a representative of the British Ministry of War Transport at Archangel has recently reported that the line is complete, though the report states that no details as to its capacity are available. So far as is known, this British report remains unconfirmed.

J. A. Morrison

b. *Winter Roads for Tractor-Sled Trains*

If Vologda or some other point on the Archangel railway should be lost, it is not impossible that a motor by-pass for winter use could be opened rather speedily. The surface of every lake and every stream of any size offers a winter road, ready made, and the comparatively flat terrain makes it possible to open tracks through the forest with little or no labor except that required for the felling of trees.[1]

[1] V. Stefansson, interview with G. T. Robinson, O.C.I., 13 December 1941.

River courses are particularly well adapted to winter freighting; every northern river should be regarded, Stefansson says, as "a liquid highway in summer and a concrete highway in winter."

A recent United States Army report indicated that transportation over trails of this kind, by caterpillar tractors with sled trains, may be practical under very severe winter conditions. For some years food, oil, and machinery have been transported by this method over tundra, through forests, and along river courses to a large mining operation in Alaska, and the use of this form of transportation of military supplies, in Alaska, has recently been recommended by a board of officers.[1] Tractor-sled trains have been used extensively by the Russians in winter logging operations in the north, and the combined experience and equipment of Russia, Canada, and the United States for this kind of haulage must very greatly exceed that of Germany and her minor northern ally, Finland.

G. T. Robinson

c. *The Northern Dvina River*

There is only one railway connection between Archangel and the war zone; but winter or summer, the Northern Dvina River offers the best of all substitutes for, or supplements to, this railway. A tractor-drawn sled-train or a river boat bound inland from Archangel by way of the Dvina would move from the port some 630 km. due southeast

[1]Hq. Alaska Defense Command, Office Experimental Board, Report on Tractor-Drawn Freight Train, Reference Test Directive No. 33; letter of transmittal dated 22 April 1941.

to Kotlas, where its load would be transferred to the railway connecting with the main transport net-work of Russia.

In an average year, a river boat drawing 115 cm. can navigate from Archangel to Kotlas during any month. In May and the first half of June in an average year, boats drawing 250 cm. can navigate between these two points successfully; but in the driest season recorded in a considerable number of years, only boats drawing 60 cm. or less could cover this course.[1]

The average period of ice-free navigation on the Northern Dvina River is 174 days. At Archangel, the principal channels of the river freeze in early November; and the spring breakup does not take place until, on the average, May 13. "Steamship travel on the river begins immediately after the breakup. River steamships from Vologda follow after the ice and within a week freight barges appear in (Archangel) from up the river."[2]

The river distance from Archangel to Kotlas is 630 kilometers (390 statute miles.)[3] At the river port of Kotlas there are wharves, grain elevators, and boat-building facilities. Nearly half a million tons of freight passed through this port in 1925; of this amount, 42,000 tons were grain and 410,000 tons were wood and lumber.

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[1] *Spravochnaia Kniga po Vnutrennim Vodnym Putiam Severnogo Basseina (Handbood on the River Routes of the Northern Basin)*, Archangel, 1929, p. 168.

[2] *Lotsiia Belogo Moria (White Sea Pilot)*, Leningrad, 1932, pp. 167-169.

[3] *Spravochnaia Kniga po Vnutrennim Vodnym Putiam Severnogo Basseina*, page 49.

Most of the wood and lumber was towed from Kotlas down the river in rafts.[1]

A single-track railway connects Kotlas with the town of Kirov (Viatra), from which there are single-track railway connections both to the Ural region and to the central industrial region of Russia. The distance from Kotlas to Sverdlovsk is 1,243 km.; from Kotlas to the city of Gorkii (old Nizhnii Novgorod) it is 841 km.[2]

In 1928, 90 per cent of the boats in the Northern Basin operated on the Dvina. The Northern fleet as a whole included

275 steamboats and tugs with a total horsepower of 39,500.
550 barges with a total freight capacity of 273,000 tons.
70 motor vessels, mostly of a small size and capacity.
80 other craft of various sorts.[3]

The Northern Dvina in the past has carried a very considerable traffic, though a very large proportion of it was in logs and lumber. Thus, in 1926 Archangel received and sent by this river a total of 2,640,000 tons, of which 2,578,000 tons were logs and lumber. Most of the lumber and logs were towed downstream by tugs, in rafts.[4]

[1]*Encyclopedia Britannica*, 1941, Vol. 13, page 496; and *Spravochnaia Kniga po Vnutrennim Vodnym Putiam Severnogo Basseina*, p. 192.

[2]*Offitsialnyi Ukazatel Zheleznodorozhnykh, Vodnykh i Drugikh Passazhirskikh Soobshchenii, Letnee Dvizhenie 1937. (Official Guide to Railway, Water and Other Passenger Communications, Summer Traffic, 1937)*, Moscow, 1937; tables 410, 325, 358.

[3]*Spravochnaia Kniga po Vnutrennim Vodnym Putiam Severnago Basseina*, p. 186. Lists of all ships, including barges, which operated on the Northern Dvina in 1928, are available in this source.

[4]Ibid., pp. 192-193.

In 1918 it was said to be possible to send from Archangel every month during the period of navigation 50,000 tons of freight upstream to the interior of Russia by the Northern Dvina River -- though there is no evidence in the available figures of the movement in recent years of any such tonnage of general cargo.[1] Still, if the fleet on the Dvina is as large today as it was in 1928, it should certainly be capable of moving a considerable volume of freight upstream to Kotlas, when the river opens next spring.

T. P. Whitney

9. *The Vulnerability of the Archangel Route*

In the Atlantic and the Barents Sea ships bound to and from Archangel may be subject to attack by submarines and airplanes, and to a limited extent by surface raiders. Presumably this entails the employment of the convoy system, with its demands upon the Navy for escort vessels, and with the delay due to slow steaming.

The White Sea traffic lanes, the port of Archangel (with those of Ekonomiia and Molotovsk, nearby), and the long railway line (partly single-track) to Vologda, are within range of medium and heavy bombers from many airdromes in territory controlled by the Axis.[2] However, the Germans have air bases slightly nearer to Liverpool than to Archangel, and the reported ineffectiveness of the Germans in bombing Moscow may

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[1]Memorandum of November 28, 1918, from the Commander of U. S. Naval Forces in Northern Russia to the Force Commander, on the subject, *The Port of Archangel.*

[2]Military Intelligence, I.B. 150, Vulnerability of Archangel and the White Sea to German Air Attack, 6 November 1941.

possibly argue for some measure of success in any Russian attempt to protect Archangel and its water and rail connections.

It has been argued that the slow movement of ships under convoy of an icebreaker makes them particularty vulnerable to attack; but it has also been said, on the other hand, that at the best the motion of a ship is so slow, by comparison with that of an airplane, that a further slowing down has little relation to the accuracy of bombing; though the longer a ship remains on its course, the longer it is without the protection of shore batteries. It is said, sometimes that ice-lanes made by convoys will guide the bombers to their target; but against this contention, it is said that no recognizable ice-lane will remain for long behind the convoy: if the ice is in a compression stage, it will close soon after the ships have passed; if it is in a state of de-compression, there will be irregular areas of open water everywhere and the course followed by the ships will hardly be recognizable from the air. The length of the Arctic winter nights should give some protection to ships, though the opposite condition will apparently operate in summer in favor of the bombers. The one factor of greatest vulnerability in winter is perhaps this: that the whole success of the ice campaign depends upon the continued operation of a few ships of a very special kind, the icebreakers. The sinking of a large breaker would be a blow of the first order to winter shipping in the White Sea.

G. T. Robinson

C. *THE PORT OF MURMANSK AND ITS RAILWAY CONNECTIONS*

1. *General Considerations*

Among ice-free Russian ports with inland rail connections, Murmansk is now the only one not completely closed to American and British ships. However the present usefulness of this port is completely controlled by two circumstances: first, the close proximity of the port and its railway to the German-Finnish lines makes the sea approach, the port, and the railway, particularly vulnerable to attack by sea, by air and by land; and second, this vulnerability has already resulted in the cutting of the Murman railway between the White Sea and Leningrad, and has thus thrown the burden of any shipments inland from Mumansk upon a new railway of unknown capacity that leaves the Murman line near the southeastern corner of the White Sea (the Gulf of Onega) and connects with the Archangel line at a point about 90 km. south of that city (See Section 4, below). There is a possibility, of course, that this new railway may be supplemented in winter by a tractor-and-sledge service, following the same general route.

At present the Russians do not wish to route large inland shipments by way of Murmansk, but if an exceptionally severe winter should make it impossible to maintain navigation to Archangel, the use of the Murmansk system might be attempted.

2. *The Port*

Even in time of peace, Murmansk was the only comparatively ice-free port of any consequence that the Soviet Union had on the open ocean -- excepting far-away Vladivostok. "The port... can always be

kept open, although the assistance of an icebreaker is sometimes necessary."[1] In November, 1939, the Russian journal, *Water Transport*, complained that lack of equipment and inefficiency of labor had resulted in an excessive idleness of ships and freight-cars at the port.[2]

However, it seems that all the facilities of the port have recently been improved. A generally reliable source of 1940 gives the following account of these facilities: The approach to the quays is 26 ft. in depth. The depth alongside the piers is 18-26 ft., and these piers will accomodate 11 ships. Wharves provide for a number of additional vessels. The available cranes are:

| | |
|---|---|
| Floating: | 1 - 140 T. |
| | 3 - 50 T. |
| | 1 - 25 T. |
| Movable, on shore: | 2 - 12 T. |
| | 4 - 10 T. |

There are railroad tracks to all piers, and a drydock under construction that is capable of handling destroyers if not larger vessels.

A recent Intelligence Report of O.N.I. states that 12 ships of 16-25 ft. draft can be discharged simultaneously at the quays. It says, "There are six railroad, caterpillar and motor cranes of lifting capacity of 6 to 7½ tons; two floating cranes with a loading capacity of 30 and 50 tons respectively; and one bunkering ship. There are 30,000 square meters of covered storage space and an open space of 25,000 to 50,000 square meters."[3]

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[1] *Arctic Pilot*, v. I, 1933, p. 133.

[2] N. A., Berlin, M-781, December 1939.

[3] O.N.I. Intelligence Report, Serial 57-41, 28 November 1941.

A British War Office report of last August estimated that Murmansk "could probably handle at least 3,000 tons of military stores per day inwards, in addition to small quantities (say 500 tons) at the neighboring ports of Kola and Polyarnoe."[1] The British Ministry of War Transport believes that six ships can discharge simultaneously at Murmansk in the winter season.[2]

The record of the past performance of the port of Murmansk may give some idea of what might be expected today, if peace-time conditions existed.

*Trade of Murmansk*

| | *Exports* | *Imports* | *Total* |
|---|---|---|---|
| Average monthly tonnage for best year between 1918 and 1937 (1935) | 38,666 T. | 74,833 T. | 113,500 T. |
| Average monthly tonnage for latest year available (1937) | 63,016 T. | 8,925 T. | 71,916 T.[3] |

The total turnover at Murmansk was much smaller than at Archangel; but while the peacetime-trade of the latter port was largely in the form of *exports of forest products*, Murmansk showed a much larger proportion of *imports of general cargo* -- a fact that suggests that the port facilities of Murmansk may be better suited than those of Archangel to the handling of incoming American supplies.

G. T. Robinson

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[1]British War Office, Report on Allied-Soviet Communications, revised edition, 13 August 1941.

[2]Cable from British Ministry of War Transport, 8 November 1941, supplied by British Merchant Shipping Mission.

[3]Department of Commerce, Eastern European Unit, E. C. Ropes.

3. *The Murman Railway*

The 1,326 km. single-track Murman Railway, now part of the Kirovsk Railway, was built during the last war to connect the rest of Russia with an ice-free port on the Kola fjord of the Murman Coast. Although not completed in time to carry any significant quantities of munitions to the Eastern Front, it played an important role during the occupation of North Russia by the Allies in 1918-1919. Following the reestablishment of Soviet authority, the line was almost completely re-built, and with the development of the port of Murmansk and the opening up of the mineral resource of the Kola Peninsula, it came to be an important artery.

Although the Finnish-German forces have cut the Murman Railway at a number of places south of the White Sea, it is possible that, under certain conditions, described below, the northern part of the line may still be of considerable use. Unfortunately, there are no data available as to the capacity of the Murman Railway. However, in view of the fact that the northern 277 km. of the line — Kandalaksha to Murmansk — are electrified, the capacity should be considerably greater than that of the single-track portion of the Archangel line.[1] However, the Schematic Album indicates that in 1937, at least, sidings were less frequent than on the Archangel line; on the 667 km. between Murmansk and Belomorsk (Soroka), they averaged only one every 17.6 km.[2] On the other hand, there would

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[1]The Kandalaksha-Murmansk section was electrified because this portion of the line across the base of the Kola Peninsula has the heaviest grades on the line and, due to the apatite movement to Murmansk for export and to Kandalaksha for treatment, it has the heaviest traffic. Power is supplied by a hydro-electric plant on the Niva River, reported to have been bombed during the present hostilities.

[2]Al'bom Skhem, etc., pl. 1.

seem to be a good chance that much of the rolling stock used in the apatite traffic on the northern part of the line is still there, due to the cutting of the railway south of the White Sea. This rolling stock is therefore available for other purposes, since the apatite traffic must have declined with the cutting off of the export market and the severing of the direct connection with the Russian interior.

In view of the nearness of the Murman line to the enemy, two factors of vulnerability should be stressed. One is the use of electric traction between Murmansk and Kandalaksha. An electrified railway is obviously more vulnerable than one on which self-contained units provide the motive power.[1] The other is the large number of bridges on the section that parallels the west shore of the White Sea. Press reports suggest that the Finns have bombed a number of these bridges. The line is also vulnerable, of course, to attack by land.

4. *The Connection between the Archangel and Murman Railways*

Obviously, the northern part of the Murman railway can be of only local utility (in serving local military forces) unless it has a connection with the Archangel railway and thus with central Russia.

Even during the last war there were plans for a "Great Northern Railway" which would start at Kotlas, terminus of 383 km. branch from Kirov on the Leningrad-Urals main line, and run northwesterly to Belomorsk (Soroka) on the Murman railway, cutting the Archangel line at or near Plesetsk. The principal argument for the line was the

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[1]The Murman railway formerly relied on Spitzbergen coal to fuel its steam locomotives, at least those operating on the northern part of the line. With the Spitzbergen mines destroyed and supplies from the interior of Russia cut off, the fuel problem is bound to be a very serious one.

necessity for providing a direct rail connection between the ice-free port of Murmansk, and the Urals and West Siberia. The Soviet authorities took over the scheme, and it was at one time on the list of concessions offered to foreign capital. Actual construction was provided for by the Second Five-Year Plan, but there have been no published statements as to the progress of the line.[1] Recently, there have been several unpublished reports in regard to the line. A Finnish source reported that the entire line, Kotlas-Plesetsk-Soroka was operating before the war (the Russo-Finnish Winter War or present Russo-German-Finnish war?). At a recent conference, the Russians reported that the Kotlas-Plesetsk section was still under construction. A reliable American source in Moscow reports that a railway connecting the Archangel and Murman lines has just been laid along the shore of the Gulf of Onega. A map published in the Stockholm *Dagens Nyheter* of 25 October 1941, indicates that this railway runs from Belomorsk on the Murman railway through the town of Onega (on the Gulf of Onega, an arm of the White Sea) to a point on the Archangel line almost due east of Onega. Signals have not yet been erected, and the new line is reported to have a limited capacity.[2]

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[1]An insert map showing lumber exploitation in the Archangel oblast and the Komi ASSR on pl. 31 of Vol. II of the *Bol'shoi Atlas Mira* shows a railway under construction between Obozerskaya on the Archangel Line and the port of Onega.

[2]The limited traffic capacity of the newly opened Pletsetsk-Onega-Belomorsk railway might be supplemented by the use of sled trains hauled by caterpillar tractors over ice-roads. The Russians have made extensive use of this technique in connection with lumbering operations in this region. With lumbering operations presumably reduced, due to the difficulties of export, tractors and sleds should be available. Canadian lumber operators also familiar with this type of transport probably could give estimates of the volume of freight which could be moved in this way. In this connection, it is of interest to recall the reindeer-sled service between the Archangel and Murmansk lines maintained by the American forces in North Russia during the winter of 1918-19.

Even if it should prove impossible to maintain navigation in the White Sea during the current winter, a limited amount of freight can perhaps be forwarded to central Russia via the port of Murmansk, the Murman railway, and the new connecting line through Onega to the Archangel-Vologda railway.

J. A. Morrison

D. *THE NORTHERN SEA ROUTE*

1. *The Problem*

In the original plan for this study, there was no place for the Northern Sea Route, but the need for its inclusion became apparent as the work progressed. There is only one reason for investigating a line of communications so remote and so difficult as this route through the Arctic waters north of Eastern Europe and Siberia, and that is that the other routes available for the shipment of American supplies to the Soviet Union are so limited in capacity or so vulnerable to enemy attack that the exploration of every possible alternative seems necessary. The problem to be discussed here is whether the Arctic sea-lanes and their Siberian river and rail connections can be employed, in the short summer season, for substantial American deliveries, and how best the capacity of the route may be utilized.

Obviously no shipping whatever can pass this way for months to come, but schedules for routing may be made long before they are to become operative, and plans for the construction of icebreakers for summer use in these waters might conceivably be put into effect at once.

2. *The Ocean Lanes of the Northern Sea Route*

a. *General description*

From the available data, it appears that there are four possible routed for supplies sent from the Western Hemisphere through Arctic waters to those rivers of Siberia that connect with the Trans-Siberian railway system. These routes are:

1) Eastward to the mouths of the Ob and the Yenisei Rivers (through the Barents Sea and the western part of the Kara Sea);

2) Eastward to the mouth of the Lena River (through the Barents and Kara Seas, and the western part of the Laptev Sea);

3) Westward to the mouth of the Lena River (through the Chukotsk and East Siberian Seas, and the eastern part of the Laptev Sea);

4) Westward to the mouths of the Ob and the Yenisei (through the Chukotsk, East Siberian and Laptev Seas, and the eastern part of the Kara Sea).

The Northern Sea Route can be used only in summer and early autumn, and its successful navigation even at this time is contingent upon the use of icebreakers, aerial reconnaissance, and ice-prognosis. Because ice conditions along the route vary from year to year, the tasks confronting icebreakers cannot be described explicitly. During the navigation season, the seas traversed by the Northern Sea Route are more subject to highly variable influences than is the White Sea in its ice season. Along the Northern Route, the variable influences that make it so difficult to predict what the ice conditions will be in a given place at a given time, are these: temperature, currents, winds, and the state of the ice in the preceding winter. In many areas along the Northern Sea Route, ice obstacles to navigation may be present during the entire navigation season in a given year, and almost completely absent during the same season in the following year. Conclusions as to the location and nature of these obstacles must therefore be of a very general nature.

In a normal year, icebreakers are not required along the entire length of the route during the navigation season, since large stretches of ice-free water are encountered in many areas. These stretches are

much more prevalent in the western section of the route (the Barents and the western part of the Kara Sea) than in the eastern section (the eastern part of the Kara Sea, and the Laptev, East Siberian and Chukotsk Seas). In the second place, the ice of the previous winter tends to remain longest and to provide the most serious difficulties for navigation in the vicinity of the straits along the route - the Kara, Iugorskii, Matochkin, Boris Vilkitskii, Dmitri Laptev and De Long Straits. Some straits, however, may be completely ice-free during a considerable part of the navigation season, while others will remain clogged. It follows from these observations that icebreakers may be required at certain points along the route during the navigation season in one year, and at different points in another year; but in general icebreakers are required along the eastern section of the route to a greater extent than in the western section.

Because of the great variability in the position and character of the ice from year to year, aerial reconnaissance and ice-prognosis are necessary for locating the ice obstacles. The functions of these aids to navigation are described below. Some concentration of planes engaged in reconnaissance, as well as of icebreakers, may at times be necessary; and this may limit the use of the Northern Sea Route to the sections that are more favorably situated, geographically and economically.

From the available material, it appears that ordinary cargo vessels can be used for carrying freight *eastward* to the mouths of the Ob and the Yenisei Rivers. On the other hand, the cargo vessels that have made successful voyages *westward* to the Lena, the Ob and the Yenisei,

are evidently especially constructed freighters or ordinary freighters with reinforced hulls. No information is available as to whether or not especially constructed or reinforced cargo vessels are required to traverse the route eastward to the mouth of the Lena.

In considering the Northern Sea Route, it must be remembered that large stretches of the route are not yet well known and are still undergoing scientific investigation. While much has been done to develop the route during the past ten or twelve years, many parts of the Arctic waters north of Russia and Siberia are still being studied with a view to ascertaining ice conditions, winds, currents, temperature of water and air, percipitation, and so forth. Some parts of the route, particularly the western sections, have been more thoroughly studied than others.

The Navigation Season
in
North-Eurasian Waters

| | *Approx. Date of Opening* | *Most Favorable Months* | *Approx. Date of Closing* |
|---|---|---|---|
| Barents Sea | July 1 | Aug. Sept. | October 15 |
| Kara Sea | | | |
| Esp. favorable year* | July 15 | Aug. Sept. | October 15 |
| Average year | Aug. 1 | Aug. Sept. | October 1 |
| Laptev Sea | | | |
| West. Section | Aug. 1 | Aug. Sept. | October 1 |
| East. Section | Aug. 1 | September | October 1 |
| East Siberian Sea | Aug. 1 | September | October 1 |
| Chukotsk Sea | (in doubt) | Aug. early Sept. | October 1 |

*Probably this applies particularly to the western part of the Kara Sea.

b. *The Route Eastward to the Mouths of the Ob and the Yenisei*

This route, the most difficult part of which is the crossing of the Kara Sea, is the section of the Northern Sea Route that has been used for the longest period of time. In the 1890's the route was already used for commercial purposes, and in 1905, 22 ships carried 18,000 tons of freight to the mouth of the Yenisei. In 1932, 28 vessels carried 96,000 tons to ports on the Kara Sea.[1] In 1933, 136,000 tons were carried over the Northern Sea Route as a whole; and by 1936, this amount had increased to 271,000 tons.[2] In 1940, the latest year for which statistics are available, 160,000 tons were carried along the Northern Sea Route. Over 100 freighters, assisted by 13 icebreakers, participated in the transport of this tonnage.[3]

The distance from Murmansk to Novyi Port, the point of transshipment from ocean-going vessels to steamers plying on the Ob River, is 1321 nautical miles; from New York to Novyi Port, the distance is about 5600 nautical miles. From New York to Port Dikson, a transfer point and coaling station near the mouth of the Yenisei River, is about 5300 nautical miles (via Matochkin Straits); and ocean-going vessels may steam an additional 500 miles up the Yenisei to another transfer point at Igarka. As an avenue of communication with the Trans-Siberian Railway and the war zone, the system of the Ob is much shorter and more direct than that of the Yenisei.

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[1]Mason, K. "Notes on the North Sea Route," in *The Geographic Journal*. July, 1940, p. 27.

[2]Taracouzio, *Soviets in the Arctic*, (New York, 1938), p. 145.

[3]Information supplied by the British Embassy, October 27, 1941.

The Barents Sea extends from the North Cape on the Scandinavian Peninsula to Novaia Zemlia and the Iugorskii, Kara and Matochkin Straits. Because of the Gulf Stream, the western portion of the Barents Sea is relatively ice-free; and it is completely clear of ice by June 1.[1] The eastern portion of the sea, however, is not considered navigable until the first part of July Even in July, ice may be encountered in the vicinity of the straits, but such ice (areas of small and large drift ice) is not a serious obstacle to icebreakers and their caravans. In August and September, the Barents Sea section of the Northern Sea Route is practically free of ice.

The western section of the Kara Sea, extending from the Iugorskii, Kara and Matochkin Straits to Ob Bay and the Gulf of Yenisei, is considered open for navigation in August and September.[2] In some very favorable years, the navigation season may extend from July 15 to October 15.

Ice conditions in the Kara Sea during the navigation period are difficult to describe because of their great variability. Some of the ice is of local origin, and some is brought in from the north by winds and currents. Hence, the thickness, compactness, variety and location of the ice depends on the nature of ice conditions in the previous winter, and on winds, temperature and currents during the navigation season.[3]

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[1]Gidrograficheskii Otdel UMC RKKA, *Lotsiia Barentseva Moriia*, (Hydrographic Department of the Administration of Naval Forces of the Worker-Peasant Red Army, *Barents Sea Pilot*) (Leningrad, 1935), II, pp. 40-50; Gidrograficheskii Otdel UMC RKKA i Gidrograficheskoe Upravlenie Glavsevmorput pri SNK SSSR, *Lotsiia Karskogo Moriia* (Hydrographic Department of the Administration of Naval Forces of the Worker-Peasant Red Army and the Hydrographic Department of the Chief Administration of the Northern Sea Route, *Kara Sea Pilot*) (Leningrad, 1935) II. pp. 58-60.

[2]*Lotsiia Karskogo Moriia*, p. 44.

[3]*Ibid.*, p. 44 ff.

During the navigation period, ships pass through stretches of open water that usually account for the greater part of the distance to the mouths of the Ob and the Yenisei. In some years no ice is encountered between the straits and the river mouths. In most years, however, ice will be encountered in one part or another of the sea, during the period of navigation.[1] The ice, moreover, has a tendency to remain in the vicinity of the straits and sometimes of the mouth of Ob Bay and the Gulf of Yenisei until the latter part of August and the early part of September.[2]

The ice encountered in proceeding from the western straits to Ob Bay and the Gulf of Yenisei is, during the summer season, usually small and large drift of varying density. Compact field ice is met only rarely. Hence, icebreaking ships or ordinary cargo vessels accompanied by icebreakers can easily navigate the western part of the Kara Sea during August and September. With the aid of reconnaissance by small icebreakers and especially by airplanes (a subject to be discussed below), it should be possible to determine in advance the areas which are most easily navigable at any given time.

The Ob and Yenisei Rivers begin to thaw in April. Access to the Ob is completely free after July 1, and to the Yenisei at an even earlier date.[3] This indicates that the rivers are open to navigation

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[1] *Lotsiia Karskogo Morsia*, p. 44.

[2] *Ibid.*, pp. 44-52, and maps following p. 80. See also Danski Meteorologisk Institute, Nautiske Afdeling, *Isforholdene i de Arktiske Have* (Danish Meteorological Institute, Nautical Department, *The State of the Ice in the Arctic Seas*) (Copenhagen, 1916), p. 2. *A Guide Book for Arctic Siberia*, prepared under the Direction of the Air Corps, United States Army (CONFIDENTIAL), pp. 256-57, 265, 30[illegible]-15, 414, 424-25, 435.

[3] *Guide Book for Arctic Siberia*, pp. 105-110.

long before the first vessels can arrive from the west. Freezing does not begin at the mouth of the Ob until after the first week in October, before which time ocean-going vessels should have returned westward. The river itself gradually freezes during the second half of October and November, the freezing dates being later as one travels southward, up the river-course. The Yenisei freezes later than does the Ob.

Fog as well as ice presents a problem in the Kara Sea. In the western part of the sea, at Matochkin Strait, fog appears during only 8 or 9 days a month; this increases as one goes eastward until one reaches Cape Chelluskin, where there is fog during 24 to 25 days a month. At Port Dikson, near the mouth of the Yenisei, fog appears from 14 to 19 days a month during the period from June to August. In September, there are many more clear days.

c. *The Route Eastward to the Mouth of the Lena River*

Unless the ship passes north of Novaia Zemlia, this route is the same as the route to the Ob and the Yenisei, plus the crossing of the eastern half of the Kara Sea, from the Ob and the Yenisei to the Boris Vilkitskii Straits, and a considerable portion of the Laptev Sea. The distance from Murmansk to Tiksi, the point of trans-shipment at the mouth of the Lena, is 2015 nautical miles; the distance from New York to Tiksi is about 6300 nautical miles.

Navigation of this route has been much less extensive than of the Ob and the Yenisei. The Lena was reached by four "fleets" in 1933 and by 16 vessels in 1937.[2] Between 1932 and 1939 the route between the

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[1]*Guide Book for Arctic Siberia*, p. 420.

[2]*Ibid.*, pp. 42-46.

Barents Sea and the Lena was successfully covered 38 times by vessels making voyage. over the entire Northern Sea Route, from east to west or from west to east.

The eastern half of the Kara Sea offers more formidable ice obstacles than does the western half. Although the eastern part of the sea has been the subject of much less investigation than has the western part, it is certain that ice conditions are usually very difficult for navigation without the aid of icebreakers, even during the favorable months of August and September. Only in one year since the beginning of navigation in this area--the extremely favorable year of 1932--was clear water encountered all the way to the Boris Vilkitskii Straits.[1] Some sections of the lane may be obstructed only by small and large drift ice, but other sections in the path of convoys may be covered with field ice, some of which is very hummocky; and occasionally icebergs may be met in and near the Shokalskii Straits and even the Boris Vilkits ii Straits.[2] Aerial reconnaissance is necessary in order to guide ships around ice obstructions and thereby to insure that they reach their destination in time to return westward the same year.

Before reaching the mouth of the Lena, ships must pass not only through the Kara Sea but through the western portion of the Laptev Sea, which extends from Severnaia Zemlia to the New Siberian Islands--from the Boris Vilkitskii Straits to the Dmitri Laptev

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[1]*Guide Book for Arctic Siberia*, pp. 638-9; *Lotsiia Karskogo Moriia*, p. 53.

[2]*Lotsiia Karskogo Moriia*, pp. 52-58 and maps following p. 80.

Straits. Of all the seas along the Northern Sea Route, the Laptev Sea is the one most subject to fogs and storms. Ice conditions are also difficult for navigation. As in the Kara Sea, these conditions depend upon the severity of the preceding winter and upon the winds and the currents.[1] The most favorable period for navigation, as in the Kara Sea, is August and September, when the sea contains the smallest amount of ice. Throughout the summer considerable quantity of ice may remain in the vicinity of the Taimyr Peninsula, which is passed on the way to the Lena. The varieties of ice and their approximate location have been studied even less extensively here than in the Kara Sea, but it is known that on the lanes traversed by ships, small and large drift, ice fields, and hummocks may be encountered.[2]

The average date for the opening of the mouth of the Lena, according to data gathered during a period of 24 years, is June 2; the earliest date was May 26 and the latest was June 9th. According to the same records, the average date for the freezing of the mouth of the river is October 24; during the 24-year period of observation, the earliest date for freezing was October 14, and the latest was November 1.[3] This permits

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[1]S. Lappo, "More Laptevykh" ("Laptev Sea") in *Sovetskaia Arktika (Soviet Arctic)*, Nov. 1939, pp. 74-75; Gidrograficheskoe Upravlenie RKKF i Gidrograficheskoe Upravlenie Glavsevmorputi, *Lotsiia Moria Laptevykh* (Hydrographic Administration of the Worker-Peasant Red Fleet and Hydrographic Department of the Chief Administration of the North Sea Route, *Laptev Sea Pilot*) (Leningrad, 1938), pp. 39-44; *Guide Book for Arctic Siberia*, pp. 638-639, 675, 677, 689.

[2]*Lotsiia More Laptevykh*, maps following p. 57.

[3]*Ibid.*, p. 45.

the transportation up the river, before it freezes, of freight from vessels that unload at the mouth of the Lena in August or in the early part of September. In order to return westward the same year, cargo vessels would probably have to reach the mouth of the Lena during the first half of September, to allow time for crossing the western part of the Laptev and the Kara Sea before freezing had made ice conditions too difficult for navigation.

Fog is also an important factor in the navigation of the eastern part of the Kara Sea: fog may appear for 25 days a month at Cape Chelluskin during July and August, and for 16 days during September.[1] The probability of fog appearing on a given day in the Laptev Sea is estimated at 40 percent.[2]

Because of the great length, the difficulty of its navigation, and its poor river and rail connections with the war zone, the eastward passage to the Lena is hardly worthy of consideration as a route for American war shipments. It would seem that any vessel eastbound along the Northern Sea Route with war supplies for Russia would do well to discharge its cargo at the Ob, instead of proceeding to the mouth of the Yenisei, still less to the Lena.

d. *The Route Westward to the Lena*

From the mouth of the Lena, the distance eastward to the Pacific Coast of the United States is much shorter than it is westward to the Atlantic Coast of this country; Tiksi Bay, at the mouth of the river,

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[1]*Guide Book for Arctic Siberia*, pp. 420.

[2]*Ibid.*, p. 661; Lappo, *op. cit.*, pp. 74-75.

is about 3900 nautical miles from Seattle and 6300 from New York. Between 1932 and 1938, 38 ships (icebreakers and cargo vessels) traversed the Northern Sea Route between the Kara Sea and Bering Straits, thus passing near Tiksi Bay even if they did not always touch there.[1] The route between Tiksi Bay and Bering Straits may therefore be considered navigable, even though it is extremely difficult.

The Chukotsk Sea, extending from Uellen on the Bering Straits to Cape Iakan, near the De Long Straits, is one of the most formidable stretches on the Northern Sea Route. The navigation season is considered to extend through June, July, August, and the first part of September, but June and July are difficult months.[2] The position of the ice varies from year to year. In some years (of the period from 1928-1939) it did not disappear from De Long Straits during the entire summer; in other years, it remained in the region of Wrangel Island. Ice reconnaissance, which has been expanding in the Chukotsk Sea, can greatly facilitate shipping.

The East Siberian Sea, extending from Cape Billings to the Dmitri Laptev Straits, is also difficult for navigation. While the western part of the sea is free of ice during the summer months, the eastern part--from the Chukotsk Sea to the mouth of the Kolyma River--is almost never completely ice-free.[3] The break-up of the compact ice fields

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[1] *Guide Book for Arctic Siberia*, pp. 42-46.

[2] S. G. Ratmanov, "Chukotskoe More" ("Chukotsk Sea") in *Sovetskaia Arktika (Soviet Arctic)*, August 1939, pp. 38-42; *Guide Book for Arctic Siberia*, pp. 992, 998.

[3] K. Gomolukov, "Vostochno-Sibirskoe More" ("East-Siberian Sea") in *Sovetskaia Arktika (Soviet Arctic)*, October 1939, pp. 47-53; *Guide Book for Arctic Siberia*, pp. 908-910.

which cover the eastern part of the sea in winter (sometimes extending 260-270 miles from the mainland) takes place during the last week in July. After the break-up, the eastern part of the sea remains the most difficult stretch on the whole Northern Sea Route. Freezing over of the offshore zones begin around the middle of October, but in all probability the ice barriers remaining throughout the summer become more serious early in October. No details on ice conditions in the eastern part of the sea are available, but navigation is possible, though difficult, with the aid of ice-prognosis and icebreakers to help ships through ice-clogged stretches.[1]

After crossing the entire length of the Chukotsk and East-Siberian Seas, ships on the way from the east to the mouth of the Lena must still traverse the eastern part of the Laptev Sea. This section is frequently clear of ice in September, but in August ships may encounter small and large drift ice, as well as ice fields and hummocks.[2]

Because the season for navigating the eastern section of the Northern Sea Route is short and the obstacles formidable, it may be advisable for ships sailing from the east to continue their course westward after having unloaded their cargoes. This practice has generally been followed heretofore. Vessels that continue westward will encounter fewer natural obstacles than if they attempt to return eastward, and will be favored by the longer navigation season of the more westerly waters. No information is at hand on the length of time required for crossing the various seas.

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[1]Gomolukov, *op. cit.*, p. 53.

[2]*Lotsiia More Laptevykh*, pp. 40-45, maps following p. 57.

If a vessel loaded with American goods for Russia once negotiates the difficult course from Bering Straits as far as the Lena, there seems to be every reason why it should steam ahead to the mouth of the Ob and discharge its cargo there, rather than at Tiksi.

e. *The Route Westward to the Mouths of the Ob and the Yenisei Rivers*

The distance westward from Seattle to the mouths of the Yenisei and the Ob is approximately the same as the distance eastward from New York to these rivers: Port Dikson, near the mouth of the Yenisei, is roughly 5,000 nautical miles from Seattle and 5,300 miles from New York, while Novyi Port, on the Ob, is about 5,500 nautical miles from Seattle and some 5,600 miles from New York. Ships approaching these ports from the east share with those from the west the benefit of the best river and rail connections that Siberia affords, to the war zone. Also the approach from the Pacific has this distinct advantage over the approach from the Atlantic: the former route is much less exposed to the potential attack of Japan than is the latter to the actual attack of Germany.

On the other hand, the approach to the Yenisei and the Ob from the Pacific is simply a prolongation of the Pacific route to the Lena, and as such it presents a much greater problem in navigation than does the Atlantic approach. A vessel that steams from Seattle to Port Dikson or Novyi Port must pass through almost all of the really difficult sections of the Northern Sea Route: the Chukotsk, East Siberian and Laptev Seas, and the eastern part of the Kara Sea (all of which have been described in the earlier pages of this report). Since cargo vessels have made successful through passages along the entire Northern Sea Route

from east to west during a single season, the utilization of the Pacific approach may be considered possible, except during extremely unfavorable seasons, but the passage is undoubtedly a difficult one at best.

Vessels proceeding westward to the Ob and the Yenisei would probably have to continue westward after having discharged their cargo. This would be even more true of these ships than of those unloading at the mouth of the Lena. The latter might arrive at the Lena early enough in the season to be allowed some choice as to whether to return eastward or to sail on westward toward the Atlantic; but ships arriving from the east at the mouths of the Ob and the Yenisei would probably do so at such a late date that their return via the Bering Straits would entail grave danger of their being locked in the ice throughout the winter. If icebreakers should be concentrated on the eastern section of the Northern Sea Route and if the season should prove to be very favorable, there would be a greater possibility of completing a round-trip between the Bering Straits and the mouths of the Ob and the Yenisei during one season. It may be noted, in this connection, that in 1939 the powerful icebreaker *Stalin* made a round-trip between Murmansk and Vladivostok in a single season.

A ship that approached a north-Siberian port from Seattle, unloaded its cargo, and then steamed on toward New York would have to pass once, empty, through the zone of possible German attack north and west of Norway.

f. *By-Passes to the Northern Sea Route*

It is not inconceivable that limited quantities of freight might be landed at the growing port of Magadan (Nagaevo) on the sea of

Okhotsk, and transported by truck over the good motor road 450 km. to Ust Utinaya -- thence by water down the Kolyma River to its mouth, where the cargo could be transferred to ocean vessels for shipment westward to the war zone via the Northern Sea Route, the Ob or the Yenisei, and the Trans-Siberian Railway. The ports of Okhotsk and Ayan, also on the Sea of Okhotsk, are similarly connected by wagon roads (220 km. and 450 km. long, respectively) with the Lena river system, and very small quantities of supplies might possibly be forwarded thus to the Northern Sea Route and then to the West Siberian rivers. The only reason for mentioning these routes, with their small capacity and their many trans-shipments, is that their use would relieve the Trans-Siberian railway in some slight degree, and would also deliver freight to the Northern Sea Route at points west of some of the most difficult areas of Arctic Navigation. On the other hand, Japanese activity would be more threatening in the Sea of Okhotsk than along the North-Pacific approach to the Northern Sea Route.

g. *Aids to Ice Navigation*

Because ice conditions vary so much from year to year along the Northern Sea Route, special navigation aids are necessary. These aids consist of permanent and temporary radio-meteorological stations, air reconnaissance and ice-prognosis. Seventy-two permanent or semi-permanent stations had been established by 1935, and over half of these were located at points near the lanes for commercial shipping.

The location of 69 of the stations was as follows:[1]

| | |
|---|---|
| Barents Sea ..... | 14 |
| Kara Sea ..... | 23 |
| Laptev Sea ..... | 19 |
| East Siberian Sea ..... | 7 |
| Chukotsk Sea ..... | 6 |

After 1935 a considerable number of stations were added, particularly in in the East Siberian and Chukotsk Seas.[2] By 1940 there were over 100 stations of all kinds.[3] Some of these were temporary stations maintained in the summer only for the express purpose of aiding ships. Stations of all types maintain a meteorological service to determine hydrographic and meteorological conditions, as well as a radio service to keep ships and planes informed of these conditions.[4]

Since 1935 there has been a gradual development of aerial reconnaissance, the purpose of which is to direct ships to open water, and to aid in the preparation of ice-prognoses.[5] Many of the radio-meteorological stations have sea-plane bases, while some of the larger stations -- such as those at Dikson Island, Tiksi Bay and Cape Schmidt -- have airports for land planes.[6] In 1936 there were 125 planes in the ice reconnaissance service, but this number has probably increased considerably, especially as a result of the incentive given to Arctic aviation by the Papanin Expedition and by the trans-Polar flights in 1937. No statistics on the number of planes now available for Arctic service can be obtained

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[1]Mason, *op. cit.*, p. 32.

[2]Gomoriukov, *op. cit.*, p. 47; Ratmanov, *op. cit.*, p. 34.

[3]*Guide Book for Arctic Siberia*, p. 19.

[4]*Ibid.*, p. 20.

[5]*Ibid.*, p. 33.

[6]Mason, *op. cit.*, p. 32; *Guide Book for Arctic Siberia*, p. 38.

from the sources at hand, but from the accounts of additional activities and from the appearance of photographs of larger and more powerful planes now being used in the service, one may judge that considerable improvement has been made. This conclusion has been verified by the British Embassy, which states that in 1941 ships were escorted by aircraft on an increasing scale.[1] An example of the service rendered by aviation is the work done by the base at Cape Schmidt. Beginning to operate in March in 1939, a plane from this base was able to diagnose conditions in the East Siberian and Chukotsk Seas before the navigation season started, thus contributing much to the success of the season.[2] In 1939 conditions along the whole route in the East Siberian and Chukotsk Seas were reported -- a service probably of considerable importance in the performance of the icebreaker *Stalin*, which in this year made the first round-trip ever made over the whole length of the Northern Sea Route in a single season.[3]

Ice prognosis, which is aided by aerial reconnaissance, became a regular feature of the Northern Sea Route Service only in 1937. The prognoses are based on material relating to atmospheric pressure, winds,

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[1]Information supplied by the British Embassy, Oct. 27, 1941.

[2]D. Karelin, "Ledovaia Sluzhba v Vostochnom Sektor Arktika v 1939 g." ("Ice Service in the Eastern Sector of the Arctic in 1939") in *Sovetskaia Arktika (Soviet Arctic)*, April, 1940, pp. 39-41.

[3]For the importance of aerial reconnaissance, see also V. Makhotkin, "Ledovyi Razvedki" ("Ice Reconnaissance") in *Sovetskaia Arktika (Soviet Arctic)*, August, 1939, pp. 22-30; T. Karavaeva, "Poliarnyi Letchik Makhotkin" ("Polar Aviator Makhotkin") in *Sovetskaia Arktika, (Soviet Arctic)* Oct. 1940, p. 47.

temperature of air and water, state of the ice, and the rate and direction of its drift.[1] A Soviet source reports that the eight prognoses issued at ten-day intervals in 1939 for the eastern section of the Route proved to be 83% correct for the East Siberian Sea, and 88% correct for the Chukotsk Sea.[2] In general, the prognoses over a period of years are said to have ranged from 40% to 100% in accuracy. One may doubt the probability of such mathematically precise verification, without at the same time questioning the great value of the prognoses to navigation in these northern waters.[3] In the future, the development of these prognoses, together with an increase in the number of temporary polar stations and the fuller development of aerial reconnaissance, should greatly facilitate the safe passage of cargo vessels during the navigation season.

Too much care can hardly be lavished on aids to navigation on the Northern Sea Route. While considerable success has been attained in navigation, it must be remembered that in especially severe seasons, like that of 1937, the dangers are considerable. In that year, twenty-five vessels were locked in the ice and forced to winter in its clutches. Yet evidence of another kind, already cited, indicates a considerable degree of success in the navigation of these difficult waters.[4]

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H. R. Weinstein

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[1]Karelin, *op. cit.*, p. 41; Makhotkin, *op. cit.*, p. 22.

[2]Karelin, *op. cit.*, p. 42.

[3]*Guide Book for Arctic Siberia*, p. 36.

[4]P. Liubarskaia, "Arkticheskomy Khozaistvy - Strogii Khozraschet" ("For the Arctic Economy -- a Strict Accounting") in *Sovetskaia Arktika (Soviet Arctic)*, July, 1939, p. 27.

## THE RIVER ROUTES FROM THE NORTHERN SEA ROUTE TO THE TRANS-SIBERIAN RAILWAY SYSTEM

a. *General Description*

In the Soviet Union there are three principal river systems that connect the Arctic Ocean with the main transport route of southern Siberia -- the Trans-Siberian railway system; these rivers might therefore serve as routes for supplies shipped from the United States to the Russo-German war zone. Each of these three river systems is navigable, in varying degree, from the Artic Ocean to railheads on the Trans-Siberian railway or its connections. Each river system is closed to navigation for most of the year because of ice, although in every case the navigation season of the river is longer than that of the ocean approaches to its mouth. These three rivers are, from west to east, the Ob, the Yenisei, and the Lena.

b. *The Ob River*

At its gulf the Ob River is frozen most of the year. At Novyi Port, on the gulf, observations extending over a period of years show that the ice forms October 12 and November 25, and breaks up between June 10 and July 3.[1]

An ocean-going vessel entering the Gulf of Ob will encounter shoals and shallow water throughout an area stretching for 80 to 100 miles north of the mouth of the Nadyn River. It is in this shallow area that Novyi Port (with a population of only about 200 in 1933) and Nakhodka Bay are located. Vessels drawing up to 9 feet will find safe anchorage in these harbors, and ships with a draught up to 18 feet may transfer their cargo to river boats off shore. Ships

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[1]*Guide Book for Arctic Siberia*, pp. 104-107

may safely winter at Novyi Port since the bay freezes over and is free of moving ice in winter, and the ice breaks up quietly in the spring.[1] In rough weather, the stretch of shoals and shallow water in the region of these ports is troublesome both to the sea-going vessels arriving from the north and to the river boats that meet them here, and is said to be the chief obstacle to the use of the Ob system.[2]

Inland from the ports, the entrance to the Ob is further obstructed by a bar where the water is usually only 8 feet deep. With favorable winds, however, the water at this point may be somewhat deeper. Once this obstacle is passed, it is said that vessels of 9 foot draught can steam through the Khamanelskaia Ob (the principal channel from the gulf through the delta) to the main course of the river.

From Novyi Port to Tiumen, the westernmost point for the transfer of freight from the Ob river system to the northern branch of the Trans-Siberian railway, the distance by river is about 950 miles; and from Tiumen by rail to Sverdlovsk, the center of the great Ural industrial district, the distance is only 201 miles. The importance of Tiumen as a river port is indicated by the fact that a major center for the building and repair of river boats is located here.[3]

East of Tiumen is Ishim, another important point for the transfer of freight from the Ob river system to the Trans-Siberian. Ishim is 381 miles from Sverdlovsk by rail, and something more than 1,000 miles from Novyi Port by river, and vessels of 10 foot draught can bring

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[1] *Arctic Pilot*, v. I, pp. 494-497, London, 1933.

[2] *Guide Book for Arctic Siberia*, pp. 202-204.

[3] Baranskii, *Ekonomicheskaiia Geografiia SSSR (Economic Georgraphy of the U.S.S.R.)*, M., 1938, p. 89.

freight from the Arctic transfer point directly to the quays of this river port.[1] Farther east on the Trans-Siberian, and farther also from Novyi Port, are the river ports of Omsk and Novosibirsk, where freight that comes up the Ob can also be transferred to the railway.[2]

Detailed information on these river ports is not now available: nor do we know anything of the size of the river fleet in the basin of the Ob. The *Arctic Pilot* reported (1933) that 3500-ton steel barges drawing about 9 feet of water and towed by powerful tugs were in common use on this and other great Siberian rivers.[3]

c. *The Yenisei River*

Port Dikson near the mouth of the Yenisei is a modern port. It has an excellent, sheltered anchorage of from 4-7 fathoms depth. The population in summer is 3-4000 and ships can be loaded and unloaded at a speed of 250-800 tons a day (1939). There are tugs and lighters, a 200-ft. stationary conveyor, and 3 conveyors for the holds of ships. In 1940 it was planned to do the unloading in the harbor instead of the roadstead and to provide new warehouse facilities. There is a narrow gauge railway on the docks, as well as tractors and horses. Port Dikson is the important bunkering station of this sector of the Northern Sea Route, and a ship repair yard was to be built there.[4]

Sea-going vessels with a draught up to 23 feet can navigate the

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[1] *Arctic Pilot*, v. I, p. 505.

[2] *Bolshaiia Sovetskaiia Entsiklopediia (Large Soviet Encyclopedia)*, v. 42, pp. 648-652. River boats of 200-ton can pass over the numerous sandbars near Novosibirsk only in May and June.

[3] v. I, p. 505, 520

[4] *Guide Book for Arctic Siberia*, pp. 453-472.

Yenisei up to Igarka, 400 miles from the open ocean. Here the navigation season lasts from mid-July to the beginning of October. Igarka has a permanent population of 20,000, with a large additional number of temporary workers in the summer. The harbor is good and the river is forty feet deep at that point. There are seven mooring basins and a quay 2,300 feet long. There are, besides, two floating wharfs. During the navigation season in 1938, 178,000 tons of freight were handled in the port, and 46 ocean-going vessels called there, many of them of foreign registry.[1]

At Igarka, goods are transferred to river vessels for the voyage upstream to Krasnoyarsk (1,100 miles) or Irkutsk — both on the Trans-Siberian railway. At Krasnoyarsk the river is usually open from May to November. The run between Igarka and Krasnoyarsk requires 10-12 days upstream and 6-8 downstream.[2] *The Guide Book for Arctic Siberia* reports 47 river boats on the Yenisei system, including 12 with passenger accommodations. The Soviet Encyclopaedia gives a somewhat higher figure.[3]

d. *The Lena River*

The town of Tiksi, outside the delta of the Lena, is the point of transfer from ocean vessels to river craft. In 1940 this town had a population of 350-400. A plan had been made for the installation of a considerable mechanical equipment for the handling of freight.

At Yakutsk, about half way between the mouth of the Lena and its southern railway connection, the river is navigable from about the middle

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[1]*Guide Book for Arctic Siberia*, pp. 519-545.

[2]*Guide Book for Arctic Siberia*, pp. 510-545. Data on speed of river trip from Gruber, *I Went to the Soviet Arctic*, N. Y., 1939, p. 56.

[3]*Guide Book for Arctic Siberia*, pp. 497-513. *Bolshaia Sovietskaia Entsiklopediia*, v. 24, pp. 511-516.

of June to the first of November. Up to Olekminsk, 1402 miles above Tiksi, the Lena is navigable by boats drawing 6-7 feet of water. Between Olekminsk and Ust-Kut, about 2,200 miles from Tiksi, the minimum depth of the river is 32 inches -- a condition that appears to limit the traffic severely. Yet it is reported that a ship-yard was built at Ust-Kut in 1936.

Ust-Kut is situated at the point where the line of the new Baikal-Amur railway crosses the Lena. It is believed, but not known with certainty, that this new railway is in operation between Ust-Kut and Taishet on the Trans-Siberian line. Other ports on the Lena can have hardly more than a local significance, since they have no railway connections.[1]

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[1]*Guide Book for Arctic Siberia*, pp. 249-860.

PART III

# THE EASTERN SUPPLY ROUTE FROM THE UNITED STATES TO THE RUSSO-GERMAN WAR ZONE

Table of Contents



SEE MAP I

PART III

# THE EASTERN SUPPLY ROUTE FROM THE UNITED STATES TO THE RUSSO-GERMAN WAR ZONE

## A. *SUMMARY AND CONCLUSIONS*

1. The Eastern supply route from the United States to the Russo-German war zone consists of a maritime section across the Pacific and through the Sea of Japan or the Sea of Okhotsk, the port of Vladivostok, the main line of the Trans-Siberian from Vladivostok to the Volga, supplementary ports and road-river connections in eastern Siberia, and supplementary rail routes in western Siberia, the Urals and the Trans-Volga regions.

2. The outbreak of hostilities between the United States and Japan greatly reduces the value of and probably eliminates, for the time being, the Eastern Route as a route of supply from the United States to the Russo-German war zone.

3. The Port of Vladivostok must handle the bulk of any supplies sent over the Eastern supply route, since it alone has the facilities for handling large quantities of freight and has the necessary rail connection to the west. Operations at the Port are maintained with the aid of icebreakers during the winter. The Port has averaged as much as 168,000 tons a month in a single year.

4. The double-track Trans-Siberian Railway must handle the bulk of any supplies routed to the Russo-German war zone across Siberia.

5. The shortage of rolling stock and motive power, chronic in peace-time and much aggravated by war-time demands, is the principal limiting factor in the capacity of the Trans-Siberian. Rolling stock and motive power may be diverted to the Trans-Siberian, but at the cost of other vital needs.

6. The trackage between Vladivostok and Novosibirsk had considerable reserve capacity prior to the outbreak of Russo-German hostilities - up to 4 million tons annually in each direction.

7. In 1937 the trackage between Novosibirsk and Chelyabinsk was loaded nearly to capacity, due largely to the heavy coal and iron ore traffic between the Urals and the Kuznetsk coal basin. However, the rapid increase of coal production in the Karaganda coal basin, the opening of a new direct railway from there to the southern Urals, the development of local coal basins in the Urals, and the increase of iron ore production in the Kuznetsk area should have relieved the main line of the Trans-Siberian of about 4 million tons of westbound coal traffic annually and a lesser amount of eastbound ore traffic between 1937 and the outbreak of Russo-German hostilities.

8. The loss of food-producing and industrial regions in the west has presumably increased the dependence of the remaining parts of European Russia on the Urals and West Siberia for foodstuffs, raw materials and munitions, thus increasing the westbound traffic load on all lines. However, for the section over which this traffic is heaviest, namely the Urals - Volga, there are four trunk lines, one of which is double-track, while in the West Siberia food surplus region there are four lines west of a meridian running north and

south through Kurgan, three west of the meridian of Petropavlovsk, and two west of the meridian of Omsk, one railroad in each case being the double-tracked Trans-Siberian.

9. Taking all factors into consideration, the *trackage capacity* - availability of rolling stock and motive power not considered - westward from Vladivostok to the Volga may possibly be sufficient to accomodate a through westbound traffic of 3 million tons of imports a year, or 250,000 tons a month. This is considerably in excess of the estimated capacity of the Port of Vladivostok.

10. Supplementary ports in the Soviet Far East north of Vladivostok and road and river connections from them to the Trans-Siberian may handle an unknown, but definitely small volume of supplies. However, these ports and the sea approaches to them are not so vulnerable to Japanese attack as is Vladivostok and its approaches.

(a) Sovetskaya Gavan, a small new port, will be of some importance when the railway connecting it with the Komsomolsk branch of the Trans-Siberian and port installations are completed. It is believed that the port can be kept open by icebreakers during the winter.

(b) Nikolayevsk near the mouth of the Amur is open 5-6 months in the year. Access to the Trans-Siberian is by the Amur River which is open to navigation 6-7 months in the year.

(c) Ayan and Okhotsk, small ports on the Sea of Okhotsk, and their road-river connection to the Trans-Siberian can have only the most limited utility for forwarding supplies due to the lack of port facilities, the poor quality of the roads, and the uncertainties of river navigation.

J. A. Morrison

B. *THE MARITIME SECTION*

The outbreak of hostilities between the United States and Japan eliminates, for the time being, the Eastern Route as a route of supply from the United States to the Russo-German war front. Although at this moment it is still possible for vessels of Soviet or non-belligerent registry to reach Vladivostok or Sovetskaya Gavan by the normal Japanese-controlled commercial routes through La Perouse and Tsugaru Straits, it seems unlikely that the Japanese will permit this for long. It may be possible for supply ships to reach the Sea of Japan through the Tatar Strait even in the event of Russian involvement in the war with Japan, since Russia controls both shores of the strait in its narrower northern reaches. But the passage of this strait would seem to be dependent on Russian control of the air between the mainland and Sakhalin. Even though vessels should succeed in passing through the Tatar Strait into the Sea of Japan, there would still be a thousand-mile run through the Sea of Japan to Vladivostok. It is, of course, possible that dispersion of Japanese naval and air forces in the series of widespread attacks of the first days of the war with the Allies may have lowered their strength in the Sea of Japan to the point where the reduced Russian Far Eastern air forces and the Russian submarines could protect shipping proceeding along the coast of the Primorsk province to Vladivostok. But for the present the route would seem to be a hazardous one at best.

While shipping in the Sea of Okhotsk will probably be less exposed than in the Sea of Japan, and the entrance to that body of water through the Kurile Strait could probably be safeguarded, the ports of the Sea of Okhotsk, with the possible exception of Nikolayevsk at the mouth of the

Amur, are of very limited capacity, and none of them are ice-free or have reliable all-year connections of any considerable capacity with the Trans-Siberian Railway.

Thus, even a limited use of the Eastern Route during the winter depends on Russian air control over the eastern part of the Sea of Japan -- the approach to Vladivostok, the one large year-round Russian port on the Pacific. Even next summer, the large-scale use of the Eastern Route will still depend upon the effective protection of the approach to Vladivostok.

Although use of the Eastern supply route may be largely, if not entirely eliminated for the present, it may be of limited value even while Japan is at war, and it will again be of great significance if Japan should be defeated while Germany and Russia are still at war. For this reason, the section of the Eastern Route first presented in the report of 16 October, 1941 is included in the present report.

J. A. Morrison

C. *THE PORT OF VLADIVOSTOK*

Vladivostok, 4,570 nautical miles from San Francisco, is the only Soviet port on the Pacific that is equipped both to receive and to forward by rail substantial tonnages of supplies.

1. *Vulnerability*

Unfortunately, however, Vladivostok is the most vulnerable of the Soviet Far Eastern ports, to Japanese attack. Not only are the sea approaches (with the possible exception of that via the Tatar Straits) controlled by Japan, as indicated in the preceding section, but the port is very vulnerable to attack from the landward side because of its proximity

to Japanese-occupied Manchuria. The degree to which the land and air defences of Vladivostok and of southeastern Asiatic Russia in general may have been weakened by the dispatch of units of the Soviet Far Eastern forces to the Russo-German front can only be guessed; but there have been numerous reports of limited transfers of Soviet forces to European Russia.

2. *Natural Conditions*

Vladivostok has one of the best natural harbors on the Pacific. The city is located at the southern end of a peninsula that extends into the Gulf of Peter the Great, and divides the Gulf into two spacious bays, Amur Bay on the west and Ussuri Bay on the east; these bays in turn have numerous smaller bays and inlets, one of which is the famed Zolotoi Rog (Golden Horn), on the shores of which are most of the port facilities. Although the port is admirably protected from storms, ice conditions are heavy enough to interfere with shipping from late December to late March.[1] However, even in the worst years, the ice does not extend farther out to sea than Askold Island, about 25 miles from the port and at no time is it heavy enough to prevent the maintenance of navigation to the port with the aid of icebreakers.[2] Cargo vessels with reliable hulls can enter the port without the aid of an ice-breaker until mid-January.[3] A report of February 20, 1941 states that at that time there were 5 icebreakers at

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[1]Hydrographic Office, No. 122, 1933, pp. 330-331. The O.N.I. report, "Supply Routes to Russia" (Serial 57-41, from ONI-Op-16-F-5, Confidential) states that the port is frozen over for about 60 days.

[2]Moscow Conference. Report of the Proceedings of the Transportation Committee, Annex I. Secret. An MID report of May 5, 1941 (G-2/2659-D-1061 Confidential) states that during the ice season icebreakers make navigation possible "to a limited extent."

[3]MID Report quoted in preceding footnote.

the port, one of which "seemed very efficient in breaking 16 in. of ice at the ship's berth." Thus, it seems that icebreakers maintain the operation of the port in winter, but presumably not at full efficiency.[1]

3. *Port Facilities*

The port facilities at Vladivostok received considerable development in the 1920's and early 1930's in connection with the large transit trade to and from North Manchuria, a natural hinterland of the port. According to a reliable recent source, the commercial port can berth 55 ocean-going vessels; 10 of them, drawing from 22 ft. to 28 ft., can discharge cargoes simultaneously.[2] The same report lists the cranes available as follows:

a) 2 electrically operated, movable cranes of 2 tons capacity each

b) 3 railway, tractor and motor cranes of 3 to 18 tons capacity each

c) 2 floating cranes of 40 and 120 tons capacity, respectively

A total area of 30,000 sq. meters of covered storage space can be alloted to imported cargoes and there is an additional open area of 13,000 sq. meters that can be used for this purpose.[3]

In view of the importance of oil and gasoline in the supplies sent to Vladivostok, reports on the turn-around of tankers at the port are pertinent. The U. S. Maritime Commission reports, as follows, the recent experience of three American ships at Vladivostok:

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[1] G-2/2659-D1061-May 5, 1941.

[2] Moscow Conference, *op. cit.*

[3] *Ibid.*

| *Type of Ship* | *Date of Arrival* | *Date of Departure* |
|---|---|---|
| Tanker | Sept. 3 | Sept. 4 |
| Tanker | Sept. 6 | Sept. 9 |
| Tanker | Sept. 11 | Sept. 14 [1] |

Allowing for delays in docking at an unfamiliar port of a country at war, it is unlikely that actual discharge could have continued in any case for more than 36 hours, suggesting a rate of discharge of somewhat over 2,000 barrels per hour.

4. *Capacity*

It was to be expected that American and British estimates of the port capacity might vary considerably. A report of the British War Office of 13 August, 1941, gives a monthly capacity of 75,000 tons to 90,000 tons.[2] An annex to this report, of a later date, raises the figure, giving the port a capacity of from 90,000 tons to 120,000 tons monthly. The recent American ONI report referred to above estimates the capacity of 75,000 to 105,000 tons per month and quotes a Russian claim that by Spring of 1942 the port will be able to handle 110,000 tons a month.[3]

However, it is somewhat surprising to find even more widely varying estimates -- apparently provided by the Russians -- in the report of the Transportation Committee of the Moscow Conference. Two estimates are given in this report -- one of 140,000 tons and one of 224,000 tons per month --

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[1] Maritime Commission, Division of Operations and Traffic, Edw. P. Cotter.

[2] "Allied-Soviet Communications," Revised edition, 13 August, 1941 (from British Army Staff, Intelligence Branch, British Embassy, Washington).

[3] ONI "Supply Routes to Russia," etc.

the lower figure substantially higher than, and the higher figure more than twice as great as, the highest British or American estimate. However, the higher of the two Conference estimates is apparently the later of the two from Soviet sources.[1]

Comparison of these varying estimates with the past performance of the port may provide a yard-stick for measuring very roughly their probable validity:

*Trade of Vladivostok*

| | *Exports* | *Imports* | *Total* |
|---|---|---|---|
| Average monthly tonnage for best year between 1918 and 1937 (1935) | 66,000 T. | 103,000 T. | 168,000 T. |
| Average monthly tonnage for latest year available (1937) | 917 T. | 34,000 T. | 35,000 T. |

Assuming that the facilities used for handling exports can also be used for imports, past performance would indicate that the port can handle somewhat more than the lower, but very considerable less than the higher of the two Soviet estimates given at the Moscow Conference. However, it is necessary to take into account the lessened efficiency of the night operations of the port during war-time as compared with the same port in peace-time, and also the greater effort likely to be made during day-time operations. All things considered, it may be concluded, very tentatively, that the capacity of the port of Vladivostok is probably more than 140,000 tons and less than 224,000 tons per month.

J. A. Morrison
G. T. Robinson

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[1]This is the figure given also in a cablegram from Mr. Harriman to the President and Mr. Hopkins, transmitted by Ambassador Winant 10 October, 1941, on Mr. Harriman's return to London from Moscow.

D. *THE TRANS-SIBERIAN RAILWAY*

(Note: This section is reproduced with only slight changes from Section III of Part IV of the Report of 16 October, 1941, "Lines of Communication between the United States and the Russo-German War Zone")

At the present time and for several years, the Trans-Siberian railway must be depended on to carry the bulk of any freight sent over the landward portion of the Eastern Route. The ability of the railway to carry this traffic depends on the physical condition of the line itself, on the servicing and repair facilities available, and the efficiency of the personnel. The line is one of the best, if not the best railways in the country in terms of physical equipment and facilities, in this respect approaching if not equalling some of our Western trunk lines. On the section between the Ural and Kuzbass (Kuznetsk Basin) mining and industrial regions, the volume of traffic is high even for the USSR which has an average traffic density higher than that of any country in the world.[1] In short, the Trans-Siberian railway is one of the major trunk lines of the world, capable of carrying a sustained heavy traffic.

1. *Definition*

The term "Trans-Siberian Railway" is a popular one. Russians may refer to the "Trans-Siberian Express", but rarely to the "Trans-Siberian Railway" which from an administrative and operating point of view does not exist. As used in this report the term is understood to mean the main line of the transcontinental railway extending from Vladivostok via

[1] In 1937 the freight traffic per kilometer averaged 4,097,000 tons-km; this compares with 1,313,000 for the U.S.A., 1,030,000 for Germany, and 822,000 for England.

Khabarovsk, Chita, Irkutsk, Krasnoyarsk, Novosibirsk, Omsk, Kurgan, Chelyabinsk, and Ufa to the Volga just west of Kuibyshev (Samara). For actual operation and administration, the line is divided into the eight railway administrations listed below:[1]

TABLE I

| Railway Administration | *Distance on main line in kilometers* | *Operation Divisions on main line* | *Number of Stations* | *Av. Distance between Stations* |
|---|---|---|---|---|
| Far Eastern (Vladivostok-Arkhara) | 1210 | 6 | 133 | 9.1 |
| Amur (Arkhara-Ksenevskaya) | 1283 | 6 | 53 | 24.2 |
| Molotov (Ksenevskaya-Petrovskii Zavod) | 1015 | 4 | 66 | 15.4 |
| East Siberian (Petrovskii Zavod-Taishet) | 1304 | 4 | 84 | 15.5 |
| Krasnoyarsk (Taishet-Mariinsk) | 803 | 3 | 85 | 9.4 |
| Tomsk (Mariinsk-Chulymskaya) | 508 | 2 | 43 | 11.8 |
| Omsk (Chulymskaya-Makushino) | 905 | 3 | 67 | 13.5 |
| South Urals (Makushino-Kropachevo) | 707 | 3 | 73 | 9.7 |
| Kuibyshev (Kropachevo-Volga)[a] | 797 | 3 | 82 | 9.7 |
| Totals | 8532 | 34 | 686 | 13.1 |

[a]The Kuibyshev Railway extends west of the Volga 155 Km. to Kuznetsk. If Chelyabinsk be considered as the western end of the Trans-Siberian, the total distance is 7415 km. In addition to the main line trackage, each railway administration also operates branch and connecting lines, in some cases totaling more in mileage than the main line section.

[1]*Al'bom Skhem Zheleznykh Dorog SSSR. (Schematic Album of the Railways of the USSR)*, pub. by S.S.S.R. Narodnyi Komissariat Putei Soobshcheniia (USSR People's Commissariat of Ways of Communication), Moscow, Trans-kartografiia NKPS, 1937. Distances from *Ofitsial'nyi Ukazatel' Passazhirskikh Soobshchenii*, 1937.

2. *Double-Tracking*

Double tracking of the Trans-Siberian began even before World War I and was completed from Omsk to Ulan-Ude (Verkhneudinsk), east of Lake Baikal, by 1914, although the larger bridges on this section remained single-track.[1] In recent years the rest of the line has been double-tracked, the last section to be completed being that from Khabarovsk to Vladivostok.[2] In some sections, notably on the Amur and Molotov Railways, the second track is often at some distance from the first; this is due to the number of tunnels and rock cutting required and the necessity of maintaining traffic on the existing line continuously. At the same time second bridges have been built on the portion of the line which was double-tracked by the previous regime. Except for the second bridge over the Irtysh at Omsk, reported to be nearing completion[3], the Trans-Siberian is now a double-track railway from the Pacific to the Volga, the longest continuous section of double-track in the world. According to statements by two travellers recently returned from Moscow over the Trans-Siberian, the section between Vladivostok and Khabarovsk (Far Eastern Railway Administration) is *triple-tracked*, presumably in preparation for military eventualities.[4]

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[1]*Bol'shoi Sovetskii Atlas Mira*, I, pl. 164.

[2]December, 1938

[3]Statement by Mr. John Scott who travelled over the Trans-Siberian eastbound at the end of June, 1941.

[4]Reported by Mr. Scott and Mr. W. C. Armstrong of the American Embassy in Moscow who travelled over the railway a week after Mr. Scott.

3. *Passing Tracks and Sorting Yards*

In addition to being double-tracked throughout, the Trans-Siberian is also well supplied with passing tracks and sorting yards. Table 1 above shows that there were 688 stations in 1937, an average of a station every 13.1 km. Assuming that each station has one or more sidings, this figure may be taken as the average distance between sidings for the entire line; the distance varying from only 9.1 km. on the Far Eastern to 24.2 km. on the Amur section of the route. In the Soviet Far East strategic considerations are responsible for the fact that at a number of stations there are several sidings. One report of a trip from Moscow to Vladivostok and return lists 38 stations where there were more than 1 siding, the number varying from 4-12. The same report states that these sidings are 1000 yards in length, as a rule.[1] In the matter of passing tracks, the Trans-Siberian would seem to compare favorably with our Western trunk lines.

There are practically no recent data on sorting yards. Gradjdanzev gives a list of "principal yards" at the following:[2]

| | | | |
|---|---|---|---|
| Chelyabinsk | Kurgan | Omsk | Novosibirsk |
| Yurga | Achinsk | Krasnoyarsk | Kansk |
| Taishet | Innokentyevskaya | Ulan-Ude | Chita |
| Svobodnyi | Khabarovsk | Voroshilov | Vladivostok |

4. *Roadbed, Rails, Bridges, Tunnels, etc.*

No up-to-date data on the gradients and radii of curves for the Trans-Siberian have been discovered by the Section. Grajdanzev, citing the

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[1] M/A. Moscow, No. 607. Sept. 14, 1936.

[2] Grajdanzev, A. J., "The Trans-Siberian Railway", unpublished Ms dated September 9, 1941, 26. The source is not given and the author admits that the list is not up-to-date.

Admiralty *Handbook on Siberia and Arctic Russia*, published in 1920, states that on the part of the line crossing the great West Siberian lowland, the gradient was less than 0.007 in 1914, while in the mountainous sections (presumably east of Lake Baikal) it rose to 0.0174; minimum radius of curves was 1050-1750 feet.[1] Since that time grades and curves have been reduced. However, the several mountain ranges east of Lake Baikal, chief of which is the Yablonovyi, and the Great Khinghan system which the railway crosses where it rounds the great northern bend of the Amur, will always reduce the efficiency of the line. The most difficult section of the entire line to construct was that around the south end of Lake Baikal. Here the Eastern Sayan drops precipitately down to the shore of the lake, necessitating much tunnelling, rock-cutting, bridging and other heavy construction. However, since the line keeps close to the shore of the lake, the gradients are slight.

There is also a lack of precise data concerning the quality of the ballast on the line. On the section carrying the heaviest traffic, Novosibirsk-Chelyabinsk -- especially Novosibirsk-Omsk -- the line seemed well-ballasted in 1937, gravel being the usual ballast. Between Novosibirsk and Krasnoyarsk the ballast seemed lighter.

Although there has been much replacement of rails, they would seem to be still too light for heavy traffic -- at least by American standards -- if, as Grajdanzev states, they weigh only 76-87 lbs. per yard.[2] The frequency of accidents may be due to this inadequacy in the rails.

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[1]Grajdanzev, A. J., "The Trans-Siberian Railway", unpublished Ms dated September 9, 1941, 21. The source is not given and the author admits that the list is not up-to-date.

[2]*Ibid*, 24, (from *Planovoe Khozaistvo*, No. 10, 1940, 43

Grajdanzev is also authority for the number of ties; he states that the number per kilometer has recently been raised to 1600-1840.[1] Wood preservation treatment is not yet general.

In the summer of 1937 it was noted that automatic block signals were installed on the entire section Chelyabinsk-Novosibirsk. Since that time the system has been extended eastward, how far cannot be said definitely.[2]

The Trans-Siberian has a number of long bridges, the longest being the twin bridges over the Amur at Khabarovsk, between six and seven thousand feet long. The Yenisei, Ob, and Irtysh are crossed on bridges over 2000 feet in length, while there are several others in excess of 1000 feet. All large bridges are of steel with concrete or masonry piers. Many of the smaller bridges are of masonry. Double-tracking has made necessary the construction of second bridges which are often at some distance from the original structures. All the second bridges are completed except that over the Irtysh at Omsk.[3]

5. *Round-houses, repair shops, and water-supply*

Here again we lack reliable up-to-date data. If one assumes one roundhouse at the end of each operating division, then it can be seen from Table I that there should be thirty-five. However, Grajdanzev, not citing his source of the year for which it was applicable, gives a total of forty-six between Chelyabinsk and Vladivostok.[4] Grajdanzev also states

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[1]Grajdanzev, A. J., *op. cit.*, 24.

[2]Mr. John Scott who travelled over the line in June, 1941, reports that east of Novosibirsk, automatic block-signalling seemed to be limited to the vicinity of the larger stations.

that over twenty per cent of the 216 car repair shops, 64 car depots and 17 wheel repair shops built in the USSR during the Second Five-Year Plan period, were constructed in Siberia.[1] The Trans-Siberian either is or should shortly be independent of the older industrial centers of European Russia for locomotive and car replacements. The Nizhni Tagil car works (Uralwagonstroi) with an ultimate capacity of 50,000 four-axle cars a year, the largest car plant in the USSR, is already producing. Another new car plant is the one at Irkutsk on which construction started in 1936 and which was due to start operations during the Third Five-Year Plan. Locomotives are either now or will shortly be turned out at the Ulan-Ude locomotive works (in operation in 1937), the Kuznetsk locomotive works (construction started in 1936, scheduled for operation in 1939 or 1940), and the Orsk locomotive plant in the southern Urals (under construction?).

Water supply presents problems on two sections of the line; the Omsk Railway in the west, where semi-arid conditions result in water shortage and possibly alkalinity, and along the Molotov and Amur Railways in the east, where extreme winter temperatures and perpetually frozen sub-soil create especial difficulties. On the Omsk Railway great hopes were placed in the Soviet-designed condenser-locomotive. However, judging from the twenty-five or thirty of these locomotives seen on sidings at Petropavlovsk in 1937, the type was not entirely successful at first. At that time it was noted that excavation for and the laying of pipe was proceeding at a number of places between Kurgan and Omsk. Russians on the train said that this was for the

[1]Grajdanzev, *op. cit.*, 18-19.

railway water supply. In the east it is necessary to heat water pipes during the winter which involves the building of galleries, or surrounding the water conduit with a warm water jacket, since pipes cannot be buried below the frost level.

6. *Rolling Stock and Locomotives*

The Section has been unable to find any references giving the number of locomotives and cars operated by the different railway administrations making up the Trans-Siberian. The lack of such data is not, however, of much importance, since the entire country can be drawn upon at need for motive power and rolling stock. In this connection, it might be pointed out that undoubtedly some of the rolling stock which normally operates in the regions now occupied by the enemy has been evacuated and is operating on the Trans-Siberian. Grajdanzev estimates that in 1940-41 the number of freight cars on the Siberian railways was 120,000 (in terms of two-axle freight-cars), locomotives about 4.200 and passenger cars about 6,000.[1] However, these estimates should be treated with great reserve, since they are derived from the ton-Kilometer distances run on Siberian railways, apparently in 1935. In recent years with the increasing output of four-axle 50 m. tons-capacity cars, the proportion of large capacity cars in the total park has been steadily increasing. In long distance transit traffic, such as much of that over the Trans-Siberian, so-called "marshrutnyi" trains, completely made up of the four-axle cars, are used. The average capacity of a Soviet freight car in 1936 was 20.87 m. tons -- it is probably nearer 22 m. tons today.[2] More intensive use of the

[1]Grajdanzev, *op. cit.*, 17.

[2]Grajdanzev, *op. cit.*, 20. These figures include many two-axle 15 ton cars.

existing rolling stock will be possible as more and more are equipped with automatic couplers and brakes. Grajdanzev estimates that about 70% of all cars are now equipped with both automatic brakes and automatic couplers, a figure which is probably too high.

The standard freight locomotive for main line haulage of mass freight is the FD type. It has a 1-5-1 wheel arrangement, a rated horsepower of 2,630, a tractive power of 1,800 m. tons gross, or 1,200 tons net on a grade of 9/1000, or 2,200 tons gross on a grade of 7/1000. The most efficient speed is 65 Km./p/h and the machine is equipped with an automatic stoker. The standard passenger locomotive is the type IS (Josef Stalin; Russian lacks the letter "J"), which has the 1-4-2 wheel arrangement, a rated horsepower of 3,030, is equipped with automatic stoker and operates most efficiently at a speed of 85-105 km. per hour.[1] These locomotives closely resemble American types of similar capacity. In 1935, 1,495 locomotives were delivered to the railways; 1,123 of these were of the FD type. The Third Five-Year Plan (1937-1942) calls for the delivery of 7,370 new locomotives to the railways: 1,870 of these to be of the FD type, and 1,500 the IS passenger type, and 3,200 condenser-type locomotives. The latter type is expected to be the chief freight locomotive in the next few years.[2] The decision to build so many of this type suggests that the earlier "bugs" have been eliminated.

7. *Personnel*

Grajdanzev, citing an article in the Gosplan publication *Trud v SSSR*, gives statistical material on number of workers in various categories on the

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[1]Grajdanzev, *op. cit.*, 18-19.

[2]Gosplan, *Tretii Piatiletnii Plan Razvitiia Narodnogo Khoziaistva Soiuza SSR (1938-1942)*, Moscow, Gosplanizdat, 1939.

Siberian railways and those of the USSR.[1] On January 1, 1936 some 259,191 engineers, technicians, clerks, workers, attendants, and apprentices were employed on the Omsk, Tomsk, East Siberian, Molotov, and Ussuri Railways.[2] Giving figures for the entire country, Grajdanzev comes to the conclusion that in 1935 the Soviet railways did only one-fifth the work of the American railway system with 74% more workers, leading to the conclusion that the productivity of Soviet railway workers is very low. This he attributes to the low wages.[3]

B. *Capacity*

In making any estimate, however tentative, of the capacity of the Trans-Siberian for forwarding supplies to the Russo-German war zone, it is necessary to bear in mind that operating conditions and traffic requirements vary considerably on different sections of the line. For the purposes of our analysis, the Trans-Siberian may be divided into three parts: Vladivostok-Novosibirsk, Novosibirsk-Chelyabinsk, and Chelyabinsk-Volga.

The Vladivostok-Novosibirsk portion has the most severe operating conditions. As pointed out previously in this discussion (p. 14 ), there are two mountainous sections on this stretch and considerable hilly country through which operating conditions are by no means ideal. Furthermore, the severe climate, more severe in Eastern than Western Siberia, makes for difficulty in winter operations. On the other hand normal traffic is not heavy. A dispatch from the M/A in Moscow in February of this year (1941) giving a spot count of train movements on the Trans-Siberian, shows 16-20 pairs of trains operating

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[1]*Grajdanzev, op. cit.*, 28-29.

[2]*Grajdanzev, op. cit.*, 29. In 1936 the present Amur Railway was divided between the Trans-Baikal (Molotov) and Ussuri (Far Eastern) Railway administrations.

daily on the Vladivostok-Khabarovsk section, 15-30 on the Khabarovsk-Chita section, and 30-35 on the Chita-Novosibirsk section.[1] Assuming that one-third of these were passenger trains, and that the average load per freight train was 1,000 tons, the tonnage movement figures out as follows:[2]

TABLE II

| *Section of Main Line* | *Daily tonnage in each direction* | | | *Total Yearly Tonnage both directions* |
|---|---|---|---|---|
| Vladivostok-Khabarovsk | 10,700 | — | 13,300 | 3,900,000 -- 4,800,000 |
| Khabarovsk-Chita | 10,000 | -- | 20,000 | 3,650,000 -- 7,300,000 |
| Chita-Novosibirsk | 20,000 | -- | 24,000 | 7,300,000 -- 8,760,000 |

However, in view of the more difficult operating conditions east of Novosibirsk, this figure is probably too high; 700-800 tons is probably more nearly correct. A correction factor should therefore be applied to the above figures.

The only statistics which give actual freight movement are for 1935, and are contained in a table appearing in *Sotsialisticheskoe Stroitelstvo* 1936.[3] The table follows:

TABLE III

| *Name of Railway* | *Freight Carried in Thousand Metric Tons* | | | | |
|---|---|---|---|---|---|
| | *Total* | *Imports* (a) | *Exports* (b) | *Transit* (c) | *Local* (d) |
| Ussuri | 11,464 | 1,840 | 398 | | 9,226 |
| Molotov | 7,937 | 2,200 | 393 | 1,996 | 3,348 |
| East Siberian | 8,655 | 886 | 2,123 | 2,732 | 2,914 |

(a) Presumably freight originating on other railways destined for stations on the railway indicated.

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[1]M/A Moscow, Report No. 1857, Feb. 12, 1941. I.G. No. 4540. Secret.

[2]Grajdanzev, *op. cit.*, p.9, gives 1,000 tons as the average for all Siberian railways. This figure is also given in a dispatch from Moscow; (M/A Moscow, Report No. 1857. Secret).

[3]*Sotsialisticheskoe Stroitelstvo* 1936, 423, Cited by Grajdanzev, *op. cit.*, 7

(b) Presumably freight originating on railway indicated and destined for stations on other railways.

(c) Presumably freight in transit over the railway shown. No transit freight is shown for the Ussuri Railway, since from the railway point of view, freight imported through the port of Vladivostok and loaded onto the railway there originates there and if destined for points west of Ussuri Railway appears as "export" freight.

(d) The heavy local freight traffic on the Ussuri Railway is attributable to the coal traffic from the Suchan mines to Vladivostok and other points on the railway.

Comparison of the data in Tables II and III suggests that there had been little increase in traffic over the part of the line east of Novosibirsk from 1935 until the train count above referred to was taken.

It seems unlikely that this represents capacity traffic when it is recalled that completion of double-tracking on the line from Ulan-Ude to Vladivostok has taken place since 1935. If single-track sections were able to carry upwards of 8 million tons in 1935, it seems likely that the double-tracked railway of today could carry a total of twice that amount, or 16 million tons.[1] Since the train count early this year suggests a volume of traffic approximately the same as that in 1935, it seems safe to assume that so far as the line itself is concerned, the reserve capacity of the Trans-Siberian east of Novosibirsk is at least 8 million tons annually -- 4 million in either direction -- or approximately 11,000 tons daily in each direction.[2]

The reserve capacity of 4 million tons available for westbound traffic should be largely free for through traffic, since Eastern

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[1]In general, the capacity of a railway can be doubled by adding a second track.

[2]Grajdanzev, using another method, calculates that the freight capacity of the entire Trans-Siberian for military purposes is between 3 and 7 million tons. *Op. cit.*, 8-10

Siberia and the Soviet Far East do not produce in quantity the raw materials, foodstuffs and manufactures needed in European Russia at the present. As a matter of fact this part of Siberia normally imports from West Siberia and European Russia considerably more than it exports.

This estimate of reserve capacity obviously does not take into consideration the availability of rolling stock, which is discussed below.

The Novosibirsk-Chelyabinsk portion of the Trans-Siberian is the best part of the entire line from an operating point of view. Grades are slight, there is a high percentage of tangents, the line is well-ballasted and is equipped with automatic block signals. It is thus capable of carrying near the maximum which a double-track railway can carry. According to an American authority, a comparable stretch of track in this country should be able to maintain a traffic density of a train in either direction every half-hour, or forty-eight per day.[1] The train count contained in the M/A dispatch above referred to gives 45-50 as the number of pairs on the Novosibirsk-Omsk stretch. This suggests that this portion of the Trans-Siberian is operating very nearly at capacity, and that there is thus little if any reserve capacity. The Soviet statistics referred to above show the following freight movement on the Omsk and Tomsk Railways (which roughly coincide with the Novosibirsk-Chalyabinsk stretch).[2]

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[1]Statement by Col. Ross, G4

[2]*Sotsialisticheskoe Stroitelstvo 1936*, 423

TABLE IV

| Name of Railway | Total | Freight carried in thousand metric tons: Imports | Exports | Transit | Local |
|---|---|---|---|---|---|
| Omsk | 20,280 | 2,879 | 3,310 | 12,048 | 2,043 |
| Tomsk | 29,329 | 5,448 | 9,987 | 3,061 | 11,334 |

Even allowing for the great proportion of branch and connecting line mileage to main line mileage as compared with the railways of Eastern Siberia and the Soviet Far East, the traffic shown in Table IV was much heavier than that carried by the East Siberian, Molotov, and Ussuri Railways. It is due in large measure to the heavy coal and iron ore traffic between the Kuznetsk Basin and the Urals. In 1935 some 5-6 million tons of coal moved from the Kuznetsk Basin to the Urals and 1½-3 million tons of iron ore from the Urals to the Kuznetsk Basin over the Trans-Siberian main line.[1] This coal and iron ore traffic explain the high "import" and "export" figures for the Tomsk Railway and the high transit figures for the Omsk Railway. Since the Kuznetsk Basin is served by branch lines of the Tomsk Railway, coal shipped westwards is "exported" from the railway and the iron ore brought to the Kuznetsk Basin from the Urals is "imported." Since neither the coal or iron ore originates on the Omsk Railway, but merely passes over it from one end to the other, it is transit freight. The large local traffic on the Tomsk Railway is presumably accounted for in the main by the movement of coal from the mines to the nearby smelters and blast furnaces within the Kuznetsk Basin or to the industrial plants of Novosibirsk.

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[1] *Bolshoi Atlas Mira*, II, pl. 79
Grajdanzev (*op. cit.*, p. 11) states that in 1937 7½ million tons of coal were moved from the Kuznetsk Basin to the Urals. He does not give his source for this figure.

Since 1935 the traffic over the Novosibirsk-Chelyabinsk section has undoubtedly increased -- the increased production of iron and steel in the Kuznetsk Basin and the Urals alone would account for a significant increase in the coal and iron ore traffic.[1]

The loss of food-producing and iron and steel-producing capacity in the Ukraine as a result of the German invasion has presumably placed an additional load on this portion of the Trans-Siberian. If it were not for the completion of the Akmolinsk-Kartaly line providing a means for getting coal from the Karaganda Basin to the Urals without using the main line of the Trans-Siberian, there would be no reserve capacity to handle additional transit freight from Vladivostok. Here again we are considering only the line itself, not rolling stock and motive power. The new line, opened only at the end of 1939, should be able by now to carry several million tons of Karaganda coal to the Urals annually, thus relieving the main line of an equivalent amount of Kuznetsk coal. Nevertheless, even with the aid of the new line, the reserve capacity of the Trans-Siberian between Novosibirsk and Chelyabinsk must be considerably less than that of the line east of Novosibirsk -- an outside maximum of 3 million tons a year at most, probably considerably less.

Even less data are available for the Chelyabinsk-Volga portion of the Trans-Siberian than for the Vladivostok-Novosibirsk and Novosibirsk-Chelyabinsk sections. The total capacity of the line is presumably less than for the Novosibirsk-Chelyabinsk stretch, since it

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[1]Between 1932 and 1937 traffic on all Siberian railways increased 2.8 times (Galitskii, A., "Gruzooborot Zheleznykh dorog v. tret'em pialiletii, "*Planovoe Khoziaistvo*, No. 6, 1939, 109). For the period 1938-1942, freight traffic on the railways of Western Siberia is to increase 50-55% according to the Third Five-Year Plan (*ibid.*, 117).

passes through the Urals and in addition involves some long grades between the Urals and the Volga. However, its capacity is probably greater than that of the Vladivostok-Novosibirsk section. Normally its reserve capacity should be greater than that of the section between Novosibirsk and Chelyabinsk, since it does not normally have any considerable coal and iron ore traffic. However, the loss of the Krivoi Rog iron ore mines, may well have led to an attempt to supply the Donets Basin blast furnaces with iron ore from the Urals, in which case this section of the Trans-Siberian has presumably had to carry a large increase in westbound freight. In addition to the iron ore, there has probably also been a considerable increase in the shipment to the west of pig iron, steel ingots and forms, and heavy manufactures of various kinds from the Ural industrial region such as tractors and tanks from the Chelyabinsk tractor plant. Presumably also there is a larger than normal shipment of grain westward from the West Siberian and Trans-Volga grain belts; much of this traffic would move over the Chelyabinsk-Volga line. While there are other lines connecting the Urals with the west, this is the only double-track line, and therefore presumably is carrying near its capacity as a result of the war situation. Unfortunately, there are no figures available on which to base an estimate of the remaining reserve capacity of this part of the Trans-Siberian. It is probably somewhat under that of the Novosibirsk-Chelyabinsk section.

In the foregoing discussion of the capacity of three parts of

the Trans-Siberian, no account was taken of the availability of rolling stock, obviously equally important with the line itself in determining the capacity of the route. It was pointed out in an earlier section that even if figures on the number of locomotives and freight cars operated by each of the nine railway administrations which share the Trans-Siberian were available, they would not be of much significance, since rolling stock can be and is drawn from all the railways of the country at need. The degree to which this is done depends on how important the authorities consider the requirements of any one rail route. For the country as a whole the rolling stock and motive power situation must be extremely serious. Even in peace times, there is a chronic shortage of cars and locomotives, in spite of large increases in the production of each. Add to this the purely military requirements - which must be enormous in view of the forces involved - and the added requirements due to dislocation of industries and raw material sources and the need for hauling food-stuffs from greater distances, and it will be seen that the shortage of rolling stock and locomotives must be acute. However, some proportion of the rolling stock and locomotives which normally operated in the territories now occupied by the Germans, must have been evacuated and should be available to help meet the emergency situation on the railways still under Soviet control. On the other hand, in view of the destruction of rolling-stock on Soviet-controlled railways by bombing attacks, it is possible that the evacuated material just about makes up for the destruction of rolling stock and locomotives on lines

still under Soviet control. In any case, there can be little doubt that the diversion of cars and engines to hauling supplies from Vladivostok over the Trans-Siberian can only be at the expense of other vital traffic.

While statistical data on the volume of transit freight carried over the entire route of the Trans-Siberian is lacking, five reports on the volume of transit goods shipped over the Trans-Siberian from the Far East to Germany prior to the latter's attack on the USSR, provide some indication of the through traffic which the line could accomodate in addition to the normal peace-time traffic load. The highest figure for this German transit traffic is 2,143 tons daily and is given in two reports.[1] The lowest figure cited is 1000 tons.[2] One may assume that if the Soviet authorities managed to move over 1000 tons daily for the Germans, an effort there is some evidence to show was less than wholehearted, they would find a way of moving a higher quantity of supplies which they urgently need themselves.

9. *Conclusions*

From the analysis of the rail connections west from Vladivostok, it appears on the basis of the available data that, so far as trackage alone is concerned, the bottle-neck for westbound traffic on the main line of the Trans-Siberian was, up to 1937, the section between

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[1]Reliable British source and memorandum from W. E. Shipp, Lt. Col. G.S.C. to Chief, Intelligence Branch, dated May 9, 1940.

[2]Dispatch from American Consul General, Harbin, to American Ambassador, Peiping, Nov. 4, 1940.

Novosibirsk and Chelyabinsk, and especially the section between Novosibirsk and Omsk, where there are no alternative routes. This was due primarily to the heavy westward movement of coal from the Kuznetsk Basin required by the metallurgical plants of the Urals.

The relief of this bottle-neck is, therefore, in large measure dependent on the degree to which this long-haul Kuzbas-Urals coal traffic may have been, or may still be, reduced. In recent years - since 1937 - efforts have been made to reduce this long distance coal traffic by greater utilization of the low grade coals of the Urals and by establishing a direct rail connection between the Urals and the Karaganda coal basin, 678 km. nearer to the south Urals than the Kuzbas.

No data are available which would indicate fully the quantitative success of these efforts. However, the increased production of Karaganda coal (4 million tons in 1938, 8 million called for by 1942) and the opening of the Akmolinsk-Kartaly railway providing direct connection between the Karaganda and the South Urals should have relieved the Trans-Siberian of upwards of 3 million tons of Kuznetsk coal which formerly went to the South Urals. In addition, the Sverdlovsk metallurgical area can be relieved from dependence on Kuznetsk coal by obtaining Karaganda coal via Petropavlovsk and Kurgan. This coal - 1 million tons annually, at least - would move over the Trans-Siberian over a section for which there is an alternative route.

Thus, if coal production at Karaganda has increased according to plan, and the new railways are sufficiently well equipped to handle the

traffic, the main line of the Trans-Siberian should by this time have been relieved of a coal traffic of some 4 million tons annually, possibly more . This capacity would be available for other traffic.

The loss of food-producing and industrial regions in the west will obviously increase the dependence of the remaining parts of European Russia on the Urals and West Siberia for food-stuff, raw materials and munitions, thus increasing the westbound traffic load on all the railways. Lacking any data on this traffic, it is impossible to say how much of the westbound trackage capacity it will require. However, it should be emphasized that for the section over which this traffic is or will presumably be, heaviest, namely, the Urals - Volga, there are four trunk lines, one of which is double track, and that in the West Siberia food surplus region there are four lines west of a meridian running north and south through Kurgan, three west of a meridian north and south thru Petropavlovsk, and two west of a meridian north and south through Omsk, one railroad line in each case being the double-tracked Trans-Siberian.

Taking all factors into consideration, the *trackage capacity* -- availability of rolling stock and motive power not considered -- westward from Vladivostok may possibly be sufficient to accomodate a through westbound traffic of 3 million tons a year, possibly even more.

E. *SUPPLEMENTARY PORTS IN EASTERN SIBERIA AND CONNECTIONS WITH THE TRANS-SIBERIAN*

(Note: This section is reproduced with only slight changes from Section IV, Part IV of the Report of 16 October, 1941, "Lines of Communication between the United States and the Russo-German War Zone.")

1. *Sovetskaya Gavan*

This is a new port 1000 km. north of Vladivostok on the Sea of Japan, which is mentioned in a number of articles and reports as the ultimate terminus of the Baikal-Amur Railway. The port has only a small sheltered anchorage, and this freezes in winter, but it is believed that it can be kept open by icebreakers as easily as the harbor of Vladivostok.[1]

Although there seems scant possibility that the entire Baikal-Amur Railway will be completed for several years, there is a possibility that the eastern end, connecting the port of Sovetskaya Gavan with Komsomolsk on the Amur River (the terminus of a branch railroad line from Volochayevka on the Trans-Siberian) may be completed in time to enable Sovetskaya Gavan to supplement Vladivostok during the present crisis. The railway between Sovetskaya Gavan and Komsomolsk is reported to be under construction, although not yet completed.[2]

Although there are no reports on the route of the new railway or the distance involved, examination of the largest scale relief map available indicates that there is a practical route across the northern end of the Sikhota Alin which does not involve elevations greater than

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[1]G-2/2657-D-1061-May 5, 1941

[2]M/A. Moscow, No. IB. 10/1/41. S.

700 meters.[1] The distance by this route would be approximately 375 km. The chief engineering problem on this line would appear to be a bridge over the Amur at or near Komsomolsk. Until the bridge is completed, trains will have to be ferried over the river, since the Komsomolsk branch lies on the west side of the Amur.

This railway might also be of use in connection with the Amur River route, discussed below, in view of the fact that the river at Komsomolsk is open longer than the port of Nikolayevsk near the mouth of the river. Vessels which reached the neighboring waters before the ice went out of the Amur in the spring or after freezing in the fall could drop down to Sovetskaya Gavan and unload there, cargoes moving over the new railway to the river open which is somewhat longer at Komsomolsk.

Until more is known about the port and the railway, it is impossible to make any estimate as to the capacity of this supplementary route.

2. *Nikolayevsk and the Amur River Route*

Nikolayevsk, near the mouth of the Amur, is an old Russian Far Eastern port and was at one time Russia's chief naval base on the Pacific. Here the sea communications and the port are somewhat less exposed to attack than at Vladivostok or Sovetskaya Gavan. The port of Nikolayevsk is ice-bound six to seven months per year.[2]

The port's only practicable connection with the interior is the Amur River.

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[1] *Bolshoi Atlas Mira*, II

[2] G-2/2657-D-1061-May 5, 1941.

The Amur is navigable for small ocean vessels up to Khabarovsk, and for river steamers as far as Sretenak. Ice limits the usefulness of the river to six to seven months per year in its lower reaches, but as suggested above, the railway under construction from Sovetskava Gavan to Komsomolsk might make the river useable before the ice has gone out at the mouth or after it has frozen over in the lower river.

Since there are no data on the amount of river shipping available, no estimates on the capacity of the river route can be given at this time. However, maximum use should be made of this route since not only will it reduce pressure on the limited port facilities of Vladivostok, but also on the rolling stock of the railway.

Obviously, use of the Amur above Khabarovsk, at least, depends on continued Japanese neutrality.

3. *Ayan and its Road-River Connection*

The small port of Ayan on the sea of Okhotsk, 450 km. by sea from the mouth of the Amur, can have only the most limited utility as a means of forwarding supplies.

Ayan is connected by a 220 km. wagon road with the village of Nelkan at the head of navigation on the Maya, a right bank tributary of the Aldan, which in turn is a tributary of the Lena. Supplies unloaded at Ayan and freighted over the wagon road, can proceed by river craft down the Maya to the Aldan, down the Aldan to the Lena, and up the Lena to Ust-Kut, to which point it is believed the Baikal-Amur Railway is completed from Taishet on the Trans-Siberian. While the use of this route would afford some relief to Vladivostok and to the Trans-Siberian

all the way to Taishet, the limitations of the Ayan-Nelkan wagon road and river shipping, suggest that the relief would be insignificant.

4. *Okhotsk*

The small port of Okhotsk, 450 km. north of Ayan, is connected with the Aldan by a wagon road which terminates at Aldanskii Perevoz. Since the road is nearly twice as long as that from Ayan to Nelkan, this route can handle even less traffic than the Ayan route, and thus need not be further considered.

5. *Magadan (Nogayeva)*

This rapidly developing port on a fine natural harbor with a good automobile road 450 km. long connecting it with the Kolyma at Ust Utinaya, is referred to in several reports. Although it can be used only for forwarding supplies to the west in conjunction with the Northern Sea Route -- the Kolyma flows directly into the Arctic -- the port and the connecting highway have significance in connection with the plane-ferry route from Alaska.

If any considerable number of planes are to be flown to the front via Alaska and Siberia, a fuel base somewhere in northeastern Siberia is essential. The port and the auto-truck highway to the interior provide an adequate route for fuel transport.

6. *Conclusions*

(a) Only the port of Sovetskaya Gavan can supplement Vladivostok the year 'round, and this port is of no utility until the railway to Komsomolsk is completed.

(b) The other routes can be used in summer only, since they are

river routes. The Amur, either alone, or in conjunction with the railway -- as yet unfinished -- from Sovetskaya Gavan to Komsomolsk, offers the best hopes, since it does not involve the use of wagon roads, is more direct, and remains open longer. It is, however, peculiarly vulnerable in the event of war with Japan. In that eventuality, only the Ayan and Okhotsk routes, with their very limited capacities, could be used to forward supplies from the east.

F. *SUPPLEMENTARY RAIL ROUTES IN WEST SIBERIA, THE URALS AND THE TRANS-VOLGA*

(Note: This section is reproduced with only slight changes from Section V, Part IV of the report of 16 October, 1941, "Lines of Communication between the United States and the Russo-German War Zone.")

The heavier traffic on the Trans-Siberian west of Novosibirsk as compared to that to the east of that point is to some degree compensated for by the existence, west of Novosibirsk, of branch and connecting railways which to some extent form supplementary routes. These are shown on the accompanying map.

Proceeding from east to west, the first alternative rail route is reached at Omsk.[1] This is the single-track line from Omsk via Ishim and Tyumen to Sverdlovsk, from which two single-track lines lead westward,

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[1]The by-pass routes around Novosibirsk--Anzhero--Sudzhensk--Kemerovo--Topki--Proektnaya--Eikhe--Ob, Yurga--Proektnaya--Eikhe--Ob, and Sokur--Eikhe--Ob--do not supplement the main line since any traffic diverted over them is returned to the main line at Ob. Their value, insofar as operations on the main line are concerned, lies in diverting through traffic around the Novosibirsk Junction.

one via Perm and Kirov (Vyatka) to Leningrad and Moscow (via Bui and Danilov), the other via Kazan to Moscow.[1] Although the Omsk-Sverdlovsk line is single-track, it is a trunk line which carries a heavy traffic. Sidings are frequent -- judging from the stations shown in the schematic album referred to earlier -- averaging one to every 10.1 km.[2] The quality of the roadbed is equal to that on the main line, judging from observation in 1937 and from the fact that the schedule of the Trans-Siberian Express calls for the same speed over the stretch Sverdlovsk-Omsk as over the Omsk-Novosibirsk portion of the main line. Unfortunately, we have no spot counts for this line.

The next alternative route is reached at Petropavlovsk, 273 km. west of Omsk. Here the new railway branches off to the Karaganda coal basin and Lake Balkash, 1208 km. to the south. At Akmolinsk on this line, 491 km. south of Petropavlovsk, connection is made with the South Siberian Railway. This railway, planned even before the last war, will, when completed, form a second Trans-Siberian south of and roughly parallel to the older line from Magnitogorsk via Akmolinsk, Pavlodar, Barnaul, Stalinsk, and Minusinsk to Taishet on the Trans-Siberian, where the main line turns southeast to round Lake Baikal. At Taishet the South Siberian will connect with the Baikal-Amur Railway, also under construction, and together with the latter form a new transcontinental line from the Urals to the Pacific. To date only the western section of

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[1]The Trans-Siberian Express operates over this line.

[2]*Al'bom Skhem*, etc., pl. 31 and 33 Distances from *Ofitsial'nyi Ukazatel'*.

the South Siberian line has been opened, from Magnitogorsk to Akmolinsk.[1] Construction is reported to be under way on the Barnaul-Stalinsk section. While the completed South Siberian Line could take over much of the traffic which has hitherto moved over the Trans-Siberian, the section already operating should have given a considerable measure of relief. This Akmolinsk-Kartaly section reduces the rail distance from the Karaganda coal basin to Magnitogorsk by about 550 km., thus removing all the Karaganda-Magnitogorsk coal traffic from the main line. Furthermore, since the Karaganda coal basin is now 678 km. closer to Magnitogorsk and Orsk than the Kuznetsk Basin, it seems likely that the movement of coal from the Kuznetsk Basin to the iron and steel plants of the south Urals, at least, should be much less than before the new line was completed, thus relieving the congested section of the Trans-Siberian still further, particularly that east of Petropavlovsk. The new line also offers an alternative rail route to the Urals, and, via Orsk and Chkalov, to the Volga at Kuibyshev or to Saratov (via the new Iletsk-Uralsk link).

There are no data on the capacity of the Karaganda-Akmolinsk-Kartaly line, but one may suppose that since the line was built primarily to carry coal from Karaganda to the south Urals metallurgical plants, it

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[1]The Magnitogorsk-Kartaly section is double-track, and has been in operation for a number of years; from Kartaly there is a double-track line north to Chelyabinsk on the Trans-Siberian; the 804 km. single-track line from Kartaly to Akmolinsk was opened at the end of 1939.

was planned to make it a high capacity line. On the other hand, the recency of its opening might suggest that the installation of siding, signals, water tanks and the like may not be complete. However, assuming only 12 trains daily each way with an average of 1000 tons per train, the line could carry a maximum of 4,380,000 tons of Karaganda coal to the Urals annually. Even though this figure be reduced to 3 million tons to allow for the movement of grain, it represents a considerable unburdening of the Trans-Siberian main line.

The next alternative route west of Petropavlovsk branches off at Kurgan. Here a single-track line completed by the Soviets runs northwest 383 km. to Sverdlovsk. Sidings average one every 11 km., suggesting a capacity of 15 pairs of trains daily. The writer travelled over this line in 1937 and was not particularly impressed with its quality. However, in 1935 it carried over 3,000,000 and less than 1,500,000 tons of coal to the Sverdlovsk area.[1] Its value in long distance haulage is that it brings the Karaganda coal basin 475 km. nearer to the iron and steel plants of the Sverdlovsk area than the Kuznetsk coal basin. Thus, if the capacity of the Karaganda basin can be increased sufficiently to meet the import coal requirements of the middle Urals as well as the south Urals, there will be no necessity for the movement of Kuznetsk coal to the Urals, thus relieving the main line

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[1] *Bol'shoi Atlas Mira* II, pl. 79.

of the Trans-Siberian of the largest item in its westbound traffic.[1]

Between the Urals and the Volga, there are, in addition to the main double-track line of the Trans-Siberian from Chelyabinsk through Ufa to Kuibyshev, three other single track trunk routes: the Sverdlovsk-Perm-Kirov (Vyatka) line and the Sverdlovsk-Kazan line north of the Trans-Siberian, and the Orsk-Chkalov (Orenburg) - Kuibyshev line to the south. In addition to these four railways extending from the Urals to the Volga, there are two additional lines branching off from two of the four trunk routes and extending to the Volga: a single-track line which leaves the main line of the Trans-Siberian just west of Ufa and runs due west to Ulianovsk on the Volga, and the newly completed Iletsk-Uralsk line connecting with Saratov on the Volga.

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[1]To be sure, Karaganda coal destined for the middle Urals, if shipped via Kurgan, has to pass over the Petropavlovsk-Kurgan section of the Trans-Siberian. However, on this portion of the Trans-Siberian there is an alternative line, that from Omsk to Sverdlovsk via Tyumen, so there is not the same danger of a bottle-neck as exists on the line between Omsk and Novosibirsk.

PART IV

# THE SOUTHERN SUPPLY ROUTES FROM THE UNITED STATES TO THE RUSSO-GERMAN WAR ZONE

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SEE MAPS I AND III

## PART IV

## THE SOUTHERN SUPPLY ROUTES FROM THE UNITED STATES TO THE RUSSO-GERMAN WAR ZONE

### A. SUMMARY AND CONCLUSIONS

1. Supplies may be sent from the United States to the Russo-German war zone by way of several ports in the Middle East and various land routes leading from them to the southern frontier of the Soviet Union.

2. The distances by sea from either west or east coast ports of the United States to these ports of the Middle East are more than twice the distances involved in the maritime sections of the Eastern and Northern supply routes.

3. The outbreak of hostilities between the United States and Japan, while not closing the route across the Pacific, has made it hazardous and will presumably increase the distance involved.

4. The ports of the Middle East and the land routes from them over which it is possible to send supplies to the southern frontier of the Soviet Union may be divided into two groups, a Western Group and an Eastern Group, on the basis of their location, orientation, and the present or possible future military situation.

5. The Western Group comprises ports on the Levant Coast of the Mediterranean and near the head of the Persian Gulf together with land routes leading from them through Turkey, Syria, Palestine, Trans-Jordan, Iraq and Iran to Tabriz, terminus of the Russian gauge railway in northwestern Iran, and to the Iranian ports on the south coast of the Caspian. A total of 4,000 tons daily may be forwarded to Russia by these routes by next spring if transit through

Turkey is possible; 3,300 tons if Turkey is excluded. The following are the different routes of the Western Group and their capacities:

a. From the Turkish ports of Mersin and Iskenderun (Alexandretta) by standard-gauge railway to Samsun on the Black Sea coast of Turkey and thence by boat to the Soviet ports at the eastern end of the Black Sea and by standard-gauge railway to Erzurum, thence by narrow-gauge railway or motor transport to Sarikamis (beginning of the Russian-gauge railway) or by motor transport to the port of Trabzon and thence by boat to Russian ports. These routes are not now available due to Turkish neutrality.

Daily capacities are as follows:

| | |
|---|---|
| Port of Mersin | 400 tons |
| Port of Iskenderun | 300 tons (approx.) |
| Standard-gauge railway to Samsun | 1,000 tons ? |
| Port of Samsun | 1,100-1,200 tons |
| Standard-gauge railway to Erzurum | 1,000 tons ? |
| Narrow-gauge railway, Erzurum to Sarikamis | 100 tons |
| Road, Erzurum-Sarikamis | 300 tons |
| Road, Erzurum-Trabzon | 500 tons |

The capacities of the ports of Mersin and Iskenderun, 700 tons daily, set the limit to the volume of freight which can be forwarded through Turkey.

b. From the port of Tripoli by standard-gauge railway to Turkey or to Iraq. No information as to the capacity of the port. Capacity of the railway to Mosul and Baghdad -- 600-900 tons daily.

c. From the port of Beirut by narrow-gauge railway to Rayak where connection is made with the standard-gauge railway to Iraq, or by motor transport direct to Baghdad.

Daily capacities:

| | |
|---|---|
| Port of Beirut | 2,000 tons |
| Narrow-gauge railway | less than 37 tons |
| Road to Baghdad | 300-400 tons |

d. From the port of Haifa by 3 ft. 5½ in. gauge railway to Rayak where connection is made with the standard-gauge line to Iraq, or by motor transport to Baghdad.

Daily capacities:

| | |
|---|---|
| Port of Haifa | over 2,000 tons |
| Railway to Rayak | no data |
| Road to Baghdad | 1,000 tons |

e. From the port of Basra to Baghdad and Mosul by meter-gauge railway (standard-gauge Baghdad-Mosul), transport on the Tigris river, and dry season road.

Daily capacities:

| | |
|---|---|
| Port of Basra | 3,600 tons |
| Meter-gauge railway Basra-Baghdad | 1,000 tons, rising to 3,000 tons |
| River transport on the Tigris | 600 tons rising to 1,500 tons |
| Dry season road Basra-Baghdad | 150 tons |

f. The Kermanshah Road from Khaniqin or Baghdad to Kazvin and the Iranian Caspian port of Pahlevi.

Daily capacity - 500 tons

g. The Rowanduz Road from Mosul or Kirkuk to Tabriz:

Daily capacity - 500 tons (with improvements)

h. From the port of Khorramshahr by river transport and dry season road to Dizful, thence by all-weather road to the Iranian Caspian port of Noshahr:

Daily capacities:

| | |
|---|---|
| Port of Khorramshahr | not definite |
| River transport Khorramshahr to Dizful | no data |
| Dry season road Khorramshahr to Dizful | no data |
| All-weather road Dizful to Noshahr | 300 tons |

i. From the port of Bandar Shahpur to Tabriz and the Iranian Caspian ports by the Trans-Iranian Railway and connecting roads:

Daily capacities:

| | |
|---|---|
| Port of Bandar Shahpur | 1,000 tons, rising to 2,500 tons by March, 1942 |
| Trans-Iranian Railway | 400 tons, rising to 2,000 tons |
| All-weather road from Zenjan to Tabriz | 1,000 tons |

6. The Iranian Caspian Ports have capacities as follows:

| *Port* | *Daily Capacity* | *Tonnage of freight to arrive by different routes* |
|---|---|---|
| Pahlevi | 600 tons | 500 tons over Kermanshah Road and 100 by rail to Kazvin and thence by truck to port. |
| Noshahr | 600 tons | 300 tons over Dizful Road and 300 tons by rail to Shahi and thence by truck to port. |
| Babul-Sar | 300 tons | By rail to Shahi and truck to port. |

| | | |
|---|---|---|
| Bandar-i-Gaz | 200 tons | By rail to nearest point on railway thence by truck to port. |
| Bandar Shah | 150-250 tons rising to 700 tons in May, 1942 | By rail all the way to the port. |

7. Information as to the capacity of the Soviet mercantile marine for removing consignments from Iranian Caspian ports and the capacities of the Soviet Caspian ports is incomplete.

a. The Caspian merchant fleet consists of 106 vessels totaling 173,287 tons, one-half of which represents oil tankers.

b. The ports of Astrakhan and Guriev are icebound 3½ months.

c. The ports of Baku and Makhach Kala are ice-free and are probably able to handle as much tonnage as can be sent them from Iranian Caspian ports.

d. Krasnovodsk is available, but its rail connection to the Russo-German war zone through central Asia is excessively long.

8. The railway from Tabriz to Djulfa on the Soviet Iranian frontier should have a capacity of 1,800 tons daily when new ties and ballast are laid. From Djulfa there are two rail connections to Baku.

9. A renewed German advance to the southeast would have the following possibilities:

a. If it reached Rostov again, it would cut the main rail connection (here double-track) between Caucasia and the main war zone to the north;

b. If it reached Salsk, 116 miles southeast of Rostov, it would cut the single-track railway connecting Caucasia with the Volga;

c. If it reached Astrakhan it would cut the remaining direct routes from Caucasia and the Caspian, thus rendering the whole Western Group of supply routes useless for supplying the main Russian forces.

10. The Eastern Group of supply routes from the south comprise the port of Karachi, Indian railways leading from it to rail-heads on the Afghan and Iranian frontiers, the branch lines extending from the Trans-Caspian railway in Soviet Central Asia to rail-heads on the Afghan and Iranian frontiers, and three roads connecting the Indian and Russian rail-heads, as follows:

a. The Eastern Iranian Road, extending from Zahidan, the Iranian terminus of the British Baluchistan railway, almost due north for 583 miles to Meshed from which there are connections to Ashkhabad on the Russian Trans-Caspian railway (160 miles), and to Sarakhs (120 miles) terminus of the branch line reported to have been built south from Tedzhen on the Trans-Caspian;

b. The West Afghan Road, 506 miles long, from Chaman on the Indian-Afghan frontier, terminus of the Quetta branch of the Baluchistan railway, via Kandahar and Herat to Kushka on the Soviet-Afghan frontier, terminus of a branch line from Merv on the Trans-Caspian railway;

c. The North Afghan Road, 563 miles long, from Landi Khotal, terminus of the British military railway through the Khyber Pass, via Jalalabad, Kabul, Charikar, and Mazar-i-Sharif to the Amu-Darya (Oxus) opposite Termez on the Kagan-Stalinabad branch of the Trans-Caspian.

11. With relatively minor improvements and with sufficient motor transport, each of the three roads of the Eastern Group probably could carry at least as much tonnage as that planned for the Burma Road, namely 16,000 tons monthly, or a total of possibly 48,000 tons for all three routes.

12. The disadvantages of the Eastern Group of supply routes are:-

a. The very considerable length of the land routes involved. For example, it is 629 miles from Karachi to Chaman by rail, then 506 miles by road to Kushka, and finally 2,115 miles by rail from Kushka to the Volga.

b. In case the Germans advance to the lower Volga, oil from the Caucasian area to the rest of Russia will have to be routed via Central Asia, placing a heavy load on the Trans-Caspian and Tashkent-Chkalov railways.

13. These Eastern roads merit serious consideration as routes for forwarding supplies to Russia for the following reasons:

a. Their Soviet railway connections are in no present danger of being cut by a German advance;

b. At present the two Afghan roads, at least, carry only light local traffic; hence most of their capacity is available for the transport of supplies to Russia;

c. They provide a direct connection between the Soviet Union and India, itself an important source of supplies.

14. The East Iranian Road, due to British control and the need for using it to some extent to supply British forces in Iran, will presumably be of less value for forwarding supplies to the Soviet Union than the two roads through Afghanistan.

15. In view of the traditional Afghan hostility to the British and Russians, proposals regarding the development of the two Afghan roads into major supply routes would probably be received more favorably by the Afghan Government if they were presented directly by American representatives.

16. If these Afghan roads are to be developed by American agency, it appears that the detailed technical information necessary for the formulation of transport plans could best be supplied by an American technical mission.

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*GENERAL DISCUSSION*

B. *THE OCEAN ROUTES*

There are several ports in the Middle East and a number of land routes leading from them by which supplies may reach the Russo-German war zone from the south.

The distances by sea from either west or east coast ports of the United States to these ports of the Middle East are more than twice as great as the distances involved in the maritime sections of the Eastern and Northern (Archangel) routes. From San Francisco to the head of the Persian Gulf via Singapore it is 11,242 nautical miles. From New York via Cape Town--the direct route through the Mediterranean is not available for obvious reasons--to the same place the distance is 12,010 miles. Until the Japanese attack on the United States, both these routes were comparatively safe; and this was especially true of the route via Singapore. While the route via the Pacific to the ports of the Middle East is presumably less affected by the Japanese attack than is the sea route to Vladivostok, present indications are that it will be necessary for the time being for ships steaming to the Middle East to follow the route via the Torres Straits, 1,401 miles longer than that by way of Singapore route, or even to pass around Australia, a voyage 1,966 miles longer than the Singapore route. The new situation respecting Japan would not appear to change the status of the New York-Cape Town route. In contrast to the maritime portions of the Northern and Eastern supply routes, which are most vulnerable in the sections nearest to the Soviet Union, the Pacific sea routes to the Middle East are at present most vulnerable in their middle sections.

C. *DEFINITION OF THE LAND ROUTES*

The Middle Eastern ports and the land routes leading from them to the southern frontiers of the Soviet Union may be divided into two groups in accordance with their location, orientation and present and possible future functions:

1) A *Western Group*, based on ports on the Levant coast of the Mediterranean and near the head of the Persian Gulf which are oriented primarily toward Trans-Caucasia and the Caspian Sea, and

2) An *Eastern Group*, based on the port of Karachi in India and oriented primarily toward Soviet Central Asia.

*The Western Group* has or may have two functions:

(1) To supply the British forces in Iran and the Russian (and possibly British) forces which may be required to hold the line of the Caucasus.

(2) To forward supplies destined for the main Soviet forces in European Russia - either by rail from Trans-Caucasia, or by the Caspian Sea to Russian Caspian ports, and thence by rail or river.

It would appear that a German advance from the Crimea and the lower Don to the southeast and east would limit the second function and then perhaps eliminate it entirely, while at the same time it greatly increased the importance of the first function. Such an advance might stop the northward movement of traffic via the Cis-Caucasian railways and the north-Caspian ports, while at the same time it threw upon the Western Group of Southern Routes the burden of moving up from the south all the supplies required by the armies holding the line of the Caucasus.

*The Eastern Group* of Southern Routes is of importance primarily for sending supplies to the main Russian forces, and only partly, and to a minor extent, for supplying the Allied forces in northwest Iran and Caucasia.

D. *THE WESTERN GROUP OF SOUTHERN SUPPLY ROUTES*

Examination of the accompanying map shows a number of routes -- rail, road, and river -- leading from ports on the Mediterranean and the Persian Gulf to the Caspian or to Trans-Caucasia. Since these routes connect with one another at one or more points, there are several alternative traffic lines. In most cases two or more methods of transportation are required to carry supplies from the original port to the Caspian or Trans-Caucasia. An attempt will be made in this section to indicate the segments in this complex of routes which limit the amount of supplies which can be forwarded from the south.

1. *Routes from the Mediterranean*

At the present time the routing of American supplies to the Russo-German war zone via the ports of the eastern Mediterranean meets with the following objections:

1) So long as it is not possible to send shipping through the Mediterranean from the west, the several ports on the Levant coast of the Mediterranean from which supplies can at present be shipped to Trans-Caucasia and the Caspian are at least 1,000 miles farther from both coasts of the United States, in terms of distances that must be travelled, than are the ports at the head of the Persian Gulf;

2) The distances from the Mediterranean ports to the points in Iraq from which roads lead to Trans-Caucasia and the Caspian are considerably greater than from ports on the Persian Gulf to the same points;

3) The combined capacity of the two roads over which all supplies from the Mediterranean or the Persian Gulf through Iraq to Russia must at present leave that country is considerable less than can be delivered to them from Persian Gulf ports alone;

4) The limited-capacity rail route through Turkey to Trans-Caucasia is not now available.

However, in view of the possibility (1) that the sea route through the Mediterranean from the west may become available, thus making the ports of the eastern Mediterranean the nearest of the southern supply ports to the United States, and (2) that the rail route through Turkey to Trans-Caucasia under certain circumstances may become available, it seems advisable to include in the present study some consideration of the Mediterranean ports and the land routes leading from them.

a. *Via Turkey*

The two Turkish ports are presumably not now available for receiving and forwarding supplies for Russia, since Turkey is maintaining a "correct" attitude vis-a-vis Germany. However, in the event that Turkey is involved in the war on the side of the Allies, these ports might be of some use, since they are connected by rail with both Iraq and Trans-Caucasia. However, neither is equipped to handle any large volume of freight. Mersin is a partially protected roadstead with dockage facilities for lighters only. There are 4 lighter piers with depths of 6-10 ft. at the outer ends. The largest of these is the Railway Pier which has 2 lines of railway track, two travelling cranes of 3 and 44 ons capacity and an electric overhead trolley system on both sides for conveying loads of approximately 1 ton to the compound at the shore end of the pier. The

Customs Pier has a trammay and 1 ½-ton travelling crane and 1 1-ton fixed crane. The port has 6 small tugs and 57 15-100-ton lighters.[1] The capacity of the port is estimated at some 400 tons daily.[2] Mersin is connected by a 28 mile branch with the Taurus line of the Turkish rail system.

Iskenderun (Alexandretta) has one of the best natural harbors in the Levant, but like Mersin, has dockage facilities for lighters only. There are travelling cranes of up to 10 tons capacity on the west wall of the enclosed lighter harbor onto which the railway runs. The port has 46 lighters with capacities of from 10 to 60 tons, some of them with motors, and 6 tugs. During the last ten years the port has handled about 100.000 tons of cargo annually, a daily average of 278 tons.[3] In view of the fact that during most of that period the port was under French jurisdiction and trade from its natural hinterland was diverted to ports further south, it is not believed that this figure represents the maximum capacity of the port; a daily capacity of 300 tons may be safely assumed. Iskenderun is connected with the main line at Toprakkale by a branch railroad reported to be in a bad state of disrepair.[4]

Mersin and Iskenderun are connected with Erzurum in eastern Turkey by a standard-gauge line via Osmaniye, Fevsipasa, Malatya, Cetinkaya and Ersincan (the last section, Cetinkaya-Erzurum was opened only in 1939), and by the more roundabout route via the Taurus tunnels, Ulukisla, Kayseri, Sivas and Cetinkaya.

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[1]Admiralty, Naval Intelligence Division, February, 1941, C. B. 1754A (2/41). Confidential

[2]Information from Dr. C. W. McEwan, Office of Program Preparations, Economic Defence Board.

[3]Admiralty, Naval Intelligence Division, *op. cit.*

[4]*Ibid.*

From Ersurum there is a 75 cm. line to Sarikamis -- 144 miles long -- built by the Russians during the First World War. Sarikamis is the terminus of the Russian broad-gauge line which connects with the Soviet Trans-Caucasian railways at the frontier near Leninakan in the Armenian Soviet Republic. The amount of freight which might be shipped over this route would be determined by the capacity of the Ersurum-Sarikamis narrow-gauge line and the transfer facilities available at either end of this bottle-neck. In the year 1938 the line carried a total of only 94,000 tons in both directions, or an average of some 257 tons daily.[1] A recent British report gives this narrow-gauge line a present daily capacity of 120 tons (presumably in each direction) and adds that with "much additional" rolling stock and motive power, 600 tons per day could be handled.[2] The figure for present capacity does not appear to take into consideration Turkish military and civil needs. Any significant addition to the rolling stock and motive power of this line appears very unlikely in view of the fact that there are only two other lines in Turkey of this gauge, and both less than 25 miles in length. If the rail route from Erzurum to Trans-Caucasia is to be a major supply route to Russia it will be necessary to extend the standard-gauge to Sarikamis, an undertaking of some magnitude since it requires the building of an entirely new line involving extensive heavy construction.[3] Pending com-

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[1]Istatistik YIllIgI, 1938, 463

[2]"Allied-Soviet Communications," Revised edition, 13 August, 1941, (from British Army Staff, Intelligence Branch, British Embassy, Washington).

[3]According to Mr. J. Aggiman, a contractor of Ankara, work on this extension began last spring, but due to the fact that construction has to be suspended during the severe winters of eastern Turkey, at least two more seasons will be required to complete the new line.

pletion of this extension, the capacity of the narrow-gauge might be supplemented to some extent by the use of motor trucks from Erzurum to Sarikamis, and from Erzurum to the Black Sea port of Trabzon. According to the British source referred to above, the Erzurum-Sarikamis road has been surfaced and is reported suitable for light and heavy motor trucks between May and October with a capacity of 300 tons daily during those months if the necessary motor transport is available. The road from Erzurum to Trabzon -- and for that matter, also the Erzurum--Sarikamis road as far as Horasan -- is the western half of the so-called Iran Transit Road, a surfaced, all-weather road from Trabzon to the Iranian frontier with bridges capable of supporting up to 7 tons and provisions for removing snow blocks in the winter. The British map "Turkey Wheel Routes" has a marginal notation to the effect that the Trabzon-Erzurum section of this road can "stand up to 2,000 tons per day, one way, limited time". It does not seem unreasonable to suppose that this road might maintain a regular traffic of 500 tons daily from Erzurum to the port of Trabzon provided sufficient motor transport vehicles were available. It seems questionable, however, whether that volume of freight could be loaded on ship at Trabzon, in view of the limited facilities of the port. All freight must be transferred from shore to ship in lighters of 15-20 tons capacity and there are only two cranes on the lighter jetty.[1]

In view of the shortness of the water distance from Trabzon to Batum -- only 90 nautical miles -- it should be possible to secure sufficient shipping to

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[1]Evaluation of British paper (August 13, 1941) "Allied-Soviet Communications" by Lt. Col. W. W. Cox, G.S.C., Chief Southern European Section, for the Chief of the Intelligence Branch, War Dept., Washington, November 25, 1941.

freight 500 tons from the Turkish to the Russian port every 24 hours. If sufficient motor transport vehicles were available and if the facilities of the port of Trabzon were used to the utmost, it should thus be possible to route approximately 900 tons daily to Trans-Caucasia via Erzurum, as follows: 100 tons by the narrow gauge from Erzurum to Sarikamis, 300 tons by truck from Erzurum to Sarikamis, 500 tons by truck to Trabzon and thence by ship to Batum.

In addition to the route via Erzurum, there is also the railway to the Black Sea port of Samsun, 230 nautical miles from Batum. The capacity of this route is given as 500 tons daily by the British report referred to earlier.[1] However, if the supplies sent via Erzurum were concentrated on the Osmaniye-Fevsipasa-Cetinkaya line, the western line via Ulukisla, Kayseri, and Amasya should be able to carry upwards of a thousand tons a day, if the rolling stock and motive power from other lines were brought to it.[2] Samsun is the principal Black Sea port of Turkey, but as at Mersin and Iskenderun, all cargoes must be lightered. There are 8 lighter jetties, two of which have 8-ton cranes and one a 20-ton crane. Transfer from the railway to lighters must be made by cart or truck since there are no tracks on the jetties. There are 67 lighters and some tugs. During strong northerly blows, there may be periods of several days during which cargoes cannot be trans-shipped. It is estimated that 1100-1200 tons can be loaded daily in favorable weather if there is sufficient labor.[3] Whether sufficient shipping is available on the Black Sea to dispatch this volume of freight daily from Samsun to Batum (or Poti) is a question in view of the losses suffered by the Soviet mercantile marine in the Black Sea.

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[1] "Allied-Soviet Communications."

[2] It should be borne in mind that all of the railways built by the Turkish Republic were designed with military loads in mind. The rolling stock and locomotives are generally modern.

[3] Estimate provided by Lt. George Miles ONI

If the several assumptions in the foregoing are accepted, it would appear that some 1,900 tons daily might be forwarded through Turkey from Mersin and Iskenderun to Trans-Caucasia. This is almost three times the 700 tons which is given above as the total daily capacity of both ports. It is doubtful whether the remaining 1,200 tons could be forwarded from ports further south. Izmir, Turkey's second port, could easily handle the additional tonnage, but the enemy forces in the Dodecanese and the Greek islands off the coast bar the use of this port at the present.

However, the question of the capacities of the routes through Turkey to Trans-Caucasia is of theoretic interest only, since Turkey is unlikely to risk a German attack by permitting the transit of military supplies to Russia. And in the event of a German attack on Turkey, it may be assumed that there will be little rolling stock and motive power available for sending supplies to Russia.

If political conditions would permit, supplies unloaded at the two Turkish ports might also be sent by rail, without trans-shipment, to Mosul and Baghdad via Fevsipasa, Aleppo, and the Baghdad line. The special status of the latter line is discussed below.

b. *Via Syrian and Palestine Ports to Iraq*

The port of Tripoli in Syria is also limited in capacity by its lack of dockage facilities. Freight must be lightered ashore and the facilities are described as "primitive".[1] No information regarding the capacity of the port is available.

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[1]Himadeh, Sa'id B., ed., *Economic Organization of Syria*, Beirut, 1936, p. 190. In 1930, busiest year for which data are available, 447 steamships with a net tonnage of 837,818 visited the port.

However, like the two Turkish ports, it is connected with the interior by a standard-gauge railway which runs north to Aleppo where connection is made with the old Baghdad line, either northwest to a junction with the Turkish State Railways and so to Erzurum, or northeast and east to Mosul and Baghdad. It is reported that the Tripoli-Aleppo line can carry only 250 tons daily.[1] Although goods landed at Tripoli cannot now be forwarded to Russia via Turkey for the reasons given above, the situation in regard to eastward shipments to Mosul and Baghdad over the Baghdad line is somewhat different even though this line lies in Turkish territory from Corbanbey to Nusaybin (Nisibin).[2]

Because the line runs practically on the frontier, with several stations actually on Syrian territory, and because both ends lie outside Turkey, this section of the Baghdad line has in a certain degree an international status. Under various agreements between the Syrian mandate and Turkey, transit freight -- including munitions -- may be shipped over the line without customs inspection. If the Turkish authorities did not choose to consider the new Free French-British regime in Syria as the legatee of the mandate, there is a more practical reason for their permitting the passage of war supplies over the line. Excepting for the Erzurum

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[1]Information from C. W. McEwan. This low figure is presumably due to the shortage of rolling stock; even a poorly built and inadequately maintained standard-gauge-line should be able to carry several times this amount. In 1934, according to Himadeh (*op. cit.*, 185) the entire Damas, Homs et Prolongements system, including the 102 km. line from Tripoli to Homs and the 331 km. line from Rayak through Homs to Aleppo, carried 610,346 tons, a daily average for the system of 1,672 tons.

[2]This portion of the Baghdad line runs just inside the Turkish border, the Turko-Syrian boundary here having been drawn one meter south of the track.

line to Soviet Russia, this part of the Baghdad railway is the sole present rail connection of Turkey with the non-Axis world. If the Turks refused permission to ship munitions over their part of this railway, the British could stop the movement of any goods into or out of Turkey over this line, by reason of their control of both ends of the railroad. If the Germans should complain, the Turks could point out that during the recent revolt in Iraq the Turks permitted the Germans to ship munitions over the line from Syria. Thus, if sufficient rolling stock can be made available, this much-discussed railway can perhaps become a significant link in the forwarding of supplies to Russia, not only from Tripoli, but, as will be shown below, also from ports further south.[1]

Beirut is a more modern port than any of the three discussed so far, but its connections with the interior are not so good. The new harbor has a well-developed sea-wall and new quays with a depth alongside of 26 ft. In addition to two floating cranes -- capacities 3 and 30 tons -- there are several on the new quays whose capacities and exact numbers are not known. However, most cargo is still discharged into lighters, of which there are several, ranging from 15 to 30 tons in capacity. Lighters use the old harbor, where the docks are equipped with 2-ton cranes. Lighter-tugs are available if they were not destroyed or removed during the recent

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[1]The Baghdad line was opened by the Germans as far as Nusaybin during the last war. For years the rail-head remained there. In 1935 the French opened the short extension across the Syrian "pan-handle" to Tel Kotchek on the Iraq frontier. The Iraq authorities then undertook the extension on their territory, opening the line to Mosul in 1939, and to Baghdad in 1940.

fighting.[1] The daily capacity of the port is reported to be approximately 2,000 tons.[2]

Beirut is connected with the interior by both a railway and a highway over the Lebanon Mountains. A 3 ft. 5¼ in. gauge railway connects the port with Damascus via Rayak, where connection is made with the standard-gauge line north to Homs and Aleppo. The capacity of the narrow-gauge line is small, largely because of the excessive grades over the Lebanon: so steep is the grade in one section that rack-and-pinion traction is necessary.[3] The highway in normal times is an excellent surfaced road and carries most of the traffic between Beirut, Rayak and Damascus. The highway and the railway together could probably deliver to Rayak (for trans-shipment to the standard-gauge line) and to Damascus (for truck transport across the desert to Baghdad) from 300 to 400 tons per day.[4]

Haifa is by far the best port on the Levant coast. It is well-protected by two new breakwaters. Vessels drawing up to 26 ft. can be accommodated at the docks. The main wharf is 1312 ft. long and there is an intermediate ward, 361 ft. long, a cargo jetty 640 ft. long, and an oil dock 1000 ft. long. In addition, twenty vessels can discharge simultaneously

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[1]Data supplied by the American Export Lines to the Office of Program Preparations, Economic Defense Board.

[2]Data provided by Squadron Leader Murray Harris, British Embassy, and C. W. McEwan.

[3]In 1929, a year of heavy traffic on this railway, the entire line, Beirut-Damascus-Trans-Jordan frontier, maintained an average daily traffic of only 9041 ton - km. (Himadeh, op. cit., 182). This amounts to an average of only 37 tons over each of the 245 kilometers of the line. Most of the traffic was presumably over the section south of Damascus.

[4]Estimates of Squadron Leader Harris and C. W. McEwan.

into lighters inside the breakwaters. Both large tugs and lighter-tugs are available. The port facilities include one 30-ton floating crane, one 25-ton railway crane, two five-ton gantry cranes, one 15-ton fixed derrick, and one 3½-ton mobile crane. The port is well equipped with suitable warehouses and customs sheds. In 1938 the port handled 793,000 tons of cargo, or a daily average of well over 2,000 tons.[1]

Haifa is connected with the interior by rail and railway. The railway is a branch of the 3 ft. 5¾ in. gauge Hejaz Railway which runs south from Damascus. By it freight can be shipped via Damascus to Rayak where transfer to standard-gauge is necessary for forwarding to Aleppo and Iraq. No data are available as to the capacity of this line. If it is converted to standard-gauge, as it is reported the British are contemplating, the utility of the line will be greatly increased, since it will then be possible to route freight cars from the Haifa docks directly through to Mosul and Baghdad.

At the present time, however, the new highway across the desert to Baghdad is of more practical significance than the railway. A road, surfaced with tarmac, has been completed along the pipe-line from Haifa east as far as Rutbah and from Ramadi on the Euphrates a similar road has been extended west for approximately 50 miles. The intervening stretch of desert track is regarded as a good all-weather road, but the road from

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[1]Data from report on *Port Handling Facilities in Palestine*, prepared by Albert W. Scott, American Consul, Jerusalem under date of Aug. 26, 1939. (State Dept. File No. 800.1561/38).

Ramdi to Baghdad is subject to inundation during high water on the Euphrates. If one bears in mind that all the pipe and the pumping-station equipment for the pipe-line were hauled by heavy motor trucks across the desert, it will be seen that the highway is capable of carrying a considerable traffic. Its capacity depends on the number and tonnage of the motor trucks available. Over most of the route, trailers can be used, thus reducing the number of drivers required for the transport of a given tonnage. A thousand tons daily over this road is probably a conservative estimate of its possibilities.[1] Shipping by truck has the added advantage that no trans-shipments are necessary — once loaded at Haifa, trucks can go directly through to the Russian rail-head at Tabriz or to the Iranian Caspian ports.

The port of Jaffa and Tel-Aviv does not compare with Haifa as a landing place for heavy imports. The 458,000 tons which the twin-port handled in 1938 consisted chiefly of citrus fruit exports. All ships must anchor in the unprotected roadstead and lighter their incoming cargoes to shore. The lighter wharves have cranes of only 7 and 3 tons capacity.[2] There are connections by standard-guage railway and by highway south to Egypt and north to Haifa.

Since the standard-gauge railways of Palestine and Egypt can be connected by car ferries across the Suez canal, Alexandria and Port Said on the Mediterranean, and Suez at the head of the gulf of that name, might also be used as ports of entry. However, if these ports were used, supplies forwarded from them by rail would require trans-shipment to the 3 ft. 5¾ in. gauge railway at Haifa or to trucks. Furthermore, more freight can be unloaded at the ports further north than the railway and highway to Iraq can handle. Finally, it is likely that the full capacity of the Egyptian ports is required to supply the British forces in Egypt.

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[1] According to Squadron Leader Harris, this road can handle 285 - 10-ton trucks daily between Haifa and Baghdad.

[2] "Handling Facilities in Palestine," State Department No. 800.1561/38.

2. *Routes from the Persian Gulf*

The ports at the head of the Persian Gulf are preferable to those of the Levant coast of the Mediterranean for shipping supplies to Russia for two reasons:

1) They are closer to both the east and west coasts of the United States by present routes; and

2) They are closer to Trans-Caucasia and the Caspian.

Two sets of routes lead from the head of the Gulf to the Caspian and Trans-Caucasia: One set leads northwest into Iraq, where junction is made with the routes coming from the Mediterranean; and from these merged routes two routes lead northwest into Iran. The other set leads directly north through Iran toward the Caspian and Trans-Caucasia.

Three ports at the head of the Persian Gulf may be used for trans-shipping supplies bound for the Russian war zone; two of these, (Basra and Khorramshahr,) are on the Shat al Arab (the mouth of the Tigris and the Euphrates), and one, Bandar Shahpur, is at the head of the Khor Musa, a shallow finger-like lagoon a few miles east of the mouth of the Shat al Arab.

a. *Basra and Its Landward Connections*

Basra, the principal port of Iraq, is located on the right bank of the Shat al Arab, some 85 miles from its mouth. The bar at the mouth of the Shat is kept dredged to allow the passage of ships drawing 21 ft. 6 in. at low tide, 30 ft. at high tide.[1] The port has 12 wharves. Six of these can accommodate large vessels, having depths of 25 ft. alongside, and are equipped with a total of 15 electric gantry cranes of 3-8 tons capacity and

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[1]*The Persian Gulf Pilot*, 1932, London, Hydrographic Dept., Admiralty 254.

several large warehouses. Five of the wharves are suitable for smaller vessels only, since they have only 10 to 15 ft. of water alongside. The port also has 4 temporary berths and special wharves for gasoline, kerosine, and fuel oil. In addition to the gantry cranes, the port is equipped with 4 floating cranes of 8, 15, 30, and 80 tons capacity.[1] According to one account, the port has a capacity of 3600 tons daily.[2] A less reliable source gives the daily capacity as 5000 tons.[3] According to the first account, the port of Basra and the adjoining port of Umqasr are to be developed to handle a total of 8,000 tons per day. For best working results the draft of vessels should not exceed 25 ft. and the length should be between 400 and 500 ft.[4]

To move this considerable tonnage inland, there are available:

1) The meter-gauge railway, Basra-Baghdad, 353 miles

2) The Tigris River

3) The Basra-Baghdad Road, 340 miles

4) The Euphrates River

The present capacity of the railway is given as 1,000 tons daily.[5] The same source states that the existing single-track line is to be developed

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[1]*Ibid.*, 289; Also, Great Britain, Air Ministry, *Military Report on Iraq*, Vol. I, 119-120. British Confidential.

[2]M.A., London, Report No. 44446, Sept. 10, 1941 (I.G. No. 4500; Subject: *Road, Rail and River Communications in Iran and Persia*. Source: British War Office). According to the *Military Report on Iraq* cited above, 1,500-2,000 tons of military stores could be handled daily with a single shift.

[3]Ireland, P. W., "The Baghdad Railway: Its New Role in the Middle East," *Royal Central Asian Journal*, July, 1941, p. 333.

[4]Great Britain, Air Ministry, *op. cit.*, 122.

[5]M. A., London, *op. cit.* *The Military Report on Iraq*, Vol. I, estimates the capacity of the line for military traffic at 5 trains of 600 tons maximum gross load in each direction daily (p. 191). According to the *M.E.I.C. Collation Map of the Russo-Iranian Frontier*, August, 1941, there are 53 meter-gauge locomotives in Iraq, 84 meter-gauge passenger coaches and over 1500 freight cars, mostly of 10.4 tons capacity.

to take 3,000 tons daily and that an additional line is to be laid to give a maximum capacity of up to 10,000 tons daily. However, if this upper figure is to be attained, additional rolling stock will have to be imported.[1] At the present time there are the following alternatives for forwarding freight reaching Baghdad over the meter-gauge line from Basra:

1) The meter-gauge cars may be ferried across the Tigris to the Baghdad-Khaniqin-Kirkuk meter-gauge line. At Khaniqin goods may be transferred to trucks for forwarding over the Kermanshah Road into Iran and beyond. At Kirkuk goods may be transferred to trucks for forwarding through Iran over the Kirkuk-Erbil-Rowanduz-Tabriz road. The capacity of the Baghdad-Khaniqin railway is reported to be 250 tons daily.[2]

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[1]According to Squadron Leader Harris, the additional line will be laid with ties of sufficient length to provide for future conversion to standard gauge. This suggests the possibility of laying immediately a third rail to accommodate standard-gauge rolling stock without waiting for conversion. If this were done, the existing meter-gauge rolling stock could still be used, while the standard-gauge rolling stock of the Baghdad-Mosul-Tripoli-Rayak line could be operated from Basra, thus saving a trans-shipment at Baghdad for freight destined for Mosul and beyond. If Turkey subsequently came into the war on the side of the Allies, Turkish rolling stock would also be available for shipments from Basra. If in addition, the Rayak-Haifa line were converted to standard gauge -- or a third rail laid on that line -- and a new standard-gauge line built to connect Basra with the southern end of the Trans-Iranian, through movement without the necessity of trans-shipment would be possible from the Western Desert of Egypt to the Caspian and to the Trans-Caucasian frontier. It would also be possible to pool the standard-gauge rolling-stock and motive power of the entire Middle East, and to shift forces rapidly to any threatened point between the Western Desert of Egypt and the Caucasus - Caspian area. Mixed-gauge railway operations of the sort envisaged above have long been common on the Denver and Rio Grande Railway system in the United States.

[2]M. A. London, *op. cit.*

2) Goods may be transferred to trucks at Baghdad West and sent on by road from there via Khaniqin into Iran. The Baghdad-Khaniqin road is reported to have a daily capacity of 150 tons.[1] This figure undoubtedly could be raised by using more trucks.

3) Goods may be transferred at Baghdad West to standard-gauge cars and forwarded to Mosul, and there be transferred to trucks for further transport over the Mosul-Erbil-Rowanduz-Tabriz road. The normal capacity of the Baghdad West-Mosul railway is reported to be 600 tons daily.[2]

At the present time the first and second alternatives are to be preferred to the third, since they involve one less trans-shipment. However, this would no longer be true if the third rail were laid on the Basra-Baghdad line, as suggested above (Footnote 1, page ).

Freight unloaded at Basra may also be forwarded to Baghdad by barge up the Tigris River. The tugs which operate on the river can tow two 160-ton barges upstream, and a total daily upstream movement of 600 tons is reported possible with present equipment. The time required varies from 4 days during high water to 15 days during low water (June-October). According to a source previously quoted the daily tonnage is to be increased to 1500 tons.[3]

If a meter-gauge branch were built from Baquba on the Baghdad-Khaniqin line southward to Kut-al Imara on the Tigris, the daily figure might be raised to 2,500 tons by concentrating barges on the shorter water haul.[4] Goods arriving at Baghdad by barge can be transferred to the meter-gauge for forwarding to Khaniqin where transfer to truck would be necessary, or to the standard-gauge for forwarding to Mosul where transfer to truck would also be necessary; or the barge cargoes can be loaded into trucks directly at Baghdad, thus saving one trans-shipment.

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[1] *Ibid.*

[2] *Ibid.* For military traffic the capacity is given as 900 tons daily, with more rolling stock, this figure could be raised appreciably.

[3] *Ibid.*

[4] *Ibid.* It is understood that this line was refused first priority by the authorities in London.

The Basra-Baghdad road may be used to forward goods from the port during the dry season (May-October), but the capacity of the road is reported to be only 150 tons daily.[1]

The Euphrates may also be used to carry a limited amount of freight with a transfer to truck near Baghdad. No data are available on the capacity of this river route, but it is believed to be insignificant.

b. *The Kermanshah and Rowandus Roads*

All supplies in transit through Iraq to Iran and beyond, whether they come through Basra or the ports on the Mediterranean, must leave the country over two roads which climb over the parallel ranges of the Zagros to the Iranian Plateau. The capacity of these two roads determines the total volume of Russia-bound supplies that can be routed through the ports and over the routes thus far described.

The first of these is the (Baghdad)-Khaniqin-Kermanshah-Hamadan-Kasvin road, which for convenience we shall call the Kermanshah Road. This is a surfaced all-weather road which was the chief avenue of communication between Iran and the outside world before the completion of the Trans-Iranian Railway. In peace-time it carried 40-50 trucks and cars daily, including tank trucks of as high as 10 tons capacity. Although it is rated an all-weather road, snow in the 7,200 feet high Asadabad Pass between Kermanshah and Hamadan may block the road for two or three days at a time during January and February.[2] From Khaniqin to Tehran the distance is 490 miles, from Baghdad, 596 miles. Driving time for a passenger car is given as about 19 hours from Khaniqin, and about 24 hours from Baghdad. Estimates

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[1] *Ibid.*

[2] General Staff, India, *M.T. Routes in Iran*, Vol. I, (Main Routes), Route I.

as to the capacity of the road vary from 150 to 500 tons daily.[1] The lower figure is presumably based on the capacity of the road if locally available motor transport alone is used, the higher figure on its capacity if additional transport vehicles are brought in from the outside. In view of the numerous heavy grades over the Zagros ranges, 500 tons is probably close to the maximum that can be delivered over this road to Kazvin daily.[2] More detailed information regarding the road and its capacity should shortly be available from the American mission at Basra.

At Kazvin there are the following alternatives:

1) The trucks may turn west over the Kazvin-Tabriz road (311 miles) an and transfer their loads to the Russian-gauge railway at Tabriz for forwarding via Trans-Caucasia. This alternative is inadvisable since the deliveries at Tabriz can be more easily maintained by truck transport from the rail-head of the western branch of the Trans-Iranian (pending its completion to Tabriz), and by truck over the Rowanduz road.

2) They may turn east over the Kazvin-Tehran road and north by the new Karaj-Chalus road over the Elburz Mountains to the port of Noshahr, 172 miles. This alternative is inadvisable also since this road over the mountains will not accommodate more traffic than can reach it over the Dizful road, of which it is the logical extension to the Caspian.

3) They can transfer their loads to the railway for forwarding to the rail-head of the western branch of the Trans-Iranian. This would mean one more transfer of goods than by any other route, and hence is to be avoided.

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[1]Lower figure from Squadron Leader Harris; higher figure from report of Military Attache, London, above referred to.

[2]The Russians have agreed to accept 11,000 tons a month at Kazvin, an average of 367 tons a day.

4) They can transfer their loads to the railway for transport eastward to the port of Bandar Shah. This alternative is objectionable since the limited capacity of this port can more easily be utilized by supplies brought to it by rail from the Persian Gulf.

5) They can continue on down to the port of Pahlevi over the 151 mile road built down the gorge of the Safid Rud by Russian military engineers before World War I. Although the road has steep gradients (up to 1:15) and blind curves, it is metalled throughout and carries a heavy motor truck traffic the year 'round.[1] This would seem to be the preferred route for forwarding supplies from Kazvin, since Pahlevi is the nearest port.

The other road leading from Iraq up onto the Iranian Plateau leaves the railway at Mosul or Kirkuk and proceeds via Erbil up through the Rowanduz Gorge to Rayat on the Iranian frontier, thence through Miyanduab and Maragheh to Tabriz, 377 miles. For convenience this road will be called the Rowanduz Road, after the famous gorge up through which the road climbs. This road is in constant use by motor transport and under normal conditions is considered an all-weather road. However, on the Iraq section the road between Mosul and Erbil may be impassable for heavy motor trucks for two or three days following heavy rains, and on the Iranian side where the road crosses the Urmiah Plain it becomes deep in mud after a heavy rain. Application of additional gravel - easily obtainable - should take care of this difficulty. Snow during January and February on the higher elevations of the Iranian port of the road may close it for a week at a time, but with sufficient labor the road could be

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[1]For a detailed description of this road see General Staff, India, M. T. Routes in Iran, Vol. I (Main Routes), Route No. VII.

kept open.[1] Bridges on the Iranian side are reported to be poor. The present capacity of the road is apparently 300 tons a day.[2] With relatively minor repairs, it should be possible to raise this figure to 500 tons, always assuming that the necessary motor trucks are available. The Rowanduz Road is to be preferred to the Kermanshah Road for forwarding supplies to Tabriz, since it is considerably shorter, and for supplies coming from the Mediterranean ports, it offers a more direct route to Trans-Caucasia than does the Kermanshah Road.

If we may assume that the daily capacity of the Rowanduz and Kermanshah Roads can be readily raised to 500 tons each, we thus fix 1,000 tons as the amount of supplies which may be forwarded daily from the Mediterranean ports and Basra through Iraq to northern Iran. This figure is considerably below the capacity of the ports and the several routes leading from them to the two roads which thus limit the amount of freight that can be forwarded through Iraq to Iran.

c. *The Khorramshahr-Dizful-Caspian Route*

The Iranian port of Khorramshahr (formerly Mohammerah) is located some 20 miles below Basra at the junction of the Karun River and the Shat-al Arab just above the great Abadan oil refinery. There are five jetties on the south side of the Karun River, capable of accommodating ocean-going ships.[3] The available figures on the capacity of the port are conflicting.

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[1]Great Britain, Air Ministry, *Military Report on Iraq*, Vol. II (Routes), Route Reports, Nos. 9, 32; General Staff, India, *N. T. Routes in Iran*, Vol. I, Route X, Vol. II, Routes 43, 65, 66. Information in these reports checks with that provided by E. M. Wright, Near East Section, O.C.I., who knows northwestern Iran intimately.

[2]This is the figure given in the report of the Military Attache, London, referred to earlier, by Squadron Leader Harris, and by Lt. Col. Tompkins.

[3]*Military Handbook on Iran*, M.I.2. (a), November, 1940 (Stamp: Joint Staff Mission, Army "I" Branch, Nov. 6, 1941). Secret.

According to Squadron Leader Harris, the port handled a million tons of cargo last year, an average of 2,740 tons daily. On the other hand, the report of the Military Attache, London, referred to earlier in this report, gives the daily capacity for both Khorramshahr and Abadan together as only 600 tons. In any case, the port can probably handle more cargo than can be taken away from it to the interior.

The principal problem on this route is getting supplies to the beginning of the all-weather road at Dizful, 173 miles north of Khorramshahr. During the dry season it is possible for heavy trucks to drive almost anywhere over the flat clay plain of Arabistan. But half an hour's heavy rain will render any road in the plain impassable to motor traffic for from four to six hours and a heavy and continuous downpour of 12 hours will put a road out of action for at least three days.[1] Thus during the rainy season (December to April) it is quite impossible to move supplies out of Khorramshahr by truck to Dizful. During this season, the only way for supplies to reach the end of the all-weather road at Dizful is by shallow-draft steamer or barge up the Karun river to Ahwaz and thence by the railway to Dizful, or from Ahwaz to Dizful up the Ab i Diz, a tributary of the Karun. In view of the fact that the capacity of the railway is less than that of its terminal port, Bandar Shahpur, it is unlikely that the railway can be used for forwarding supplies from Ahwaz to Dizful. During high water (December to May or June), however, vessels drawing 5 ft. can ascend the Karun and Ab i Diz to Dizful.[2] Thus, by using motor transport during the dry season the river

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[1] *M. T. Routes in Iran*, Vol. I, Route IV, Section IV-a.

[2] *Persian Gulf Pilot* 1932. 276-278, and Squadron Leader Harris.

steamers and barges on the Karun and Ab i Diz during the rainy season, supplies landed at Khorramshahr can be delivered to Dizful.

From Dizful north the road is metalled and is used by heavy motor trucks at all seasons.[1] At Malayir the road forks, one branch leading northwest to a junction with the Kermanshah Road at Hamadan, while the other other turns east to Iraq (Sultanabad), thence northeasterly to Qum and Tehran. There is thus a choice of routes for further transport. However, better utilization of roads would be secured by sending all Dizful trucks over the eastern road, leaving the Kermanshah Road free for traffic from Khaniqin and Baghdad. At Tehran trucks coming from Dizful could transfer their loads to the railway. But as at Kazvin, it would be preferable to continue on to the nearest Caspian port, Noshahr, 106 miles from Tehran by the new road over the Elburz Mountains to Chalus.[2] The length of the entire route is 912 miles. With little improvement it could carry up to 300 tons a day.

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[1] *M. T. Routes in Iran*, Vol. I, Route IV; and information from M. Leon Brasseur of Tehran to Dr. Walter L. Wright, Jr., OCI. According to M. Brasseur, 10-ton tank trucks operate regularly over this road.

[2] This road is the most remarkable in Iran, if not in the entire Near East. It was built by the recent Shah in order to provide quick access from Tehran to his large estates along the Caspian, north of the capital. The road is well built, with steel and masonry bridges, and stone embankments and coping. The outstanding engineering feature is a tunnel, 2½ miles long, under the summit ridge. However, in spite of the tunnel, the grades are so steep that trucks have avoided the road, and it has been used chiefly by passenger cars during the summer. It could be kept open in the winter, however. (Information from E. M. Wright, Near East Section, OCI).

d. *Bandar Shahpur and the Trans-Iranian Railway*

In Part V of the "Report on Supply Routes to the Soviet Union" submitted by this section on October 16, 1941, a brief description of the Trans-Iranian railway was given, together with various estimates of the capacity of the railway and its two terminal ports. Since that time additional information has become available which throws a somewhat more favorable light on the railway as a supply route to the Russo-German war zone. However, since a detailed report on the railway and the two ports by competent American engineers should shortly be available, no attempt will be made here to attempt a definitive statement.

In the memorandum above referred to, the only estimate on the capacity of this route was based on the capacity of the northern port, Bandar Shah, it being assumed at that time that all supplies entering Bandar Shahpur and moving over the railway to the Russo-German war zone would have to go through this Caspian port. However, it now appears that supplies moving over the railway may also reach the war zone over other routes.

In the earlier report it was stated that completion of the western branch of the railway to Tabriz in the near future was unlikely, in view of the difficult nature of the terrain between Zenjan and Tabriz. When this statement was made it was assumed that the line would follow a more or less direct route from Zenjan to Tabriz, necessitating a long tunnel under the Shibli Pass between Mianeh and Tabriz. However, it has since been learned that the line will follow a less difficult although longer, route westward from Mianeh to Lake Urmiah and thence north to Tabriz.

It has recently been stated by an apparently well-informed witness that about one-fifth of the route from Zenjan toward Tabriz has been graded and that contracts for the completion of grading on the entire line within two years were let before the British-Russian occupation.[1] A copy of a Tehran newspaper which has come to hand since the preparation of the earlier report, states that a 600-meter-long tunnel near Mianeh station, approximately 80 miles northwest of Zenjan, was opened on December 30, 1940, and that completion of two other tunnels, 1,550 meters and 1,700 meters in length respectively, is being pushed.[2] It would thus appear that there is a possibility that the western branch of the Trans-Iranian may be completed to a junction with the Russian broad-gauge line at Tabriz in the relatively near future. Connection of the two lines would make possible the shipment of supplies to the Russo-German war zone with but one transfer -- that from standard-gauge cars to Russian-gauge cars at Tabriz. Every other southern route requires at least two transfers. While a German advance to the Caucasus, by cutting the Russian railway lines north of that range, would make it impossible to send supplies to the main Russian armies by this route, the necessity of supplying from the south the forces holding the Caucasus against the Germans would increase rather than decrease the importance of a through rail connection from the Persian Gulf to the Caucasus. The completion of the western

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[1]Statement by M. Leon Brasseur of Tehran to Dr. Walter L. Wright, Jr., Near East Section, OCI, October 30, 1941. M. Brasseur did not know whether any grading had been done from Tabriz southward. M. Brasseur was of the opinion that European contractors could do the job in considerably less time than two years.

[2]Journal de Teheran, January 5, 1941.

branch of the Trans-Iranian to Tabriz would thus seem to be worthy of a high priority rating.[1]

Until the closing of the gap, supplies routed over the western branch of the Trans-Iranian will have to be transferred to trucks at the rail-head for forwarding to the end of the Russian-gauge line at Tabriz. Fortunately, the road from Zenjan (to which point the railway now operates) to Tabriz, a distance of 201 miles, is one of the best in Iran. It is metalled over most of its distance and carries heavy motor transport in all seasons. The only difficult section is the Shibili Pass (alt. circa. 8,500 ft.). However, the steeper and longer grade is on the western side of the pass, thus favoring traffic toward Tabriz. Normal traffic has frequently been held up for 10 days at a time by snow on the pass, but special measures would keep the pass open without great difficulty.[2] Most of the bridges are of wooden construction and it is reported that several have broken down under Russian military loads.[3] In addition to strengthening the existing bridges or building new ones, it will be necessary to

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[1]A telegram received while this report was in process of final typing gives late information on the status of the western branch of the Trans-Iranian. According to this information, the rails are actually laid as far as Saremsaghlou beyond Zenjan and 115 miles from Kazvin, the section of 174 miles from Saremsaghlou to Maragheh is partially constructed, while preparatory work only has been done on the final section of 82 miles from Maragheh to Tabriz. In general, structures are further advanced than grading. (Telegram from Dreyfus, Tebran, December 11, 1941, No. 254.)

[2]For a detailed description of the road see *M. T. Routes* in *Iran*, Vol. I (Main Routes), Route VIII -- Section B.

[3]Note by Lt. Col. Tompkins in *Evaluation of British Paper (August 13, 1941), "Allied-Soviet Communications,"* submitted by Lt. Col. L. J. Compton, Chief, British Empire Section, Military Intelligence Division G-2. According to the Journal de Teheran of May 31, 1941, 91 new bridges were authorized for this road last May.

widen the road in certain places.[1]

The tonnage of supplies which can be delivered at Tabriz depends on the capacity of the port of Bandar Shahpur, the capacity of the Trans-Iranian, and, pending the completion of the railway to Tabriz, on the capacity of the road from the rail-head to Tabriz. The capacity of the port of Bandar Shahpur is reported to be 1,000 tons daily.[2] The capacity of the railway for north-bound freight is 400 tons daily at present and could be raised to 800-1,000 tons in from nine months to a year according to one authority.[3] However, the London source above cited states that "by development of the Port of Bandar Shahpur and considerable addition of locomotives and rolling stock, the capacity of the Trans-Iranian railway could be increased to 2,000 tons per day."[4]
On the other hand, the Russian agreement to accept delivery of 1,000 tons daily at Tabriz "via Zenjan" suggests that in their opinion the railway

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[1] According to the British "Allied-Soviet Communications," the width of the road does not exceed 18 ft. anywhere and in several sections is only 15 ft. wide.

[2] Telegram from Dreyfus, Tehran, Oct. 11, 1941, No 183. S. According to Lt. Col. Tompkins, the port should handle 2,500 tons daily by the end of March, 1942.

[3] William B. Poland, Office of Program Preparations, Economic Defense Board. The report of the Military Attache, London, above referred to, also gives 400 tons as the present daily capacity of the railway.

[4] M.A., London, *op. cit.* The MID report "Future aid to Russia" (18 October 1941, OCI Accession No. 2115) indicates that by the spring of 1941 the railway may have a capacity of 1,900 tons. However, as indicated earlier, final estimates of the capacity of the Trans-Iranian railway must await the report of the American mission at Basra.

cannot in the immediate future deliver more than that amount to Zenjan.[1]

If we may assume that the railway can shortly carry 1,000 tons daily to the rail-head on the western branch, there is the problem of moving that amount from the rail-head to Tabriz. It is estimated that to move that tonnage the 200 miles from Zenjan to Tabriz would require 600 5-ton trucks. However, as the rail-head advances and the length of road haulage is reduced, the number of trucks required will be less.

The completion of the eastern branch, now operating as far as Shahrud, to Meshed and its extension to a connection with the Soviet Central Asian railways at Sarakhs, while presenting fewer physical obstacles, would not appear to have the same urgency as completion of the western branch, especially in view of the fact that the entire capacity of the main line is needed to deliver the tonnage expected at Tabriz and at Bandar Shah.[2]

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[1]Apparently the Russians estimate the northbound capacity of the main line of the Trans-Iranian as at least 1,250 tons daily at present, since in addition to the 1,000 tons to be delivered over the western branch, they expect 250 tons to be delivered at Bandar Shah. And by May they expect 700 tons daily to reach that terminus, or a total of 1,700 tons daily over the main line. These figures obviously do not include other traffic over the railway. According to the British report "Allied-Soviet Communications" of August 13, 1941, "with much additional rolling stock and motive power this (the capacity of the railway) could be increased to 800 tons to Bandar Shah (or vicinity) and 960 tons to Zenjan." The MID report referred to in the preceeding footnote estimates that 900 tons daily can be delivered at Tabriz over the Trans-Iranian and the connecting highway by next spring.

[2]However, if the western branch were completed to Tabriz and the eastern branch extended to Sarakhs there would be a through rail connection, albeit with a change of gauge, between Trans-Caucasia and Soviet Central Asia (and thus with the rest of unoccupied Russia) through northern Iran. Such a connection presumably would be an advantage in the event that it becomes necessary to establish a new front along the Caucasus cut off from the main Russian front, since it would permit the rapid reinforcing and supply of the Russian forces holding the Caucasus front from Central Asia and the Ural-West Siberian region over a protected rail route.

3. *The Iranian Caspian Ports*

Pahlevi, located at the mouth of the Murdab river, is the oldest and best of the Iranian Caspian ports, and for many years has been the principal Caspian entrance to Iran. An undated plan of the port shows five quays on the east bank of the estuary, one of 225 ft. frontage, one of 190 ft., one of 276 ft., one of 375 ft., and one of 150 ft.[1] This would indicate that five vessels of varying sizes can be docked simultaneously.[2] According to Lt. Col. F. D. Tompkins who visited Pahlevi last summer, the port can be entered by vessels drawing up to 12 ft. 6 in. and he was assured by the Belgian engineer in charge of the port that the two dredges at the port (a large suction dredge and a smaller chain bucket dredge) could maintain a depth of 15 ft. without difficulty. Col. Tompkins also reports that the port equipment includes 3 floating cranes -- one of 30-ton capacity, one of 8-ton capacity and one of 4½ ton capacity -- and two portable type cranes of 4½ ton capacity each. The capacity of the port

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[1]Plan provided by ONI (Office of Origin: Op-16-F-5). Frontage figures approximate. The *Military Handbook on Iran* referred to above mentions a quay 120 yards long which is being extended to 300 yards.

[2]According to the M.E.I.C. *Collation Map of the Russo-Iranian Frontier, August, 1941*, two or three vessels of 1,000 tons burden can be handled at one time. E. M. Wright, Near East Section, OCI, states that four vessels can be taken care of at once. M. Leon Brasseur states that the port can accomodate the largest ships on the Caspian.

is estimated at 600 tons daily.[1] This is 100 tons more than the 500 tons which it is assumed could be delivered to the port daily over the Kermanshah Road. If the Kazvin-Pahlevi road has the capacity to carry 100 tons in addition, the full capacity of the port might be utilized by transferring the extra 100 tons from the railway at Kazvin.

The new port of Noshahr, almost due north of Tehran, is one of the developments of the Shah, who recently abdicated. It is an unprotected port with a single pier which can accommodate two vessels drawing up to 12 ft. It has four cranes of 7 ton capacity, two of 10 tons, one of 12 tons, one of 15 tons and also a floating crane of 15 ton capacity.[2] The port is reported to be able to handle upwards of 600 tons daily.[3] A narrow-gauge railway that extends from the pier to a quarry in the hills would facilitate extension of the pier. Although the port is not protected, severe storms are infrequent.[4] If the capacity of the port

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[1] *M.E.I.C. Collation Map.* The report of the Military Attache, London, above referred to, gives 500 tons as the daily capacity of the port. Lt. Col. Tompkins gives the capacity of the port as 1,500 tons daily (Evaluation of British paper *"Allied-Soviet Communications,"* by Lt. Col. Compton), but this figure seems too high for the facilities at present available.

[2] Telegram from Dreyfus, Tehran, September 10, 1941, No. 114. S.

[3] *Ibid.* The report of the Military Attache, London, gives the same figure for capacity. That Noshahr, although able to berth only two vessels at a time, can handle approximately the same tonnage at Pahlevi is presumably due to the large number of cranes at Noshahr.

[4] Information from E. M. Wright.

is reported correctly, it has double the capacity of the road from Tehran. If the full capacity of the port is to be utilized, it will be necessary to bring 300 tons a day over the excellent coastal highway from Shahi, 105 miles away, where the railway to Bandar Shah comes down out of the mountains.

The remaining Caspian ports have smaller capacities. Babul Sar (Meshed-i-Sar), with a daily capacity of 300 tons, is about 22 miles from Shahi. It is also the point where the road over the Elburz from Firuzkuh joins the coastal highway. Bandar-i-Gaz is a small port on the Asterabad lagoon about 15 miles from Bandar Shah. A narrow-gauge railway connects the port with the nearby station on the Trans-Iranian Railway. It has a small pier and a daily capacity of 200 tons.[1]

Bandar Shah, near the entrance to the Asterabad lagoon and farthest east of the Iranian ports on the Caspian, is the Caspian terminus of the Trans-Iranian Railway. However, it had proved to be a great disappointment. For several years the level of the Caspian has been dropping, with the result that the depth of water in the channel is now only 4½ ft. Hence, all goods have to be handled by lighter and the capacity of the port is only 150-250 tons daily.[2] The Russians state that a

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[1]Port capacity figures for Babul Sar and Bandar-i-Gaz from report of Military Attache, London, above referred to. According to the telegram from Dreyfus above referred to (No. 144, Sept. 10, 1941), freight cannot be handled in any large quantities at Babul Sar and Bandar-i-Gaz.

[2]The higher figure is the tonnage which the Russians have agreed to to accept here. According to the *N.E.I.C. Collation Map of the Russo-Iranian Frontier*, August, 1941, the capacity is 150-200 tons daily. This figure is also given in the report of the Military Attache, London, above referred to. Lt. Col. Tompkins states that the present capacity of Bandar Shah is 150 tons daily.

12 ft. channel can be dredged so that the capacity of the port can be increased to 700 tons daily by next May. Data are not available to prove or disprove this claim.[1]

Summing up, the total daily capacity of all five of Iran's Caspian ports appears to be approximately 1,900 tons at present -- 2,400 tons by next May if a 12 ft. channel can be dredged at Bandar Shah by that time. To utilize this capacity, approximately 800 tons daily would come over the Kermanshah and Dizful roads without recourse to the Trans-Iranian, perhaps 250 more would be delivered direct by the Trans-Iranian, and the remainder brought to Kazvin and Shahi by rail and transferred to truck for delivery at Pahlevi, Noshahr, Babul Sar, and Bandar-i-Gaz.

The capacities of the several ports and the means by which they might be supplied are shown in the following table:

| *Port* | *Daily Capacity* | *Tonnage of freight to arrive by different routes* |
|---|---|---|
| Pahlevi | 600 tons | 500 tons over Kermanshah Road and 100 by rail to Kazvin and thence by truck to port. |
| Noshahr | 600 tons | 300 tons over Dizful Road and 300 tons by rail to Shahi and thence by truck to port: |
| Babul-Sar | 300 tons | By rail to Shahi and truck to port. |
| Bandar-i-Gaz | 200 tons | By rail to nearest point on railway thence by narrow-gauge railway to port. |
| Bandar Shah | 150-250 tons rising to 700 tons in May | By rail all the way to the port. |

[1] A German-built dredge was delivered to the port just before the German attack on Russia.

4. *Soviet Transport Northward From Iranian Caspian Ports and From Tabriz*

All supplies destined for the Russian front which are delivered at Iran's Caspian ports or at Tabriz must be transported across the Caspian to Soviet ports and then forwarded by rail or river, or else be transported by rail through the Caucasian isthmus to the war zone. Obviously if transport is blocked for any reason on the Soviet side, the entire Western group of southern supply routes are useless for sending supplies to the main Russian armies.

a. *Transport on the Caspian; the Soviet Caspian Ports and Their Landward Connections*

The most obvious physical fact about the Caspian is that it is land-locked. For the problem under consideration this means that the only shipping available for forwarding Soviet supplies across this body of water is that which is already on it or such Volga shipping as can be used on it. According to one source, the Caspian merchant fleet consists of 108 vessels totaling 173,257 tons, of these vessels about one-half are tankers.[1] This office has seen no information from the Soviet authorities as to the maximum amount which their shipping could load monthly at the Iranian Caspian ports.

A second physical fact about the Caspian that has a direct effect on the supply problem has already been touched on -- the lowering of its level during recent years. Constant dredging is necessary in most Caspian

[1] *M.E.I.C. Collation Map of the Russo-Iranian Frontier, August, 1941.* According to M. Leon Brasseur, there are not over 100 vessels on the Caspian of "useful" size. According to this source, these vessels run from 600 to 2,000 tons, with the smaller sizes predominating.

ports to keep them open to shipping. A third fact is that the northern part of the sea is frozen for an average of three months (January-March) every year, the thickness of the ice varying from 50 to 70 cm.[1] This is due to the large amount of fresh water poured into the shallow northern end of the sea by the Volga. The thickness of the ice would not appear to be too great for icebreakers to overcome; but no data regarding the use of these vessels on the Caspian are available.

The cheapest and easiest route by which large volumes of goods can be moved into the interior of Russia from the Caspian is the Volga river. But the Volga is closed by ice even longer than the northern end of the Caspian. At Astrakhan, the river is frozen for an average of 100 days, from December 6 to March 24; at Stalingrad for 150 days, from November 21 to April 20; at Saratov for 166 days, from November 13 to April 28; at Kuibyshev for 171 days, from November 9 to April 29; and at Gorky for 172 days, from November 6 to April 27.[2] Not only does the freezing of the Volga prevent its use for over five months in the year, but it also prevents the use of the railway which connects Astrakhan with the main rail system of the country for forwarding goods from the Caspian during most of that time. The railway can take the place of the river for only about a month in the spring when the port of Astrakhan is accessible while the river above is still ice-bound.

For this reason the port of Makhach Kala, 235 miles north of Baku on the western shore of the Caspian, takes the place of Astrakhan during

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[1] *Bolshaia Sovetskaia Entsiklopediia*, Kaspiiskoe More

[2] *Op. cit.*, Volga

the period when the Volga is frozen. Here navigation is seldom closed by ice for more than a week or two in January. The harbor, which has a depth of 12 to 14 ft., is enclosed by a wooden pier and a curved stone mole about 500 yards long with railway connection from each to the railway station. In addition to the pier and mole, there are several quays and berths with sufficient space to allow about 10 steamers to load or unload at once.[1] Makhach Kala is on the main railway line from Baku to Rostov which is now double tracked from here north. The distance to Rostov is 586 miles. Freight may also be routed over this line to Stalingrad, leaving the main line at Tikhoretakaya, thus avoiding Rostov. When the Kizlyar-Astrakhan line, parallel with the shore of the Caspian, is completed, a still more easterly connection with the main railway net will be available.

Baku, one of the major Soviet ports, although primarily an oil-shipping port, is also equipped to handle dry cargoes. A new pier for handling such cargoes was recently completed. It is equipped with several 2-ton cranes and can accomodate deep draft steamers alongside.[2] The railway connections northward which serve Makhach Kala are also available for cargoes unloaded at Baku.

The only other Russian Caspian ports which have rail connections with the rest of Russia are the small port of Guriev east of Astrakhan and the desert port of Krasnovodsk on the east coast of the Caspian. Guriev is connected with the main rail net by the recently completed line to Kandagach on the Chakalov -- Tashkent railway, but, like Astrakhan, it is closed by

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[1] *Admiralty C. B. 1753 c* (11/40)

[2] *Ibid.*

ice during the winter. No information on its port facilities is available.

Krasnovodsk is the best harbor on the east coast of the Caspian and is accessible to vessels drawing up to 14 ft. There are 9 wharves, 5 of which can accommodate large steamers. The longest is a stone pier 500 ft. long and 42-56 ft. wide with a double set of railway tracks along its whole length.[1] Although the wharves are not equipped with cranes, the port is reported able to handle 2,000 tons daily.[2] Any supplies landed here would have an excessive rail haul before reaching the central front -- 2,647 miles to the Volga and 3,221 miles to Moscow.

b. *Transport from Tabriz*

Tabriz is the terminus of the Russian-gauge railway which was built into Iran from Djulfa on the Russian side of the Araxes river just before the First World War. Until recently only two trains each way per week were operated, and little attention was paid to maintenance. However, with new ties and ballast, the line should have a capacity of 1,800 tons daily, if the Russians can provide sufficient rolling stock.[3] From Djulfa there is now a choice of two rail routes, thanks to the completion of the Djulfa -- Baku line which has been spasmodically under construction since before the last war. This new line follows down the Araxes river and provides a direct

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[1] *Ibid.*

[2] *M.E.I.C. Collation Map*

[3] *M.A. Report, London, op. cit.*

route to Baku, from which the lines discussed previously can be used. Baku can also be reached by the older, more round about line via Tiflis (Djulfa-Tiflis-Baku, 700 miles). The completion of the Black Sea railway, also many years under construction, provides an alternative and somewhat shorter route to North Caucasia via Tiflis, Sukhum, Tuapse and Armavir.

5. *Effect of Further German Advance on the Western Group of Southern Routes*

The reported German Capture of Rostov throws into sharp relief the fundamental disadvantage of the Western Group of routes from the south: namely, the vulnerability of their extensions of Soviet territory. As these are cut by a continued German advance to the east, the value of the Western Group of southern supply routes for forwarding supplies to the Russo-German war zone becomes progressively less. The capture of Rostov means that the principal rail connection between Caucasia and the rest of Russia is no longer available. While it may still be possible to route supplies to the central front over the Tikhoretskaya-Stalingrad line, the capacity of this line -- a single-track railway -- is probably less than half that of the double-track line through Rostov. Furthermore, since this line is less than 100 miles east of Rostov, it may be assumed that it has already been severely damaged by bombing and its capacity much reduced. The Kizlyar-Astrakhan railway, which may have been completed, is less vulnerable to air attack -- for the present -- since it is well over 300 miles east of Rostov; however even this distance does not make an objective immune from crippling air bombing. Even Astrakhan and its railway

connection to the north is now well within bombing range.

If the Germans arrive at Astrakhan, it will be very difficult to move supplies by way of Caucasia and the Caspian to Central Russia. Such a move by the Germans would not only cut the Tikhoretskaya-Stalingrad and Kizlyar-Astrakhan lines, connecting Caucasia with the Volga; the occupation of the mouth of the Volga would stop any movement of supplies to Astrakhan from the Iranian Caspian ports. Any supplies forwarded by these ports would then have to go either to Guriev at the northeastern corner of the Caspian or to Krasnovodsk on its eastern shore. Guriev will be closed by ice for at least three months, and its port facilities are probably limited in any case. Furthermore, ships en route to Guriev would be within bombing range from Astrakhan for the last part of their journey. While Krasnovodsk is safer from air attack, its capacity and the capacity of the Trans-Caspian railway east to Tashkent and thence northwest to the Urals would probably be severely taxed by the necessity to send over this route all Baku oil destined for the main Russian armies and the remaining Soviet industry. In any case, supplies from the south could more easily reach the Trans-Caspian railway by way of Afghanistan than by way of Krasnovodsk.

In the measure in which the routes making up the Western Group become of decreasing value for forwarding supplies to the Russo-German war zone, they become of increasing importance for supplying the Russian forces in the Caucasus (which will be cut off from their sources of supply in Russia if the German advance continues) and for supplying the British forces in northwest Iran. In the event that the Germans advance to the

Caucasus and an active front develops there, the full capacity of all the Western Group of supply routes will be needed to supply the Russian and British forces holding that front. It seems more than likely that even at the present time the threat of a German advance to the southeast is such as to require almost the full capacity of these routes for the supply of the Allied forces being assembled in Trans-Caucasia and adjacent northwest Iran to meet this advance. It thus appears that even now the Western Group of supply routes from the south is of very limited value for forwarding supplies to the Russo-German war zone, and that these routes are likely to be of even less value for this purpose in the future.[1]

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[1]The preceding section was typed in final form before the German retreat from Rostov. At this moment the forces of General von Kleist appear unable to mount a new offensive toward Rostov and the mouth of the Volga. Thus, for the time being all the Soviet connections northward from the Caucasus and Astrakhan are available for the transport of supplies coming over the Western group of southern supply routes. However, until the final defeat of the German armies in the Russo-German war zone, there is always the possibility of a renewed German thrust to the southwest with the aim of cutting the supply routes from the south and at the same time securing the oil resources of north Caucasia. The reported withdrawal of German forces from the Moscow front may indicate a regrouping of German forces as a prelude to such a move.

*E. THE EASTERN GROUP OF SOUTHERN SUPPLY ROUTES*

In view of the limited capacity of the Western Group of Southern Supply routes for forwarding supplies to Russia, and the possibility that whatever capacity they have may be rendered ineffective or diverted to other uses by a German advance to the lower Volga and the Caucasus, serious consideration may well be given to the possibility of forwarding American supplies to Russia via Indian ports and railways and motor-truck transport across Afghanistan and eastern Iran to the Soviet rail-heads in Central Asia.

There are three practicable roads for motor-truck traffic from India to Soviet Central Asia--one across eastern Iran, and two across Afghanistan:

1. The East Iranian Road, which extends from Zahidan, the Iranian terminus of the British Baluchistanc railway, almost due north for 583 miles to Meshed from which there are connections to Ashkhabad on the Russian Trans-Caspian railway, 160 miles, or to Sarakhs, terminus of the branch line reported to have been built south from Tedzhen on the Trans-Caspian, 120 miles;

2. The West Afghan Road, 506 miles long, from Chaman on the Afghan-Indian frontier (terminus of a branch line from the Baluchistan railway), west through Kandahar and Girishk to Farah, thence north through Herat to Kushka on the Afghan-Soviet frontier, terminus of a branch line from Merv on the Trans-Caspian;

3. The North Afghan Road, 563 miles long, from Landi Khotal (end of the British military railway through the Khyber Pass) or from Peshawar,

west to Kabul, thence north and east through Mazar-i-Sharif to the Amu Darya (Oxus) opposite Termez on the Kagan (Bukhara)--Stalinabad branch of the Trans-Caspian railway.

As compared with the Western group of Southern routes, these three eastern roads have the following advantages:

1. Their Soviet railway connections are in no present danger of being cut off by a German advance;

2. The two Afghan roads, at least, are now carrying only light local traffic; hence most of their capacity is available for transit traffic;

3. They provide direct connection between Russia and India, itself an important source of supplies.

The major disadvantage is the very considerable length of the land routes involved. For example, from Karachi it is 628 miles to Chaman by rail, then 506 miles by road to Kushka, and finally 2,115 miles by rail from Kushka to the Volga at Kuibyshev--a total land distance of approximately 3,250 miles.[1]

1. *The Port of Karachi*

Karachi is the nearest port for all three routes. It is a modern, large-capacity port that has handled up to 2,869,000 tons a year. Twenty-two ships drawing up to 26 ft. can be accommodated at the docks simultaneously.

Calcutta and Bombay might also be used, but this would involve a much longer rail haul: from Calcutta to Landi Khotal the distance

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[1]This is via the Tashkent--Chkalov (Orenburg) railway; if goods were routed by the Turksib and Trans-Siberian railways, the distance would be over 4000 miles.

is 1,528 miles, as compared with 1082 miles from Karachi. However, for urgent cargoes shipped from the west coast of the United States, there would be a saving in time if they were routed via Calcutta.

2. *The Indian Railway Connections*

Supplies landed at Karachi can be forwarded toward all three Indian rail-heads over the 5 ft. 6 in. gauge Northwestern Railway as far as Sukkur. The line to Baluchistan turns west here; it is a well-built military line, double-tracked in the Bolan Pass, to Quetta and Chaman. The long branch to Zahidan, which leaves the Quetta line just south of Quetta, is more lightly built. It was extended into Iran during the last war to supply British forces operating in that country. In view of the conflicting reports on the status of the line west of Nok Kundi, the following passage from a letter by an American who travelled from Meshed over this route as recently as last spring is worth quoting: "So far as could be observed from the road, all rails are in on the Nok Kundi--Zahidan railroad; they say that the yard trackage in Zahidan was removed and used in buildings, but I was not near that spot. Of course the grade is washed out from under the track where it crosses the washes; while there is a lot of work to be done, it ought not to take much time."[1] Another American who travelled this way in August 1940 has this to say as to the status of this railway: "Whenever we crossed the railroad or could see it between Zahidan and Mir Jawah (frontier station), the rails were still in position (we crossed

[1]Letter dated November 11, 1941 from J. D. Payne, on leave from the American Mission, Teheran, to E. M. Wright, Near Eastern Section, OCI.

it several times), but the bed has suffered from erosion and a good deal of work would be necessary to straighten out the line and resurface it. Of course, it is possible that some rails are gone, but certainly not where the line was visible from the road in 1940--and that is a large part of the whole distance."[1] The British authorities in India would doubtless provide information as to the present status of the line and as to their plans for its future.[2] However, utilization of the East Iranian Road does not depend on operation of trains to Zahidan, since a road used by motor trucks parallels the track to Nok Kundi and beyond to Quetta.

North of Sukkur the railways fan out into the Punjab, so there is a choice of several routes to Peshawar. However, the main line via Lahore is considered the best, although longer than the direct line up the Indus which is used primarily for local traffic. Although Peshawar is the terminus for commercial traffic, the military authorities have built a heavy-duty line up through the Khyber to Landi Khotal.

3. *Soviet Rail Connections*

For many years Ashkhabad was the most accessible station on the Trans-Caspian for Meshed, northern end of the East Iranian Road proper. However, recent non-Soviet maps show a new branch railway from Tedzhen, 135 miles east of Ashkhabad on the Trans-Caspian, south to Sarakhs, a distance of approximately 80 miles. If this line is actually in operation or nearing completion, it will provide a rail-head 40 miles nearer Meshed than is Ashkhabad.[3]

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[1]Letter from Mr. Walter Hauser to Dr. Myron B. Smith, November 3, 1940.

[2]According to the British periodical *Modern Transport* for October, 1941, the line west of Nok Kundi is to be rehabilitated immediately.

[3]A description of the roads from Meshed to Ashkhabad and Sarakhs will be found at the end of the section on the East Iranian Road.

Kushka, the Soviet railhead for the West Afghan Road is the terminus of the 196 miles-long branch line south from Merv on the Trans-Caspian. Stations on this line average 16.2 miles apart, suggesting a rather low capacity.[1] However, it may safely be assumed that this line can carry all the freight likely to be delivered to it over the West Afghan Road. The Soviet authorities have agreed to accept supplies at Kushka in such quantities as can be delivered there.

The nearest railway station to Mazar-i-Sharif on the North Afghan Road is Termez, 303 miles from Kagan on the Kagan-Stalinabad branch of the Trans-Caspian. However, neither Termez or any other place on the Stalinabad-Kagan line has been designated by the Soviet authorities as a receiving station for supplies coming over the North Afghan Road. This may have been due to lack of information on their part as to the suitability of the North Afghan Road for transit traffic to the Soviet Union. It would seem doubtful that it could have been due to the condition of the branch railway, since this line is the only rail connection between Tadzhikistan and the rest of the country, and, in addition, serves the only Egyptian cotton-growing region of the country. Whatever the explanation, it would do no harm to ask the Soviet authorities to designate a station for reception of goods coming over the North Afghan Road.

The capacity of the Kagan-Stalinabad branch line is not great,

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[1]This and subsequent figures for station spacings on the Soviet railways are derived from the 1937 edition of the *Ofitsial'nyi Passazhirskikh Soobshchenii* and the *Albom Skhem Zheleznykh Dorog SSSR*, both published by N.K.P.S.

judging from the spacing of the stations, which average 15.1 miles apart from Termez to Kagan. However, since cotton is the only commodity normally moving over this line in any quantity, the railway should be able to handle whatever is delivered to it by the North Afghan Road.

The Trans-Caspian railway normally has a rather light traffic, at least as far east as Samarkand, since most of the cotton, the chief commodity exported from Central Asia, is raised east of Samarkand, primarily in the great Fergana Valley, and moves to European Russia over the Tashkent-Chkalov line. If the Germans should reach the lower Volga, it will be necessary for the Trans-Caspian railway to carry a substantial part of the crude and refined petroleum from Baku required by the Russian armies and by the industry, agriculture and transport of unoccupied Russia. That this would tax the capacity of the line severely is clear when it is reflected that this single track line whose stations average 10.7 miles apart, would have to carry much of the oil normally carried by the Caspian and Volga tankers and the railway from Baku to Rostov. This would be true until large additional producing and refining capacity had been developed in east-central Russia.

The most direct rail connection between the Trans-Caspian and the railways of European Russia is the Tashkent--Chkalov (Orenburg)--Kuibyshev line, one of the country's main single-track railways. This line normally carries the bulk of the cotton crop produced in Central Asia. In case of a German intersection of the direct routes from Baku to European Russia, this line would also be called on to carry a large

part of the oil traffic. Station spacings on this line between Arys, where the Turksib branches off, and Iletsk, from which there is an alternative route to the Volga, average 9.4 miles.

The Turksib railway from Arys on the Tashkent—Chkalov line to Novosibirsk on the Trans-Siberian provides a roundabout connection to the Urals and the Volga. This line was opened to through traffic in 1931 and since then has been considerably improved. Its chief traffic is wheat, lumber, and coal from Siberia to Central Asia; hence there should be considerable reserve capacity for north-bound freight. Stations on this line average 11.1 miles apart. Aside from the much greater distance to east-central Russia via this route, its chief drawback is the fact that traffic moving over the Turksib to the Volga would have to move through the bottle-neck of the Trans-Siberian--the Novosibirsk--Omsk section of the main line.[1]

Distances from the Soviet rail-heads in Central Asia to Kuibyshev on the Volga are shown in the following table:

| *Rail-head* | *Via Tashkent--Chkalov* | *Via the Turksib and the Trans-Siberian* |
|---|---|---|
| Ashkhabad | 2134 miles | 3898 miles |
| Sarakhs | 2054 miles | 3819 miles |
| Kushka | 2114 miles | 3879 miles |
| Termez | 1999 miles | 3764 miles |

[1]The necessity for passing through this bottle-neck will be eliminated with the extension of the Petropavlovsk--Balkash line from Mointy around the western end of Lake Balkash to Chu on the Turksib line, 199 miles west of Alma-Ata. Completion of this line, believed to be under construction, will also provide a third rail-connection between Central Asia and the Urals (via the recently completed Akmolinsk-- Kartaly line) which will be longer than that via the Tashkent-Chkalov railway, but shorter than that via Novosibirsk.

Unless and until the Germans reach the Volga, there is the possibility of supplies coming over the three eastern roads being routed through the port of Krasnovodsk, and thence either to Baku or Astrakhan for further forwarding. As stated earlier, Krasnovodsk is reported to have a capacity of 2000 tons daily. Should the Germans reach the Volga, some shipments might still be made from Krasnovodsk to the port of Guriev and thence by the newly-opened railway to Kandagach on the Tashkent-Chkalov line.

4. *The East Iranian Road*

This road, called the East Persian Gordon by the British who developed it as a motor supply route for their forces operating in northeast Persia and Trans-Caspia in 1918-1919, is, according to most reports, an all-weather truck route. The Iranians have used it ever since the last war as their principal overland connection with India. A number of Europeans and Americans have driven over this road to and from India and the Iranians have used it for tea transport from India in 5--7 ton trucks. An American who drove over the road last July states that "we must have met or passed 20 trucks every night."[1] The British are currently believed to be improving the road.

The most authoritative description of the East Iranian Road is that in *N. T. Routes in Iran (Vol. I* -- Main Routes, Route No. II). According to this description, compiled in 1934, the surface of the road is "either metalled or sufficiently hard to be regarded generally

[1]Letter from Prof. Robert L. Fox, Robert College, to Dr. Walter L. Wright, Jr., Near East Section OCI, Nov. 15, 1941.

as the equivalent of metalled. It suffers from deterioration in the spring from rain and spates. Metalling is sprinkled on but not rolled. Pot holes are filled in on an average once a year. The surface of the road across the Amrani desert gets cut up badly in wet weather and would require maintenance."

Statements concerning the road have been obtained from four Americans who have driven over this road within recent months. Mr. Walter Hauser in August of 1940, Mr. Andrew J. Lynch of the American Consular Service in November, 1940, Mr. J. D. Payne of the American Mission, Tehran, in the spring of this year, and most recently, Prof. Robert L. Fox of Robert College, in July of this year. Their views as to the quality of the road differ rather markedly. Mr. Lynch reports as follows: "From Meshed to Zahidan, the going is for the most part exceedingly rough. To people who are used to concrete highways or even to the country dirt roads still occasionally found in the United States it would seem unbelievably bad. To those of us who are used to Persian travel it would seem somewhat worse than usual, nothing more."[1] Mr. Payne, however, has this to say about the road: "The road all the way is as good or better than the Tabriz-Kazvin road and the bridges are better. It is a very fast road, comparable to the Isfahan-Shiraz stretch. The road can take as much heavy traffic as either of these roads right now; none of it is desert track, as we understand that term."[2] Dr. Hauser is somewhat more specific: "The Meshed-Zahidan road is all right

[1] Letter to Dr. Myron Bement Smith, Consultant in Islamic Archaeology, Library of Congress, October 29, 1941.

[2] Letter to Mr. E. M. Wright, Near Eastern Section, OCI, Nov. 10, 1941.

for heavy trucks. Some of it south from Sefid Abeh, 175 kilometers north of Zahidan, runs through open salt desert and can get sticky in wet winter and spring weather. In this region it has not been banked up or properly drained. I do not remember hearing that it is impassable. Zahidan to Mir Jawah is also likely to be bad in wet weather as it runs in low land near foothills and gets washed out by heavy rains rushing down onto it. Trucking is seldom held up for more than a day or two."[1] In view of the fact that Mr. Payne came over the road in the spring when it is supposed to be at its worst, and the other two came over it during the dry season, his praise of the road is the more remarkable. However, last spring was an unusually dry one for the Near East. Professor Fox has this to say about the road: "The roads were never so bad, at least from Meshed to Zahidan, but what one could make 25 miles an hour quite comfortably .....The road (from Birjand to Zahidan) was fairly smooth,..... scarcely wide enough for two cars, for there were piles of gravel at rather frequent intervals."[2]

In spite of the seeming disagreements between the four reports quoted, it would seem safe to conclude that the road is practicable for heavy motor trucks throughout most of the year, and that with some grading, the wet season would impose no handicap.

According to *N. T. Routes in Iran* the distance from Zahidan to Meshed is 583 miles.[3] It took Dr. Hauser 28 hours to cover the distance

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[1]Letter to Dr. Myron B. Smith, November 1, 1941.

[2]Letter to Dr. Walter L. Wright, Jr., Near Eastern Section, OCI, November 15, 1941-

[3]General Staff, India, *N. T. Routes in Iran*, Vol. I (Main Routes), Route II.

in a "seven-passenger heavily laden Dodge car." Trucks cover the road in two to three days, depending on their loads. Slight road improvement could probably cut down the driving time.

From Meshed, northern end of the East Iranian Road proper, there are roads used by motor trucks to both Ashkhabad and Sarakhs. The road to Ashkhabad runs northwest to Kuchan and thence north over the Kopet Dagh to the Trans-Caspian railway, a distance of approximately 160 miles. It has been for long the most travelled route from Meshed to the railway; mail and goods from and to Russia and Europe having used this road. The road is characterized as "good" by Hauser, who also states that it has been thoroughly repaired recently.[1]

During the winter heavy snow may close the road over the Kopet Dagh for a few days at a time. The road to Sarakhs is about 40 miles shorter and according to Hauser was formerly bad in wet weather, but was extensively repaired in 1939. According to a British source quoted previously, the road was apparently widened to a minimum width of 6 meters, but is not metalled and hence, although it has a firm surface, it is impassable from December to mid-April. The report states, however, that it is the best and shortest connection from Meshed to the Russian Railway system.[2] In addition to being shorter than the Ashkhabad road, it goes around the end of the Kopet Dagh, thus avoiding the steep grades of the other road.

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[1]Letter from Dr. Hauser.

[2]"Allied-Soviet Communications", Revised edition, 13 August, 1941 (From British Army Staff, Intelligence Branch, British Embassy, Washington.)

Fortunately, the question as to which of the two roads from Meshed is the better one for supplies does not require an answer, since the Soviet authorities have designated Meshed as the delivery point. The fact that they have agreed to accept as much as can be delivered at this point strongly suggests that the roads from Meshed to the Russian railway are as good as those south and west of Meshed.

If one compares the relatively level terrain traversed by the East Iranian Road with the mountainous country which the Burma Road crosses, and if one bears in mind further that the prolonged season of heavy rains which impedes traffic on the Burma Road is fortunately much shorter on the Iranian road, it seems reasonable to assume that, provided sufficient motor transport vehicles are made available, the East Iranian Road can carry at least as much, and probably more, than the 16,000 tons monthly planned for the Burma Road.

However, in view of the fact that the East Iranian Road, in addition to providing a route from India to Russia, also provides a land connection between the Indian base of supplies and the British forces in northwest Iran, it is unlikely that the full capacity of this road can be used for forwarding supplies to Russia. It seems more than likely that the British who are now in control of the East Iranian Road will wish to use a substantial portion of its capacity for forwarding reinforcements and supplies to their forces in northwest Iran if they are not already so doing. Consultation between the members of the American Mission and the British authorities on the spot might establish a suitable apportionment of the capacity of the road

between British and Russian needs. In any case, in view of the importance of the road, it would seem that its maximum capacity should be developed--with American aid, if necessary.

5. *The West Afghan Road*

This is the shortest of the three roads connecting the Indian and Soviet railways. It is 197 miles shorter than the East Iranian Road (to Sarakhs) and 57 miles shorter than the North Afghan Road. In addition, the distance by rail from Karachi to the Indian end of the road is considerably less than to either of the two road terminals. It is the chief trade route between Afghanistan and the Soviet Union and one of the two major trade routes between Afghanistan and India. The second and third cities of the country, Herat and Kandahar, lie on this road and all traffic between Herat and Kabul passes over this route.[1] There is considerable trucking over the road by natives and a regular postal bus service is maintained.

From Chaman to Kandahar (70 miles) the road is surfaced, but for lack of proper maintenance, it has become very rough. From Kandahar west to Girishk (75 miles), the road, partly surfaced, runs over the steppe to the Helmand river across which a steel bridge has recently been built.[2] Between Girishk and Farah (140 miles), the

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[1]The direct road between Kabul and Herat over the Unai Pass and down the valley of the Hari Rud which was made into a motor truck road in Amanullah's reign has been neglected and is no longer passable for motor vehicles--at least not over its entire length.

[2]Two photographs of this bridge appear in the Afghan publication *The Iqtesad Journal* (vol. 218, April-May 1941, p. 139).

road crosses plains of outwash which are liable to sheet flooding during the spring and early summer due to run-off from the nearby mountains. However, it is reported that the Afghan government has recently had as many as 9,000 men at work on this section of the road, and it is possible that measures have been taken to overcome this problem.[1] From Farah, where the road turns north to Herat, it is 145 miles over rolling steppe country; here the road is reported to be fair and passable the year round. The only part of the route which involves any climbing, or a snow problem is the last section of 66 miles between Herat and the rail-head at Kushka. Here the highway has to cross the western end of the Parapamisus range via the Ardewan Pass (el. 4,850 ft.), the ascent to which from Herat is rather abrupt. The Pir Sang Pass (el. 4,670 ft.) is also used. Both passes are reported to be difficult, but not impassable, in winter.

It appears that with little improvement this road can be made into a heavy truck route capable of carrying at least as much as the 16,000 tons daily planned for the Burma Road. The present capacity is between 100-300 tons daily using 1½-ton trucks.[2]

6. *The North Afghan Road*

Very few Europeans have passed over this road through the heart of Afghanistan, and there is very little published or unpublished material available. Consequently, the Section was very

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[1]Squadron Leader Harris. The above-mentioned British report states that with chains the road is now passable for trucks in wet weather.

[2]"Allied-Soviet Communications"

fortunate to contact Mr. Wilbur V. Harland, who recently returned to Washington from Kabul where he served as a teacher from December 1938 to December 1940. During his residence in Afghanistan, Mr. Harland travelled over this road several times, and now has very kindly prepared extensive notes on it and on matters pertaining to motor transport in Afghanistan in general.[1] All material in this memorandum bearing on the North Afghan Road is based on his notes and on conversations with him.

The Landi Khotal--Kabul section of this road has been used for auto transport for a number of years and provides the principal means of communication between the capital city and the outside world. Numbers of foreigners have driven over this section of the road. But the motor road from Kabul through the Hindu Kush Mountains to Afghan Turkestan is a development of recent years. One of the reasons for building the road was to provide a cheap means of bringing cotton and wheat from Afghan Turkestan to the capital. There is a lively truck traffic on the road, cotton and wheat being the chief freights.

There are two high passes on this North Afghan Road, the Lataband (el. 10,086 ft.) between Nimla and Kabul, and the Shibar, (el. 9,800 ft.) between Charikar and the Kunduz river. Snow on the Lataband generally closes the road for up to a month each winter. However, the government is building an entirely new road down the valley of the Kabul river from Kabul, which will eliminate the Lataband entirely. This road should be nearing completion if it is not

[1] A detailed report and map based on these notes will be available shortly.

already finished. The Shibar, although further north and almost as high as the Lataband, has less snow; it is not closed more than a week or two and could easily be kept open. The descent on the western side is very sharp, so sharp that Kabul-bound trucks are generally partly unloaded in order to climb one particularly steep pitch. A little blasting and grading here would greatly improve this road.[1]

The only other section of this road which presents difficulty is the 30-mile stretch between Mazar-i-Sharif and the Amu Darya opposite Termez. The Afghans have not improved this part of the road, and there are reported to be some difficult sandy stretches. However, motor trucks have been over this section, and it would appear to be a relatively simple matter to improve the road for heavy traffic.

The bridges over the larger streams are generally of steel construction, smaller streams and gullies being crossed by stone bridges or by culverts of one type or another. The road is supposed to be a two-way highway throughout, but this is narrowly interpreted in some sections. While motor trucks carrying loads of 3-4 tons now operate over the road, relatively little work with American road-building machinery would bring it up to the standards of the Kermanshah Road. Even without improvements, trucks driven by relays of drivers, and not overloaded, could make the transit from rail-head to rail-head in 36 to 48 hours. With relatively little road improvement (such as gravel-spreading to fill in chuck-holes, straightening out some of the needlessly sharp curves, realigning the road

[1]The Shibar is not a pass over the Hindu Kush, but rather a saddle between that range and the Paghman range to the south. The road passes through the Hindu Kush on a water-level grade down the valley of the Kunduz.

for easier grades), the transit time could be materially reduced and the loads increased. With such minor improvements, the North Afghan Road should be able to at least equal the performance of the Burma Road.[1]

7. *Necessity for Afghan-American Cooperation*

The development of the two Afghan roads into major supply routes obviously depends on the attitude of the Afghan government. In view of the traditional hostility of the Afghans toward the British and the Russians, it would seem highly unlikely that the Afghan government would give favorable consideration to proposals for the improvement of the two roads and for the organization of regular transit traffic over them, if such proposals came from British or Russian sources, or if American proposals were transmitted by the British or the Russians. On the other hand, in view of the high esteem in which Americans are reported to be held in Afghanistan, and the desire of the government for modern highways, it is possible that proposals from official or semi-official American sources would be welcomed.[2] While subsequent cooperation would be essential from the British for the transit of supplies through India, and from the Russians with respect to delivery at their rail-heads, it would seem essential that any proposals be made first directly to Kabul by Americans.

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[1]The British report "Allied-Soviet Communications" referred to above, gives a capacity *after improvements* of only 100 tons daily. From the evidence available, this figure appears closer to the *present* capacity of the road.

[2]There is at present no full-time American diplomatic representative in Afghanistan. The American Minister to Iran is also accredited to Afghanistan, but visits Kabul at infrequent intervals only.

While the two Afghan roads can be used at once for forwarding limited amounts of supplies (perhaps 100-200 tons daily), improvements of the sort mentioned above and large numbers of imported trucks of suitable sizes will be required if each of the two roads is to reach the capacity planned for the Burma Road.[1] To secure estimates of the amount of and kind of improvements necessary, the types of road construction equipment needed, and the length of time required for such improvements, and to establish the necessary technical cooperation with the Afghan authorities, it would seem advisable to send at least two American road-engineers - preferably with foreign experience - to Afghanistan to make preliminary surveys of both roads. If these road engineers were accompanied by motor transport experts, a simultaneous survey could be made as to the best use of local transport equipment, the types of trucks best adapted to the roads, locations for repair and supply depots, quarters for the American staff, the availability of local drivers, and similar technical matters. On the basis of the reports of the road engineers and the transport experts, a comprehensive plan for the development of the two roads into major supply routes could be drawn up.

8. *Conclusions*

Assuming that cooperation can be secured from the Afghan government for the development of the two Afghan roads, that motor transport vehicles

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[1]It is estimated that there are at present 2,590 General Motors trucks (mostly Chevrolets) in Afghanistan. In 1941, 800 General Motors trucks were exported to Afghanistan. (Information from General Motors Overseas Operations.) According to the *Iqtesad Journal* (vol. 227, January-February, 1941, p. 49 of the English section), there are now 5,000 privately owned motor trucks engaged in transport.

in sufficient numbers can be delivered, that drivers can be obtained, and that the requisite improvements on the roads themselves can be made expeditiously, it should be possible to develop the three roads forming the Eastern Group of southern supply routes into the equivalent of three Burma roads, with a total capacity of approximately 50,000 tons monthly. However, since a considerable portion of the capacity of the East Iranian Road is or will be required for the supply of the British forces in Iran, the volume of supplies which might be delivered to the Russian rail-heads in Central Asia would be between 32,000 and 50,000 tons monthly.

John A. Morrison

MAP II

ICE CONDITIONS IN THE WHITE SEA

Explanatory Note

A. Thickness of Ice

The measurements (in inches) are taken from British Admiralty, Hydrographic Department, *Arctic Pilot*, Volume I, London, 1933, page 44; these measurements are 5- to 21-year averages of thickness, as recorded by Russian observation stations. The least satisfactory data, from the point of view of the number of measurements, are those for Onega and Popov Island (5 years), and Intsi, Letni Orlovski and Chesmenski (7 years). It was impossible to make any extensive use of the tables in Gidrograficheski Otdel, *Svedenita o Sostoianii L'dov na Morskh S.S.S.R.*, 1926-1932, (Hydrographic Division, *(Information on the State of Ice in the Seas of U.S.S.R.)* because only one or two records (of maximum thickness) are given for any one observation point, and the readings are dated only as to year, and not as to month and day. However, some use of these measurements was made as a check on the figures which appear on the map. Finally, the measurements for the average thickness at certain points (for example, Archangel-Solombala) could be checked approximately against similar measurements given in general accounts of ice conditions in the White Sea.

B. Character and Distribution of Ice

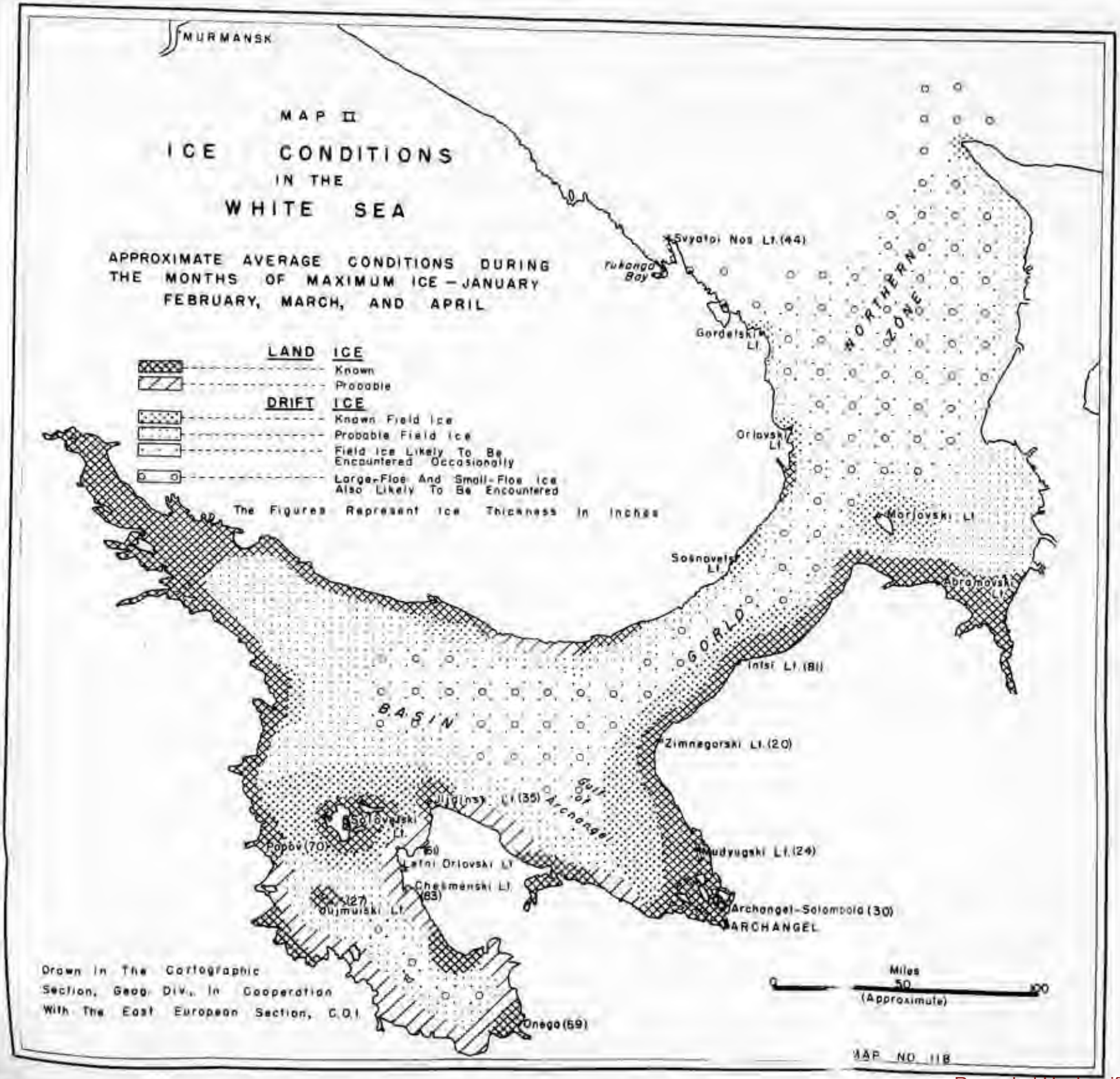
The sources for this information are the *Arctic Pilot*, pp. 42-3 and passim; Gidrograficheskoe Upravlenie, *Lotsiia Belogo*

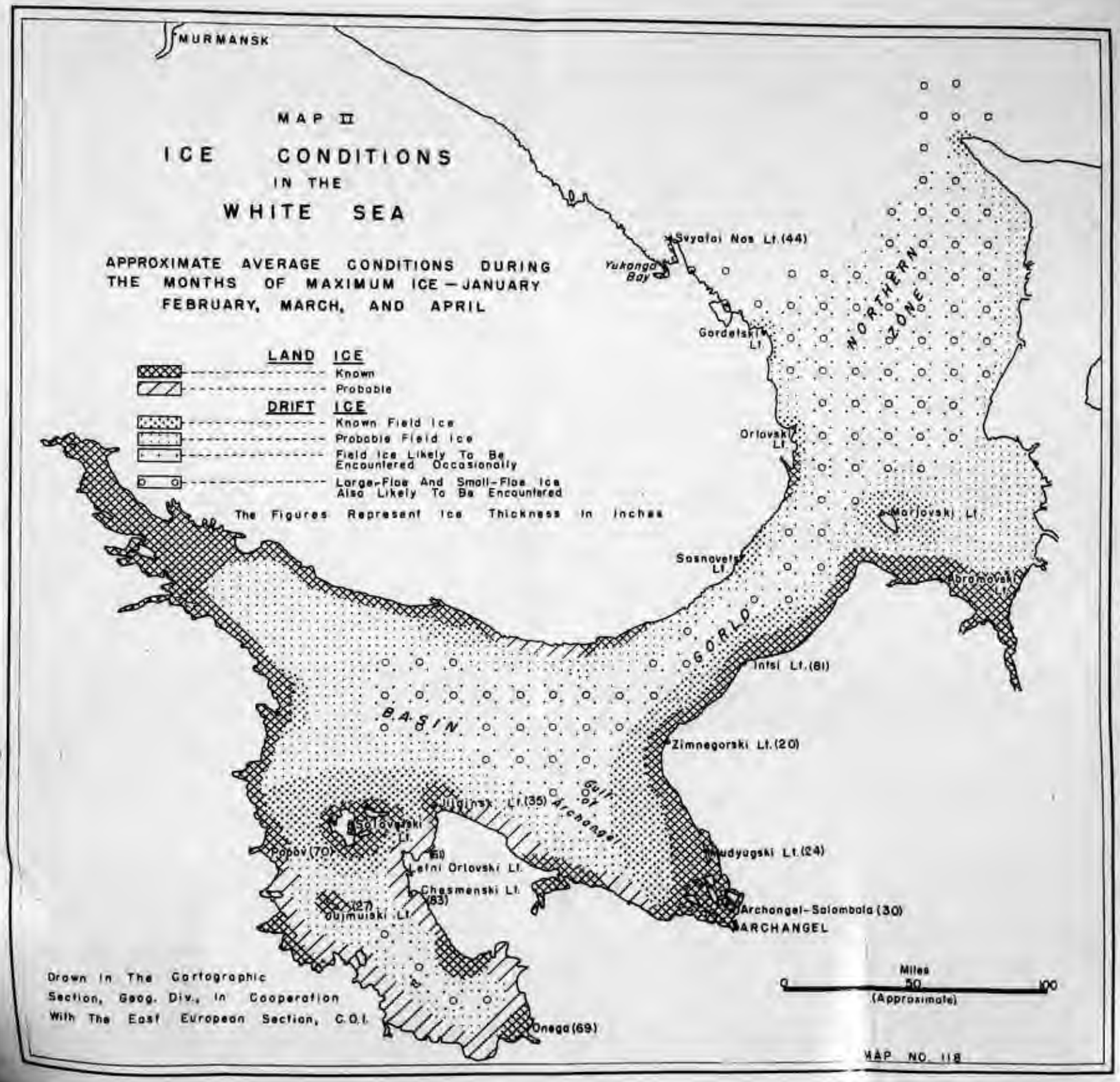
*Moria* (Hydrographical Institute. *White Sea Pilot*), 5th ed., Leningrad, 1932, pp. 167 ff.; and most important, the series of maps in each number of the *Svedenia* (1926-32), which show the distribution of the principal categories of ice: grease, small and large-floe, field, and land, for the months of December through May. In the present map the first category has been disregarded. In some cases these maps incorporate material from land, vessel, and plane observations. In addition, each number of the *Svedenia* includes descriptions based on individual observation flights by airplanes and also running accounts of the season's observations from each recording station. For Yukonga Bay, information for the map was obtained from the general account of ice conditions there in the *Arctic Pilot*, p. 173.

C. Cautions respecting the Use of the Map

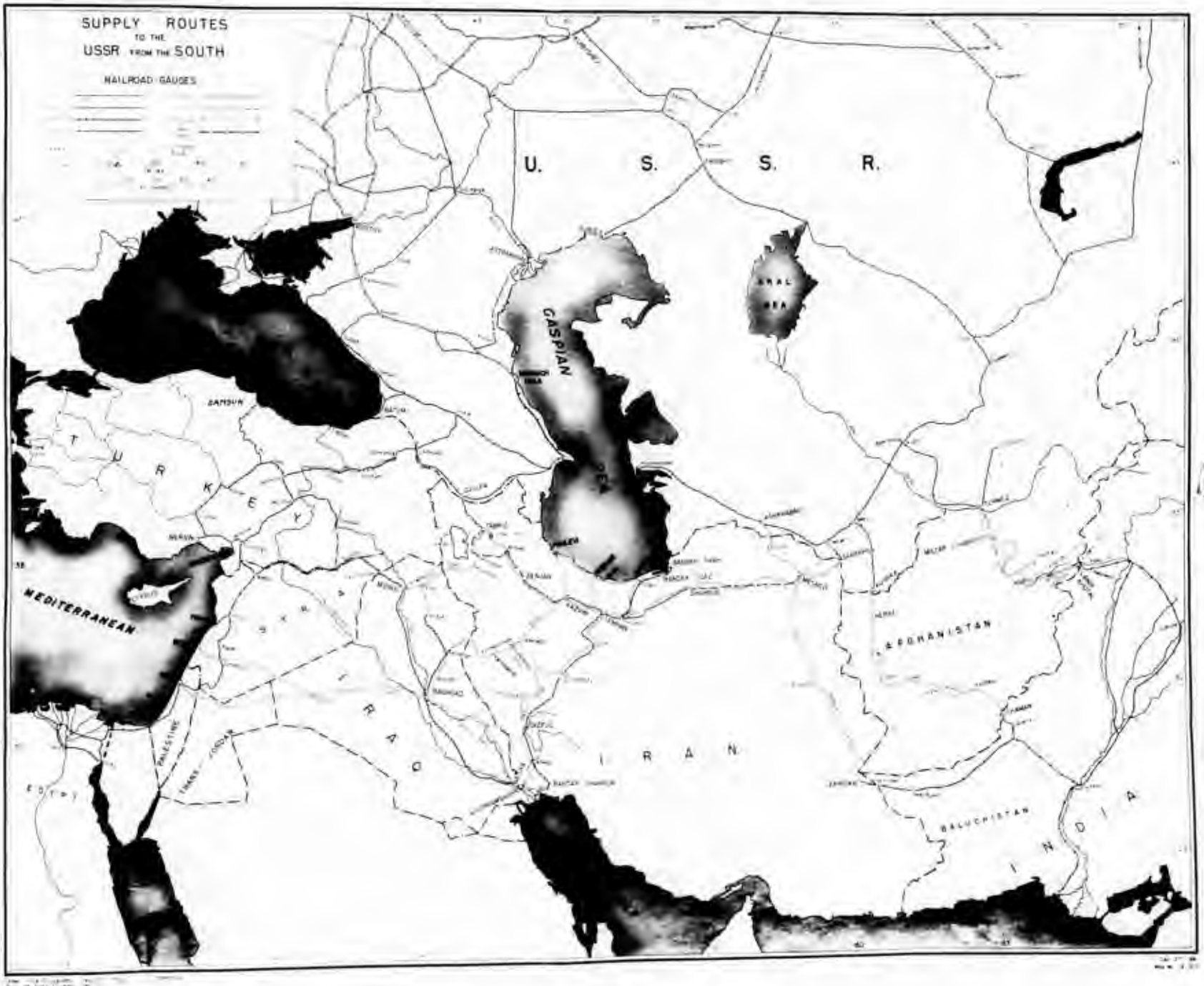
No attempt is made to show the thickness of the ice at points other than those for which there are averages for at least four years. For the character and distribution of ice, a considerable amount of interpolation and generalization, based in part on general descriptions and on indications of probability in the maps in the *Svedenia*, seemed necessary in order to give a representation of the *probable* average conditions which might be faced during the months of maximum ice - January, February, March, and April. However, the precise situation at any given time -- the location of ice floes, for example -- depend on variables such as the degree of severity of

the winter and the direction of winds and currents. Furthermore, for the same reasons, ice conditions attain their maximum severity at different points at different seasons. Hence, the map is not an absolute but a general average representation.





MAP III



CONFIDENTIAL

MILITARY INTELLIGENCE DIVISION
WAR DEPARTMENT
Washington, December 22, 1941

AIR INFORMATION BULLETIN
No. 1
MID 461

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# NOTES ON JAPANESE AIR TACTICS

## SOURCE

These notes are based on a report, dated December 16, 1941, from a highly reliable source.

## CONTENTS

CONFIDENTIAL

# NOTES ON JAPANESE AIR TACTICS

## 1. ATTACKS ON BRITISH CAPITAL SHIPS

On the morning of December 10, 1941, H.M.S. Prince of Wales and H.M.S. Repulse were in position about lat. 4° N.-long. 103°30' E. close in to the eastern coast of the Malay Peninsula in open column, the Wales leading at the distance of about 1000 yards. The ships had no air protection.

At 11:13 local time nine (9) Japanese high-level bombers approached in line from dead ahead at an altitude of about 12,000 feet. All of the planes dropped bombs simultaneously in line across the Repulse, one being a near miss on the port side. Fire broke out and casualties were incurred from fragments. During the approach the ships turned 90° right, placing the Repulse on the starboard quarter of the Wales.

At 11:39 nine (9) torpedo planes attacked the Wales, which changed course too late to a parallel track. At least one and perhaps two direct hits caused severe damage, the ship appearing to rise out of the water. Speed was promptly reduced to 15 knots and continued to drop. Generators were reported out of action and steering control was lost. The ship began to list about 15° to port.

At 11:56 the third attack was launched, again by torpedo planes, eight (8) or nine (9) in number. This time, the attack was directed on the Repulse, which turned to parallel the torpedo tracks and remained unhit.

At 12:18 the fourth attack was made, once again by torpedo planes, three (3) being directed on the Repulse and two waves of three (3) each on the starboard side of the Wales, which now listed heavily to port and was unable to maneuver. The Repulse again was unhit, but the Wales suffered two hits under her forecastle, one near her "Y" turret.

At 12:26 came the fifth attack, with nine (9) or ten (10) torpedo planes launching torpedoes on the Repulse, which maneuvered to avoid them, but received two hits on her port side and one on her starboard side, all well aft. The Repulse sank at about 12:33.

At 12:35 nine (9) bombers returned to make the sixth attack, dropping full-load bombs about 6 miles away for no apparent reason. The bombers then flew over the Wales from port to starboard without dropping any bombs. The speed of the Wales was now reduced to about

8 knots. At 12:42 the same number of bombers attacked the Wales from ahead, scoring one direct hit on her "S3" turret and several near misses. The Wales lost all propulsion and sank at about 13:15.

The details of the attack which should be stressed are:

a. Bombers approached from ahead in close line abeam and dropped bombs together by signal. They made an excellent pattern, using what were believed to be 1000-lb. bombs.

b. When the torpedo planes were first sighted, they were in close formation at a high altitude. While still out of range, they lost height and were strung out in loose column, expanding into an approximate diamond as the target was closed. Their maneuvers showed complete disregard for gunfire. Their tactical unit is usually nine (9) planes. Eighteen-inch torpedoes were dropped from heights as great as 300 feet and distances as close as 1000 yards, the average distance being 1500 yards. No glider attachment was seen on the torpedoes, which fell at an angle of about 40° to the horizontal. Each plane seemed to take individual aim, there appearing to be no coordinated attack or zones of attack. After dropping bombs, the planes took no evident precaution to avoid action. They rose heavily, departed slowly, and passed close to the ship under attack, thus drawing a large volume of gunfire on the planes which had completed their attack.

c. The approach of the enemy planes was not detected by radio detection equipment.

d. The lack of air support for the British ships was occasioned by British aircraft proceeding to Singora on the eastern coast of the Malay Peninsula in order to launch a surprise dawn attack there on mass enemy transports on December 10. Unfortunately these planes were sighted by three Japanese reconnaissance planes between 17:00 and 18:30 the previous evening, and the Singora attack was abandoned, the planes turning south for Singapore. En route, about midnight, they received a report of enemy transports near Kuantan, lat. 3°50'N., and decided to sweep them up at dawn. The transports were not found, however, and the search for them was still underway when the attack on the Wales and the Repulse began.

2. ATTACKS ON PEARL HARBOR

In the attack on U. S. naval vessels at Pearl Harbor, which started shortly before 08:00, Sunday, December 7, Japanese horizontal bombers were reported attacking in a nine (9) plane formation line abreast at about 12,000 feet. Bombs were dropped on a signal, and formed an excellent pattern. Both instantaneous and delayed-action fuses were used in 500 and 1000-lb. bombs. The use of AP bombs was

also reported.

Torpedo planes in nine (9) plane formations lost altitude while they were still outside gun range. They approached in loose column and deployed into a wedge or loose diamond formation before making individual drops. In spite of heavy AA fire, they dropped torpedoes at varying altitudes up to 300 feet and from distances as close as 1000 yards.

The torpedoes were reported as being 18-inch and 21-inch Whiteheads. They ran very well in 40 feet of water. One such torpedo which was recovered had a tail-fitting which acted as a drag to prevent the torpedo from seeking too great a depth. There was no evidence of any magnetic pistols.

3. POINTS OF SIMILARITY IN THE ATTACKS

In comparing the two engagements the following points of similarity are noted:

a. The tactical unit for both horizontal bombers and torpedo planes was nine (9) planes.

b. The horizontal bombers in both cases were at an altitude of about 12,000 feet and attacked in a close line abreast, thus making an excellent pattern. During both engagements they dropped bombs simultaneously on signal. Many of the bombs weighed 1000 pounds.

c. On both occasions the horizontal bombers preceded the torpedo bombers.

d. In all attacks by torpedo bombers the tactics were apparently identical. The torpedo bombers lost altitude out of gun range, approached in loose column, and deployed for attack into a wedge or loose diamond formation. They dropped torpedoes at an average distance of 1500 yards, some closing to 1000 yards. Altitudes at the drop varied up to 300 feet. Only individual attacks were made, always with a complete disregard for AA fire.

e. In the attack on the Wales and the Repulse only 18-inch torpedoes were reported, whereas at Pearl Harbor both 18-inch and 21-inch Whiteheads were noted.

4. ADDITIONAL NOTES

a. In the bombing of land objectives heavy AP bombs, which were converted 15-inch AP projectiles, were used.

b. Dive-bombing release altitudes were reported only as being very low, and for future guidance strafing by dive bombers may be expected.

c. Gun armaments of enemy planes consisted of 20-mm. cannon and 7.7-mm. guns. No armor was installed in any of the planes shot down.

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G-2/2657-220; No. 577 MID., W.D. 11:00 A.M., December 22, 1941

SITUATION REPORT

I. Pacific Theater.

Philippines: Situation at Davao is obscure. Fighting is in progress. Japanese landing attempts are under way slightly north of Lingayen from the 70 to 80 enemy transports concentrated in Lingayen Gulf. A major drive at the Philippines is indicated. Hawaii: No further reports of hostile activity have been received. Malaya: Japanese major attack expected momentarily in the western sector. In the east, the British are withdrawing to more favorable positions. British North Borneo and Sarawak: Dutch air and submarine action continues. Hong Kong: No further reports received. West Coast: No further reports have been received.

II. Eastern Theater.

There is no change in the general situation on the Russian front. The Russians are maintaining pressure against the Volkhov River west of Tikhvin and have made gains southwest of Tula.

III. Western Theater.

Air: No R.A.F. offensive because of weather conditions. There were some limited reconnaissance and anti-shipping patrols by German air units over the eastern coast of Great Britain.

The German communique this morning states that two British bombers were shot down during raids last night by single planes over Helgoland Bight and German-occupied regions along the Channel. The German bombers attacked port installations on the southwest coast of Great Britain.

IV. Middle Eastern Theater.

Ground: Axis retreat continues toward Bengasi from North Cyrenaica. Heavy troop movements reported south from Bengasi, and large concentrations of German troops are reported 50 miles south of that place. Italian troops massed in disorganized state north of Bengasi.

Air: British light bombers attacked motor transports near Derna and Mechili yesterday, and other planes bombed railroads around Zuara. R.A.F. continues bombing and strafing of Axis troops. Yesterday's Cairo communique stated that R.A.F. is leading the assault in Libya, harassing air bases, railroads, and supply centers of Tripolitania.

The German high command claims that German aircraft attacked heavily the British naval base at Malta last night.

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