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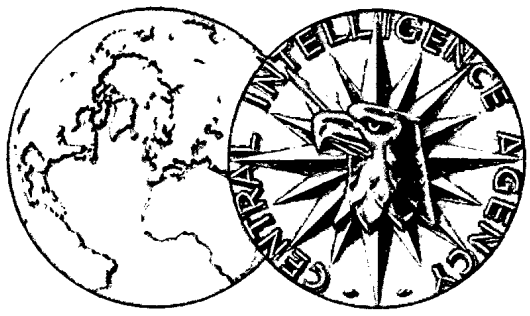

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SWEDEN

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SUMMARY

Sweden lies on the direct air routes from the Western Hemisphere to the USSR, nearer to vital Soviet centers than any other western nation which still retains freedom of action. The Swedish people are intelligent, industrious, and staunchly democratic. Their government, friendly to the West, is liberal and stable. The armed forces are small but competent, and the country has an essentially healthy economy. For these reasons Sweden is potentially a valuable ally to the United States, and its affairs are important though not vital to US security.

The Swedes have succeeded since Napoleonic times in keeping out of wars, and the basis of their present foreign policy is a determination to continue, if possible, to do so. Traditionally they fear Russia, and ideologically they hate totalitarianism. Nevertheless, the Swedish Government has steadfastly refused to identify itself with any concerted western resistance to Soviet policy lest such an alignment provoke Soviet resentment and imperil Swedish "neutrality." Even more emphatically, the government has made plain its determination neither to enter into any western military alliance nor to engage in prior military planning with any great power. It has earnestly endeavored to persuade its Scandinavian neighbors, Norway and Denmark, not to give ear to the counsels of the West but to join Sweden in a military defense pact strictly dedicated to neutrality unless attacked. Neither Norway nor Denmark appears to believe that Scandinavian neutrality has the slightest chance of being respected in a future war, and both countries are therefore likely to leave Sweden to its own devices and join an Atlantic Pact if invited to do so. There is little to indicate that even this development will cause Sweden to change its policy, though isolation will not be welcome, and influential Opposition newspapers already urge that the government forsake a course which they call unrealistic. Swedish military opinion appears to be generally in agreement with this Opposition view, but the government and the great majority of the population remain unconvinced. It follows that, although no one doubts the democratic sympathies of the Swedes, their full political weight is not thrown into the "cold war" on either side. This official and popular neutrality is not attributable to dislike for the United States, nor certainly to any lack of constancy in democratic convictions. It stems rather from the peaceful tradition of nearly a century and a half, and from a belief that the chance of remaining unmolested in a future war, however slim, is yet greater than the hope of preventing war through a common front of the democratic powers.

Sweden is highly industrialized and yet produces some 90 percent of its own food requirements. The principal natural resources are comprised in the forests and in what is probably the world's largest reserve of high-grade magnetite iron ore. Before 1945 almost 90 percent of the ore annually mined was exported, mostly to Germany, and it formed an important strategic raw material for the Nazis. Shortages of coal and

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Note: The intelligence organizations of the Departments of State, Army, Navy, and the Air Force have concurred in this report. The information herein is as of 1 January 1949.

oil limit the scope of Sweden's own industrial expansion, but an abundance of hydro-electric power partially compensates for the lack of fuels. Swedish labor is highly skilled, well disciplined, and loyal; Communists are active but their effective influence is negligible. Airplanes, ships, ordnance, machine tools, and ball-bearings are the Swedish industrial products of most obvious strategic interest, but none of them can be manufactured in quantity without imported fuel and supplementary raw materials. Although Sweden's raw and manufactured products would certainly be useful to the United States in time of war, the denial of them would not be seriously embarrassing.

The Swedish people are accustomed to a high standard of living and have contrived to maintain it even while much of the rest of the world was undergoing economic depression and war. Their success in this respect has been due partly to the natural advantages of the country and partly to the enlightened economic policies of the government, which managed to avert the worst manifestations of the trade cycle and maintained at the same time a system of social legislation widely acclaimed as a model for the western world. Since the war, however, fortune has begun to frown on the Swedish economy. It now suffers from the universal afflictions of domestic inflation and a dollar shortage, and the government is proposing to remedy this condition by a program which, though far from austerity as measured by British standards, will nevertheless tend to diminish the amenities of Swedish existence. Imports will be cut and exports increased, capital investment more closely regulated, wages frozen, and taxation held high enough to insure a budget surplus. Sweden now receives a modest share of ERP funds, though the government in ratifying the necessary agreements had to swallow some anxieties as to the political implications which they might contain for the cherished status of neutrality in the East-West conflict. Thanks to the aid thus received and to the essentially healthy condition of Swedish economy and morale, it is believed that the austerities of the economic program will not have to be extended to lengths which would cause any appreciable public discontent or political instability.

The Swedes believe in guarding their neutrality with the strongest armed forces feasible for a country possessing limited population and wealth. They have therefore maintained small but well-balanced forces under a unified command, backed by numerous reserves, and supplied by a workable economic organization. The equipment of the forces is not entirely up to date; the country's economy is not self-sufficient, and the national policy has confined the doctrine of the services to one of defense only. Because of the exhaustion of other countries, however, Sweden now possesses probably the strongest armed forces in Europe save for those of the USSR, the UK, and perhaps France. They are the mainstay not only of Sweden's own defense, but of that of all Scandinavia. The Swedes would like to get further military supplies from the United States, but up to the present have been quite unwilling to reciprocate by any firm commitment to use such supplies on behalf of a Western democratic alliance. If war breaks out, the Soviets will possibly invade Sweden, their most important strategic objectives being to deny the Scandinavian peninsula to the Western Powers and to obtain submarine bases on the Atlantic coast of Norway. If such an invasion occurs, Sweden alone cannot resist for long, and without prior planning it is most unlikely that assistance can arrive in time to save the country from conquest.

CHAPTER I

POLITICAL SITUATION

1. ORIGIN AND DEVELOPMENT OF THE PRESENT POLITICAL SYSTEM.

Sweden is said to have been inhabited by the same race for longer than any other European country, and the Swedes claim to be of virtually pure Teutonic blood. Whether this claim is anthropologically correct does not greatly matter, but it is remarkable that the political institutions and cultural characteristics of the people have evolved in comparative freedom from outside influences. During the Middle Ages as in modern times Sweden existed upon the periphery of major events. The Swedes occasionally made violent forays into continental Europe, but Europe did not retaliate, and the Swedish nation developed without benefit of the invasions, folk-wanderings, and mixings of blood, habits and ideas that fertilized and troubled other communities. As the somewhat less complete isolation of England behind the Channel made possible the evolution there of a peculiarly free and stable form of government, so were the Swedes able almost without molestation to create one of the most democratic of all modern societies.

Between the years 600 and 800 A.D. a consolidation of various petty Swedish kingdoms began, and about 1200 Sweden started to assume the outlines of a state. After the extinction of the first ruling family in 1060 the monarchy became elective, depending as did most European kingdoms upon the support of the nobility and the clergy but also to some degree upon the farmers. In 1397, largely through the initiative of Denmark, the kingship passed to a member of the Danish ruling house, and for more than a century the three countries of Norway, Sweden, and Denmark were ruled by the same sovereign under an arrangement known as the Union of Kalmar. From time to time local Swedish potentates were in opposition, but none was able to make good a title as King. There was a tendency for the generality of the population to revolt against the rule of Danish monarchs and the officials imported from Holstein who surrounded them. One of these rebellions, led in 1435 by a certain Engelbrekt, was memorable for the summoning of the first Riksdag to contain representatives of the four estates of nobility, clergy, burgesses, and peasants. The Union of Kalmar came to an end in 1523 with the election to the Swedish throne of Gustavus Vasa; henceforth Sweden was entirely separated from Denmark. A few years later Sweden renounced the Roman Catholic Church (to which it had never been strongly attached) and appropriated its property, becoming thereby one of the earliest and most powerful of Protestant countries. In 1544 the monarchy was made hereditary in the family of Gustavus Vasa, whose reign thus formed one of the turning points in Swedish history.

Under King Gustavus Adolphus, who reigned from 1611 to 1632, Sweden reached the peak of its military success. For reasons political as well as religious the King took his army into the Thirty Years' War and campaigned extensively in Germany, holding

his court as far from home as the cities of Mainz, Frankfurt, and Munich, and making Swedish arms famous throughout Europe. Already possessed of Finland and other territories on the eastern coast of the Baltic, Sweden acquired at the Treaty of Westphalia in 1648 large portions of Pomerania, the bishopric of Bremen, and other slices of northern Germany, holding these territories as fiefs of the German Empire. Sweden thus became a substantial continental power. During the same early decades of the seventeenth century the country underwent a remarkable evolution of political institutions and cultural life, quickened in part by the extensive contacts which the Swedes now made with European peoples, and in part by the genius of the monarch himself. Although the reign of Gustavus Adolphus was expensive because of the wars and adventures of Swedish policy, it was fruitful in the development of institutions. The king was by no means a tyrant.

At the turn of the century another king of Sweden, Charles XII (1697-1718), provided Europe with one of the most spectacular careers of modern times. In 1700 this monarch, then aged under 20, defeated the Russians in a great battle at Narva, and commenced a chapter of military achievements which made the Swedish Army one of the most renowned in Europe. After a remarkable series of victories, Charles in 1709 finally suffered one of the most complete of military defeats at the battle of Poltava. The defeat at Poltava signaled the beginning of the end of the Swedish Baltic Empire; a further result was that Russia acquired outlets on the Baltic.

The adventures of Charles XII and his autocratic form of government both exhausted and exasperated the Swedes, and upon his death in 1718 they reconstructed the government in such fashion as to give the Riksdag virtually supreme control. The eighteenth century was a period of Parliamentary rule, with a considerable strife between opposing parties curiously known as the "Hats" and the "Caps." Such a system eventually proved almost as disagreeable as one-man rule, and it was followed in 1772 by another period of domination by strong monarchs and a form of government closely approaching absolutism. This in turn collapsed in 1809 when King Gustavus IV was deposed and a new constitution accepted by King Charles XIII. This constitution still forms the basis of the Swedish governmental system, though it has been so altered by amendments and by the growth of new practices that it has become scarcely recognizable.

Sweden had lost its eastern Baltic possessions to Peter the Great of Russia, and gradually was forced to relinquish its territorial acquisitions in Germany and Poland. In the general settlement of 1814, after the Napoleonic Wars, the conquest of Finland by Russia was confirmed, but Sweden received Norway, which was taken away from Denmark in order to compensate Sweden for turning against Napoleon. The Norwegians remained subjects of the Swedish king until 1905, when the union was peaceably dissolved, but kept their own parliament and local government, and considered themselves almost as an independent state. It is an important fact of Swedish history that with the 1814 territorial adjustments Sweden ceased to have possessions elsewhere than in the Scandinavian peninsula, and ceased to take a prominent part in European history.

King Charles XIII had no heirs, and the Riksdag, casting about for a successor, chose Napoleon's marshal, Jean-Baptiste Bernadotte. Bernadotte immediately exercised great influence as Crown Prince, and was responsible for conducting the policy and the arms of Sweden in such fashion as to bring the country out of the Napoleonic upheaval without serious losses. In 1818 he succeeded to the throne, founding the dynasty which still reigns.

The 19th century in Sweden was marked by the development of political democracy and the growth of industrialization; the nation's energies were turned inward and the now traditional foreign policy of neutrality developed.

2. PRESENT GOVERNMENTAL STRUCTURE, FUNCTIONS, AND OPERATIONS.

The Swedish form of government resembles that of the United States in that it is based upon a written constitution which may be amended only by a specified procedure, but it bears closer resemblance to that of Great Britain in being a constitutional monarchy with a parliamentary rather than a congressional system. The Cabinet is appointed by the King, but is selected by him so as to command support from the dominating party or parties in the Riksdag, and is responsible for the acts of the government. Despite the existence of the written constitution, various customs and conventions have come to be observed and now form almost as important a part of the system of government as they do in the United Kingdom; this renders the system somewhat difficult of description.

There are four fundamental laws, none of which may be amended save by the specified process. They are: (1) the Constitution of 1809; (2) the law of succession to the throne, of 1810; (3) the law of freedom of the press, of 1812; and (4) the law defining the organization of the Riksdag, of 1866. Amendment is not difficult; it may be done by a majority vote in an ordinary session of the Riksdag, followed by another majority vote in the next session following a general election.

a. The Riksdag.

The Swedes like to trace the continuous history of the Riksdag from its first full session in 1435 to the present day, and they point out that it was never suppressed. Throughout the years until 1866 it was curiously organized into four houses, corresponding to the four estates of nobility, clergy, burgesses, and peasants; needless to say the last of these exerted less influence than the first, but it is remarkable that genuine small farmers participated in the functions of government in Sweden from very early times. In 1866 the Riksdag was reorganized into two chambers; the First, or Upper Chamber having 150 members elected for a term of eight years by the various municipal and provincial bodies of the country. One-eighth of the First Chamber comes up for election each year. The Second or Lower Chamber contains 230 members chosen nowadays by universal suffrage and according to a system of proportional representation for a term of four years. Regular sessions are held annually, beginning in January; special sessions may be called.

The two houses have equal powers, and legislative business is carried on to a considerable degree by a peculiar system of joint committees. There are seven of these

committees; their size, number, and jurisdiction is laid down in fundamental law. Half of each committee is chosen from each of the two houses of the Riksdag, and proportionally according to the representation of parties in each house. No bill may be passed by either Chamber until it has been acted upon by the appropriate committee, which thus constitutes a miniature Riksdag for the consideration of the measures coming under its cognizance. Cabinet Ministers, who may speak in either Chamber, are excluded from the joint committees.

b. The Cabinet.

According to constitutional law the Cabinet must contain the heads of the government departments and three additional ministers without portfolio. There are actually eleven departments: Justice, Foreign Affairs, Defense, Interior, Social Affairs, Communications, Finance, Public Worship and Education, Agriculture, Supply and Commerce.

In the working of the Swedish Cabinet system may be seen one of the widest divergencies between the letter of the constitution and the customs and conventions which have sprung up to govern its operations. The constitution of 1809 left the King free to decide questions as he saw fit, even though acts of his had to be countersigned by the ministry. He could appoint to his council anyone whom he wished. Prior to the Riksdag reorganization of 1866 it was virtually impossible to construct a system of Cabinet government on the British model; since 1866 there has been a gradual evolution towards this system. Nowadays the King does not in actual fact decide questions, though he is still constitutionally entitled to do so. Since 1905 the King has as a rule appointed a council more or less directly sustained by some party or party combination in the Riksdag, but only since 1920 has the parliamentary principle been generally accepted, even by the King himself. Thus there is no long tradition of Cabinet government in Sweden as in England, and the Riksdag has never been so strictly managed by the ministry as has the House of Commons. Its decisions have frequently differed considerably from what the government has proposed, and the center of political gravity long remained very definitely in the representative assembly. This situation was in part due to the fact that proportional representation did not make possible a clear parliamentary majority for any one party, and the succession of coalition governments were weak instruments. Since 1932, however, the increasing strength of the Social Democratic Party has permitted the formation of much more stable ministries, and this has tended to increase the power and influence of the Cabinet. The Swedish system is thus rapidly approaching that of Britain.

There is no constitutional provision that a Cabinet must resign if defeated in the Riksdag; the King legally can, and as recently as 1914 actually did, maintain in office a Council unsupported by the parliamentary majority. But the King probably would not do so again. The Cabinet likewise would probably not resign merely upon a defeat, but would do so rather "as a result of a realization that the whole political situation in the Riksdag would make resignation a wise procedure." Swedish Cabinets have never formed the habit of asking for a dissolution of the Riksdag, nor have they held their Parliamentary supporters in line by threatening such dissolution.

c. *The Administration.*

The numerous boards and offices of the Swedish bureaucracy are nearly all comprised within one or another of the ministerial departments, and the chiefs of the administrative units have their contact with the Cabinet through the Minister under whose department they are listed. However, the Minister does not actually have control over the boards and offices within his department, and the bureaucracy thus constitutes a separate hierarchy of its own, which rejoices in a long tradition and an exceedingly high standard of professional competence. Civil servants are removable only after trial has been held and judgment given; they cannot even be transferred from one job to another save at their own request. Their *esprit de corps* resembles that of the judiciary.

The Riksdag chooses an official whose title may be translated as "Parliamentary Supervisory Official for Civil Affairs," and whose duty is to take cognizance of the administrative functioning of the government and to act as a link between the representative assembly and the bureaucracy. He is a last resort for complaints against the administration, and he reports to the Riksdag on the effectiveness with which its policies are being carried out. A similar official is chosen to oversee military affairs. Thus the principal connection between the legislative and administrative branches of the government is maintained not as in Britain through Cabinet members, but through functionaries specially elected for the purpose.

d. *Judiciary.*

There is a Supreme Court, five Courts of Appeal, and numerous borough and district courts of first instance. Judges are appointed by the King and are removable only after proper judicial process. Jury trial is not used except in certain cases involving the freedom of the press. On the other hand, the judges in local courts of first instance are assisted by a body of twelve citizens elected in each subdivision of the judge's district for a six-year term. These laymen assist the judge in passing on questions both of law and of fact, and a certain number (usually seven) serve in all cases which arise in the district during their term of office. By a unanimous vote the body of laymen can overrule the judge, but if the laymen disagree the judge decides the question.

Despite the fact that Sweden has a written Constitution, the judiciary has not undertaken to pass upon the constitutionality of laws. If an act is passed in proper form by the Riksdag it becomes law; thus it may be said that the Riksdag, rather than the judges, is the final interpreter of the Constitution. This situation has not given rise to any difficulties.

The laws of Sweden have twice been codified, once in the Middle Ages and more recently in 1734. The latter code is still in force, with some changes, and is esteemed a masterpiece. Adjudication is founded upon this code and generally upon statute law rather than upon the body of court precedents, and the general principles are supposed to be easily accessible to the ordinary citizen. A statute book, issued every year and containing all statutes in force except those that have only a very special bearing, will be found on the shelves of many Swedish laymen.

Beside the Swedish Supreme Court there exists a Supreme Administrative Court to which the citizen may carry appeals from the various administrative bodies with which he may have dealing. Every decision of an administrative authority which concerns the rights of a citizen may be complained of within a certain period of time to the hierarchy of bodies which culminates in the Supreme Administrative Court.

e. Local Government.

For purposes of local government and administration the main division of Sweden is the *län.* Although each *län* is headed by a governor appointed by the central government, the *län* enjoys a considerable degree of local autonomy. Five privileged towns are outside the *län* jurisdiction; Stockholm constitutes virtually a *län* in itself, with a special form of government.

f. The Electorate and the Press.

The people of Sweden are highly literate, politically intelligent, and socially stable almost to the point of stolidity. There are no minority problems whatever; only an insignificant number of the population are of any other religion than the Protestant Christian or of any other race and nationality than the prevailing type. The wandering Lapps of the north give no trouble and seemingly feel no grievances. There are few very wealthy people in Sweden, and few very poor, and a paternal government has removed from the mass of the population the worst fears and insecurities arising from the ordinary misfortunes of life. In national as well as international policies the Swedes boast of adopting the "Middle Way."

Of a total population of 6,800,000 with an electorate numbering 4,699,000, nearly 4,000,000 voted in the general election of September 1948. The Swedes take their civic and political duties seriously, but they are not much interested in events outside their own country. Neutrality and even isolationism are satisfactory doctrines to the majority, who tend to resent the way in which world events have forced themselves upon their country.

The press is an active factor in the political life of the nation and, under the guarantee of the famous "Freedom of the Press and Printing" Act of 1812, has enjoyed great freedom. (The Act of 1812 is now in process of amendment to provide the government with a constitutional basis for censorship in time of war. The proposed amendment specifically limits the government's right of censorship to wartime only and stipulates that any censorship imposed must be reviewed by the courts within thirty days.) There are 228 newspapers with a combined daily circulation of 3,100,000 copies; of these 195 are directly allied with political parties. The Liberal Party press with a circulation of one and a half million is by far the largest; it is noteworthy that this represents a party presently in opposition, and that some of its principal newspapers (although they represent a minority wing in the party) preach the abandonment of neutrality. Next in circulation to the Liberal press comes the Conservative with 620,000, while that of the governing Social Democratic Party follows with 500,000 and that of the Agrarians with less than 150,000. The Communists have three newspapers with a circulation of 50,000, of which *Ny Dag,* the party's principal mouthpiece,

claims nearly 30,000. About 95 percent of the adult Swedish population reads at least one daily paper.

3. Political Parties and Issues.

From the eighteenth century days of the "Hats" and the "Caps" Sweden has been familiar with political parties, or at least with political factions. Prior to the reform of the Riksdag in 1866 it was impossible to establish a modern party system, due to the rigid organization of the Riksdag into four estates sitting in four separate chambers. After 1866 a fairly well-defined division began to appear between Conservative and Liberal groups, but it was actually only in the 1890's that parties in the sense of machines to organize the elections began to appear. It was the workingmen in the Social Democratic Party of 1889 who started this development. It was also the Social Democratic Party which in the 1930's, by obtaining substantial control of the Riksdag, began to give the Swedish governmental system more of the familiar characteristics of the British parliamentary form.

During World War II partisan issues were subordinated to the task of maintaining neutrality, and a coalition government was formed in 1940, headed by the Social Democrats but containing members of all parties save the Communist. When the military threat to the country had passed this coalition was dissolved and replaced by a Social Democratic Cabinet. The following diagram shows the relative standing of the parties in the Riksdag; numbers indicate the seats each party holds in the Lower Chamber, as a result of the elections of September 1948.

LEFT		CENTER		RIGHT
Communist 8	Social Democrat 112	Agrarian 30 Liberal 57	Conservative 23	Fascist Parties (non-existent since 1940)

The following table shows the results of the general elections to the Lower Chamber in 1940, 1944, and 1948:

	1940			1944			1948		
	Votes	Seats	% of Vote	Votes	Seats	% of Vote	Votes	Seats	% of Vote
Soc. Dem.	1,546,804	134	53.8	1,436,571	115	46.6	1,789,440	112	46.2
Cons.	518,346	42	18.0	488,921	39	15.8	478,779	23	12.3
Agr.	344,345	28	12.0	421,094	35	13.7	480,360	30	12.4
Lib.	344,113	23	12.0	398,293	26	12.9	882,414	57	22.8
Comm.	101,424	3	3.5	318,466	15	10.3	244,812	8	6.3
Others	19,385	...	0.7	22,959	...	0.7	...	...	...
Total	2,874,417	230	100.0	3,086,304	230	100.0	3,875,805	230	100.0

Elections to Municipal Councils and Provincial Assemblies in 1942 and 1946 (the next elections will be held in 1950):

	1942			1946		
	Votes	Seats	% of Vote	Votes	Seats	% of Vote
Soc. Dem.	1,453,288	825	50.3	1,478,818	742	44.4
Cons.	509,984	276	17.6	494,949	213	14.9
Agr.	380,851	211	13.2	452,793	242	13.6
Lib.	358,183	168	12.4	520,593	244	15.7
Comm.	170,856	41	5.9	372,424	107	11.2
Others	18,404	3	0.6	11,628	3	0.2
Total	2,891,566	1,524	100.0	3,331,205	1,551	100.0

The seats in the First Chamber consisting of 150 members, one-eighth elected each year for a period of eight years, are distributed as follows:

Social Democrats	85
Conservatives	25
Liberals	16
Agrarians	21
Communists	3
Total	150

a. Social Democratic Party.

The Social Democratic or Labor Party was organized in 1889, developing out of a number of socialist societies which sprang up during the eighties under the intellectual leadership of Hjalmar Branting, the great Swedish statesman. The Social Democrats became champions of the working class and, cooperating initially with the Liberals, fought for political rights, especially for a broadening of the suffrage. Most of their reforms, at first resisted, have been accepted by nearly all quarters and during the 1930's were greatly admired by liberal circles throughout the world. Today the Social Democrats are a constitutional socialist group, moderate socialist in aim and democratic in method. A radical but minority faction advocates a more Marxist line, but the party is not guided by its doctrinaire left wing and to a large degree has allayed bourgeois fears that it will sponsor a violent social revolution.

Now, as from its beginning, the Social Democratic Party is closely associated with the trade-union movement, which furnishes a solid core of voters. The party was in fact built up on the basis of collectively affiliated labor unions which today provide roughly 70 percent of the party's enrolled members. The party also has the electoral support of lower income groups in general, including farm labor, individual union members and many intellectuals. The Social Democratic Party has rejected the solicitations of the Communists to form a "united labor front" and has conducted an anti-Communist campaign which has contributed to Communist defeats in labor unions and elsewhere.

The dominant position which the Social Democrats have achieved primarily reflects their progressive domestic policies and the great ability of their leader, Per Albin Hansson, who died in 1946. Since the end of World War I, they have been by far the largest political group in Sweden; from 1940-1948 they had complete control of

both chambers of the Riksdag and, although their numerical majority in the Lower Chamber of the Riksdag was lost in the September 1948 election, they still retain their dominant position. Being the majority party they set the pattern for the World War II Coalition Cabinet which unanimously advocated the Social Democratic policy of strong defense and strict neutrality.

The party apparently reached its peak in the 1940 election, which resulted in its controlling more seats in the Riksdag Lower Chamber than the other four parties combined. A trend away from the Social Democrats began after 1940. In the 1944 election they lost votes notably to the Communists—votes which were not so much pro-Communist as anti-government since the Communists were the only party not included in the wartime coalition and voting Communist appeared to be the sole means of expressing disapproval of government measures. (The popular admiration which the Communists had gained by their resistance to the Nazis also increased the Communist vote.) The relatively radical postwar economic program of the Social Democrats resulted in further losses in the 1946 municipal elections. This program, adopted in 1944, was built around a plan of full employment and nationalization of certain basic industries. Apparently impressed by the strength of non-labor opposition and suffering from internal division on the nationalization issue, the Social Democrats took no step toward implementation of the program. The Communists were quick to exploit the situation and by adopting the same program and advocating it strongly won considerable support from the Social Democratic left wing. Votes were also lost to the non-socialist parties due to the fears of moderates that the program might be implemented. At present the Social Democratic government is condemned by business and industrial circles on the charge that its postwar policies were ill conceived and led to the difficulties with inflation and dollar shortage which now confront the country. Liberal and Conservative authorities protest that the government's deflationary program is even yet not stringent enough to meet the emergency.

In the election of September 1948 the Social Democrats gave less ground than had generally been expected and lost only three seats; they thus remained the dominant party. The anticipated loss was evidently softened by an increase of about 15 percent in the total organized labor vote (about 80 percent of those eligible voted instead of an estimated norm of 65 percent) and by a marked shift of votes from the Communists to the Social Democrats. The election outcome attested to the diligence of the Social Democrats in getting out the labor vote and reflected, in a decline in Communist votes, the popular disapproval of the USSR's recent aggressive actions in Eastern Europe.

b. Liberal (People's) Party.

The Liberal or People's Party is the largest non-labor party in Sweden. It is the successor of the old Liberal Party which split in 1923 on the question of prohibition but was reunited in 1934. Representing no class group, the Liberal Party draws its membership from middle class businessmen, certain big financial interests, religious dissenters and intellectuals who are radical in their social views but not necessarily in their politics. The party is the champion of private industry and small business and advocates free enterprise with government interference in economic processes

only to the extent necessary to preserve the capitalist system. It opposes reduction in defense expenditures but advocates greater economy and more efficient use of government funds, lower taxes and social reform to be effected by gradual adoption of various social security schemes. The Liberal Party is of particular interest today since it contains a minority group, made up chiefly of individuals who were strongly pro-Allied in World War II, who are attempting to pioneer a trend away from strict neutrality. This group is the chief proponent of the view that neutrality would be untenable in the event of a third World War and that Sweden should seek security in regional associations such as the North Atlantic Union. The bulk of the party, however, does not share this view and the Liberal Party officially supports the government's neutrality policy.

The Liberal Party made slight increases in its membership during the past decade but its gains in the 1948 election were spectacular; it more than doubled its 1944 vote, increasing its seats in the Lower Chamber of the Riksdag from 26 to 57. It is now the second largest political party and the strongest opposition group in Sweden. Occupying a position a little left of center with political ideas similar to those of the New Deal, it has grown at the expense of the Conservatives and Social Democrats. Three reasons in particular account for this sudden rise in the popularity of the Liberal Party. First, it is in a better position than any other opposition group to capitalize on current discontents. Higher taxation, continued rationing, and the imposition of other irksome controls for which the government is held responsible have caused dissatisfaction. While such considerations did not sway the solid labor core of the Social Democratic Party, they influenced unattached voters who normally vote Social Democratic. Second, as the most aggressive opposition group, the Liberal Party appealed to voters who saw in it a real bourgeois challenge to the Social Democrats. Votes of this type were gained particularly from the Conservatives and from young voters generally. A third factor in the advance of the Liberal Party is the leadership of Bertil Ohlin, a professor of economics and an astute parliamentarian and brilliant debater.

c. *Agrarian Party.*

The Agrarian Party was formed in 1913 without definite party ancestry and from its beginning has been organized as a non-socialist farmers' union. Prior to its formation farmers generally voted with the Conservatives or the Liberals. The party steadily increased its popular vote until the 1940 election when it received a setback. It recovered somewhat in the 1944 election but it appears that the Agrarian Party has reached its peak. In the 1948 election the Agrarians, suffering from the constant drain of farm population to the cities as well as from internal dissension over whether the party should become politically more liberal or more conservative, received another setback and lost five seats in the Riksdag Lower Chamber.

Today the Agrarian Party is made up of farmers with small and medium sized holdings, the large landowners being generally Conservatives while farm labor supports the Social Democrats. It advocates measures to improve farm conditions and protection of domestic agriculture; it stresses economy in government. The

Agrarians are in principle opposed to socialization but, on grounds of political expediency, might support it so long as it did not affect agricultural interests. The Agrarians advocate strong national defense, are friendly toward the US, but strongly isolationist. In cultural matters they are extremely conservative.

d. Conservative Party.

The Conservative Party is almost a direct descendant from the old Lantmanna Party—the first of the loosely organized political factions which formed after the reorganization of the Riksdag in 1866. Its membership is drawn chiefly from professional groups, large landowners, big businessmen and the old aristocracy. Despite its inherited traditions, the Conservative Party is neither reactionary nor non-progressive and has been able to adjust its policies to more modern political trends. It opposes socialization but not social reform; it objects to Social Democratic domination of the Confederation of Trade Unions but has more or less accepted trade-union direction of labor. It favors moderate protection for industry against foreign competition and advocates free enterprise instead of planned economy. The Conservatives are traditional advocates of strong national defense and are hereditary Russophobes. Among Swedish political parties, the Conservative Party is the strongest supporter of the monarchy and the National Church.

e. Communist Party.

Up to 1939 the Communist Party, weakened by internal schisms, had only a small membership and an insignificant place in Swedish politics. Its membership increased greatly during the war, however, and today it is reported to have approximately 40,000 members of which it is estimated that only a small minority would be unswervingly pro-Soviet. Although the Swedish Communist Party is not openly affiliated with the Cominform its leaders and press slavishly echo the Moscow-Cominform line. Recently there has been a tendency within the party leadership to promote the actively pro-Cominform members to responsible positions while the more moderate "nationalist" leaders are given posts of lesser importance or retained as figureheads.

By and large, the USSR's reputation in the west may be taken as a gauge of the Swedish Communist Party's fortunes. In the 1940 election, the Communists, who had fallen into public disrepute largely because of their support of the USSR during the Winter War in Finland, suffered a severe setback. In 1944, when the USSR had gained the western world's good will for its fight against Nazi Germany, the Communists made their biggest strides forward, receiving over ten percent of the total vote in the general election. While undoubtedly a considerable number of the electorate was swayed by admiration for the Soviets, there were also other reasons for these gains. Many former left-wing Social Democrats voted the Communist ticket as their sole means of expressing dissatisfaction with the wartime Coalition Government in which only the Communists were not included. Rebellion against the Social Democratic hierarchy in organized labor also swelled the Communist ranks in trade unions; this was notably true in the war-expanded metal and engineering industries which absorbed a great number of young and politically inexperienced workers. The Communists

were also able to exploit the confusion within the Social Democratic Party over implementation of the Social Democratic postwar economic party; as a result certain radical Social Democratic labor groups turned to the Communists in protest against what they regarded as evasion by their own party and contributed to the increased Communist vote in the 1946 municipal elections.

In 1948, with western regard for the Soviet Union at a low ebb, the Communist tide in Sweden again turned, and the Communists lost nearly one-half of their previous parliamentary representation in the general election. Recognition of the threat inherent in Communist tactics, as exemplified in Eastern Europe and notably in Czechoslovakia, resulted earlier in 1948 in an official anti-Communist drive conducted with public debates and intended to expose Communist tactics. The primary target of attack was Communist strength in organized labor. In nearly all unions which held elections after the Prague coup, the Communists were removed from office. While they suffered a severe setback in the 1948 elections, membership in the Party is not likely to show a sharp decline immediately. However, with the Communist threat pushed into public consciousness by recent international developments and by the government's educational campaign, the trend away from the extreme left, as illustrated by this election, is likely to continue.

4. STABILITY OF THE PRESENT ADMINISTRATION.

Even though the elections of September 1948 resulted in the Social Democratic Party losing its majority in the Lower Chamber of the Riksdag, it remains in virtual control of Swedish politics. The administration is expected to be stable, but it faces two substantial problems. The first is the necessity of adopting measures to counter inflation and to increase exports. Should these measures prove either inadequate, and so fail to stop an inflationary spiral, or unduly harsh and disagreeable for the populace, there might be serious discontent with the government. The second problem is that of foreign policy: Sweden stands inflexibly for neutrality and refuses to concert policy with the western powers while both Norway and Denmark show signs of abandoning the Swedes to isolation and joining in an Atlantic Pact. Should this happen, the shock to Swedish sensibilities might be severe but is not likely to alter the present course of Swedish foreign policy.

These considerations indicate that the Social Democrats may find it difficult to maintain themselves in power during the years of the coming Riksdag. They will be closely pressed by the Opposition, and they will suffer for any mistakes they may make. Providing Sweden escapes invasion, however, any changes in government will assuredly be made by democratic and parliamentary processes; they will be changes toward the center rather than toward the left, and they will not affect the essential stability of the Swedish political and social system.

CHAPTER II

ECONOMIC SITUATION

1. General Summary of Economic Development and Present Economic Situation.

Swedish economy developed gradually and systematically throughout Sweden's more than a century of freedom from war. By 1830, when the industrial revolution had already shown its effects on the economies of England and the continent of Europe, Sweden still remained rural and isolated with more than 80 percent of its population deriving its living from agriculture. By 1870 the rural population still constituted 72 percent of the total.

Industrialization was hastened, after 1870, by the discovery (outside of Sweden) of a new method of smelting iron ore, and by the increasing utilization in England and the countries of the continent of Swedish forest products. By the beginning of the century Sweden was well on the road to a balanced economy, and by 1930 had brought its industries to a high level of development. Economic growth was accomplished in part through the ability to export iron ore and forest products, two of Sweden's greatest natural resources. The abundant water supply also contributed a great deal to industrialization, forming an important source of energy.

Although Sweden did not participate in the war and suffered only slight physical damage, its economy was adversely affected. Its greatest and practically only direct war loss was the destruction of 600,000 gross tons, or more than one-third, of its merchant fleet. Indirect losses resulted from interferences with the country's foreign trade and from the necessity of maintaining a high state of military preparedness.

Before the end of the war the Swedish Government prepared plans for a postwar economic policy, whose object was to combat an expected boom caused by high demand for peacetime goods, to avoid employment difficulties during the period of demobilization and reconversion of industry from wartime to peacetime production, and to insulate the domestic economy against the effects of depression in other countries, principally the United States. The measures taken by Sweden after the war to implement this policy have included: (1) extension of credits to European countries; (2) appreciation of the krona to offset price increases abroad and to encourage imports; (3) negotiation of a series of bilateral trade and payments agreements with several European countries, and (4) immediately after the war, a relaxation of foreign exchange and import controls.

The failure of Sweden's postwar policies to have the anticipated effect, together with the slow recovery of Western Europe, were the principal factors contributing to the rapid depletion of gold and foreign exchange reserves built up during the war when, because of the blockade and concentration of other countries' production on armaments, Sweden was prevented from spending its foreign earnings. Other factors which have contributed to this result have been an excessive internal purchasing power and the

resulting diversion of export goods to the domestic market. As reserves of gold and foreign exchange continued to decline the government imposed continuously stricter import regulations, especially on imports from hard currency areas, but it has delayed effective measures to deal with the domestic causes of its unfavorable balance of trade.

Economic activity and employment in Sweden have risen above prewar levels. The general industrial production index (1935=100) rose to 129 in 1946, 130 in 1947, and reached a high of 136 in April, 1948. Unemployment has been practically nonexistent, amounting only to 2.8 percent in 1947 and 3.3 percent in 1948. It is estimated that nearly 40 percent of the working population was employed in industry by 1948. The last Swedish census, taken in 1940, showed the following occupational distribution of the labor force:

	Total	*Percent*
Agriculture and related field	864,000	29
Industry and handicraft	1,070,000	36
Communications	202,000	07
Trade and commerce	409,000	13
Administration and free occupation	263,000	09
Domestic work	157,000	05
Unspecified activities	35,000	01
Total	3,000,000	100

Despite many shortages and measures taken to reduce imports, the Swedish standard of living is still high. Per capita consumption of food items is approximately at the prewar level although rationing continues for meat, butter and other fats, sugar, and coffee. Flour, bread and other products of bread grain were derationed effective 2 October 1948. Food production is slightly below the prewar level but nevertheless approximates 90 percent of requirements.

The cost-of-living index (based on 100 for 1935) rose in 1947 from 157 to 169. This rise was attributable chiefly to increased taxes and higher prices on foodstuffs, fuel and light. By comparison with immediate prewar costs, the general cost-of-living index shows a rise of 56 percent. Taxes are almost trebled, foodstuffs have risen 51 percent, clothing 65 percent, and fuel and light 74 percent. Rents, which have been the subject of strict control, rose only by six percent.

Postwar wages have risen faster than the cost of living, and because this has increased domestic demand for both Swedish manufactured and imported consumer goods, it has contributed to Sweden's "unfavorable" balance of trade. From 1939 to 1948 nominal wages increased by 75 percent for men and 89 percent for women compared with a corresponding cost-of-living increase of roughly 55 percent. The aggregate 1947 wage increases have been estimated to amount to roughly 15 percent. In the manufacturing industry the 1947 wages including overtime and cost-of-living supplement were on an average 65 cents per hour for adult males and 44 cents for adult female workers.

There have been no major postwar strikes except the prolonged metal workers' strike of 1945. The record low in industrial disputes reached in 1946 appears to have been duplicated in 1947. In 1946 only 26,500 workdays were lost as a result of industrial disputes. The relations between management and labor, particularly the collective bargaining process, have evolved on the basis of voluntary agreement rather than on legislation or compulsory arbitration. The Collective Bargaining Act of 1936 largely incorporated earlier practices in labor-management relations.

The two main parties to the Swedish labor market are the Confederation of Trade Unions (LO) with a 1947 membership of 1,194,181 and the Swedish Employers Federation (SAF) representing management. LO consists of 45 unions broken down into 8,916 locals. Most of the unions are organized by trades within industries, with nationwide collective bargaining, and with policies determined largely by the central organization. LO membership includes approximately 92 percent of the manual laborers and totals approximately 38 percent of the country's labor force. Salaried employees, the "white collar" workers, are organized in a Federation of Salaried Employees (TCU) with a membership of 220,000 representing 40 percent of this class of employees. Two other "white collar" organizations, *Sveriges Akademikers Centralorganisation* (SACO) and *Statstjänstemännens Riksförbund* (SR), each have a membership of about 18,000. The aggregate unionization in Sweden comprises approximately 23 percent of the entire population.

No major industries in Sweden are nationalized. The government, however, owns and operates the telephone, telegraph and radio services, three-fourths of the railroad mileage (12,304 kilometers out of a total of 16,712), and public harbors. In addition, the government owns considerable land, primarily forest land, and has a monopoly on the external and internal trade in tobacco, liquor, and, to a minor extent, in sugar. The government owns 50 percent of the stock of AB Aerotransport which in 1948 merged with the privately owned *Svensk Interkontinental Lufttrafik AB* and became a partner with the airlines of Norway and Denmark in the Scandinavian Airlines System. One particularly significant government-owned industry is the Norrbotten Ironworks, which was established in 1940 for the declared purpose of improving the domestic supply of iron and steel.

The Swedish cooperatives are larger in proportion to population than similar movements in any other country. The central organization, which is the wholesale society for the local cooperatives, has also entered into various lines of production. The local societies in 1947 handled an estimated 13 percent of all retail trade in Sweden. (See Section *e.* "Consumers' Cooperatives," page 49.) The cooperatives advocate free enterprise and compete with both private and State monopolies.

2. PRESENT ECONOMIC SITUATION.

a. Natural Resources.

(1) *Agriculture.*

Agricultural production is an integral part of Swedish economy. Approximately one-third of Sweden's present population of 6.8 million people depend

upon agriculture for a livelihood. While Sweden is the fourth largest country in Europe, only slightly over 10 percent of the total area of 101,373,130 acres is arable. Cultivated land in the south of Sweden, which is farmed intensively, comprises 71 percent of that area, but in the far north it is only 0.7 percent. Farms are small as a rule, more than 50 percent being less than 25 acres.

Before World War II Sweden was 90 percent self-sufficient in the production of food considering imports of feed grains, largely corn, in terms of their food equivalents. The largest deficiency was in edible fats and oils. While some butter was usually exported, the use of imported oils for the production of edible fats was nearly twice as large, so that domestic production supplied only about 75 percent of total fat consumption. Sweden was self-sufficient in the production of sugar and practically so in the production of bread grains. Some meat was exported, though the production of meat must be considered in terms of a small deficit when allowance was made for the use of imported feed to produce the meat. Considerable quantities of fresh fruit including apples, pears, and citrus fruit were and continue to be imported.

The 1947 food and feed harvest in Sweden was unusually poor owing largely to a combination of unfavorable weather conditions. The area sown to wheat and rye in the autumn of 1946, for harvest in 1947, was 20 percent below the previous year because of unfavorable weather at seeding time. The long and severe winter of 1946-47 killed a large acreage (estimated at 170,000 acres) of fall-sown wheat and rye and the summer drought of 1947 further reduced the yields of grain as well as most other crops. The above combination of adverse weather conditions reduced the 1947 bread grain (wheat and rye) harvest about 45 percent below 1946 and about 53 percent below the average harvest during the 1935-39 prewar period. Smaller yet significant reductions occurred in the 1947 production of most other food commodities except meat, as shown in table No. 1. The slight increase in meat production was caused by forced slaughter of livestock due to the shortage of feed grains.

Table No. 1. Comparison of prewar and postwar production of major food commodities expressed in 1,000 metric tons:

	1935-39	*1946*	*1947*
Wheat	707.0	635.8	364.2
Rye	377.0	289.3	142.2
Barley	216.3	182.5	180.7
Oats	1,263.7	781.6	679.4
Mixed Grain	591.0 [1]	515.0	434.0
Sugar (beet)	340.0	320.0	275.0
Potatoes	1,813.0	1,941.0	1,678.0
Hay	5,073 [1]	5,715	3,430
Meat: beef, veal, pork, mutton and lamb	294.3 [2]	282.0	300.2
Milk—mil. lbs.	4,643 [2]	4,709	4,547

[1] 1939 only.
[2] 1934-38.

Table No. 2 summarizes livestock numbers in 1945, 1946, and 1947 compared to prewar averages. It will be noted from this summary that the number of cattle, hogs, and horses in 1947 range from 6 to 12 percent below prewar averages whereas the number of sheep has increased by approximately 5 percent.

Table No. 2. Prewar and postwar livestock numbers in thousands:

	1936-40	*1945*	*1946*	*1947*	*1947 percent of 1936-40 average*
Cattle	2959	2909	2870	2790	94
Hogs	1292	1201	1166	1188	92
Sheep	398	516	482	420	105
Horses	633 [1]	610	593	549	88

[1] Sept. 1937.

Weather conditions during the planting and growing season for the 1948 crop have been unusually good. Current (October 1948) prospects are for a near record 1948 food and feed harvest. It is estimated that stocks of bread grain at the end of the 1948 production year will considerably exceed minimum stock requirements.

Sweden's agricultural policy aims at developing agriculture in such a way that in an emergency domestic production will cover the country's minimum food requirements. This does not represent any great departure from the policy pursued in prewar times, nor does it imply any marked adjustment in production. The basic issues of a long-term agricultural policy were placed before the Swedish Riksdag early in 1947 and on 20 June 1947, the Riksdag approved a committee report embodying the following principles: (a) that production shall be maintained at a level somewhat above nine-tenths of domestic requirements; (b) that "rationalization" of agriculture shall be in direction of farms of sufficient size to permit economical operation and that the State shall have certain prior rights of land purchase to this end; (c) that the income objective of agriculture shall be comparability with income of other groups; (d) that the principal means of achieving the income goal shall be by price support through protection of the domestic market against foreign competition, and by increased efficiency of production through "rationalization" including economic size of farms and wider use of technical improvements.

The new organization, both central and local, to carry out the policy adopted by the Riksdag did not commence functioning until 1 July 1948. On that date a reorganized Central Board operating through 26 regional boards assumed the responsibility for carrying out the agricultural policy legislation, i.e., to guide the "rationalization" of agriculture, including regional planning, adjustments in sizes of farms, improvement of land and buildings, supervising drainage projects, and carrying on certain credit and other activities.

Supplies of draft power and machinery are adequate to maintain field crop acreage at prewar level, though there is developing a need for tractors, tractor plows, and spare parts to meet current and accumulated replacement needs and for

expansion. The shortage of agricultural machinery is attributable to low wartime replacement, general labor shortage and shortages of iron and steel. Normally domestic production supplies 90 percent of the agricultural machinery and considerable quantities are exported. The US is the principal supplier of large items of equipment such as crawler tractors, plows, harvesting machines, and mowers.

In order to broaden the use of agricultural machinery by putting it within the reach of a large number of independent small farmers, the Minister of Agriculture in the early part of 1948 proposed a network of "machine stations." The organization would consist of local cooperative machine stations, regional "machine centrals" for assisting and complementing the local stations, and a central administrative and research organization. Under the plan, purchases of machinery would be financed by State loans up to 80 percent of the cost value payable in ten years. The plan is not new in Sweden but is an extension of projects already tried on a small scale. Some machine stations are in operation and special State credit funds already available.

The postwar use of nitrates as well as other chemical fertilizers has been considerably above prewar levels. Supplies of phosphates and potash were readily available in Sweden in 1947 and were sufficient for 1948 without rationing. Nitrogenous materials were rationed, however, and are expected to be in short supply for the 1949 fertilizer year. The present nitrate shortage is partially attributable to the shortage of hydroelectric power in Sweden and Norway brought about by the drought in 1947.

An estimated 75 percent of Sweden's agriculturalists whose principal income is derived from farming are members of the Farmer's Union (Riksförbundet Landsbygdens Folk—RLF). This is an occupational organization as distinguished from the economic and political organizations of agriculture. The membership on 31 March 1948 was 191,400 divided among 2,360 local organizations. Of the union membership about 100,000 have small holdings of less than 25 acres of cultivated land, about 55,000 have 25-50 cultivated acres and about 35,000 have more than 50 acres.

The number of members in farmers' marketing, purchasing, and service associations affiliated with the Central Federation of Swedish Farmer's Associations, a cooperative organization, totalled 1,025,405 in the calendar year 1947. Most of the farmers, however, are members of more than one organization. The total number of farms which, through membership, is represented in the Central Federation, is approximately 350,000. This means that practically the whole of Swedish agriculture is represented in the central organization. The largest number of members is found in the organizations for livestock and dairy products which had 277,000 and 251,000 members respectively. The credit unions and purchasing associations each had more than 125,000 members and the forest associations almost 100,000. Total marketings and purchase in 1947 of cooperative organizations which actually handle the goods, amounted to 1,935 million crowns (about $700 million).

(2) *Fishing.*

Sweden has a long coast line which provides good facilities for a fishing fleet, but in normal times the fishing industry is not of major importance. It was subsidized by the government during the war as an incentive to increase catches. As a

result, catches subsequent to the 1939 salt-water catch of 146,739 tons valued at $7,830,480, were substantially increased. In 1946 an estimated 20,300 boats of various sizes and 34,000 workers were engaged in the fishing industry.

Before the war the import of fish was about 50,000 tons a year, valued at some 22 million crowns. The export was only slightly less in quantity, about 40,000 tons, but was far less in value at 11 million crowns; this was because Swedish fish imports consisted mainly of the prepared product, while fresh fish dominated the export. Iceland, Norway, and Denmark provided 75 percent of the Swedish fish import. More than one-half of Swedish exports went to Germany, but Denmark and Great Britain were also large buyers.

During the war the import as well as the export of fish was reduced. After the war, fish imports from the three traditional suppliers started again, but in smaller quantities than during the last prewar years. The export pattern changed, however, since the largest prewar buyer of Swedish fish, Germany, was only a limited market. Under these circumstances, one objective in Swedish commercial negotiations has been to find new markets for Swedish fish, either for deliveries directly from Swedish fishing boats or for direct commercial deliveries. Postwar markets have been established in England, Poland, Czechoslovakia, Holland, Belgium, France, and Italy. Exports have also been made to Switzerland and South America, and after persistent attempts an agreement was negotiated for the delivery of fish to the American and British zones in Germany. When Germany returns to prewar status as an export market the prospects for Swedish fish exports will be further improved.

(3) *Forests.*

Forests are concentrated chiefly in the northern district of Norrland, but important growths also are located in the central and southern parts of Sweden. The total wooded area of Sweden has been measured at slightly more than 58 million acres. Of this total slightly less than 5 million acres are deemed worthless growths, consisting of old waste land, sparsely seeded stands, and retarded thicket stands as well as marsh areas. The wooded area comprises roughly 56.5 percent of the area of the country, compared with 23 percent in the US and 33.3 percent in Canada. On this wooded area, 80 percent of the trees are coniferous, offering an excellent source of wood for pulp mills. The primary coniferous growths extend southward through Norrland and the provinces of Kopparberg and Gävleborg. Growths in the sections lying in the southern part of Sweden are mostly birch.

The annual growth of timber in Sweden is estimated at 58.5 million cubic meters per year. For a number of prewar years annual cutting exceeded the currently estimated annual growth. Overcutting was especially prevalent in Norrland, from which the paper and pulp industry derived the greater part of its wood supply. As a result it became apparent that unless annual cutting was curtailed, the forest resources would in time be exhausted and for this and other reasons there has been a steady drop in cutting for the last three years. A total of 51.9 million cubic meters of timber, solid measure, was cut in 1946 and this dropped by ten percent to 46.3 million cubic meters in 1947. Indications are that there will be a further reduction in 1948. Other reasons for reduced cuttings in the postwar years have been the shortage of labor, adverse

weather conditions, and dissatisfaction of forest owners over disproportionate prices paid to them in comparison with the value of wood and pulp in the world market. The 1947 timber cut was distributed as follows:

	In Million Cubic Meters
Saw mills	16
Firewood	17.7
Pulp mills	12.6
Total	46.3

In order to offset the evident overcutting which has taken place especially in Norrland the Forest Research Institute has formulated what amounts to a 20-year plan of reduced cutting and replanting which will apply to all areas. The plan, so far as practicable, will be carried out under the broadened Forest Protection Act passed by the Riksdag 21 April 1948. The Institute has estimated that the annual cut in central Norrland should, for a considerable time, be reduced by at least 30 percent and that the provinces of Kopparberg and Gävleborg may continue to cut at the same level as in the years before the war. In other areas in central and south Sweden, exclusive of Kopparberg and Gävleborg, it is felt that cuttings may be increased by about three percent per annum. The total result will be a reduction of approximately five percent in cuttings compared with the immediate prewar period. The plan also provided for annual cultivation of approximately 240,000 acres throughout all the forest areas. At the end of the proposed period it is believed that this plan will result in an annual growth representing the maximum potentialities of the country's soil resources.

(4) *Water Power.*

Since coal and oil resources in Sweden are meager, the government began in 1909 to encourage the development of the country's abundant water power to reduce dependence on imported fuels. By 1945 Sweden had 1,808,000 Kw. of hydroelectric capacity and 310,000 Kw. of steam electric capacity. An additional 879,000 Kw. of hydroelectric capacity is under construction or newly completed and 375,000 additional Kw. of steam electric capacity is planned.

Today Sweden is the world's third largest consumer, per capita, of electric current. When fully developed it is estimated that Sweden's water power resources will have an annual average capacity of 6 million kilowatts. The present total production of electricity (largely obtained from water power) is in excess of 14 billion kilowatt-hours a year, of which 80 percent is used in industry, 5 percent for traction and 15 percent for street lighting, domestic, and commercial uses.

The state power system is divided into electrical districts which are grouped into three blocks—the Central Block in the lake region and the south, the Norrfors Block along the middle Bothnian coast, and the Porjus Block in the far north. The Porjus Block is of great strategic importance since it includes the third largest hydroelectric power station in Sweden on which depends the Luleå-Narvik electrified railway system and the operation of the Kiruna-Gällivare iron mines.

The government's encouragement of the extensive use of electrical power in industry has resulted in Sweden becoming increasingly self-sufficient in the production of industrial machinery and consumer goods and in the development of a flourishing industry for the production of electrical machinery and equipment for export. It should be noted, however, that while increased electrification of Sweden's economic structure improves its self-sufficiency, it simultaneously renders that structure more vulnerable by making it dependent upon a few key power plants.

(5) *Iron Ore.*

Sweden has what is probably the world's largest reserve of high-grade magnetite iron ore, with a metallic content averaging about 63 percent. Total resources are estimated at 2 billion tons and represent 3 percent of the estimated world total.

The deposits are found in three regions. The area of oldest production is the Bergslagen area of central Sweden, where ore of low phosphorous content used chiefly by the domestic iron industry is mined. The most recently developed mines—and the least important—are in the Skellefteå region of Västerbotten.

The great ore region is in Lapland at Kiruna and Gällivare—north of the Arctic Circle—where 80 to 90 percent of Sweden's iron ore is located within an area of 8,000 square kilometers. The mines have undergone large-scale exploitation only in the past 40 years. They are chiefly open-cut mines and could not be made profitable until electricity was available to light them during the long, dark Arctic winters. The Gällivare deposits are estimated at 230 million tons and those at Kiruna at one billion. It is the Lapland ore that is chiefly exported. State-owned electric railroads carry the ore to the Norwegian port of Narvik during the winter months and to Luleå on the Gulf of Bothnia during the ice-free summer months.

Swedish production of iron ore is dependent on the export market. In 1939 about 13,800,000 metric tons were mined, about 90 percent of which was exported. During the prewar period Germany was the chief customer and when the war blockade cut off other markets Germany continued to take Swedish ore in exchange for German coal and coke. By 1944, however, when the Nazi power was weakening, shipments to Germany were reduced, and in 1945 iron ore production fell to the lowest figure in many years—about 3,930,000 tons. A partial recovery in the export market resulted in a production figure of 6,867,208 tons for 1946 or about 50 percent of 1939 production. Exports of iron ore rose from 5,316,000 tons in 1946 to 8,451,000 tons in 1947. Roughly 35% of the 1947 production was exported to the UK, and the US has recently been importing Swedish ore at the rate of about 1 million tons per year because of the exceptional shortage of high grade ore in the US. Capacity production of iron ore, however, will be dependent upon the reopening of the German market.

(6) *Other Minerals.*

Sweden has important non-ferrous mineral resources, but the shortage of solid fuels has made the domestic smelting of non-ferrous metals uneconomical. The general practice has been to import the metals, often exporting the ores in exchange, except in times of emergency such as existed during the World War II blockade. Thus in 1945, Sweden produced 2,929 metric tons of zinc but none was

produced in 1946 or 1947. In 1946, 25,180 metric tons of zinc were imported to satisfy domestic needs. Small deposits of chromite exist in Sweden and attempts were made to mine these during the war but were abandoned in 1944 as being uneconomical. Another example is the aluminum industry, which normally uses imported bauxite but in emergency can produce aluminum from indigenous andalusite.

Boliden's Gruvaktiebolag (Mining Co.) is Sweden's largest non-ferrous metal producing company, owning mines, smelters, and refineries in North Sweden. In 1947, it produced 16,000 tons of copper and other producers 2,000 tons, compared with imports of 54,000 tons to satisfy Sweden's needs. In 1947, Boliden also produced 10,000 tons of lead; other companies produced 1,000 tons, while 18,000 tons were imported. With respect to both lead and copper much of the imports had previously been exported as ore in concentrated form and returned to Sweden as metal. Significant quantities of zinc concentrates are shipped to Belgium to be smelted.

The Boliden deposit is a huge mineralized ore-body yielding as high as .5 oz. gold and 1.6 oz. silver per ton, as well as large quantities of copper, lead, and zinc. This mine is also believed to contain the world's largest deposit of arsenic. Sweden's output of arsenic runs about 20,000 tons of As_2O_3 annually, and since there was a limited demand abroad in prewar years some has been jettisoned in the ocean. Current output is being stored while research continues for new uses.

Other minerals produced in Sweden are manganese, tungsten, and nickel. The production of nickel in 1944 amounted to 713 tons and in 1945, to 494 tons. Production was discontinued in 1946 and 3,000 tons were imported that year. In 1946, production and imports of manganese and tungsten were as follows:

	Manganese Ore *(In metric tons)*	Tungsten Concentrates (60% WO_3) *(In metric tons)*
Produced	12,594	490
Imported	21,612	1,075

(7) *Coal.*

Sweden's domestic production of coal is small, averaging about 500,000 metric tons; an equal amount of coke made from imported coal and roughly 100,000 metric tons of briquets are produced. Peat produced from extensive peat bogs in southern Sweden is used to supplement available coal supplies. Production in 1947 amounted to 400,000 metric tons compared with more than a million tons in the peak year of 1945 and 800,000 tons in 1946. The decline in production was attributed primarily to a shortage of labor.

The Swedish economy depends heavily upon imports of coal and coke. Prewar imports came chiefly from England, Germany, and Poland and normally averaged about eight million metric tons including roughly two million metric tons of coke. While imports of coal and coke in 1947 totalled about six million metric tons and exceeded the 1946 figures of 3.5 million tons, shipment in 1947 included less than 900,000 metric tons of coke. Thus, while the coal situation improved, coke supplies

declined during the year. During 1946 and 1947 the United States was the main supplier, followed by Poland.

The following tables show the solid fuel imports for 1947 by kinds and country of origin and their end use for the same year.

Table 1. Imports of solid fuels into Sweden by kinds and countries of origin for 1947 in metric tons:

Kind	*Country of Origin*	*Amount*
Coal	Poland	1,972,570
	UK	7,409
	US	2,399,098
	Total	4,384,697
Coke	Belgium	149,315
	Germany	170,451
	Netherlands	146,736
	Poland	375,706
	US	30,905
		873,113
Brown coal coke	Czechoslovakia	1,148
Brown coal briquets	Germany	688,047
Total solid fuel imports		5,947,005

Table 2. Consumption of solid fuels by end use and types of fuel for 1947 in metric tons:

Use	*Amount*
Electricity works	261,900
Gas works	754,800
Railways	448,500
Coastwise shipping	174,300
Bunkers	27,300
Industrial	1,949,800
Domestic	1,890,100
	5,506,700
Types of fuel	
Coal	3,340,400
Brown Coal	257,900
Coke and coke breeze	1,194,000
Brown coal briquets	706,200
Brown coal coke	8,200
	5,506,700

(8) *Shale Oil.*

Having little or no natural petroleum Sweden has sought to exploit its extensive deposits of oil shale. Total reserves are estimated at about 5 billion tons located convenient to rail and water transport. Only the richest deposits have thus far been developed on a large scale; these are located at Kvarntorp, south of Örebro and are estimated to contain 1½ billion tons of oil shale, enough to yield perhaps 400 million barrels of oil. Here a novel and efficient technique is being applied. Huge electrodes are inserted in the ground distilling the oil from the shale in place. The oil is then collected in a central condensation plant and subsequently refined. The annual output of oil from the Kvarntorp plant now exceeds 550,000 barrels—6.5 percent of Sweden's annual prewar oil consumption. It is estimated that oil production can be increased to 750,000 barrels annually by 1950.

(9) *Uranium.*

Some of Sweden's black pyritic oil shale deposits have recently been found to contain recoverable amounts of uranium. Estimates of the total amount of extractable uranium contained in the deposits vary considerably but an average figure is 500 million pounds of uranium oxide.

b. Industry.

(1) *General.*

Sweden is a highly industrialized country. According to the 1940 census, out of a total working population of approximately 3,000,000 people, 1,070,209 were employed in industry and handicraft compared with 864,011 in agriculture, out of a total population of 6,371,432. The growth of the working population between the date of the last census and the beginning of 1948 is estimated at slightly above 150,000. Taking into consideration some shift in the labor force from agriculture to industry it is estimated that nearly 40 percent of the working population or roughly 1,200,000 people were employed in industry by 1948. Despite this increase, the shortage in the industrial labor market is estimated at nearly 100,000 persons.

The value of industrial production in 1944, the latest year for which official statistics are available, totalled 3,118 million dollars, at the official rate of exchange of 4.20 crowns=$1.00, distributed as follows:

Industry	*Value of Production in Million dollars*
Mining and Metal Industries	1,038
Foodstuffs Industry	790
Textile and Clothing Industry	317
Paper (including wood-pulp and graphic art)	256
Chemical-technical Industry	194
Wood Industry (sawmills, furniture factories, etc.)	184
Public Utilities	127
Clay and Stone Industries (coal mining, peat cutting, brick & cement manufacture, pottery & glass)	108
Leather Hides and Rubber	104
Total	3,118

Compared with the basic year 1935 (100) the industrial index at the end of the war had declined to 91, but by the end of 1947 had climbed to 130 and rose to a peak of 136 in April 1948.

Following is a table of production indices for 1938 and 1939 and the postwar period (base 1935=100) as compiled by the Federation of Swedish Industries:

Period	*General Index*	*Lumber export*	*Pulp & Paper*	*Iron & Steel*	*Machines*	*Food-stuffs*	*Textile Cloth*	*Prod. of elec. energy in million KWH*
1938	117	92	103	112	131	114	107	6,656
1939	124	93	105	124	139	120	115	7,408
1945	106	74	69	129	109	113	110	11,677
1946	128	77	97	142	178	113	109	12,103
1947	130	75	103	139	174	115	109	11,712
1948								
Jan	130	75	103	143	176	114	112	973
Feb	133	75	107	149	180	115	116	907
March	134		106	145	184	116	119	919
April	136		109	149	186	116	119	
May	134		106	144	180	117	117	
June	134		108	150	177	116	115	
July	133		108	144	173	117	112	

It will be noted from the above table that the iron and steel industry and the machine industry registered the greatest index rises with increases of 32 and 42 points respectively from 1938 through July 1948. The pulp and paper industry and the foodstuffs industries remained relatively constant; the textile and clothing industry rose by 10 points during the same period, while the lumber export industry had declined by 17 points at the end of 1947. Production of electrical energy has shown a continuous increase. The slight decline in 1947 is attributable to the shortage of water caused by the severe drought in the summer of that year. It is doubtful that the general production index will rise rapidly within the near future; more probably it will even off near the present level. Though programs to expand electric output and steel production have been commenced they are being retarded, like industrial production generally, by shortages of labor and material.

The industries in Sweden are not concentrated in congested localities. Decentralization, attributable partly to extensively developed inland water transportation and electric power resources, has prevented urban congestion of industry. Industrial plants, however, are more numerous in the south and central regions than in the north.

(2) *Forest Products.*

Forest resources form the basis for Sweden's largest industry. In the production of wood pulp Sweden ranks next to the US and Canada. The following

table makes a comparative analysis of approximate wood pulp capacity and production figures in 1,000 metric tons for 1937 and the postwar years of 1946 and 1947:

	Capacity			*Production*		
	1937	*1946*	*1947*	*1937*	*1946*	*1947*
Bleaching Capacity	570	1020				
Total Chemical	2920	2815	2790	2597	1827	2185
Sulphite Bleached				215	255	558
Sulphite Unbleached				1227	750	742
Total Sulphite	1750	1685	1660	1442	1005	1300
Sulphate Bleached				85	102	170
Sulphate Unbleached				1070	720	715
Total Sulphate	1170	1130	1130	1155	822	885
Total Mechanical	750	800	800	700	550	625
Dissolving				193	241	313

In general, the postwar output of the pulp mills has been only about eighty percent of capacity. This is partially attributable to the modification and closing of some mills, but primarily to decreased cutting of timber and the necessity of allocating timber for fuel in the absence of an adequate supply of coal and oil.

The paper and board mills had a record output of more than a million metric tons during 1947, and operated within six percent of their estimated capacity of approximately 1,125,000 tons. There has been very little change in capacity during and after the war other than that brought about by modernization and improvement in different mills. An analysis of postwar production compared with 1937, in metric tons, is as follows:

	1937	*1946*	*1947*
Kraft papers	212,112	230,814	258,966
Newsprint	268,052	263,389	274,337
Greaseproof & Transparent	29,528	25,333	28,861
Sulphite paper, magazine, wrapping, fine and other paper	288,847	307,927	307,780
Total paper	798,539	827,463	869,944
Boards & Cartons	127,461	146,847	157,869
Grand Total	926,000	974,310	1,027,813

In a normal peacetime year an average of more than 50 percent of the total value of Swedish exports was derived from forest products. In the years following the first world war a large share of the exports in this field consisted of unfinished products such as plain timbers, pit-props, sleepers, and bleached as well as unbleached pulp. As it became apparent that forest reserves were being overcut stress was placed on additional processing in Swedish mills before export. An example is the well-organized wall-board industry, which by the close of the war was producing from

fifteen mills. The manufacture of prefabricated houses also is a relatively new industry which is expanding as a result of the demand for housing throughout the world. During 1947 the export of complete houses consisted of 11,781 units which nearly doubled the 1946 figure. While factors such as increased domestic consumption affect the amount of timber available for export, the following comparative table expressed in cubic meters indicates the general trend away from export of unfinished products:

	1935-39	*1947*
Sawn Softwood	2,700,000	1,550,000
Planed Softwood	800,000	200,800
Square Timber	108,000	36,600
Sleepers	11,900	41,400
Boxboard	255,000	163,000

In comparison with the foregoing export figures, it is estimated that Sweden in 1947 consumed domestically 3,260,000 cubic meters of the above types which represents an increase of 40 percent over prewar years. As a result the government has gradually tightened building restrictions in an attempt to divert lumber for export shipment.

Wood pulp constitutes about 30 percent of Sweden's total exports, with paper and paper products and timber second and third in importance, respectively. From the standpoint of volume, the same factors which have contributed to the decrease in production, namely, decreased cutting, shortage of labor and a continuation of the wartime necessity of substituting wood for solid and liquid fuels, are reducing the quantity of exports. Thus, while in 1937, 2.2 million metric tons of all grades of pulp were exported, the total export in 1947 was 1.7 million metric tons. The same situation prevails with respect to paper and paper board, though for the additional reason that domestic consumption has increased. While 1947 production of paper and paper products exceeded 1937 production, exports in the earlier year amounted to 664,000 and in 1947 to 575,000 metric tons. Domestic consumption of paper and board has doubled in the last ten years and in 1946 exceeded 525,000 tons. As a result of the adverse effect on export trade the government has restricted domestic use of paper in 1948 to 411,300 metric tons.

In March and April of 1947, the government removed export price controls on pulp, paper and paper board, and on lumber. This action, combined with the acute world demand for wood products and the removal of competition in the Scandinavian countries by cartel agreement, caused an increase in prices far beyond any reasonable relationship to production costs. Two other events contributed; the first occurred in April 1946 when the government increased the value of the crown by over 16 percent, in terms of its relation to the dollar. The second occurred coincident with the removal of export price controls when the government created a Business Cycle Equalization Fund which levies a tax of approximately $13.85 on each metric ton of chemical pulp shipped into the export market, $5.54 for each metric ton of mechanical pulp, and approximately $36.00 per standard of all sawn lumber. The combined effect of these two pieces of legislation alone has been to raise the export price of pulp

by about 25%. The increase in over-all export prices of pulp and paper, f.o.b. Swedish port, in 1947 over 1937 is indicated in the following table:

	1937 (per metric ton average price)[1]	*1947 (per metric ton average price)*[2]
Bleached Sulphite	$50.00	$169.80
Unbleached Sulphite	40.00	132.15
Bleached Sulphate	56.00	155.00
Unbleached Sulphate	38.00	124.65
Newsprint	34.00	152.90

[1] One Crown=$0.255.
[2] One Crown=$0.278.

As world markets readjust and as competition develops from other paper-producing countries it will no longer be possible for Swedish producers to sell at almost any price, which was the case in 1946, 1947, and the beginning of 1948. The first major indication of the changing market came in June 1948 when an estimated 50 percent of US pulp and paper buyers cancelled contracts containing reservations providing for quarterly adjustment of price. It is estimated that this will decrease Sweden's dollar earnings by more than 25 million for the second half of 1948. The immediate result of the contract cancellations was a request from producers that the export tax collected for the Business Cycle Fund be abolished, and that the value of the crown in relation to the dollar be decreased to its former level of 3.60. Although the export tax was removed in October, 1948, producers have not yet indicated a desire to forego any part of their excessive postwar profit margins.

While the government has repeatedly pointed out to the pulp and paper industry the continued drop in gold and dollar exchange and has urged the industry to export more to the US, the industry has preferred to supply markets where higher prices were obtainable. While American buyers have taken less of Sweden's national output other markets such as the Latin American and Asiatic countries have been receiving considerably larger percentages. During 1947 the US received approximately 28 percent of the total pulp shipped from Sweden compared with a prewar average of slightly less than 40 percent. Similarly, in 1937 Sweden shipped over 40 percent of its total export of newsprint to the US, but in 1947 its export to the US was 20 percent.

During the World War II blockade Sweden made extensive use of forest products to maintain her internal economy. Cloth was made from cellulose, liquid fuel was extracted from wood tar, automotive vehicles were powered by gas generated from wood distillation, animal fodder was produced from wood byproducts, and wood was used as a substitute for coal and oil in industry, transportation and household use.

(3) *Iron and Steel.*

The iron and steel industry is Sweden's second largest industry. Its capacity already has been increased by approximately 30 percent above prewar levels. Expansion began during the war, and in 1946 the country's largest producers agreed to

a five-year plan to modernize and enlarge facilities so that the production of pig iron and steel would be increased by approximately 40 percent. The expansion was made necessary not only by insufficient imports from Germany but because of greater domestic requirements. The ultimate object of the plan is to attain national self-sufficiency and to increase the industry's export capacity. Implementation of the plan, however, is being slowed down by shortages of labor and fuel and by quantitative restrictions on imports of necessary machinery and equipment from hard currency areas. As a result, the expansion program probably will not be completed before 1952.

Pig iron capacity in 1947 was estimated at approximately 900,000 metric tons and ingot steel capacity at about 1,500,000 metric tons. Only a limited number of existing furnaces are being operated, the remainder being obsolete or beyond repair. Although some effort is being made to modernize unused capacity, the general trend is toward construction of new modern furnaces. On 31 December 1947 the following types and numbers of furnaces were being operated:

	Total	*In operation*	*Percentage of Total in operation*
Blast furnaces	71	25	35.2
Lancashire furnaces	60	17	28.3
Bessemer (converter)	15	7	46.7
Martin (open hearth)	64	42	65.6
Electric and crucible furnaces	71	47	66.2

The largest expansions are being made at Domnarfarts Järnverk and at the government-owned Norrbotten iron works. The former is expected to increase steel ingot capacity from 200,000 to 400,000 metric tons and the government-owned project is expected to have an annual capacity of 500,000 metric tons of pig iron when completed. The first stage of expansion of the Norrbotten iron works, which is expected to be completed by the end of 1950, will be the installation of a new coke blast furnace with an annual capacity of 200,000 metric tons. Present facilities also are being increased and a new rolling mill is being constructed. The second stage provides for installation of another 200,000 metric ton annual capacity blast furnace and an additional rolling mill.

Limited supplies of electricity and fuel, primarily coke, have prevented a full postwar utilization of the iron and steel industry's capacity, but the increasingly acute shortage of manpower has been the main reason for the failure to increase output. The number of workers employed by the Swedish iron works has continued a gradual decline from a high on 31 December 1942 of 34,326 to 32,030 on 31 December 1947. This is estimated to be 2,500 short of actual present requirements.

While the total production of pig iron showed a slight increase from 686,500 metric tons in 1946 to 689,900 metric tons in 1947, total ingot steel output in 1947 decreased to 1,185,100 metric tons from 1,202,800 metric tons in 1946. The ingot steel production figures however, are considerably higher than the 1938 output of 972,000

metric tons while pig iron was far short of the peak 1944 output of 853,800 metric tons. Steel ingot production in metric tons for 1947 by production method is as follows:

	1947
Bessemer (converter)	
High quality	5,100
Ordinary	18,800
Thomas	124,000
Martin (open hearth)	
High quality	260,800
Ordinary	395,700
Electro-steel	
High quality	229,900
Ordinary	150,800
Total	1,185,100

The following table shows the domestic production, imports, exports, and estimated consumption of finished steel from 1938 to 1947 in thousand metric tons:

Year	*Production*	*Imports*	*Exports*	*Apparent consumption* [1]
1938	708	321	175	853
1939	838	553	174	1,217
1940	840	322	183	978
1941	862	235	207	890
1942	891	274	129	1,036
1943	890	217	108	999
1944	878	222	80	1,021
1945	880	33	97	815
1946	851	467	82	1,236
1947	837	645	86	1,396

[1] Production plus imports, minus exports.

It should be noted that the year of highest production was 1942 and that the level of production remained both high and constant during the war years when Sweden was preparing its own defenses and also exporting to Germany. The low year for both imports and consumption was 1945 when consumption was limited to domestic production owing to the cessation of imports from Germany and restricted shipments from formerly occupied Belgium. These two countries, together with France, normally accounted for the bulk of Swedish iron and steel imports. In 1947, the peak import year and also the year of highest domestic consumption, the United States supplied 40 percent of the finished steel imports. The following table of imports for 1947 by countries of origin, with comparative figures for the years 1936-39 shows clearly how the United States replaced Germany as a major source of finished steel. (Does not include tin plate, other metal-coated sheets, cold-rolled and stainless steel.)

	Import 1947	*Average import 1936-39*
United States	235,000	49,000
Belgium-Luxembourg	195,000	182,000
Germany	...	119,000
Czechoslovakia	43,000	17,000
France	11,000	59,000
Great Britain	70,000	11,000
Hungary	15,000	...
Other countries	37,000	44,000
Total	606,000	481,000

The latest year for which figures are available on a break-down of estimated domestic consumption of finished steel is 1945. In that year actual requirements were estimated at 1,205,000 metric tons (which was considerably above the available 815,800 metric tons) distributed as follows:

	Thousand Metric tons
Metal goods manufacturing and mechanical workshops	521
Shipbuilding	140
Railroads, street railways	93
Building and construction	318
Other industries	133
Total	1,205

Production of sponge iron in 1946 increased by 15.8 percent over the 1945 output. 2,963 metric tons of the 1946 production were exported, 1,414 metric tons being exported to the US. Production of ferro-alloys increased by 36.8 percent in 1946 in comparison with 1945 but was still 30.7 percent below the 1939 level. The output of sponge iron and ferro-alloys in 1939, 1945 and 1946 is shown below in metric tons:

	1939	*1945*	*1946*
Sponge iron	20,229	26,357	30,526
Ferro-alloys	47,364	24,002	32,788

Shortages of fuel as well as labor are expected to cause a slight decline in the total 1948 output of pig iron, steel ingots and finished steel. For the first four months, in comparison with the same period in 1947, production of pig iron showed a slight drop while steel ingots and finished steel registered a slight gain. Conservative estimates based on the assumption that the manpower shortage will not be alleviated and that rationing of electric power will be reintroduced during the winter, place finished steel output at about 800,000 metric tons. Imports of finished steel are not ex-

pected to exceed 565,000 metric tons owing to anticipated reduction of shipments from the United States. 1,265,000 metric tons of finished steel are expected to be available for the domestic market during 1948 compared with an estimated requirement of 1,400,000 metric tons.

Sweden attaches great hopes to revival of the iron and steel trade with Germany which it expects will commence with implementation of the trade and payments agreement with the US and UK occupied zones of Germany. This agreement was concluded 19 April 1948 and calls for deliveries to Sweden of 50,000 tons of finished steel, 10,000 tons of pig iron, and coke valued at more than 10 million dollars. In return Sweden will deliver 1,750,000 tons of iron ore together with other goods.

(4) *Machinery.*

The machine industry in Sweden has registered a greater increase in production over the last ten years than any other industry. Despite this increase, postwar production has covered only a part of Swedish manufacturers' requirements for replacements and new installations. Demands for all types of industrial machinery have been very heavy, and domestic delivery periods which in prewar years had been a few months, have now been extended to two years or more. Shortage of raw materials, labor, and fuel have restricted the production not only of industrial machinery but of all types of machinery. The volume of 1947 production of industrial machinery was estimated to be five percent below the 1946 level which was valued at slightly over 140 million dollars. The value of industrial machinery imports including electrical motor and apparatus rose from 34 million dollars in 1946 to 72 million dollars in 1947. The corresponding increase in exports was from 40 million dollars to slightly over 48 million dollars.

Swedish production of construction machinery, which has increased by over 50 percent since 1938, is still insufficient to satisfy local demands. Production is still increasing but in general it is confined to lighter types of construction machinery. Swedish production of small excavators is about fifteen per year. Scrapers, bulldozers, asphalt finishers, crawl tractors, large excavators, road graders, and rollers are not made in Sweden but are imported, principally from the United States.

Postwar demand for construction machinery has been very heavy. Public road and harbor construction and maintenance were neglected during the war years due to shortage of labor and material which resulted in a huge backlog of construction projects. Private construction of both industrial property and dwelling units also increased the demand for construction machinery which, despite large imports in 1947, far exceeded the supply. Accomplishment of much of this construction, particularly road construction, will have to be deferred indefinitely owing to the lack of dollar exchange necessary for the purchase of heavy machinery.

Prewar output of agricultural machinery was adequate to satisfy domestic requirements except for some of the heavier equipment; considerable quantities of light equipment, such as small tractors, are exported. Domestic production of agricultural machinery in 1946 was valued at approximately 16 million dollars but was inadequate to satisfy demands. Demands have been great in the postwar years owing

to increased mechanization of farms and to the accumulated need for replacement of equipment worn out during the war period. The government has given priority of iron and steel allocation to manufacturers of agricultural equipment and it is felt that domestic production will soon be adequate to satisfy essential requirements except for heavier types.

Several Swedish firms completely dominate domestic production in their respective fields. The *Allmänna Svenska Elecktriska AB (ASEA)* is one of the oldest electrical firms in northern Europe and the largest in Sweden. It produces nearly everything in the electrical line and has built most of the equipment, including large generators, which has been used in developing Sweden's extensive hydroelectric network. It has also supplied much of the equipment for electrification of Swedish railroads. The company's production capacity has been increased by 50 percent over prewar capacity and its output in 1946 was valued in excess of 110 million dollars. In 1946 it employed over 24,000 persons which makes it one of the largest private employers in Sweden. Some of the company's current production of hydroelectric equipment is for export to the USSR under the Swedish-Russian credit agreement.

The Atlas Diesel Company of Stockholm is one of the oldest manufacturers of Diesel engines. It manufactures engines from 30 to 3,000 hp., pneumatic tools, hydraulic devices, naval gasoline engines, and other similar products.

AB. Svenska Kullagerfabriken, (SKF) the Swedish ball and roller bearing works, owns a total of seventeen factories throughout the world, five of them located in Sweden. The total combined daily production of SKF factories is estimated at 400,000 ball bearings. The capacity of the factory in Göteborg, is estimated between 80,000 and 100,000 per day, though output is less owing to a shortage of labor. SKF owns the Horfors Steel Works which has an annual capacity of over 90,000 metric tons of finished steel. SKF's annual steel requirement for its Swedish factories is estimated at approximately 50,000 metric tons. Other SKF subsidiaries are Linköping Mechanical Works, a machine tool plant, and the Katrineholm Works which manufactures molds.

Restrictions which have been placed on imports attributable to depleted foreign exchange reserves will undoubtedly extend to machinery requirements. With respect to industrial machinery, the 1948 investment program called for an expenditure of approximately 155 million dollars of which 45 million dollars was to be for imported machinery, mostly from hard currency areas. The hard currency available will be considerably less than this amount and part of it also will have to be used to cover outstanding 1947 commitments. If the shortage becomes serious it will reduce industrial production and exports. Imports of construction machinery undoubtedly will be given secondary consideration to imports of industrial machinery. In that event many construction projects will be delayed for a considerable length of time. The shortage of electrical equipment will also continue and will delay the proposed expansion of the hydroelectric system.

(5) *Shipbuilding.*

The present yearly capacity of Swedish shipyards is 440,000 DWT, or 40 percent greater than in 1939. Shipbuilding continued at a high level during 1947 al-

though shortages of raw material, particularly steel, and skilled labor prevented capacity production. Nevertheless, Sweden ranked second in the world launching of ships in 1947.

Fifty-two merchant vessels were launched, totalling 222,598 gross tons. This represents an increase of slightly more than 75,000 gross tons over the 1946 production of 147,400 gross tons and established a record high for tonnage launched in any one year. With the exception of three 3,800 gross ton steamships, the vessels launched were all motorships, of which eleven, totalling 109,522 gross tons, were tankers. Included in the tanker tonnage is the largest merchant vessel ever launched in Sweden, a floating whale oil factory delivered to Norway.

Nearly 125,000 gross tons or 56 percent of the 1947 launchings will be delivered to foreign buyers, primarily to Norway. This represents a decrease from 1946 deliveries of 184,100 gross tons and 1945 deliveries of 278,750 gross tons. In 1945 a great many ships which had been under construction during the war were delivered to Norway.

Orders placed during 1947 continued to increase. At the beginning of 1948, including ships launched but not yet delivered, the total of vessels under construction or ordered from Swedish shipyards was estimated at nearly 1,400,000 gross tons and 2,100,000 tons dead weight. Norwegian orders account for approximately 870,000 gross tons or about 60 percent of the total. Orders on hand will keep the shipyards operating at capacity for an estimated minimum of four years. There is a possibility, however, that the yards will be faced with a slump when the temporary demand for replacement of tonnage lost during the war has been met.

Despite foreign exchange difficulties and shortages of steel and labor, 1948 production held up. By the end of June 1948 merchant vessels under construction totalled 241,980 gross tons compared with total world tonnage under construction on the same date of 4,021,889 gross tons. Out of the latter figure 55 percent is under construction in Great Britain. France has risen to second place with 331,216 gross tons, followed by Sweden. In further comparison, the United States and Denmark are in seventh and eighth place respectively with 162,072 and 118,711 gross tons under construction at the end of June.

Swedish shipbuilding is concentrated in 15 yards possessing 43 beds with an estimated capacity of 443,300 DWT. Göteborg is the chief shipbuilding center followed by Malmö, Stockholm, and Landskrona. Other yards are located in Oskarshamn, Hälsingborg, Gävle, Kalmar, Marstrand, and Sälvesborg. Because of more favorable climatic conditions, milder winters and ice-free harbors, the largest percentage of shipbuilding is concentrated on the West coast of Sweden.

(6) *Textiles.*

The textile industry is carried on primarily in Southwestern Sweden, Borås being considered the center. Important textile mills are also located in Olingsas and Norrköping. Except for synthetic fiber (rayon) and small quantities of wool all raw material for the textile industry must be imported. The same situation exists with respect to textile machinery since Sweden has no plants capable of producing it in required quantity.

While 1947 production was estimated at nearly 25 percent below minimum capacity, it was nevertheless at approximately the same volume as in 1946 and in normal prewar years. The supply of raw materials was on the whole satisfactory but shortages of labor, electric power, and to some extent a lack of spare parts and machinery replacements prevented a full utilization of the industry's capacity.

The following rough estimates in metric tons are illustrative of 1947 production: cotton yarn, 23,000 tons; woolen yarn, 14,000 tons; worsted yarns, 3,500 tons; spun rayon yarn, 3,500 tons; cotton fabrics, 3,000 tons.

The volume of cotton and wool imports for 1947 was slightly lower than for 1946, while volume imports of yarns as well as of fabrics, knit goods and other manufactured products showed a substantial increase. The value of textile imports in 1947 reached an all time high of nearly 300 million dollars compared with roughly 170 million dollars in 1946. While the value of 1947 imports was almost four times the average for the immediate prewar years, the quantity of raw materials remained about the same and the quantity of manufactured goods was about twice the prewar average.

Present annual cotton consumption is estimated at about 26,000 metric tons while estimated capacity of the cotton mills is 32,000 metric tons. Swedish cotton consumption before the war averaged about 30,000 metric tons. The US was the chief cotton supplier until 1941 when Brazil assumed this role. In 1947 the US regained some of its former importance although Brazil still remained the chief source of supply. The radical changes in Sweden's sources of supply of cotton during the war were owing principally to the blockade. Present factors controlling the total volume of imports and their distribution by countries are Sweden's shortage of hard currencies and the relatively high price of American cotton.

The annual production of cotton cloth by the Swedish cotton weaving mills averaged 20,000 metric tons during 1938-40. From this figure it dropped to an annual average of 14,100 metric tons for the year 1941 through 1944. After 1944 the production recovered rapidly to an estimated 19,000 tons in 1946 and 18,000 tons in 1947. It is estimated that over 80 percent of the cotton cloth sold in Sweden at present is manufactured domestically. Imports of cotton cloth totalled 1,147 metric tons in 1946 and 6,503 metric tons in 1947. The prewar average was slightly over 5,000 metric tons.

Domestic production of wool is very small, having averaged approximately 700 metric tons from 1938 to 1947. Because of the limited domestic production most of the wool consumed is imported. Imports fell sharply during the war and consumption was met to a large extent by means of synthetic fiber and reduction in stocks. Imports of wool from 1938 to 1947 were as follows, in metric tons:

Year	*Volume*
1938	9,860
1944	6,861
1945	7,739
1946	19,216
1947	17,020

Of the 1946 imports, 27 percent were from Argentina, 25 percent from Australia, 19 percent from South Africa and 13 percent from Uruguay. In addition to the estimated annual consumption needs of 15,000 tons of wool, approximately 3,500 tons of worsted yarns and woven goods are also imported.

The development of synthetic fiber (rayon) production in Sweden has been based on a definite policy aiming at maximum self-sufficiency in textiles. This policy was determined prior to the war but restrictions on imports caused by the war accelerated the program to expand production of synthetics in an effort to obtain a supply of substitute fibers and thus to be less dependent on cotton import. Production of rayon staple fiber increased steadily from 937 metric tons in 1938 to 15,000 metric tons in 1944. However, there was a slight decline in production during 1945 and 1946. The increase in production has eliminated imports and permitted an export of 2,567 metric tons in 1945 and 8,717 metric tons in 1946. The increased output of rayon staple fiber will have a significant bearing on cotton consumption and to a lesser extent on wool consumption, since it can be cut and mixed or blended with appropriate fiber lengths of either cotton or wool.

Production of rayon filament yarn increased from 803 metric tons in 1938 to 1,700 metric tons in 1946. Imports in 1946 amounted to 2,556 metric tons. The limited expansion of filament yarn production is accounted for by the fact that it does not extensively displace cotton and cannot be processed on standard cotton machinery since it is produced in continuous lengths.

(7) *Munitions.*

Most of Sweden's munitions plants are located in the more highly industrialized central and southern portions of the country. Production is divided between a few government arsenals which manufacture small arms and ammunition and the more important private arms producers. The industry expanded considerably during the rearmament period beginning in 1940 in order to meet Sweden's defense requirements. Largest expansions were made in facilities for the production of tanks and automatic weapons.

Aktiebolaget Bofors and its subsidiaries are by far the most important of Swedish armament plants. In addition to manufacturing armament the company owns and operates its own mines and railways and produces at its own iron and steel works about 40,000 tons of high-grade steel annually, which is used for finished ordnance pieces and for armor plate. Before World War II, Bofors was the chief source of artillery weapons for the Scandinavian countries. About 85 percent of the prewar production was exported. *AB. Bofors Nobelkrut* is the chemical and explosives division of Bofors and supplies the explosives for the firm's production of artillery shells.

Prewar expansion of Bofors led to the acquisition of two subsidiary plants for the manufacture of gun forgings, gun mounts, turrets, military tractors, and other ordnance products. Nydquist and Holm AB. an important producer of locomotives and diesel engines was acquired in 1936, and a short time later AB Tidaholmsverken, a manufacturer of bus and truck bodies, was taken over. The acquisition of these two plants permitted utilization of the main plants at Bofors for production of finished gun

barrels and accessories and the final assembly of weapons. The expansion of Bofors which started before the war was continued in 1940 by the construction of branch plants at Svarta and Karlskoga.

Other privately owned armament plants are the AB Landsverk plant which prior to and during the war manufactured tanks and armored vehicles; Huskvarna Vapenfabrik AB which manufactured small arms and ammunition; and AB Norma Projektilfabrik, a source of shells, bombs, and small arms ammunition.

Peak war production was achieved near the end of 1942 when munitions of an estimated value of $300,000 were being delivered to the Swedish army daily. Replacement of all important categories of arms had been effected in early 1943 and matériel in excess of army needs was being stockpiled. War production tapered off rapidly after 1943. As a result of accumulated stocks of weapons and ammunition, none of which was used by the armed forces, Swedish internal requirements dropped abruptly on termination of the war in Europe.

The bulk of postwar arms production has been for export, but in common with Swedish industry generally, production has been limited by shortages of fuel, raw material, and skilled labor. The government has adopted a postwar policy which it hopes will maintain adequate reserve of armament manufacturing capacity and to some extent is appropriating money to support research and development of new equipment. The munitions industry at present is operating at considerably less than capacity but is believed capable of meeting current Swedish military requirements except in heavy tanks and in the field of electronics, particularly radar equipment.

(8) *Chemicals.*

Prior to World War II Sweden depended principally on imports for its supply of chemical requirements. With the outbreak of war the development of a chemical industry became imperative, and a surprisingly diversified industry in heavy and organic chemicals, plastics, and medicinals was established. This achievement is all the more remarkable in view of the lack of coal and petroleum and the limited indigenous resources of raw materials. Utilization of cellulose and waste liquors from pulp manufacture were intensively developed and Swedish chemists have been particularly successful in producing a high purity cellulose for the rayon and plastics industries. Abundant hydroelectric power has stimulated development of electro-chemicals.

Extension of research along applied rather than fundamental lines by government, universities, and industry contributed materially to the development of the industry.

Another significant development has been the expansion of the industry through companies primarily engaged in other industries. Thus, the Bofors company which is important as a munitions manufacturer, produces synthetic organic chemicals from the same raw materials used in making explosives, and the Boliden Mines Company, in connection with its metal mine operation, is a large producer of pyrites, raw material for the manufacture of sulphuric acid.

c. Money, Banking, and Government Finance.

Sweden's basic currency unit is the krona (crown) whose fractional unit is the öre (one krona equals 100 öre). Sweden abandoned the gold standard in 1931 and became a member of the sterling area in 1933 when the crown was pegged to the pound sterling. Immediately prior to the outbreak of World War II, on 28 August 1939, the crown was pegged to the United States dollar at a selling rate of 4.20 crowns per dollar. A new rate of 3.60 crowns to the dollar (one crown=$0.27778) was established 13 July 1946 for the declared purpose of offsetting price increases abroad and to encourage imports.

Sweden has a well-developed banking system to support the country's trade and general economy. The Central Bank of Sweden (Sveriges Riksbank), controlled by the Riksdag (Parliament), has the sole right to issue bank notes. The discount rate of the Riksbank guides the rate policy of the other banks and banking institutions. The Riksbank is largely a bankers' bank and its direct relations with the public and business world are comparatively small. Its activities are mainly confined to lending to commercial banks, savings banks, and agricultural credit associations and the buying and selling of foreign and domestic securities in pursuance of the monetary policy established by the Riksdag. Through the Foreign Exchange Control office (Valutakontoret), which is subordinate to it, the Riksbank supervises the flow of foreign currencies and issues regulations to other banks governing their foreign exchange transactions.

Though there are 22 privately owned commercial banks, about two-thirds of the banking business is handled by four large banks: Svenska Handelsbanken, Skandinaviska Banken, Göteborgs Bank and Stockholms Enskilda Bank. The first three have branches throughout the country. Handelsbanken, with about 300, has the largest number of branch offices. There are 458 private savings banks, 84 of which hold 73 percent of the total savings-bank deposits, and the Postal Savings Bank, with headquarters in Stockholm had 4,337 branch offices at the end of 1946.

Sweden's postwar fiscal and monetary policy was declared to be directed towards two objectives: (1) to maintain the internal stability of the currency, i.e., to maintain the equilibrium between wages and prices; and (2) to maintain an adequate reserve of foreign exchange. The first objective has been realized within reasonable limits, though wages in general have risen 25 percent above the cost of living in comparison with prewar levels, resulting in considerable excess purchasing power. The loss of foreign exchange, however, has been so extensive that it indicates a failure to attain the second objective. The rapid deterioration of Sweden's foreign exchange position caused the government to tighten its control over imports and foreign exchange early in 1947 and these restrictions have continually been made more stringent. (See *Foreign Trade*, p. 42.)

In response to a great postwar demand for liquid funds, the commercial banks, savings banks, and insurance companies have gradually sold their large holdings of Treasury bills and Government bonds acquired during the war. This resulted during certain periods in very large offers of bonds which threatened to lower their market value and to affect a corresponding rise in the effective interest rate.

The government has adhered with determination to a policy of preventing a rise in the rates of interest on the theory that a rise in interest rates would increase the cost of living sufficiently to outweigh its effect in checking the expansion of investments. Thus, the Riksbank, in pursuance of this policy has had to purchase the bulk of government bonds offered for sale which has in turn increased the availability of loanable funds. The Riksbank's note circulation, instead of showing a desired postwar constriction, has continued to expand as shown in the following table:

Swedish Note Circulation and note cover
(In millions of Kronor)

At end of:	*Note circulation*	*Gold Reserves*	*Net Foreign Exchange Reserve*	*Swedish Treasury Bills & Bonds*	*Other Domestic note cover*
Dec. 1938	1061	1332	750	106	50
Dec. 1945	2782	2024	758	434	32
Dec. 1946	2877	1371	538	1544	172
Dec. 1947	2895	379	346	2746	127
Mar. 1948	2730	348	219	2534	141
June 1948	2824	307	79	3064	60

It should also be noted from the above table that Swedish Treasury bills and bonds held as note cover have increased in direct proportions to the depletion of gold and net foreign exchange reserves. The Riksbank Act of 1934 fixed the note issue limit at twice the gold reserve plus 350 million kronor. Because of the decline in gold and foreign exchange reserves it became necessary for the government to increase the legally authorized proportion of other note cover. For this purpose the government in 1947 issued two decrees making it possible to use an increasing proportion of the steadily growing Riksbank holding of Treasury bills and notes. The second decree increased the note issue limit to twice the gold reserve plus 2,500 million kronor.

Other factors which have contributed to the increase of consumer spending funds and inflationary pressure have been the abolishment of the retail sales tax on 1 January 1947 which released about 300 million kronor; decreased income tax rates in the lower income brackets, effective 1 January 1948; increased wages, and payment from 1 January 1948 of a general child-support subsidy of 260 kronor per child up to the age of 16 years.

During 1946 gross public and private investments totaled 1,280 million dollars. Of this 353 million was utilized for housing and 325 million for private industry. While private Swedish investments have expanded greatly since the end of the war, they slowed down somewhat in 1947, showing an increase of 12 percent over 1946 compared with the 1946 increase of 33 percent over 1945. In both years the total increase was due chiefly to larger industrial investments but these also slowed down, showing corresponding increases of only 25 percent in 1947 compared with a 50 percent increase in 1946. Similar trends were displayed by agriculture, private dwelling construction

and shipbuilding investments. The 1947 increase in investments was practically absorbed by the rise in prices and costs.

The total Swedish national debt as of 31 December 1947 was 3,136 million dollars, compared with approximately 700 million dollars at the outbreak of the war. This is broken down roughly into 74 percent in the funded debt and 26 percent in the floating debt. The increase in the national debt corresponds closely to the budget deficit incurred during the war years, which on 30 June 1945 stood at approximately 2,087 million dollars. Small surpluses of revenue over expenditures during succeeding fiscal years which have been transferred to the budget deficit account, by 30 June 1948 had reduced the balance to approximately 1,919 million dollars. The budget adopted for the fiscal year 1948-1949 does not indicate a serious intention of bringing about a substantial reduction of the accumulated budget deficit and national debt.

The Swedish government operates under two budgets, one for ordinary operating expenses and the other for capital investments. The ordinary budget has enjoyed a surplus since the end of the war while the capital budget has shown a deficit. Preliminary estimates indicate that because of an increase in revenue from taxes, government finances for the fiscal year ending 30 June 1948 will show a surplus of approximately 125 million dollars. The income from Capital Assets, on the other hand, is expected to be about 13 million dollars less than estimated in the budget. The Postal Service, Telephone and Telegraph Service, State Railroads, and State Waterfalls will show an income less than that estimated while State Forests and Lands will yield slightly more than originally estimated.

The budget of estimated receipts and expenditures for the fiscal year commencing 1 July 1948 is balanced at roughly 1,325 million dollars, with a surplus of 180 million dollars and current operating expenditures of 1,145 million dollars. Overbalancing the budget carries out the government's policy to absorb some of the excessive purchasing power which now exists. A series of revenue measures also have been adopted to offset the deficits which have occurred in previous fiscal years in the Capital Assets budget.

Taxation in Sweden takes roughly 19 percent of the gross national product in the form of excises, customs duties, and taxes on incomes, capital, inheritances and gifts.

d. Foreign Trade.

Foreign trade is essential to Sweden's economy, hence fluctuations therein are quickly reflected in the general level of the country's prosperity. For more than half a century Swedish foreign trade has had a moderate net import balance which in the years immediately preceding World War II was offset by returns from foreign investments, shipping services, foreign tourists, and other invisible income. The substantial prewar import balance with the dollar area was covered by exports to other areas and by income derived from shipping services.

Swedish imports consist largely of raw materials and fuel while exports, though fairly diversified, are composed chiefly of a few major classes of goods such as wood, pulp, paper, wood products, iron ore, and iron and steel. The countries which constitute

sources of Swedish imports are not, as a general rule, the destinations of its exports, thus Sweden's prewar trade had a distinct multilateral character. While the Swedish government continues to express official support of unrestricted multilateral trade as a long term objective, as a matter of expediency it has had to pursue a postwar policy of bilateralism.

The bulk of Sweden's prewar trade was carried on with European countries; Great Britain and Germany, the two most important countries in this regard, accounted for more than 35 percent of the total. Germany, the chief source of imports, supplied such important goods as coal and coke, chemicals, textiles, iron and steel, and machinery, while Great Britain, the leading export market, received wood products, pulp and paper, butter and pork, iron and steel manufactures, and iron ore. In 1938, Swedish exports were valued at approximately 440 million dollars and imports at approximately 500 million dollars. The following table, showing the extent to which Great Britain, Germany, and the United States shared in Sweden's exports and imports for 1938, 1946, and 1947, indicates to some extent how Sweden has had to shift its trade since the war:

Distribution of Sweden's Foreign Trade

	Share in total imports (percent)			Share in total exports (percent)		
	1938	1946	1947	1938	1946	1947
Great Britain	12	10	9	24	15	15
Germany	22	1	2	18	0.7	0.6
United States	16	24	32	9	7	11
Total	50	35	43	51	22.7	26.6
Other	50	65	57	49	77.3	73.4
	100	100	100	100	100	100

After the outbreak of the war and the establishment of the Skagerrak blockade, Swedish markets were confined almost exclusively to the Nazi-dominated countries. Through its trade with Germany and the negotiation of trade and barter agreements with Denmark, Norway, Finland, Hungary, Rumania, France, and Italy, Sweden was able, in spite of the war and blockade, to keep her economy functioning with reasonable success.

Sweden's postwar foreign trade has passed through two distinct phases. First, immediately after the war, there was a comparatively high level of export, while import opportunities were strictly limited. This imbalance resulted in an export surplus of 187.2 million dollars in 1945, with the consequence that gold and foreign exchange holdings increased to 760.6 million dollars. This period was also marked by the extension of credits to various foreign governments which ultimately totalled nearly one billion dollars. The largest credit granted during this period was that extended to the

USSR in the amount of 278 million dollars. Substantial credits were also established in favor of Denmark, Finland, Norway and Great Britain, and a few other countries.

The second phase of Sweden's postwar foreign trade became apparent in the middle of 1946, after which there was a reversed trend in the country's trade balance. During the final phases of the war Sweden had to depend almost entirely on existing stocks of goods and material. It was, perhaps, only natural, therefore, that an import boom should develop as soon as foreign supplies again became available. Faced with the loss of the relatively cheap German products and the inability of a devastated Europe to supply the expanded demand, Sweden was obliged to reorient its foreign trade. An effort was made to satisfy import requirements by purchases from countries whose economies had not suffered physical damage, such as the United States and South American countries. Thus, although the value of Sweden's exports to European countries in 1946 was 27.7 million dollars greater than its imports, its imports from other areas, particularly the United States, were at such a high level that an over-all net import surplus of 234 million dollars resulted.

To prevent foreign price increases from disturbing the domestic price level, the government in July 1946 raised the international value of the Swedish krona by 14 percent, altering it from 4.20 kronor to 3.60 kronor to the US dollar. Although this stimulated imports, it had an adverse effect on exports. Thus, whereas the volume of 1946 exports amounted to 66 percent of that in 1938, imports reached 95 percent of the 1938 volume, although their composition had changed considerably. Imports of many basic necessities and raw materials still suffered from world shortages, whereas in the absence of rigid import controls, imports of luxury items increased disproportionately.

In 1947 the value of Sweden's foreign trade reached a record high of 2,332 million dollars. Despite progressively enforced import regulations after 1947, the value of imports rose to 1,437 million dollars, which was more than 50 percent greater than in 1946. The value of exports, on the other hand, rose by little more than 25 percent to 895 million dollars, and this increase was owing principally to the advance in export prices rather than an increase in volume, Sweden's export price index rose from 153 in 1946 (1937=100) to 184 in 1947; the import price index, on the other hand, rose more slowly, increasing from 202 to 213, during the same period. In 1947 Sweden had an import balance of 542 million dollars, which was more than double that in 1946. More than half of Sweden's imports in 1947 came from the Western Hemisphere, whereas that region took only a fourth of its exports; imports from the United States were valued at approximately 453 million dollars while exports to the United States amounted to 97 million dollars, constituting 32 and 11 percent of the total, respectively. In comparison, the average annual net import balance with the US in the immediate prewar period, 1936–38 was only 41 million dollars.

As a result of the continued import balance of trade, foreign currency reserves declined rapidly. Net holdings of gold and foreign exchange, totalling some 760 million dollars at the end of 1945, declined to 610 million by the end of 1946, and to approximately 160 million by 31 December 1947. By May 1948 only 64 million dollars remained, reflecting a decrease of more than 90 percent in slightly more than two years. Foreign holdings continued to decline gradually during May and June 1948, but by

October totalled roughly 100 million dollars. Sweden's dollar balances were virtually exhausted by 1948 and a general requisitioning of hard currency assets was effected in October. Sterling balances, apart from 25 million pounds in blocked account, were exhausted by April 1948.

Sweden's postwar trade problems must be viewed against the general economic background of the country. Because of the slow recovery of European production and international trade, Sweden has been unable to import sufficient quantities of industrial equipment and raw materials from European countries, its customary sources of supply. Since the war, Germany has been practically eliminated, both as a source of imports and as an outlet for exports. Hence, the increase of foreign trade with the Western Hemisphere has added to Sweden's import surplus with that area. Concurrently, in August 1947, it became apparent that Great Britain's postwar dollar shortage would preclude Sweden from counterbalancing the unfavorable trade balance with the Western Hemisphere by means of exports and shipping services to the sterling area.

Internal factors have also contributed to Sweden's critical postwar foreign trade situation. It would appear that the government's domestic anti-inflationary program, directed toward stabilizing living costs, that is, insulating the Swedish economy from world-wide trends, has contributed to the present balance-of-payment difficulties by making it more difficult to export and less difficult to import. Under the domestic stabilization program, home markets have been supplied at the expense of export sales, and measures to restrict the importation of luxury items and effectively allocate foreign exchange were undertaken tardily.

In order to cope with the loss of gold and foreign exchange reserves, and to assure that the limited earnings of hard currency would be used for the most urgent needs, particularly for imports from the dollar area, rigid import restrictions were finally imposed in March 1947; this measure was intended to be a virtual embargo on all imports except those vital to Swedish industry. Authority for imposition of controls was based on the exchange control law of June 1939, as implemented by subsequent decrees. Although the Government established the basis of a complete system of exchange control, in February 1940 control was exercised only in nominal fashion and licenses were liberally granted until the measure of 15 March 1947 was invoked. Thereafter, licenses were required for imports not specifically placed on a free list, and a coordinated relationship was established between the authorities responsible for exchange control and those for licensing imports.

Imports restrictions were continually tightened in the last half of 1947 and in November of that year the government further exercised its power under the Exchange Control law by requisitioning certain private assets held by Swedish nationals in hard currency countries. Restrictions were also placed on the right of foreign companies to remove their earnings from the country. Despite increasingly severe import restrictions, Sweden's balance-of-payments position has continued to deteriorate. This unfavorable situation has been attributed primarily to liberal transitional policies regarding import licenses and the unforeseen suspension of British sterling convertibility in August 1947.

Since the end of the war, nearly all exports have been subject to control; such regulation has been exercised: (1) to assure an adequate domestic supply of scarce commodities; (2) to channel exports to countries able to pay in hard currency; (3) to ensure the fulfillment of Sweden's commitments under bilateral agreements; and (4) to supplement official foreign-exchange control measures.

Following the huge import surplus of 1947, the Government announced a foreign trade policy for 1948 designed to achieve a balance of trade with the hard currency countries. The plan called for a small increase in the total volume of exports and, wherever possible, a shift of exports from soft to hard currency areas. Although the plan provided for only a slight reduction in the total value of imports, it was estimated this would result in a 25 percent reduction in volume from 1947. Imports from hard currency areas were to be reduced to approximately half their 1947 value. Theoretically, the plan permitted imports sufficient to satisfy Sweden's minimum essential needs from hard currency countries; it was believed, however, that the contemplated reductions could be borne without serious hardship. The plan has not operated as effectively as its designers had hoped. The value of total imports in the first half of 1948 actually exceeded that during the comparable period in 1947, although there was substantial decrease in imports from the United States. The increased value reflects both a rise in prices and the inability to put the plan into effect quickly. The result, of course, has been a further drain on gold and foreign exchange reserves requiring further import restrictions. In June of 1948 imports from hard currency countries, excluding Switzerland, the Western Zone of Germany, and some South American countries, for the second half of 1948, were limited to 50 million dollars. Of this amount, 25 million dollars has been allocated for fuel, 16.6 million dollars for industrial equipment and raw materials, and the balance of 8.4 million dollars for miscellaneous items. In view of the time required to make a restrictive policy fully effective it is doubtful whether the new regulations will operate in time to prevent further depletion of Sweden's gold and foreign exchange reserves.

Aware of the fact that Sweden's gold and foreign exchange reserves might soon become exhausted, and recognizing the danger to its economy of further import reductions, the government became increasingly interested in the possibility of obtaining foreign aid. While European recovery has been a fundamental objective in Sweden's foreign policy, and although there was little doubt that Sweden would ratify the OEEC convention, as late as June 1948, no decision in principle had been made with respect to use of ECA credit. The approaching foreign exchange crisis apparently outweighed objections that the Marshall Plan would involve Sweden politically, and on 20 July 1948 the Riksdag ratified the bilateral ECA agreement without a dissenting vote except by Communist members. Sweden requested a third quarter ECA credit for the period September–December 1948. Indications are that ECA assistance will be in the form of loans and conditional grants, which may approximate 50 million dollars by 31 May 1949.

Sweden can play an important part in European reconstruction by furnishing certain vitally needed commodities in large volume; these items include wood pulp and paper, lumber and wallboard needed for industrial reconstruction and for relieving the

critical housing shortage, pit props for European mines, and iron ore for steel industries. Without aid, Sweden's capacity to produce these important commodities would decline. Even with ECA aid, however, Sweden will have to increase exports relative to imports, as a long-range policy for balancing its accounts. Perhaps the most effective means of increasing exports would be a drastic restriction of home consumption and the acceptance of a more austere standard of living, thereby neutralizing domestic purchasing power.

Although, in principle, Sweden endorses a multilateral trade policy, continued commodity shortages, scarcity of foreign exchange, and the general disruption of the European economy have prompted it to pursue a course of short-term bilateral trading. Through bilateral trade and payments agreements Sweden has sought: to achieve an over-all trade balance, to market luxury articles in countries which could not otherwise afford them, to divert as far as possible importations from hard currency to soft currency areas and, more basically, to revive and extend its foreign trade wherever possible. By 1948 Sweden had negotiated bilateral trade and payments agreements with Austria, Belgium, Bulgaria, Czechoslovakia, Denmark, Finland, France, Germany (Bizone, French Zone, and Russian Zone), Greece, Hungary, Iceland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, United Kingdom, Soviet Union, Spain, Switzerland, Turkey, and Yugoslavia. Trade with these countries has not expanded to the extent that was anticipated. Imports from the agreement countries amounted to 58.0 and 46.9 percent of total imports in 1947 and 1948, respectively, compared with 49.4 percent in 1946. Exports during 1947 and 1948 amounted to 64.2 and 63.2 percent compared with 67.2 percent in 1946. Of the existing agreements only those with the USSR, Poland, and Yugoslavia provide for settlement of net debit balances in gold or dollars.

Trade with the USSR is regulated by two agreements, the Commodity Exchange and Payments Agreement of 7 September 1940, which was extended with modifications for a period of five years on 7 October 1946, and a credit agreement also signed on the latter date. Under the Commodity Exchange and Payments agreement, an exchange of goods amounting to 27.7 million dollars in each direction was planned for the year. Debit balances in excess of 139 thousand dollars were to be paid in gold or dollars. During the first year covered by the agreement both exports and imports were smaller than contemplated; moreover, Sweden ended the year with an import surplus estimated at ten million dollars which it was required to pay in gold and dollars to the USSR. (This estimate includes payments to the Soviet Occupation Zone of Germany made pursuant to a trade and payments agreement negotiated on 21 May 1947.) By a supplementary protocol dated 17 December 1947, trade between Sweden and the USSR for 1948 was fixed at a value of 8.3 million dollars in each direction exclusive of trade with the Soviet Zone of Germany.

Thus far Soviet deliveries have more closely approximated the goals set by the agreement than those by Sweden. As of 1 July 1948 Sweden had contracted to purchase Soviet goods, chiefly wheat, manganese ore, apatite, asbestos and potassium salts totalling 11 million dollars and had contracted to export chiefly iron, steel, ball bearings, tungsten wire, cattle, and rags, valued at approximately 6.4 million dollars.

Under these contracts, Soviet deliveries during the first half of 1948 amounted to 6.5 million dollars and Swedish deliveries to only 1.9 million dollars. No payments have been made on its payments deficit since September 1947 so that accumulated balances due the Soviets 1 July 1948 totalled approximately 11 million dollars. Discussions at that time resulted in an agreement that the balance should be settled primarily by Swedish exports.

The Swedish-Soviet Credit Agreement, also of 7 October 1946, made available to the USSR 278 million dollars for purchases in Sweden over a period of five years of stipulated heavy industrial equipment and related commodities, as well as for the payment of certain claims and previous credits. The total amount of goods purchasable on credit from Sweden amounts to 241.6 million dollars. The remainder of the credit, or 36.7 million dollars, is set aside for payment of Swedish personnel installing machinery in the USSR, shipping costs, payment of claims on property nationalized by the Soviets in the Baltic States, and to cover a previous credit to Russia amounting to approximately 10 million dollars.

During 1947 Soviet orders negotiated or placed with Swedish firms under the Credit Agreement totalled approximately 80 million dollars. Actual shipments, however, were valued at only about 5 million dollars. During the year an additional 15 million dollars was utilized for advance payment to Swedish manufacturers, for effecting deliveries to the USSR, and in payment of claims for nationalized properties. In the first half of 1948 Soviet representatives, at the request of Swedish firms, permitted a downward revision in several contracts, relating particularly to the delivery of heavy electrical equipment. Thus, as of 30 June 1948 the value of Soviet orders still totalled no more than 80 million dollars. Swedish deliveries as of that date amounted to roughly 8 million dollars, and the total amount of the credit used was approximately 25 million dollars.

Both the Swedish and Soviet governments recognize that orders have not been placed under the credit agreement to the extent anticipated. The usual Soviet complaint has been that Swedish prices are too high and that periods of delivery are unacceptable. Swedish manufacturers, generally opposed to the Social Democratic government whom they feel responsible for the agreement, prefer to trade with the West and have been hesitant to accept Soviet orders. They have also been reluctant to make what they feel to be uneconomic plant expansions and have, therefore, looked adversely on Soviet orders for heavy machinery requiring special tooling and long periods of manufacture. Although the government has been severely criticized for negotiating the agreement, it has refused to seek its modification, contending that the agreement is adjusting itself to Swedish capacity for implementation. While the Soviets through the agreement may have acquired a means of exerting influence over Swedish economy, such influence has not yet become evident and would in any event be limited inasmuch as the Swedish Government is not required to guarantee contemplated deliveries.

The exchange of goods between the United States and Sweden is governed by a reciprocal trade agreement concluded in 1935. Thus, after Sweden imposed quan-

titative import restrictions in March of 1947, discussions were held between the two governments concerning features which were in violation of the agreement. In view of Sweden's foreign exchange difficulties, an understanding was reached providing for temporary modification of certain provisions of the 1935 agreement. In effect, it was agreed that the Swedish government might discriminate against the United States in licensing imports if failure to do so would result in a restriction of Sweden's over-all volume of trade. Sweden agreed that a certain minimum volume of imports would be paid for on a current basis and that no further reductions of imports were to be made without equitable transitional regulations. As previously mentioned foreign exchange holdings declined rapidly and for that reason the government in December 1947 initiated further discussions on Swedish-American trade. These discussions resulted in a revised understanding permitting Sweden to control the transfer of earnings and remittances and to further reduce its imports from the United States with special attention being given during the transitional period to "hardship cases."

e. Consumers' Cooperatives.

The *Kooperativa Förbundet* (cooperative union), started in the 19th century as a purchasing pool, has grown into an important factor in the Swedish economy. Retail outlets for the central organization are local cooperative societies which at the end of 1947 totalled more than 700, representing approximately 880,000 members or nearly one-half the families in Sweden. All the local societies belong to Kooperativa Förbundet, the central organization, which is owned and controlled by them. The central organization is the wholesale society of the cooperative movement and is the central buying organization for the local societies. In addition it operates more than twenty production plants so that many of the goods which it delivers to the local societies are manufactured in its own factories. Kooperativa Förbundet also sells goods to the government and to private firms. The local societies, on the other hand, are not compelled to buy from it.

At the end of 1946 the combined assets of the central organization and its subsidiaries totalled about 143 million dollars and its total sales amounted to 164 million dollars. Goods sold to the local societies were valued at 107 million dollars. The 1946 turnover of the local societies, however, amounted to 316 million dollars, an increase of nearly 16 percent from 1945. In 1947 the turnover of the local societies increased by another 13 percent to 356 million dollars. It is estimated that the consumer cooperatives in 1947 handled more than 20 percent of the retail food trade and approximately 13 percent of all retail trade in Sweden.

The Kooperativa Förbundet operates flour, oatmeal, and margarine factories in addition to plants for the production of clothing and footwear; its rubber goods factory and its porcelain plants for the production of bathroom fixtures are the largest in Sweden in their respective lines. The cooperative electric bulb factory employs some 1,600 people and has subsidiaries in Glasgow and Oslo. Forest products are the basis of several cooperative industries, including the production of paper pulp, insulating material and wallboard. A recent venture has been the formation of a petroleum cooperative which now handles about 10 percent of the petroleum business in Sweden.

Aside from the Union's economic activities it also operates a cooperative college near Stockholm and is the leading publisher of books on economics and social subjects as well as publishing several popular periodicals.

3. ECONOMIC STABILITY.

A mild inflationary tendency has characterized the postwar Swedish economy. This tendency has contributed to the unfavorable balance of trade and to the resultant reduction of Sweden's net gold and foreign exchange reserves to a minimum working balance. Now that the quadrennial elections are over, however, the government has adopted a new economic plan and submitted its self-aid program to the OEEC. The government is emphasizing increased exports through closer cooperation between industry and labor, increased production of export goods and other measures to channel goods into the export market but is doing very little to remedy the superfluity of consumer spending funds. The government has rejected proposals for depreciating the value of the krona and proposals for raising discount rates and increasing taxes. In order to promote cooperation with industry the government has tacitly shelved socialization plans and has promised to reduce controls over industry. While the government, possibly for political reasons, hopes to avoid a reduction in the standard of living it is nevertheless felt that to achieve the objects of the new economic program there will eventually have to be some reduction of excess domestic purchasing power. With ECA assistance, however, industrial production should remain close to the present level and it should rise moderately after completion of the industrial expansion program which is now being slowed down owing to shortages of material and labor. A balance of trade, especially with the Western Hemisphere, is expected by 1952.

CHAPTER III

FOREIGN AFFAIRS

1. Genesis of Present Foreign Policy.

The basic policy governing Sweden's present foreign relations dates back to the early 19th century when, together with other small European states, she abandoned ideas of active participation in the political maneuverings and military exploits of the European powers and took refuge in neutrality. The Swedes realized that with the spread of conscription and the steady advance of war techniques a small country with limited manpower and insufficient resources could not compete for military prestige with great powers. The recollection that, by great expenditures of men and resources in frequent wars, Sweden had built an empire only to lose it to stronger powers greatly influenced the Swedes in this realization and in fact, in view of the general exhaustion of the country, made it practically obligatory. Recognizing their weakness and the dangers inherent in their proximity to the centers of power politics on the continent, Sweden decided that her independence might well depend on avoiding friction and thus resolved to keep away from alignments and seek security in neutrality.

The term "neutrality" applied to Swedish foreign policy is incorrectly used if defined in the strictest sense. So determined are the Swedes to keep out of war that their policy is commonly described as one of "neutrality" whether or not other nations are engaged in conflict. When war actually breaks out, Sweden seeks to be recognized as a neutral and to isolate herself from the struggle; she is furthermore prepared to support this position by maintaining a defense force sufficiently strong to make an attack on her more costly than the advantages to be gained would justify. Even in time of peace Sweden seeks to remain "neutral" by avoiding political commitments from which extrication would be difficult in the event of war, but she participates wholeheartedly in international organizations * so long as no such entangling commitment is required. Sweden's entire peacetime foreign policy is characterized by the desire for international cooperation which will realize collective security, and by the fear that if she participates too actively she will not be treated as a neutral in case international cooperation breaks down and war occurs. Unrealistic as such a policy may seem, Sweden has since the Napoleonic era successfully avoided war; the wisdom of being prepared to pursue armed neutrality during an emergency was proven once again—to Swedish satisfaction—by the experiences of Denmark and Norway in World War II.

Sweden was an eager participant in the League of Nations, seeing in the collective security provisions of the Covenant a shield to protect small countries. The League also offered an opportunity to participate actively in international affairs without

* Thus Sweden's "neutrality" is not carried quite to the logical extreme of Switzerland's; the latter country, furthermore, has its neutrality guaranteed by international treaty.

joining a big power bloc. Sweden has especially sought to promote political, economic, and cultural collaboration among the Scandinavian countries, but even this has not been allowed to lead beyond the bounds of neutrality. In 1864, for example, Sweden stayed aloof from Prussia's war on Denmark, and during World War II fired no shot in defense of Norway or Denmark.

In summary, Sweden's foreign policy has been based on a determination to maintain correct relations with all major powers, to participate in international programs so far as her ability to be neutral in time of war is not compromised and, in the event of war, to trust to neutrality backed up by arms to prevent encroachment on her independence.

2. Post World War II Foreign Policy.

Sweden emerged from World War II relatively sound and whole economically, determined to continue the "Middle Way," and convinced that for a small nation surrounded by strong neighbors impartiality between conflicting power groups is the safest course, well worth the uncertainty and guile it entails.

Peacetime policy was officially embarked upon when, at the opening of the Riksdag in the fall of 1945, the government announced its intention of seeking membership in the United Nations, thus pledging cooperation for the preservation of world peace. Under the terms of the UN Charter, Sweden thereby agreed—technically, at least—to forego neutrality if requested by UN to assist in the enforcement of a UN decision. The Swedes undertook UN participation with something less than enthusiasm, in part at least as a result of disillusionment over the failure of the League of Nations, and were apprehensive that the East-West antagonism emerging in the UN might place Sweden in the position she had consistently avoided: that of being required to take sides with one of the great powers. The Swedes realized, however, that more than ever before a peaceful future and the freedom of small nations depended upon some international accord.

Despite Sweden's reluctance to make commitments which might be interpreted as "choosing sides" between East and West, postwar international developments occasionally have forced the government to take a definite stand on international problems. In unison with Norway and Denmark, Sweden has committed itself—if with reservations—on three major points: (1) the European recovery plan has been embraced so far as its economic aspects are concerned, while its political and potential military implications have been carefully ignored; (2) Communism has been officially denounced; although the government was reluctant to risk offending the USSR by such a step, it yielded to the point of view of the other Scandinavian countries and the anti-Communist campaign, once adopted, has been pursued with sincerity; and (3) official conferences to explore the possibility of military collaboration with Norway and Denmark have been agreed to, although Sweden's insistence that any bloc formed be committed to neutrality makes mutual agreement unlikely.

The government's policy of armed neutrality has practically unanimous support. However, neither the government nor the Swedish people as a whole are complacent

as to the future success of neutrality. Most Swedes realize that in the event of a third war Sweden's chances of remaining neutral will be significantly less than in previous wars, but they are willing to gamble on any chance that might preserve Swedish independence and prevent the country becoming a battle ground.

3. SIGNIFICANT RELATIONS WITH OTHER NATIONS.

a. Germany.

Sweden's relations with Germany are based on long-established public attitudes. For centuries Germanic influence has been strong in Sweden. Business and cultural connections have been numerous and mutually beneficial. During the Nazi regime the Swedish attitude was generally one of disapproval, especially after Nazi policies led to war and the occupation of two Nordic states, but disapproval was tempered by past friendly relations and the existence of kindred racial characteristics. Today, Sweden's relations with Germany consist principally of business deals arranged with, or subject to the control of, the occupation authorities while the Swedish Government awaits a change in the great powers' policies toward their defeated enemy. Sweden desires and hopes to see the political and economic rehabilitation of Germany proceed at a rapid rate. Revival of the commercial ties between the two countries is in Sweden's interest. In addition, there is considerable support in Sweden for a strong (but nonaggressive) Germany to provide some counterweight to the present dominant position of Soviet Russia in Central and Eastern Europe.

b. Soviet Union.

For centuries, Swedish-Russian relations were marked by almost constant warfare for control of the Baltic littoral. Despite the existence of peaceful relations since 1809, the traditional fear of Russia is still prevalent; indeed, it has been intensified by the threat inherent in Communist ideology to the individualistic society of Sweden, although diplomatic relations with the USSR have continued without interruption since March 1924.

While Sweden remains fundamentally anti-Russian, the end of World War II left the strategic situation in northern Europe so altered that the government has felt impelled to revise its policy toward the USSR. The security which the European balance of power provided in the 19th century and which after World War I resulted from Russian and German weakness and the presence of intervening states has disappeared. Soviet power extends to the Baltic; the weakness of the other European nations provides no counterpoise to it, and US power is far removed from Sweden. Sweden turned to the international security organization for any support she might need in the future against the Soviet Union. The UN, however, will serve Sweden's security interest only insofar as it promotes the solidarity of the Great Powers and establishes a forum for the mobilization of world opinion against aggression.

Viewing this situation, Sweden concluded that her immediate security lay in friendly relations with the USSR. and embarked on a good-neighbor policy toward the Kremlin while carefully maintaining elsewhere an independent foreign policy that

would not offend the Soviets. Swedish desire to be a friendly neighbor found expression in November 1946 when a billion-kronor trade and credit agreement was concluded with the USSR. Swedish fear of displeasing the Kremlin was exhibited when the European nations gathered at Paris in the summer of 1947 to consider Secretary Marshall's proposal concerning economic collaboration: Sweden indicated willingness to participate on the express understanding that no political commitments were involved. In other words, Sweden wants to give the USSR no opportunity to accuse her of joining a Western or anti-Soviet bloc.

In summary, the Swedes believe that their future security with respect to the USSR will be contingent upon the effectiveness of UN and the successful pursuit of correct relations with the Kremlin.

c. United States.

Sweden's prewar political orientation was completely western. A long history of mutually beneficial trade between the US and Sweden was coupled with cultural, technical, and scientific interchange. The US was the land of opportunity to Sweden and, although from time to time, particularly in the post World War I period, the dominant Social Democratic Party recalled that the American capitalistic system is theoretically anathema to socialist doctrine, in practice there were no serious conflicts of ideology. After World War II, however, while Sweden's friendly attitude toward the US underwent no fundamental change, the increased stature of the USSR made it expedient for Sweden to divide her attentions between the two great powers in order to avoid the appearance of having "chosen sides."

d. United Kingdom.

The UK is traditionally one of Sweden's most important markets and Anglo-Swedish relations have been marked by the same friendliness as Swedish-US relations. The existence of socialist governments in both countries has developed no especial friendliness based on socialist sympathies, but the Swedish and British trade unions maintain close contact. However, Sweden's desire to be on friendly terms with all but aligned with none has resulted in the same adjustment in her official attitude toward the UK as toward the US.

e. Norway and Denmark.

Sweden's relations with Norway and Denmark are so close and friendly that a Nordic Union of the three Scandinavian states has been discussed for centuries. Few concrete results have been obtained, and during World War II when Sweden remained neutral after Norway and Denmark were occupied by Germany, the ties were severely strained. However, despite Norwegian resentment of Swedish conduct during World War II, consultation on mutual problems was resumed shortly after liberation. Since that time UN issues, international economic matters and foreign policy questions of many types have been discussed and a joint stand generally agreed upon. After the Danish elections in October 1947 the bonds of union were strengthened by the existence of Social Democratic governments in all three countries. In

1948 several joint policies were agreed upon, including (1) campaigns to counteract Communist influence to be carried on in each of the three countries, (2) establishment of a Joint Nordic Committee for Economic Collaboration to study questions of common interest to the economy of the Scandinavian countries, and (3) formation of a Joint Defense Committee to explore possibilities of Scandinavian military collaboration.

The Joint Nordic Committee for Economic Collaboration is studying and recommending practical steps leading to greater economic cooperation in Scandinavia with a Nordic Customs Union as a possible but future goal. Such questions as common tariff policy, increased freedom of trade and rationalization of production are being examined. However, not only are there serious obstacles to the establishment of a Nordic Customs Union because of the competitive nature of the Scandinavian economies, but Norway is opposed and Sweden only mildly interested.

Common cultural ties have led to the formation of numerous inter-Scandinavian organizations and, both through their efforts and through government arrangements, considerable progress has been made in social and cultural cooperation. The Nordic Interparliamentary Group, composed of the separate interparliamentary groups in the three countries, is active and influential in this field. The inter-Scandinavian society "Norden" has been active since the end of World War I in fostering a kind of pan-Scandinavian movement and in promoting official and unofficial cooperation.

Following World War II, largely as a reaction to the threat posed to Scandinavian security by the growing rift between East and West, the Scandinavian governments began to give serious consideration to military collaboration. Sweden, initially unwilling to risk compromising her position as a neutral, later agreed to explore possibilities of military cooperation without reference to political considerations, and a Joint Defense Committee was set up in September 1948. Some degree of unanimity apparently has been reached on the technical problems of military coordination but, when the question of forming a military alliance is discussed, Sweden is almost certain to refuse to participate unless the proposed alliance is committed to neutrality. Since this view is likely to be opposed in Norway and unpopular in Denmark, the formation of a Scandinavian military bloc remains highly uncertain.

4. INTERNATIONAL ORGANIZATIONS.

a. United Nations.

Although aware of the necessity of joining the UN, the Swedes in general showed little enthusiasm for the organization. The fear in Sweden, as in other small nations, was that the UN had within it the same seeds of dissolution and failure as the late League of Nations. Yet, as a small nation in a world dominated by two or three great powers, the Swedes had no recourse but to work through the new organization. Sweden's membership did not become a subject of partisan debate in Swedish politics, and she was admitted in November 1946.

Sweden entered the UN with two main ideas: (1) that the organization was the only existing means to a lasting peace; and (2) that Sweden would cooperate as fully as her policy of neutrality toward East-West quarrels would permit.

Sweden realizes that the success of the UN depends upon reasonable harmony among the Big Three, on which in turn hinges her own security. She is therefore alarmed over the growing rift between the western democracies and the USSR. During 1947, wary of identifying herself with either side, Sweden tended to regard East-West disputes as a Great Power quarrel which Swedish policy had neither caused nor could cure, and as a consequence frequently abstained from voting on issues where there was a clear East-West division; this abstention was often excused by the Swedes as a desire not to increase the tension. In the 1948 sessions, however, Sweden's policy was more positive and in several cases, e.g. disarmament and control of atomic weapons, Sweden definitely lined up with the West. Two main factors account for this modification of policy: (1) sincere endorsement of the merits of the Western position and (2) realization that world opinion is now so clearly aligned and Sweden's Western sympathies so well known that abstaining from voting would be censured in the West as moral cowardice but would not win increased good will in the East.

b. European Recovery Plan.

The course of the European recovery plan in Sweden from the time of Secretary Marshall's Harvard speech of 5 June 1947 to the final passage of the ECA agreement by the Swedish Riksdag on 20 July 1948 reveals the flexibility of Swedish neutrality. The immediate reaction of enthusiasm gradually turned to scepticism when it became apparent that the Plan would be met by strong Soviet opposition. After the withdrawal of the USSR from the Paris conference, convened for the purpose of considering the Plan, Sweden reluctantly agreed to participate but reiterated a determination to avoid any political implications. Sweden, at that time relatively well off financially and not expecting to derive substantial direct benefit from American aid, viewed participation indifferently; some left-wing circles even suggested that the Plan was designed primarily to avert a depression in the US.

After the US Congress had voted interim aid for France, Italy, and Austria in December 1947, and after the coup in Czechoslovakia in February 1948, Swedish opinion veered to the view that the Marshall Plan was vital to European recovery and an effective means to halt Communist aggression. The government, reluctant to make an abrupt about-face, however, continued on the cautious line of favoring the economic aspects of ERP but condemning any political implications. Meanwhile, Sweden's gold and foreign exchange reserves had decreased to a critical level. The ensuing internal economic difficulties viewed against the background of the approaching general election together with further assurances of the non-political nature of the Marshall Plan prompted the Swedish Riksdag to approve the ECA agreement in July 1948 without a dissenting vote except from Communist members.

CHAPTER IV

MILITARY SITUATION

1. Genesis of Military Policies.

Stemming from a national policy of armed neutrality, Sweden's military policies are aimed at the maintenance of strong, up-to-date, armed forces designed for defensive purposes only. The foundations of the national and resultant military policies lie in three conflicting traditions. First and foremost of these is a desire for peace. For over 135 years, or from Napoleonic times, Sweden has devoted itself to peaceful pursuits and, in so doing, has gradually transformed its previously aggressive and warlike attitude into a defensive one. Also during this period Sweden, by managing to stay neutral, has enjoyed a prosperity and stability which has greatly strengthened the national determination to continue at peace. Yet, despite the establishment of this tradition, a pride has survived in the military exploits of Kings Gustavus Adolphus and Charles XII. Hence there is also a military tradition which has kept alive a high respect for the military profession and a consideration that military service is a civic duty.

The last, and perhaps oldest, of the three traditions is fear of Russia. With two brief exceptions, one during the extremely remote threat of war with Norway in 1905 and another during the more imminent threat of German invasion in World War II, Sweden has from time immemorial organized her defensive system with the prime consideration that Russia is the potential aggressor.

The experiences of World Wars I and II confirmed the Swedes in their convictions of the value of peace and a neutrality backed by armed might. Threats of a third world conflict in which Scandinavia would occupy a position of strategic importance seem to have intensified these convictions even further, for Sweden has developed well-balanced land, sea, and air forces, backed them by substantial and readily mobilized reserves, and striven for their complete modernization. But the purpose of these forces is held clearly in view: they are not for military adventures, and it is hoped that they are not for use in a third world war; they are primarily to protect the neutrality of Sweden by making its violation so costly as to deter the attempt.

2. War Potential.

a. Manpower.

Out of a total population in excess of 6.8 million, Sweden has over 1,100,000 males within the conscription age limits of 20 to 47 and considered fit for military service. A large majority of these men have received limited training under the existing conscription system and about 850,000 are considered available for military service in event of an emergency. Because of equipment limitations, however, it is

estimated that no more than 725,000 would be utilized by the Armed Forces in their wartime tactical and administrative organizations. An estimated 100,000 men, consisting of those over and under the conscription age, would be in the organized Home Guard.

The Swedish reserves are organized to the extent that each man has been assigned to wartime "paper" units with each unit having an assembly point in the military district in which the reserves assigned to it normally live. At such assembly points available stocks of supplies and equipment have been distributed. To become militarily effective after call to active duty, these reserves must receive unit and combined training.

With respect to the use of women there is a program underway to expand the existing quasi-military Women's Corps (*Lottakår*) for training and use as a regular branch of the armed forces in duties similar to those of the US Women's Army Corps. It has been estimated that approximately 350,000 women (ages 20-50) would be available for this type of duty.

b. Natural Resources and Industrial Potential.

Sweden's economic military potential, *i.e.,* the ability to produce weapons, equipment, and other supplies necessary to sustain its armed forces, is limited by an almost negligible supply of coal and petroleum. Other compensating characteristics of the economy, however, raise the economic war potential. On the basis of output of certain raw materials and intermediate and final manufactures used in immense quantities during the last war, Sweden would rank not higher than 9th among the nations of the world. Based on estimated annual current productive capacity and excluding the UK and the USSR, Sweden would rank approximately as follows among the countries of Europe in the production of essential raw materials and manufactures:

	Rank	*Quantity*
Electric Power	4th	14.0 billion KWH
Iron Ore	2nd	8.2 million MT (metal content)
Steel	6th	1.2 million MT
Nonferrous Metal Ores:		
Copper	6th	9.6 thousand MT (metal content)
Bauxite	9th	10.4 thousand MT (metal content)
Lead	6th	11.4 thousand MT (metal content)
Zinc	6th	36.0 thousand MT (metal content)

	Rank	*Quantity*	
Refined Nonferrous Metals:			
Copper	4th	16.6	thousand MT
Aluminum	7th	3.9	thousand MT
Lead	9th	10.4	thousand MT
Zinc	12th	2.9	thousand MT
Sulphuric Acid	8th	125.0	thousand MT
Motor Vehicles	4th	20,000	
Airplanes	2nd	1.5	million pounds of airframe weight
Arms and Ammunition	4th	6	Percent of US capacity
Shipbuilding	5th	275,000	gross tons

On the basis of relative importance allotted to the above raw materials and products in accordance with their essentiality in the prosecution of war, and considering that production of coal and petroleum and petroleum refining capacity are negligible, Sweden nevertheless would have an economic war potential exceeded in Europe only by the UK, the USSR, Germany, France, and the Benelux countries.

Sweden's economic war potential is based primarily on its iron ore resources, hydroelectric power capacity, the high state of development of its industries and the skill of its labor force. Swedish output of iron ore exceeds that of the UK and approaches USSR output exclusive of the satellites. Prior to the termination of World War II plans were already developed for the increase of iron and steel output by 40 percent and for the expansion of the electric power system. When fully developed it is estimated that the hydroelectric system will have an annual output of 6.5 million KW. It should be pointed out, however, that the destruction of a few key power plants could cause serious dislocation of industry.

While the aircraft industry is expanding and produces fighters and light bombers, it would not be capable of meeting airforce requirements in the event of war. The Bofors Company, together with smaller producers and government arsenals, are capable of meeting the requirements of the military forces for small arms, artillery, explosives, and ammunition. Bofors has recently contracted with the Philips Company of the Netherlands for the production and assembly of VT fuzes. With the assistance of the domestic automobile industry it produces tanks up to 22 tons. Swedish manufacturers can meet communications requirements although not with equipment equal to latest US types nor with modern radar and sonar. The shipbuilding industry ranked second in world launching of ships in 1947 with 222,598 gross tons.

c. *Scientific.*

Sweden is making much effort to expand and modernize its research program in all scientific fields. In view of the importance and diversity of this program a somewhat detailed summary of Swedish scientific activities has been attached as Ap-

pendix D. In brief, Swedish scientific capabilities are generally adequate to meet the demands of the nation's armed forces and industry. Swedish scientists, though few in number, are thoroughly trained and highly respected. The trend is toward ever-increasing coordination of scientific effort, with the government exercising a major role by financial support to universities, institutes, and individuals, joint state-private control of nominally private institutions, and creation of policy committees. Some progress is being made in major fields of interest including atomic energy, guided missiles, chemical warfare, electronics, and aeronautics; but work to date is almost entirely along established lines of endeavor.

3. Basic Policies and Practices.

a. Mission and Strategy of the Armed Forces.

The primary mission of the Swedish Armed Forces is to defend Sweden against an aggressor. To carry out this mission, military leaders are responsible for the maintenance of the armed forces in a maximum state of military preparedness and serviceability. Plans and organization of the Armed Forces are directed toward resistance to aggression by coordinated defensive action within Sweden proper. Extensive reorganization would be necessary to conduct offensive action and current information eliminates the possibility that such action is contemplated.

In detail, the geographical defense organization divides Sweden into regions, with Army, Navy, and Air Force Commands generally conforming to these regions. Available information indicates that the defensive strategy contains the following elements: (a) initial, perimeter (chiefly coastal) defense; (b) northeastern defense based on Boden; and, (c) central defense based on Stockholm. The Swedes believe that an attempt at invasion of their territory would be temporarily checked by a perimeter delaying action. In the northeast, along the Finnish frontier, attack would be met by outpost forces of the northeastern defense zone, with air support. If the attack was directed against any point along the lengthy coastline, the mission of opposing the enemy's initial effort would fall chiefly on the Air Force and Navy (including coastal defense forces), plus Army local defense troops which would be shifted as required from key concentration points. Defense of the northern frontiers would have to be based on delaying actions fought by infantry-artillery combat teams concentrated at main ingress portals to Sweden and Norway. Since the mountainous nature of this terrain is looked upon as a considerable natural barrier in itself, only a minimum defense along this frontier would be offered. It is also believed that Gotland is and would be well fortified and strongly held as a strong point in perimeter defense.

A second line of defense in the northeast would be the partially completed line of fortifications based on Boden. This line is designed to control important communications from Finland through northern Sweden to Narvik in Norway. The final defense of the central area, which contains the greater part of Sweden's critical industries represent the major all-out effort, in the hope that this most important area could be held until aid from outside could arrive.

b. Favored Arms and Techniques.

Arms and techniques in Sweden's Armed Forces are designed to conform to her defensive policy, geographic location, and terrain characteristics. The Army emphasizes defensive fighting on the home ground, utilizing permanent fortifications and defensible terrain features to the utmost. Special conditions in Sweden, such as snowbound seasons, extensive forests, and scarcity of roads, have caused particular attention to be paid to guerrilla and small unit tactics, with little or no consideration being given to large unit tactics (division and above). These same conditions have also dictated the use of light mobile combat arms and equipment. The Navy, though possessing a general tactical concept that is obsolete, is cognizant of World War II advances and aims at development of a fast, light but hardhitting force which can, in cooperation with the land based Air Force, meet the needs of a shallow-water coastline defense. The Air Force, at present, uses conventional defensive tactics in the employment of their fighter force, concentrating the maximum number of planes available on initial efforts. Much effort is being expended to develop a homogeneous, highly mobile striking force featuring high altitude interceptors and low-level fighter bombers operating from secret, dispersed airfields. Nightfighter training is being pursued and jet fighter tactical doctrine based on operational capabilities of available jet aircraft is being formulated. All branches of the services are seriously lacking in the equipment and techniques for proper use of radio and radar. With respect to combined operations, little progress has yet been made owing to lack of attention and funds and to friction between the services.

c. Military Organization and Duties.

(1) *Military High Command.*

Being vested with all executive authority, the King is the nominal Supreme Commander of the Armed Forces. Actual control, however, is exercised by the Minister of Defense who is charged with administering all matters pertaining to the Armed Forces. The Defense Minister is the only representative of the Armed Forces at cabinet level as there are no separate civilian ministers for the Army, Navy, or Air Force. He confines his work to the political aspects of defense, delegating authority to his subordinate, the Commander-in-Chief of the Armed Forces, for actual military control and supervision of the three coequal components, Army, Navy, and Air Force. The Ministry of Defense includes a section of the Crown Chancery, which handles matters of a financial and legal nature, and the Command and Liaison Office, which has Army, Navy, and Air sections and decides governmental matters of a command nature. This office is not subordinate to any purely military authority and is charged with such other activities as liaison with foreign attachés and decorations of military personnel. The Commander-in-Chief is held responsible for maintaining the Armed Forces in a state of maximum military preparedness and serviceability and has direct command of field commanders in wartime. He is assisted by a joint defense staff composed of personnel from, and operated as a general staff for, all three services. Economic and technical problems of the Minister of Defense are handled by certain cen-

tral governmental offices which occupy positions relatively independent of respective service commanders. These offices are: the Defense Civil Administration, Defense Medical Administration, Board of War Supply, Defense Factory Administration, Defense Research Institute, and the Military Fortifications and Building Board.

(2) *Army.*

The Commander of the Army is responsible for up-to-date organization, equipment, and efficiency of both the Army and Home Guard. In peacetime he also has operational command of all land forces of Sweden, including the Home Guard. In wartime he retains responsibility only for administration, including the procurement and training of recruits. He is assisted by the Army Command consisting of the Army Staff, Army Administration, Central Conscript Bureau (for all three services), Army Inspectorate, and the Home Guard Commander. Geographically, the chain of command to troops is through the seven Military Districts, into which the country is divided with one of the districts on Gotland Island. Each Military District is subdivided into a number of "Defense Areas." Functionally, the Army is organized into Infantry, Cavalry, Artillery, Antiaircraft Artillery, and Armored Force as the combat arms and Engineer, Signal, Supply or Transportation, Ordnance, Quartermaster, Medical, Veterinary, and Judge Advocate Department as the non-combatant branches or services. Tactically, the Swedish Army contains no units larger than regiments during peacetime. Corps and divisions would be formed during wartime.

(3) *Navy.*

The Chief of the Navy is responsible for up-to-date organization, equipment, and efficiency in the Navy and Coast Artillery. He is assisted by the Navy Command which includes the Naval Staff, Coast Artillery Inspectorate, Branch Inspectors, and Naval Administration. Geographically, the Navy is organized into six Naval Districts, five along the Swedish coastline and the sixth on Gotland. The Coast Artillery Defense organization conforms to these districts for command and administration with the Coast Artillery Inspector mainly responsible for inspection and training. The Navy's tactical organization consists of a Coastal Fleet (with varying numbers of warships and submarines) with subordinate divisions functionally organized. In addition there is a Training Task Force comprising older ships. There is no naval air arm.

(4) *Air Force.*

The Air Force Commander has responsibility for the up-to-date organization, equipment and training of the Air Force only. He is assisted by the Air Command which includes the Air Staff, the Air Surgeon General, and the Air Administration. Geographically, the Air Force is organized into five Fying Base Districts each responsible for supply and the maintenance of buildings and aerodromes within its specified area. The Air Force performs a purely tactical defense role with fighter, ground attack, and reconnaissance units. Tactical organization consists of four *Eskaders* (equivalent of US Wings) with a total of seventeen subordinate tactical flotillas (equivalent of US Groups). Each flotilla is composed of three divisions (equivalent of US Squadrons) which are further broken down into three flights.

d. Recruitment.

Compulsory military service was instituted in 1812, and is considered by Swedes as a civic duty. Initially the required training lasted only a few days; in 1901 the period was extended to 240 and in 1914 to 340 days. Between the two World Wars the compulsory service period was reduced but after the invasion of Norway and Denmark in 1940, it was increased to 12 months. In the summer of 1948, the training period was changed to 9 months' basic training with 3 monthly refresher courses for the Army and Coast Artillery, while the 12-month training period for Navy and Air Force remained unchanged. In a national emergency, all inductees can be required to remain in active service for an additional 180 days. General administration of the system is handled by the Central Conscription Bureau under the Army Commander. This bureau keeps statistics for the whole country and coordinates the requirements of all the services. There are 21 registration or conscription areas with a recruiting board for each area established under a designated army regiment.

Up to 1941 military training and service were selective and considerable numbers of men, though physically qualified, were not called up. As of 1 January 1942, however, every Swedish male between 20 and 47 years of age became liable for military service. Of approximately 48,000 men reaching military age each year, about 35,000 are inducted, with the remainder representing deferments and exemptions. Of those inducted about 25,000 normally go into the Army (mainly infantry), 5,000 into the Navy and Coast Artillery, and 5,000 into the Air Force. Opportunity is given inductees for training as both commissioned and non-commissioned officers.

e. Training.

(1) *Pre-Induction.*

Preliminary military training is given in a number of ways. Military instruction, totalling about one week devoted to target practice, is given in high school, and voluntary shooting clubs for boys 14-20 have a membership of approximately 320,000. Four hours weekly of Home Guard training is given teen-age boys (17-20) who may volunteer for training. Instruction consists primarily in infantry squad tactics and marksmanship. Physical conditioning consisting of gymnastics totals five hours weekly and is obligatory, and there is field and track work, including cross-country running. Finally there are extension courses for both teen-age boys and girls, devoted to civil defense training such as first aid, fire fighting, etc.

(2) *Army.*

The Army calls up its annual quota of recruits in the spring and divides them into two groups. Those in Group "I", which is by far the larger, are assigned to a particular branch of the service and to the unit nearest their residence. With this unit each recruit receives his basic training and to it he generally belongs for 17 years; he is then transferred to a local defense unit in his home area. Group "K" includes graduates of secondary schools, volunteers, and men with special qualifications. After completion of the basic training period, the soldier is assigned to his war organization. During the summer months, emphasis is placed upon individual recruit training

in the regiment. In addition to physical conditioning and gunnery, the infantry recruit is instructed in marksmanship, map reading, scouting, patrolling, and special subjects such as demolition, first aid, etc. Unit training, usually given during the winter months, includes maneuvers, combat firing and defense against airborne attack; emphasis is placed on snow, forest, and mountain fighting. Tactical unit training above that of the regiment is extremely rare.

In the third and eighth years after conscript training the men are required to serve an additional month. Usually this refresher training is accomplished during winter maneuvers, when partial mobilization of wartime units is held. This is the only time the conscript trains with the unit to which he will be attached in time of war. A final 30-day re-schooling course, normally taken during the seventeenth year, aims at qualifying the older soldier for service with a local defense unit.

All mentally and physically qualified men are eligible for officer training, although those selected are preponderantly high school (equivalent to 2 years of college in US) and university graduates assigned to Group "K" at time of induction. All officer candidates must complete basic training plus a six months' NCO course. Reserve officer training totals two years, while the course for regular army officers requires three. In addition, all officers are required to attend specialized courses at one of the infantry, artillery, cavalry, or engineering schools maintained by the Army. For NCO's the total training period, including 9 months' basic training, is 15 months plus the required refresher courses.

There is a Swedish Military Academy composed of (1) the War College at Karlberg (near Stockholm) which all officer candidates attend for one year; (2) the Defense College at Uppsala, at which Army, Navy, and Air Force officer candidates are trained, and (3) the Army NCO School at Uppsala. In addition, the Army maintains the Royal Staff College at Stockholm where a two-year course is designed to train officers for higher echelon duties.

(3) *Navy.*

The Navy calls up about 3,000 conscripts annually, in quarterly increments. Recruits are usually given basic training in their home naval district for 3 months after which the majority go to sea for the remaining nine months. The remainder spend a second 3-month period at specialist schools either in Stockholm or Karlskrona studying radar, sound signals, radio, etc. For their last six months this group joins the other at sea. About 660 regulars are enlisted annually for 4½ years. Enlisted reserves are considered too old for sea duty after 10 years and are transferred to the Coast Artillery Reserve or the Army Reserve. Officer training at the Naval Academy requires 3½ years and includes four cruises. About 150 candidates are in training at one time, with executive, coast artillery, and paymaster trainees in the ratio of 8 : 5 : 2 respectively. There is a continuous process of elimination; the loss is expected to be, and usually is, nearly 50 percent of the original entry. Instruction is not based on foreign doctrines, but rather on traditions and experiences of the Swedish Navy dating back to the 15th century. Upon graduation the midshipmen are assigned to coastal units for fleet training. Two years after graduation, specialist post-graduate

work is obligatory, and after five years every officer is required to attend a course at the Naval War College.

Engineering cadets take a four-year course at the Institute of Technology in Stockholm. After graduation, they spend two years in various industrial plants and then receive their commissions.

Merchant marine officers desiring to receive a commission in the Naval Reserve are required to complete a 1½ year course at the Naval Academy.

(4) *Coast Artillery.*

About 1,900 conscripts are called up for each 9-month cycle. The first seven months are devoted to basic training and the remaining two to firing instruction at one of the various forts. About 150 regulars are enlisted annually for a period of 4½ years. Enlisted reserves remain in the Coast Artillery Reserve for about 25 years, after which they are transferred to the Home Guard or other civilian defense organizations.

A firing school near Stockholm is the only training institution maintained by the Coast Artillery. After 2 years' basic training, one-half of which is spent at sea, an officer candidate is promoted to cadet. He then receives theoretical instruction at the Naval Academy, attends two command courses with Coast Artillery troop units and takes another tour of sea duty. The last semester is devoted to tactical instruction and a firing course. After completion of the prescribed 3¼-year training, the cadet is commissioned a 2nd lieutenant.

(5) *Air Force.*

The Air Force calls up about 5,000 recruits in two annual increments. Recruits are stationed at all air force installations and after four weeks' basic training are assigned to a specialized category in one of the four *Eskaders* (Wings). Each recruit is allowed some choice of station and specialty. Two-thirds of the enlisted reserves stay in the Air Force Reserve for 10 years, after which they are transferred to the Air Force Administration and remain until they are 47 years old. The other one-third comprises technicians who remain in the Air Force Reserve for their entire term. Technical and signal training is accomplished at Västerås and gunner training at Luleå.

As a result of a recent change, there are no enlisted pilots. Each year approximately 220 officer cadets and contract airmen enter the Central Flying Training School at Ljungbyhed for primary and basic pilot training. The course lasts 10 months and consists of 160 hours flying time plus ground instruction in technical air subjects. Trainees are then farmed out to Wings for one year where they complete 150 hours of basic operational flying. From this point they are separated. The officer cadets enter the Flight Cadet School at Uppsala for training as officers, and after one year and 60 hours of flying, those completing the course are commissioned. Contract airmen are of three grades based on educational backgrounds. They receive 150-200 hours additional flying training and general educational training proportionate to their prior schooling. Those selected for commission pass on to Uppsala with the remainder continuing as contract airmen for 6½ years after which time they leave the service.

There is an Air Staff College at Stockholm with administrative, staff and technical training courses for officers. All officers are expected to pass the administrative course five to six years after commissioning and before attending either the staff or technical schools. The staff school has the object of training officers for staff duties at higher levels; it alternates yearly with the technical school which trains officers for duties in the technical fields.

4. STRENGTH AND DISPOSITION OF THE ARMED FORCES.

a. General.

Latest available figures give the over-all strength of the Swedish Armed Forces at close to 74,000 men. More than half of this strength consists of conscripts in training. Maximum wartime strength after mobilization should swell the total to an estimated 825,000 including Home Guard.

While efficiency of personnel is generally high, fighting qualities are unknown as they have never been combat tested. However, the average Swede possesses the traits of a superior soldier and with proper leadership, can be expected to render a good account of himself. Younger officers can be expected to provide good leadership, but the older officers are to a great extent "hidebound."

b. Army.

The Swedish Army numbers about 50,000 men consisting of approximately 3,500 officers, 13,000 enlisted men, 25,000 annual conscripts undergoing basic training, and 8,000 conscripts held over for leadership training. The peacetime army has no tactical units larger than regiments, of which there are 38—19 infantry, 7 artillery, 4 cavalry, 4 armored, 3 anti-aircraft, and 1 signal. Each regiment with its cadre of key officers and enlisted personnel is operated as a training center for the annual conscripts assigned to it. For this reason there are no units ready for combat. In addition to these regiments there are 13 *kår,* which are between the regiment and battalion in size.

Fifty percent of the troops are located in the industrial area from Stockholm west to Göteborg, 10 percent near the Swedish-Finnish border, 15 percent facing Denmark, and the remainder scattered throughout the country.

Under the 1943 organization well prepared plans exist for a rapid recall of conscripts and reserves. The most expeditious means of notification are to be used, such as radio, newspapers, posters, and personal notices. Each man knows his unit and mobilization stations; available arms and equipment are stored at these stations and units can be formed in a matter of hours, once the personnel becomes available. In case of sudden attack, each man will proceed to his unit forthwith. If this is not possible, he will join another unit, and if that fails he will attach himself to the Home Guard. According to these plans, Sweden could probably accomplish initial mobilization of key personnel in 72 hours, but several more weeks would be required to complete mobilization and prepare the units for field service. Under their own standards and available stocks of equipment it is estimated that this mobilization would not exceed 350,000 men organized into 12 divisions. Approximately 350,000 additional men would probably be utilized in local defense and Home Guard units.

By US standards, the Swedish Army is poorly equipped. Automatic weapons, armored vehicles and anti-aircraft show a marked deficiency for modern warfare. In addition to some obsolete light tanks of Swedish and foreign manufacture the army is reported to have about three hundred 24-ton tanks (75 mm gun). Multiple automatic guns on motor carriages, such as the USA M-16 and M-17, are non-existent. Most of the Swedish artillery is 75 mm. or larger and represents a heterogeneous collection with many types obsolete. The supply of motorized vehicles is inadequate. Horse and even dog-drawn military vehicles are still widely used and transport vehicles are a key shortage. Other major shortages are in radar, anti-aircraft automatic weapons and communications equipment. Maintenance is, in general, of high standard.

Efforts are being made, mainly through the medium of the Swedish Bofors Company, to modernize present equipment where possible and to develop and manufacture improved models of nearly all equipment.

c. Navy.

The active personnel strength of the Navy presently exceeds 9,000. This includes 505 officers, 258 staff officers (these are partly naval, partly coast artillery officers, the two services having combined staffs), 1,550 warrant officers, 3,800 regular enlisted men, and 3,000 conscripts. There are approximately 185 vessels in the Navy with 115 of these of combat types. Owing to budget limitations and lack of skilled engineering personnel, only a portion of these ships are currently in commission. While those in commission plus some in reserve could be readied in two weeks, others cannot be considered active as units for a somewhat longer period. The time required would depend upon the type of duty to be performed (anti-submarine, AA, convoy, escort patrol, etc.). Personnel mobilization is another limiting factor, owing to uncertainty as to the number of merchant marine reserves whose ships would be in home ports at any given time, and the demands of civilian industry. To remedy this, mobilization plans specify recall of pensioned civilian and ex-navy personnel for whom a period of refresher training for gunnery, operational and tactical purposes would be necessary. Once fully mobilized the Navy would number over 42,000.

The three naval bases are located at Stockholm, Karlskrona, and Göteborg; each ship has one of these three bases as its home port. The principal combat force is the Coastal Fleet, usually located on the east coast. Major combat vessels include 3 cruisers, 15 destroyers, 6 escort vessels, 25 submarines, and 23 motor torpedo boats. Two of the cruisers are modern and the navy has a small destroyer program of sound design. The submarine service is the elite of the navy but no new submarines are being built at present, possibly owing to a desire to watch the rapid development in design prior to re-equipping.

With the exception of the two new cruisers, and two new destroyers, the fleet is generally lacking in modern armament. In general, the navy is inexperienced in present-day methods such as anti-submarine warfare, employment of radar and sonar, and AA fire control technique. However, very gradual modernization of existing ships is in progress. Relatively new vessels are being equipped with additional AA defense

and new technical aids; radar and sonar gear are being installed in some of the destroyers; and it is intended to make Schnorkel standard equipment on all submarines.

d. Coast Artillery.

Active personnel strength in the Coast Artillery totals approximately 3,300. This includes 235 officers, 520 warrant officers, 610 regular enlisted men and 1,900 conscripts. The staff officers are included above under (c) *Navy,* the two services having combined staffs. The major units are five regiments with one each located at Vaxholm Karlskrona, Gotland, Älvsborg, and Harnösand. Coast Artillery Defense District headquarters are located at Stockholm, Blekinge, Göteborg, Gotland, and Hemsö. Main equipment is immobile seafront and mobile anti-aircraft artillery plus floating batteries and minefields. A number of patrol craft and minelayers have been assigned by the Navy to the various District commands.

Little information is available on mobilization plans for the Coast Artillery. Because of the fixed nature of coast artillery defenses it is safe to assume, however, that this branch of the Armed Forces can man all positions in a very short time. It is estimated that the total reserve strength approximates 35,000.

e. Air Force.

Present Air Force strength is 11,687 with 1,147 officers and 10,540 enlisted men, including conscripts. There are 1,502 pilots including officer cadets and contract airmen.

The Air Force is considered Sweden's first line of defense against attack. It is estimated that the AF in an emergency could mobilize, disperse, and be ready for action within 72 hours. Approximately 32,000 semi-skilled draftees swell the mobilized strength to approximately 44,000 men. Trained replacements would remain at home until ordered up as reinforcements. Complete reliance on imports of fuel would undoubtedly prove a limiting factor in a total mobilization.

AF officers are proficient in the various specialized fields and the officer pilots demonstrate skill in handling aircraft. The reserve and enlisted pilots rank somewhat below the active officer pilots in proficiency.

There are twenty flotillas (US Groups) in the Swedish Air Force. Nine fighter, two light-bomber, two dive-bomber, one torpedo-bomber, and three reconnaissance groups make up the major operational units. One of the light bomber units is in the process of conversion to night-fighters. Of the four main tactical groupings, *Eskaders* (US Wings), into which the operational units are organized, Groups 1, 3 and 4 have headquarters at Stockholm. The fourth, Group 2, has headquarters at Göteborg, nearly 300 miles west-southwest of Stockholm on the Kattegat.

Current information indicates a total aircraft strength of 1,474, of which 1,011 are in tactical units to include 140 light bomber, 263 attack, 513 fighter and 201 reconnaissance. Except for 69 Vampire jets and 111 P-51D's, nearly all aircraft are obsolete. This situation is being partly overcome by the purchase of additional Vampire jets from Great Britain (210 airframes now on order for delivery by 1951) and of Spitfires for reconnaissance and Mosquitoes for night fighter duties. Also the Swedish

fighter type, J-21, is being converted to jet propulsion and a new Swedish type jet fighter, the J-29, is now undergoing flight tests with production scheduled by 1950. 510 J-29's are to be delivered by October 1953. Engines for the Vampire airframes and the J-29's are to be British designed jets produced by the Swedes under a manufacturing license from Great Britain.

Sweden is divided into five flying base districts with headquarters in Ängelholm (south), Göteborg (west), Stockholm (east), Östersund (north), and Luleå (far north). The Districts are responsible for the maintenance of some 40 secret airfields to be used in case of attack. Airfields in Sweden are generally grass, but work is underway to hard-surface most of the runways. The airfields, are, in the main, adequate for daylight fighter operations only, with none considered usable by US heavy or medium bomber types. Numerous underground hangars and workshops are in operation. Air Force plans call for sufficient underground installations within four or five years to house the entire fighter force.

f. Quasi-Military Organizations.

(1) *Home Guard.*

The Home Guard (Hemvärn) is a government-supported, semi-military organization numbering about 100,000 volunteers, its maximum authorized strength. Men below and above draft age (20 to 47) plus those of draft age deferred or exempt from military service are eligible. Units are immobile, and organized wherever people live; they are attached to and operate with the regular administrative and tactical units of the army in time of war when the Defense Commander takes operational command. The Home Guard's official wartime missions are: (1) to perform security and guard duties; (2) to maintain organized resistance; (3) to cooperate with regular forces; and (4) to relieve military units of line-of-communication work. Unofficially Home Guard units will also be intelligence-gathering agencies and will resist infiltrating elements in unit areas. The weekly four-hour training periods under qualified instructors consist primarily of infantry squad tactics and marksmanship training with small arms and hand grenades. At a special school Home Guard commanders are given a two-weeks' training course by regular army officers in small unit tactics and other military skills. This school trains about 2,000 men annually. Communist infiltration in the Home Guard is reportedly very low.

(2) *Shooting Association.*

This semi-military organization is composed of a series of local clubs with a central board in Stockholm. As of January 1947, there were 2,430 shooting clubs with 242,153 members; 540 pistol clubs with 15,089 members, and 173 sport shooting clubs with 3,119 members. Excellent instruction in small arms marksmanship and simple musketry is given. Any Swede may become a member, including regular and reserve military personnel. Free ammunition is supplied by the Government. At present, only rifles and pistols may be used, but arrangements are under discussion to permit military members to practice with automatic hand weapons. The clubs have little military value as most of their members are carried on the rolls of the regular,

reserve, or Home Guard forces; however, the Association fulfills its mission in that it raises the standard of marksmanship of the populace as a whole.

(3) *Voluntary Motorcycle Corps.*

This semi-military organization under Army control trains about 300 volunteers annually. These motorcyclists are used in the emergency organizations, both military and civilian. In addition, the Army trains its own motorcyclists.

(4) *Miscellaneous Quasi-military Organizations.*

The Army also maintains a voluntary nursing organization and voluntary veterinary and canine clubs. The Navy supports a Voluntary Sea Defense Corps and a Navy Youth Activity, the members of which are believed to be regular and reserve navy personnel. The Air Force maintains a private flying club. At the beginning of 1948 the Club had issued 1,184 private flying licenses with the largest group of trainees consisting of Air Force personnel.

(5) *Women's Corps (Lottakår).*

This corps, the Swedish equivalent of the WAC as to duties, is under the control of the Defense Ministry and currently numbers about 94,000 women. While it was never integrated with the defense forces, its membership exceeded 100,000 during World War II: women enrolled voluntarily and were given a modicum of training for duties such as canteen work, ambulance driving, nursing, aircraft spotting and clerical work. The High Command is expanding the program for the training and use of women as a regular branch of the armed forces; the Lottas will be provided with military uniforms and will receive military rating and pay.

The Women's Automobile Auxiliary under Army control, has a total of 1,300 members. Altogether, it has trained and registered 4,000 female truck drivers.

5. ESTIMATE OF MILITARY CAPABILITY.

As a result of basic national policy, Sweden's military capabilities are purely defensive. Attainment of any degree of offensive capability would require time for extensive reorganization. In addition, there are a number of deficiencies in manpower and economic resources, and equipment and training, which seriously limit Sweden's military capability. Yet, in comparison with other small nations, Sweden has Armed Forces that are strong, well trained, and well equipped. Backed by substantial readily mobilized reserves, these forces could, at present, successfully defend Sweden against any small nation, and probably any combination of small nations, that could bring arms to bear against it. In comparison with the great powers, however, Sweden's Armed Forces suffer in almost every respect and without substantial aid from outside could not hope to do more than delay a determined attack by a major power for a period of four to six weeks.

CHAPTER V

STRATEGIC CONSIDERATIONS AFFECTING US SECURITY

Geographic position causes Sweden to be of great though not vital strategic importance to the US. This factor of position, together with certain economic and political considerations and a small but useful military capability, make Sweden potentially a valuable ally.

The Scandinavian peninsula, of which Sweden forms the greater part, lies across the most direct air approaches to western USSR from the Western Hemisphere. From its southern part the entrance to the Baltic Sea may be controlled, and the main east-west lines of communication through Germany are within easy range. Therefore, if allied with the US and successfully defended against Soviet invasion, Sweden could provide bases (a) for offensive sea and air action against arctic and western Russia, (b) for bottling up Soviet naval forces in the Baltic and neutralizing important naval facilities, and (c) for operations on the flank of all Soviet communications with Central and Western Europe. Sweden could also provide fighter bases and anti-aircraft and early warning sites valuable in countering Soviet air operations against western targets. Sweden is, in short, the nearest to vital Soviet centers of all western democratic countries save Finland, and Finland has already passed virtually under Soviet control.

Conversely, in Soviet hands Sweden would provide offensive and defensive air bases, early warning facilities, and other installations. US air attacks launched from Greenland, Iceland, the United Kingdom, or carriers operating in the North Atlantic, would be hindered. But the most important Soviet objective in Scandinavia would probably be the long Atlantic coast of Norway with its admirable submarine bases for attacks against North Atlantic shipping. It is possible that the Soviets would attempt to occupy this coast without molesting Sweden. It is also possible, however, that their forces would pass through Swedish territory; and for US military strategy, one of the most important functions of Sweden is as a barrier against hostile occupation of the Norwegian coast. In the event of general war, a Swedish alliance would thus be valuable to the United States.

As to Sweden's economy, denial of its strategic materials would not affect US security, but its large, high-grade iron ore resources and capacity to manufacture ball-bearings, pit-props, other mining equipment and machinery, electrical equipment, and ships can contribute substantially to an integrated Western European economy, and thus to the reconstruction of Western Europe.

Finally, the staunchly democratic character of the Swedish government and people permits no doubt of their Western sympathies and would render them a strengthening political and moral force in a Western coalition whether in peace or war. But the Swedish government still hopes that the country may remain neutral in a third World War as it has in the first two. Realizing its significant strategic relationship to Soviet Russia, Sweden has assiduously sought to avoid giving offense to that country, and par-

ticularly to avoid any semblance of political commitment to the Western Powers as against the Soviet Union. Although not complacent about the possibility of neutrality succeeding, Sweden has urged this policy on Norway and Denmark as providing the best chance of avoiding war. Both reject the idea of isolated Scandanavian neutrality but as yet are hesitant to break up their close family relationship with Sweden by making formal commitments to the west. Thus far the differences of opinion among the three countries have prevented the foundation of a firm Scandinavian bloc which could carry a good deal of weight in European affairs.

CHAPTER VI

PROBABLE FUTURE DEVELOPMENTS AFFECTING US SECURITY

Only one significant development affecting US security could happen in Sweden; this would be an abandonment of the policy of non-alignment with either side of the East-West dispute. Otherwise, Swedish efforts will be directed toward: ensuring a continued weakening of Communist influence; the improvement of economic conditions; expansion of normal trade patterns with Western Europe, which is important both to continued Swedish westward orientation and to reconstruction in Western Europe; and a strengthening of the Armed Forces to ensure the attainment of a high state of preparedness along more modern lines.

With respect to the neutrality issue, Sweden will continue its efforts to induce Norway and Denmark to form the Scandinavian Defense Alliance, presently under discussion, on a basis of joint neutrality. This effort will probably fail, since Norway and Denmark realize that the strategic value of Scandinavia (particularly the Norwegian coast) to Soviet Russia will probably override any respect for a neutrality pact and that their future security is more dependent on obtaining military aid from the West than on maintaining Nordic solidarity. Sweden may, therefore, shortly be confronted with the alternative of modifying her neutrality stand or proceeding alone in a divided Scandinavia. Faced with such a choice, Sweden cannot be expected to do more than modify its neutrality to the extent necessary to form a Scandinavian alliance for joint military defense purposes but without Swedish commitments outside Scandinavia.

Because of the limited capability of Sweden's Armed Forces acting alone, the natural difficulty of defending the country against Soviet attack, and the apparent determination of the Swedish Government to postpone any commitment to the Western Powers until the very moment of such attack (thus eliminating prior military planning for concerted defensive action), it is extremely doubtful that Sweden could be saved from Soviet domination in event of war.

APPENDIX A

TOPOGRAPHY—CLIMATE

1. TOPOGRAPHY.

Sweden, including lakes covering about 14,500 square miles, comprises the eastern two-thirds of the Scandinavian Peninsula and is slightly larger in area than California (173,000 square miles) or one and one-half times the size of the British Isles. The two large islands of Öland and Gotland off the southeastern coast in the Baltic also belong to Sweden. The country is bounded in the west by Norway and in the east and south by the Gulf of Bothnia and the Baltic Sea. In the northeast there is a land boundary with Finland. Sweden is nearly 1,000 miles in length from north to south, and its greatest breadth is about 250 miles.

Densely forested Norrland, the northern part, accounts for more than half of the total area of the country and contains the principal rivers and forests and most of the mineral wealth. It consists of a series of plateaus which slope gently to the southeast from the Norwegian border to the Gulf of Bothnia. These plateaus attain elevations up to 5,000 feet near the Norwegian border, with isolated peaks rising a few thousand feet higher. This mountain barrier is lowest west of Östersund where good roads lead to the Trondheim Fjord. Approaching the Gulf of Bothnia, the terrain is rolling hill country. The entire area is parcelled by hundreds of rivers flowing southeastward through deep and narrow valleys, often flanked by precipitous cliffs and containing narrow fingerlakes up to 80 miles long.

Central Sweden, or Svealand, is the main lowland area of the country. The terrain consists principally of undulating, cultivated plains with scattered rocky hills; poor land in this area is still forested. Four large lakes—Vänern (2,124 square miles), Vättern (734 square miles), Hjälmaren (185 square miles), and Mälaren (440 square miles)—occupy a large part of the plain.

Götaland, or the southern part of Sweden, is an undulating plain interspersed with many lakes and canals; it is heavily populated and intensively cultivated.

The coastline is predominantly rocky, with innumerable small off-shore islands and shoals. Local knowledge is required for approaching almost any part of the Swedish coast and in many parts the extinguishing of light houses and the removal of buoys prohibits approach of any craft. Typical coastal areas have narrow, rocky, short beaches, ending abruptly in hills or cliffs, although some beach terrain is to be found in southern Sweden and on the Baltic in the Gävle area, north of Stockholm.

The limestone islands of Öland and Gotland are located off the southeast coast. To the west they end in precipitous cliffs, 100 to 200 feet high, while eastward the land slopes gently to the sea.

2. CLIMATE.

Several factors contribute toward variations of climate in Sweden's several regions. The land runs through more than 13½° of latitude; about 15 percent of its area is within

the Arctic Circle; the boundary mountains are sufficiently high to be much colder than the adjacent coastal lands, but are not high enough to shut out entirely the warming effects of those drifts of wind and water from the southwest which give Norway a remarkable climate; the southeastern and southern borders are washed by the sea; the piercing winter winds from the great Russian pool of cooled atmosphere sweep westward over the Swedish lowlands or reach the mountain tops. February is the coldest month and has a mean temperature of below freezing over Sweden. Stockholm averages 25.7°F., Göteborg 30.4°, but the coldest region is in the heart of Lappland where Karesuando, near the Finnish border has a mean of 5.2°. In some northern parts frost occurs in every month with Karesuando having only 5 months above freezing. July is the warmest month with the mean at Stockholm 62°F., Göteborg 62.2°, and Karesuando 54.2°. The summer is short but a high of 88° has been recorded in Lappland.

The relative length of seasons shows contrasts resembling those of temperature. Ice forms in the north in October and breaks up in May or June, while in the inlands the corresponding months are late November and April. Ice-covering of the lakes ranges from 100 days annually in the south to upward of 200 days in the north but local increases in the ice period occur in some highlands areas. Drifting ice usually appears in Kattegat Sound in January with obstruction later due largely to drift ice from the Baltic. In an exceptional winter the Sound may be completely frozen over. Ice conditions in the Baltic vary considerably from year to year but usually navigation in the southern part of the Gulf of Bothnia is impeded from the end of November to early May. In the north the gulf is covered with ice from November to mid-May.

The average rainfall for Sweden increases, on the whole, from north to south, reaching a maximum toward the southwest. Thus, the annual average rainfall varies from 16.5 inches in the far north to 35 inches for locales in the southwest. Heaviest precipitation occurs in the latter half of summer and the lightest in February and March. The proportion of total precipitation which falls as snow ranges from 36 percent in the north to 9 percent in the south. Snow lies for an average of 140 to 190 days in the north and 47 days in the south. Thunderstorms are rare in the winter occurring mostly between May and September, and on a maximum of three or four days in July. On the east coast fog occurs mostly in the spring and autumn with midsummer the clearest time. Elsewhere winter is the season of most fog, which is present about seven days a month from December to February. Inland fog is often very local.

APPENDIX B

COMMUNICATIONS

1. HARBORS.

Sweden has some 40 major ports, generally modern and well equipped. The principal ones are Stockholm, Göteborg, Malmö, Hälsingborg, and Trälleborg. Many Swedish ports, distributed principally along the Baltic coastline, are natural harbors formed at the mouths of rivers emptying into the sea. Most of the ports in the northern half of Sweden are ice-bound for long periods during the winter months; the major ones to the south are kept open for navigation the year around.

2. NAVIGABLE INLAND WATERWAYS.

Ten canals link up with the country's highway system. Only four are deep enough to admit vessels of any considerable size: (1) Trollhättan Canal connecting the Skagerrak with Lake Vänern; (2/3) the Södertälje and Hämmarby Canals, both connecting Lake Mälaren with the Baltic Sea; and (4) the Falsterbo Canal in the extreme south, permitting large vessels to pass from the Baltic to the Kattegat. A series of lakes and rivers in south central Sweden, joined together by canals in 1832, form what is known as the Göta Canal, representing a 240-mile cross-country inland waterway from Göteborg on the North Sea to the Baltic. In addition, numerous rivers useful for transportation and for floating timber radiate toward the central and northern coasts.

3. ROADS.

The State highway system, generally paralleling the main railroad lines, is centered in the southern half of Sweden, serving the farms, the cities, and the major industries. At the end of 1946, there was a total of about 56,000 miles of public highways, or approximately one mile of road for every 3.3 square miles of area. In addition, there are about 12,000 miles of so-called "private roads", although in the more important cases the state contributes 60 percent of the maintenance. A route numbering system has been adopted but is not yet in operation. It should be noted that Sweden is one of the few countries where traffic goes to the left.

One State highway runs along the entire east coast from Malmö as far north as Haparanda and extends into Finland. Other main trunk highways run inland from Stockholm to Malmö; from Stockholm to Göteborg, with a branch to Hälsingborg, and from Stockholm cross-country to Oslo. From Oslo a trunk highway runs inland some distance to Göteborg then parallels the Kattegat coastline and the Sound to Malmö. Another arterial highway runs inland the entire length of the country from Hälsingborg to Karesuando on the Swedish-Finnish frontier. Considering the generally rugged terrain, the highway network is well developed in the northern half of the country.

The most common form of road surfacing is surface-treated macadamized gravel, of which there were about 53,000 miles by the end of 1946. Road building was practically at a standstill during the war. While no new arterial highways are currently under construction or projected, a comprehensive reconstruction and repair program of existing roads has been put into effect. This plan includes the strengthening of bridges to carry a maximum axle load of 14,000 kg. (13.8 tons) with a maximum wheel pressure of 7,000 kg. Currently only a small part of the road system can stand a pressure of even 3,000 kg.

4. RAILWAYS.

Sweden has the greatest European railway mileage per capita (2.67 km. per 1,000 inhabitants), and the railways have to compete with well developed bus and coastal steamship services. As of July 1945, there were 10,448 miles of State-owned and private standard-gauge lines. Eighty percent of railroad traffic is now electrically hauled; power failure would drastically reduce Swedish railway capacity since the available steam locomotive park is totally inadequate. The Swedish railway system fulfills both peacetime and military needs.

The strategic main lines are: In Norrland, the east-west Luleå-Narvik line, single-track, completely electrified with power supplied by separate generators in the Porjus power plant. This line serves the iron ore mines at Kiruna and Gällivare; a short line from Boden runs to Tornio where it connects with the broader Soviet-gauge rail net in Finland. It also joins the north-south electrified Malmö-Tornio line, running the entire length of the country. In central Sweden, at Läxa and Hallsberg, other main lines branch off from the basic north-south artery to Stockholm, Oslo, and Göteborg. Läxa and Hallsberg control the Stockholm-Oslo and the long Tornio-Luleå-Malmö lines. The destruction of these two key transportation centers would seriously cripple transportation of through line traffic. From Bräke, in north-central Sweden, a through line runs to Trondheim in Norway. This is another vital key point on the north-south main line. Other transportation nuclei of strategic importance are at Malmö, Hälsingborg, Stockholm, Avesta, and Luleå.

The work of electrifying the railways, considered of major economic and strategic importance owing to Swedish lack of natural fuel, progressed throughout the war; it was partially dicontinued on 1 July 1947 due to shortage of labor and materials.

Train ferries, starting from Trälleborg, Malmö and Hälsingborg connect with Denmark and Germany. Although in themselves not vital to the interior transportation systems, they have considerable strategic value as links with the European mainland.

5. MERCHANT MARINE.

The Swedish merchant fleet ranked tenth in the world before the war, with 1,619,000 GRT. During the period 1939-45 it was somewhat reduced by war action. About 80 percent of Swedish merchant vessels of 2,000 tons and over were engaged in Allied service outside the Skagerrak blockade.

At the beginning of 1947, the Swedish Shipowners' Association, to which all major shipowners belong, comprised 168 shipping firms with 538 vessels totalling 1,478,493 GRT (2,268,097 dwt.); 13,837 men were employed on these vessels. About 173,000 gross tons were added to the fleet in 1947. It is estimated that about 50 percent of the merchant fleet is over 20 years of age and considered obsolete; 1.3 percent of the vessels are under 10 years of age, and 2.3 percent are under 5 years old. The following table indicates the total ocean-going merchant fleet by type of vessels at the beginning of 1947:

301 Steam vessels	481,464 GRT
176 Motor vessels	685,301 GRT
2 Tank steamers	688 GRT
56 Motor tankers	301,365 GRT
3 Tank lighters	675 GRT
Total	1,478,493 GRT

Net earnings of the merchant marine in 1946 amounted to approximately 350 million kronor, or approximately 100 million dollars; earnings were increased by 13 million dollars in 1947.

6. Commercial Aviation.

International commercial aviation was placed on a solid basis when the Government-controlled ABA (AB Aerotransport) was founded in 1924. Before World War II, ABA operated regular routes to Finland and England. By the summer of 1940, inauguration of an air service to the US via Iceland and Greenland was under consideration, but was abandoned because of the war.

SILA (*Svensk Interkontinental Lufttrafik* AB) was established during the war and is privately owned. Its shares are held by ABA (50% government owned), business, industrial, and shipping companies.

SILA with the DDL (The Danish Airlines) and DNL (The Norwegian Airlines) comprises SAS (Scandinavian Airlines System) which was established in July 1946. Sweden, Denmark, and Norway formed a joint service in this company to operate airlines to North and South America, Africa and the Far East, while ABA and the airlines of Norway and Denmark operated concurrent and competing traffic in Europe until 18 April 1948. On the latter date ABA and SILA merged from an operational standpoint, though technical merger had to await Swedish Riksdag approval which was given in July 1948, and their activities are now coordinated under SAS. The merger of ABA and SILA and the joinder of this new company to SAS practically effects a 100 percent consolidation of Scandinavian airlines and eliminates Scandinavian competition in Europe in the same manner that such competition was eliminated in intercontinental traffic by the original SAS organization. It is estimated that SAS, when it receives the DC-6's and Boeing Stratocruisers now on order in the US, will have between 90 and 100 planes which will make it one of the world's largest single airlines.

The most important commercial airdromes in Sweden are (1) Bromma, near Stockholm, furnished with latest American communications, weather and air navigation equipment, and (2) Torslanda, near Göteborg. There are two fully equipped flying boat bases at Stockholm and Karlskrona. The most northerly airdrome is at Kiruna.

7. ELECTRIC COMMUNICATIONS.

a. Telephones.

The government owns the telephone system. In the number of telephones relative to population, Sweden is exceeded only by the US. There are about 18.3 telephones per 100 population. In 1945, there were 6,877 telephone exchanges and 1,583,389 miles of telephone wire.

b. Telegraph.

The Royal Telegraph Office owns and directs the telegraph system. The local administration of the network is arranged in six districts, with centers in Malmö, Göteborg, Norrköping, Stockholm, Gävle, and Sundsvall. In 1945, there were 4,389 telegraph stations connected by 5,066 miles of wire. The service is adequate to the needs of the country.

c. Cables.

Sweden possesses extensive international cable connections, although the only direct contacts are with her northern neighbors.

d. Radio.

The Swedish radio system is government-owned. There are 33 broadcasting stations, the three largest being Motala (150 KW), Falun (100 KW) and Hörby (60 KW). The government charges an annual license fee of Kr. 10 ($2.80) for each radio receiving set. In October 1948 the number of licensed radio sets was 2,000,000.

APPENDIX C

POPULATION STATISTICS AND CHARACTERISTICS

1. STATISTICS.

At the beginning of 1948, the population of Sweden numbered 6,842,046 (6.1 millions in 1930), averaging only about 40 persons per square mile. The Malmö, Göteborg, and Stockholm areas have the heaviest population, whereas the provinces bordering on Norway and those in the extreme north are the most sparsely settled. Malmöhus Province in the extreme south has about 269 persons per square mile, while in Norrland, in northernmost Sweden, there are less than 11 persons per square mile.

2. RACE.

The Swedes are of virtually pure Teutonic blood although individual groups of Scots and Walloons, about 7,000 Jews, and a sizable population of Finns (about 34,000) have settled in Sweden.

The most distinct ethnic minority is the Lapp population of about 7,000 living in the far northern area. The exact racial origin of the Lapps is unknown but physically, linguistically, and culturally they are entirely distinct from the Swedes. Physically they are midway between the Asiatic Mongoloids and the European Alpines; their language belongs to the Finno-Ugrian group. In general, they subscribe to the Christian faith. Fishing and settled agriculture occupy many, but more than half of them are still nomadic and make a living from their herds of reindeer. The Lapps are scattered throughout the strategically important area of the Lappland iron mines. There is no evidence that they are dissatisfied with Swedish rule.

3. ALIENS.

The number of foreign residents in Sweden is about 178,000 (23,700 in 1939), of which roughly 87,000 are gainfully employed. These aliens are mainly workers from the other Scandinavian countries and refugees from the Baltic States. Approximately 4,300 laborers, mainly Italians, Sudeten Germans, and Hungarians, have been imported to work on a contract basis.

4. RELIGION.

Sweden has a National Church (Lutheran) which includes practically the entire population. Approximately 400,000 adults are members of dissenting Protestant groups, most of which, however, have not formally severed their connection with the National Church. In addition there are several Protestant sects completely divorced from the National Church, about 5,000 Roman Catholics and 7,000 Jews, all of which enjoy complete freedom of worship.

5. LANGUAGE.

The language of the country is Swedish, a member of the Scandinavian or North-Germanic group. The knowledge of foreign languages, especially German and English, is widespread. In recent years the latter has taken precedence and English-speaking persons can move about freely in Sweden without an interpreter.

6. EDUCATION.

The illiteracy percentage of 0.3 percent is the lowest in the world. This is all the more impressive when it is remembered that the nomadic Lapps make up most of this ratio.

The Swedish public school system, covering the school age from seven to fourteen, has attained a high degree of competence. There are numerous higher elementary and secondary schools; a new education bill has been passed, but not yet put into effect, to streamline their confusing arrangement. In 1947, 8,444 students were registered at the four Swedish universities—Uppsala, Lund, Stockholm and Göteborg. Of these universities, Uppsala and Lund are supported by the state while Stockholm and Göteborg are privately and municipally supported. In addition to the four universities, there are numerous specialized technical schools; among the more notable are the Karolinska Medical Institute, Chalmers Institute of Technology at Göteborg and the Royal Institute of Technology at Stockholm.

Many scientific agencies help to keep Sweden among the leading states in certain lines of industry. Among the more notable ones are the Schools of Mines at Stockholm and Filipstad, a State-supported College of Forestry, and a Commercial University College. Several academies sponsor research, as the Academy of Sciences and the Academy of Engineering Research. There is also a Metallographical Institute and a Cellulose Research Laboratory.

7. SIGNIFICANT PERSONAL CHARACTERISTICS.

A homogeneous people with no racial conflicts, the Swedes are deeply rooted in an ancient culture. In this atmosphere, social and economic forms have evolved with far less conflict than in most other countries. Long after the industrial revolution had begun to change much of Europe, Sweden remained remote and rural. As late as 1830, more than 80 percent of the people lived off the soil, and by 1870 the rural population still constituted 72 percent. With the rapid development of native industry after 1860, the Swedes began to borrow social and economic forms from the European mainland and from England. These they modified and adapted to their own ends. Protected from wars and imperialist rivalries by a wide strip of sea, the political and economic life of Sweden progressed slowly and carefully. Out of this evolutionary growth came a way of life that is characterized by stability, order, and sanity which sets Sweden, as well as Denmark and Norway, quite apart from the rest of the Continent.

Vestiges of an older privileged society still linger and an elaborate ceremonial persists. Though small in numbers, the noble families exercise a subtle influence in the

realm of manners and custom. The average Swede, however, is not old fashioned; keeping up with the present has become almost a fetish. The arts are generously supported, and the attention given to science and invention is widespread. The pursuit of physical fitness has become a cult in all strata of the nation. The Swedes are to a high degree mechanically minded, and have established a creditable tradition in the manufacture of precision instruments. Swedish engineers have an enviable record of achievement both in Sweden and abroad.

APPENDIX D

SCIENCE IN SWEDEN

1. INTRODUCTION.

In a discussion of the status of Swedish science and technology, it is necessary to remember that Sweden's population is only 6,800,000 — about equal to that of Texas, but occupying an area two-thirds the size of that state — with inhabitants concentrated in a few large cities. Swedish scientists, though few in number compared with those of the US, are thoroughly trained and highly respected, both in their own country and abroad. In the past 30 years, Sweden has had three Nobel Prize winners, one in physics and two in chemistry. Outstanding recent contributions to original research have included the developing of new tools and new techniques in the biochemical and physicochemical study of high-molecular-weight materials. In the field of applied research, Sweden has contributed important practical developments in forestry and forest products. Although exact figures are not available for comparison, it has been estimated that Sweden's expenditures for research in 1947-1948 represented approximately one-half of one percent of those of the United States, while its total budget was three and one-half percent of the US budget.

2. ORGANIZATION OF SCIENTIFIC RESEARCH AND DEVELOPMENT.

The goal of research organization in Sweden is the maintaining of a delicate balance between organic structure and individual freedom. To this end, Sweden has evolved a pattern in which education, state, and industry provide a tripartite nucleus for the grouping together of institutes, research councils, academies, universities, and related units. Within this whole body of organized research, individual Swedish scientists are provided with the means to participate in a variety of research activities. In order to facilitate government-industry cooperation, the Swedish Government appointed, in 1940, a committee of experts under Gösta Malm, which recommended the formation of such advisory councils as the State Council of Technical Research (1942), the Council of Research on Natural Science (1946), and the Atomic Research Committee (1945).

The government also maintains a number of State laboratories and institutes, one of the most important being the Research Institute of the Defense Forces, which carries on research in chemistry, physics, and teletechnics as related to the national defense.

The State also owns the Swedish Peat Utilization Company and the Swedish Shale Oil Company; the latter's plant at Kvarntorp in Närke, near the shale beds, is producing not only shale oil but uranium from shale ash. Sweden is interested in atomic energy as a substitute for coal, oil, and wood, and to supplement hydroelectric power.

Sweden's two principal academies, the Royal Academy of Science and the Royal Swedish Academy of Engineering Sciences, have established a number of research institutes in pure and applied science.

Advanced scientific education in Sweden is mostly concentrated in two State Universities (Lund and Uppsala), one smaller, private and municipal university (Stockholm), and two technological institutions (Royal Institute of Technology and Chalmers Institute of Technology). The universities are supervised by a government official, the Chancellor of the Universities; the two technical schools are governed by a common board of directors with representatives from both State and Industry.

The most important industrial research commission is the Jernkontoret Forskningsverksamhet, controlled by the Swedish Ironmasters' Association. This commission cooperates closely with educational institutions and with steel works and their laboratories.

In recent years several cooperative research institutes have grown up, which operate under an agreement by which the government provides buildings plus funds for basic research, while industry provides all equipment plus funds for applied research. Two of the largest and most important cooperative institutes are the Swedish Wood Research Institute and the Institute for Metal Research.

3. SCIENTIFIC AND TECHNICAL TRAINING.

As early as 1944, the Kemikontoret, a group representing the Swedish chemical industry called attention to the fact that Sweden's shortage of scientific personnel was attributable in part to the very rigorous standards in mathematics, chemistry, and physics required of students entering the schools of higher learning. Fewer than half of those who applied were accepted. The Kemikontoret recommended that a more realistic approach to entrance requirements be taken. They further recommended that there be an increase in the teaching staffs, more time set aside for research, the appointment of outstanding foreign scientists and technologists, and a joint directorate for the two technical institutes (Chalmers and the Royal Institute) with industry receiving increased representation beyond that allowed in 1944. Some improvement has been made as a result of these and other recommendations, but Swedish needs for scientists and engineers are still far from being fulfilled.

The two state universities, Lund and Uppsala, and the two technical institutes, Chalmers and the Royal, are the educational centers for scientific and technological training.

At the universities, the degree of doctor of philosophy may be obtained only after the candidate has qualified in all preliminary work and has prepared, published, and publicly defended his thesis. The highest academic title is that of "docent", given to a Fil. Dr. (Ph.D.) who has passed his examination with honors. The degree, Fil. Dr., normally requires about twelve years of undergraduate plus graduate training.

Of the 4,795 students enrolled at the Universities of Lund and Stockholm in the spring of 1947, approximately twenty-two percent were studying mathematics and the natural sciences, under the direction of twenty-nine full professors of science. At the University of Uppsala there were twenty-one full professors. No figures are available for the number of science students.

The degree of doctor of technology (Tekn. Dr.), like that of Fil. Dr., may be attained after six years of successful study in the lower schools plus additional prep-

aration in a chosen field leading to the publication and public defense of an approved dissertation. As in the universities, the title of "docent" is awarded to a doctor of technology who graduates with honors.

In the autumn of 1946, there were in total about 3,000 students and 80 full professors at Chalmers and the Royal Institute. In an effort to meet the ever-growing demands for technical workers, both institutes plan to expand their enrollment by fifty percent; but the fact that this quota will not be met until 1960 is indicative of Sweden's scientific and technical labor problem.

4. PHYSICS AND ELECTRONICS.

a. Atomic and Nuclear Physics.

There are no indications that Sweden is working on atomic-energy problems for bomb production. Motivated by the acute fuels shortage, Swedish scientists are directing their efforts toward developing atomic energy as a substitute for coal and oil. According to one estimate, production of power at a low level from atomic energy will begin within the next two or three years.

Only a few of Sweden's outstanding scientists were interested in nuclear physics before World War II, but since then many have left their original specialties for this field. Close liaison exists among the Swedish, Norwegian, Danish, and French scientists on matters pertaining to atomic energy.

Plans for a pile, or uranium reactor, have not yet been completely crystallized; instead they are being kept flexible in the hope that current laboratory research will point the way towards the best possible construction.

At the Chalmers Institute of Technology, the Royal Institute of Technology, the University of Uppsala, and the Nobel Institute, new facilities for nuclear research are under construction. The few, but brilliant, theoretical nuclear physicists at these four locations are active and productive in the study of meson fields, nuclear interactions, and quantum electrodynamics. Other studies include the theory of the diffusion and slowing down of neutrons, the exchange forces in nuclear three- and four-body problems, and the photographic-plate techniques for investigating nuclear processes.

(1) *Cyclotrons.*

Sweden has one 32-in. cyclotron in operation, and two new ones under construction. The larger of these, a 100-in. one, will be located at the Institute of Physical Chemistry at Uppsala; the other, 88-in. in diameter, is being built by ASEA for the Nobel Institute at Stockholm.

(2) *Beta-ray Spectroscopy.*

Beta-ray spectroscopy is one of the most powerful tools for the study of energy levels of complex nuclei, and Sweden's Nobel Institute for Physics is one of the world's leading centers for this kind of research. About seven scientists at the Institute are providing able leadership in the intensive investigation of medium and heavy nuclei. Their several new beta-ray spectroscopes of the axial focussing type are being used, in addition, to investigate the application of tracer elements in other branches of physics, and in biology and engineering. Some attention is being given to counters and counter circuits.

(3) *Uranium Production.*

Indications are that uranium production is disappointingly slow. Sweden claims, however, that, from the enriched oil shale ("kolm") and from the residue of oil distillation, production will eventually reach nine tons of uranium a year. Estimated from the practical, economic point of view, Sweden's total resources of uranium are about 100,000 tons. (For further discussion of shale, see Applied Research and Engineering.)

b. Electronics Research.

Research in electronics is strong in some phases, weak in others. Radar is one of the weak phases, the decisive reason being the lack in number of scientific personnel and technicians. On the other hand, telecommunications as represented by the developments at L. M. Ericsson AB (in conjunction with the Chalmers Institute) is developing strongly. In the field of antenna research Sweden has long been in the forefront and, as a corollary, a high degree of competence in the field of propagation of radio waves is exhibited. Nuclear electronic instrumentation is not voluminous although adequate technical skill is available.

(1) *Radar and Microwaves.*

What little radar equipment Sweden has is composed mostly of obsolete German sets and a few modern installations for weather forecasting and ship navigation. The Defense Research Institute, however, has a program for radar development. In addition, research on microwaves has been started at two institutes of technology: Chalmers and the Royal Institute. There is also evidence that investigations into new techniques for ultra-high frequencies, including microwave propagation, are being carried on.

(2) *Vacuum-Tube Developments.*

Sweden, forced by World War II into producing the vacuum tubes formerly purchased from abroad, has become virtually self-sufficient in this medium. Tube types, however, are largely modeled on those of the United States, Britain, and Holland.

An interesting development at the Royal Institute of Technology is the new electronic-switch tube called the "trochotron." The "trochotron," extensively tested in Britain, can be used reliably under certain conditions as a scalar for counters or for memory devices in high-speed calculating machines; but in general it possesses only a slight advantage over the more conventional installations.

Research on the travelling-wave tube has so far not achieved favorable signal-to-noise ratios. The work is being done at the Chalmers Institute in collaboration with the L. M. Ericsson Company.

(3) *Guided Missiles, VT Fuzes, and Servomechanisms.*

The latest Swedish electronics development in guided missiles, is the use of (a) radio guidance on mid-course, and (b) the Swedish toss bombsight at terminal flight. Successful work has been concluded on a VT fuze for free-falling and glide bombs, limited, however, to low accelerations. (See also Technology, Ordnance.) Direct

sale to eastern governments of either of these two items is unlikely. The now separate Army, Navy, and Air Force Guided Missile Sections are being combined into one unified bureau.

In the field of servomechanisms, Sweden has progressed at a pace commensurate with that of the United States and Great Britain.

(4) *Television.*

Television research in Sweden has been almost non-existent. Whatever research is now being done will have military precedence. Television sets for Swedish homes will not become a reality for at least five years.

(5) *Additional Electronic Items.*

(a) Considerable attention has been given by Swedish scientists to the directional characteristics of atmospherics and to radar studies of the phenomena of the lower atmosphere.

(b) At the Nobel Institute for Physics, an electron microscope has been constructed, and at the Physics Institute, Uppsala, one of the first mass spectrometers in Sweden, has been completed.

(c) Based on years of previous research, Swedish scientists are carrying forward the further development of the electromagnetic theory of antennas and the formulas for calculating their impedances.

(d) So far as is known, no infrared research other than that in spectroscopy is being done in Sweden today.

c. Astrophysics.

Sweden has long been prominent in the astronomical and astrophysical fields. At the Royal Institute of Technology research continues on the cause of the aurora.

A theory of sunspot formation has also been evolved, in which magnetic whirl rings generated by convection in the solar core are shown to have the eleven-year period as their transit time. In addition, studies have been made of the solar general magnetic field and the geomagnetism of solar rotation.

Cosmological research on the origin of the chemical elements has been a subject of research at the Institute for Mechanics and Mathematical Physics at the University of Stockholm.

d. X-rays and Crystallography.

Sweden has played a long and honorable role in this field, beginning with Röntgen himself. One of the chiefs centers is still at the Physics Institute of Uppsala.

Sweden's comprehensive interest in X-rays has led to a fairly intensive interest in crystallography. It may be that neutron diffraction studies will soon also receive attention.

Recent work in crystallography includes a study of the crystal structures of lawsonite, bismutite, and beyerite, and a quantum-mechanical calculation of the cohesive energy, interionic distances, and elastic constants of lithium, sodium, and potassium chlorides.

e. Applied Mathematics.

Following a visit to the United States, a commission of Swedish mathematicians recommended that a high-speed computing machine be purchased for immediate use and that another be built in Sweden.

f. Other Areas of Investigation.

(1) *Optics.*

Work on optical and infrared spectra is being pursued fairly extensively. The Physics Institute at Lund has recently become concerned with such optical problems as the Stark effect, dispersion in gases, and analysis of atomic spectra.

(2) *Radiofrequency Spectroscopy.*

A beginning has been made in the field of radiofrequency spectroscopy with the devising of equations for the frequencies of the longitudinal, torsional, and lateral vibrations of rod-shaped cylindrical molecules. The possibility of investigating the vibrations of polar macro-molecules by measurement of dielectric properties is under discussion.

(3) *Low Temperature.*

In the low temperature area the properties of liquid Helium II have been receiving further study.

(4) *Metals.*

Research in the theory of metals includes the electric and magnetic properties of metals and alloys, the order-disorder transformations, and the kinetics of precipitation in alloys.

(5) *Acoustics.*

Although the total effort is not impressive, an increase in emphasis on acoustics is apparent from an article giving standards for acoustical definitions and measurement methods.

5. CHEMISTRY.

With but few in the field Sweden is nonetheless a dominant figure in the chemical field among the nations of northern Europe.

a. Organic Chemistry and Biochemistry.

At the University of Uppsala, an oil-resistant rubber, called Svedoprene after its originator Theodor Svedberg, was produced on a commercial scale during the last war. Although it is a useful material, it is costly.* At the University of Lund, progress is being made, under the guidance of Lennart Smith, on resins and intermediates from retene. At both Uppsala and Lund, research projects on organic compounds of sulfur are aimed primarily towards the development of new elastomers and plasticisers.

At the Royal Institute of Technology, Holger Erdtman's group is working on lignin, lignanes, humic acids, the fungicidic constituents of coniferous heartwood, and on the symbiotic and antibiotic substances from fungi and microorganisms which destroy wood and pulp. Further research on the utilization of the by-products of wood

* Svedoprene is comparable in some respects to US Neoprene.

and on new methods of cellulose manufacture is being conducted at the Wood Products Research Institute, under Erik Hägglund.

In the industrial chemical laboratories, alcohols, fusel oils, turpentines, tall oil, DDT, wood preservatives, amino resins, alkyds, phenolics, chlorinated solvents, and derivatives of benzene and toluene are being developed or intensively investigated. One Stockholm firm has recently begun producing penicillin on a scale intended to supply the major portion of Swedish requirements for this antibiotic.

b. Physical Chemistry.

Swedish physical chemists have earned a world-wide reputation by their contributions to the chemistry of high-molecular-weight materials and to the development of experimental techniques for basic physical-chemistry research. Their methods for studying various protein and cellulosic systems have been adopted or further developed, in all the major countries, for they are of considerable practical significance in such fields as plastics, rubber and textile technologies.

Consequently these Swedish scientists experience ease in obtaining funds for research institutes and equipment.

The Institute of Physical Chemistry at Uppsala leads in its field in the Scandinavian countries; in certain areas, particularly sedimentation analysis and electrodiffusion phenomena, it ranks first in the world. This institute has also entered the field of nuclear reactions, supplied with funds from the Rockefeller Foundation, but it is not yet clear whether the emphasis will be on the chemical or physical aspects. During the last thirty years the Institute has developed, and also constructed for other laboratories, items of precision equipment for measuring the basic properties of large molecules.

Several Swedish laboratories possess such modern physical-chemistry tools as large optical and mass spectrographs, electron microscopes, X-ray and ultrasonic equipment. The reputations of the leading personalities, creators of new experimental approaches, have attracted to Sweden for study promising young scientists from many other countries.

c. Chemical Warfare.

Sweden's efforts in military chemistry have been limited to the defensive aspects only. "Pentamin," a successful anti-mustard gas agent, an anti-gas liquid for winter conditions, claimed to be superior to a similar British product, and some protective clothing and facial masks comprise the extent of known Swedish chemical-warfare developments.

6. Biological Warfare.

Sweden is fully aware of the importance of biological warfare, but to date has shown no evidence of taking vigorous steps even towards the development of defensive measures. The proposed appropriation for all medical defensive research for the year 1948 amounts to only 415,000 crowns. And according to Dr. Gunnar Olin, Head of

the State Bacteriological Laboratory at Stockholm, no provisions have been made for mass immunization in the event of a biological-warfare attack.

Two of Dr. Olin's associates, Dr. Hans Ericsson and Dr. Sven Gard, have been assigned to the full-time study of biological warfare. Professor E. Torsten Teorell, M.D., Director of the Institute of Physiology at Uppsala, and Professor Hilding Berglund, M.D., Professor of Surgery at the University of Stockholm, have been appointed biological warfare advisors. These actions are the most decisive taken thus far.

An American source who talked with Olin, Gard, and Ericsson in January of 1948 reports that Ericsson had completed a digest of the unclassified Rosebury-Kabat analysis of possible BW agents. Although Ericsson was enthusiastic, he seemed confused about the proper approach to take in the drawing up of a domestic program for BW. Dr. Gard, Professor of Bacteriology at the Caroline Institute, stated that, in his opinion, viruses — with the possible exception of the psitticosis virus — were not suitable agents for biological warfare. As Dr. Gard is being considered for the position of Professor of Virology and as other countries have already progressed far enough to be convinced of the feasibility of using certain viruses in BW, it is apparent that Sweden is lagging behind in biological warfare research.

7. Applied Research and Engineering.

Consistent with her position as a small but highly industrialized nation, Sweden has well qualified personnel and excellent, modern facilities for both applied industrial research and experimental engineering. Prior to World War II, Sweden had approximately 125 privately owned industrial laboratories, staffed with about 2,000 workers of whom 350 were technically trained. In 1939 over half of these laboratories belonged to the steel and engineering industries. Currently, several firms are operating new laboratories, each with facilities for 10 to 30 trained researchers and 20 to 40 assistants. Two other types of applied research laboratories are the state research institute and the semi-industrial branch institutes, the latter administered by trade associations but financed jointly by industry and the state.

Scientists for Sweden's industrial-research programs are trained primarily at the two institutes of technology, which have together somewhat fewer than 3,000 students, of whom only one-third graduate in either the engineering or natural sciences. The greatly increased national research program, together with the restrictive educational system, is straining the recruitment potential of technological personnel.

Present efforts in applied research are directed towards those exportable products having the most beneficial effect on the national economy, for example, steel, lumber, engineering products, and substitute and synthetic fuels. Swedish industrial research excels in those industries which depend on an abundant electrical power supply, as in the electrosmelting of metals and other metallurgical processes. Sweden's metallurgists are more comprehensively trained than those of the US, particularly in the field of high-temperature alloys.

Since the war, there has been an estimated increase of 100 to 300 percent in the production of precision equipment. Special emphasis is placed on automatic and

precision measuring devices, on control instruments, and on antifriction and ball bearings, in which field Sweden leads the world outside the United States.

For many years, Sweden's fuel technologists have been working to perfect methods for extracting oil from shale and for utilizing sulphite alcohol to augment the limited amounts of motor fuel obtained from shale. The importance of the Swedish work with shale oil lies in the development of a continuous process rather than the batch processes used in all other countries, including the United States. Plans are well advanced towards the recovery of C_3 and C_4 constituents, which will eventually serve as a source of raw materials for the growing chemical industry. By means of the so-called Ljungstrom method, oil can be produced without removing the shale from the ground, and moreover this method makes possible the refining of gasoline and Diesel oil conforming to US Navy specifications, a feat that our own oil technologists have not yet been able to duplicate.

The 1,500,000 tons of shale mined each year yield approximately 100,000 metric tons of oil products, from which gasoline with an octane rating of 70 to 72 can be made.

Swedish engineers have exhibited a high order of inventive design and creativeness in their underground assembly lines.

8. TECHNOLOGY.

a. Ordnance.

The Bofors Company, one of the world's leading manufacturers of armaments, is at present concentrating on the following projects: a VT fuze for use with artillery; a squeeze bore attachment for gun barrels; a multiple-mount, recoilless, 18-gun aggregate called the Stalin organ; and several types of automatic weapons.

The Stalin Organ is an assembly of 18 recoilless, 10.5-cm. guns, arranged in three tiers of six guns each. Although four Stalin Organs are under development, the project may be abandoned (a) because of the proportionately high quantity of propellant necessary to achieve the desired muzzle velocity and (b) because, unless a brisk breeze is blowing, the gun position becomes unbearable during the two to three minutes following the simultaneous burning of the 81 kg. of powder.

In the field of automatic weapons, Sweden prefers to purchase the actual weapons or the manufacturing rights to them from other countries, including the United States. Objectives of present Swedish Army automatic weapons include a machine pistol of about 2.5 kg. weight, an automatic or semi-automatic rifle similar to the Garand, a light machine gun with a bipod and tripod mount, anti-aircraft weapons for close-in defense of ground troops, and the conversion of the present 6.5 mm. Browning-type gun to the US caliber .30. Development of the above weapons is slow.

b. Rockets and Guided Missiles.

In addition to the armaments projects referred to in Section *a.* (above), the Bofors Company has under development short-range rockets and guided missiles and a solid, slow-burning powder for rocket fuel.

There is no evidence that Sweden is attempting the development of a long-range guided missile or rocket. The emphasis, rather, is on the perfection of a 300-mile range, V-1 type which is equipped with a turbojet engine, and on a 40-to-140-mile-range V-1, equipped with an intermittent jet engine. To date, both developments lack satisfactory power plants.

At Bofors and elsewhere, other Swedish developments in rockets and guided missiles comprise:

(1) an experimental missile, the 300-LT-FO2 (formerly designated as the 250-LT) for catapult-launching from an airplane;

(2) an anti-warship and anti-merchant marine projectile, Missile 301, to be launched from the 21-R fighter or the 18-B bomber, in above-the-waterline attacks;

(3) a second anti-ship projectile, Missile 303, also carried by the 18-B, for below-the-waterline proximity hits;

(4) Missile 311-LT, for which the 300-LT-FO Missile is a prototype; and

(5) Missile 321, still in the developmental stage, designed for radar homing, a mach number of 1.5, and a range of 5 km.* It is for this projectile that Bofors is compounding a solid, slow-burning powder for fuel.

Apparently progress has been slow on the tests of surface-to-surface missile 300-LT-FO2 by the Svenska Aeroplan Aktiebolaget (SAAB). This missile is a prototype for a larger missile (311-LT), a copy of the German V-1, on which construction is expected to start in the near future. Judging from the tests on the 300-LT, guidance progress has been made only to the extent that lateral and vertical control can be obtained. It is believed that this missile is intended to operate at a height of not over 10 meters and will be used primarily for shipping targets. A small radar altimeter will be utilized for altitude control.

Contrary to the abundance of information on work devoted to development of V-1 type missiles, it has been reported that the Guided Missiles Bureau (Robot-Vapen Byrå) of Sweden is concentrating its main efforts upon the task of developing medium range guided missiles of two types, a surface-to-surface supersonic rocket, and an air-to-ground/sea supersonic rocket.

The Swedish Air Force has under development a new pulsejet engine consisting of ten ducts to form a cylinder. It is believed that this engine is the power plant for missile 311-LT and, if so, five of these engine have been built and tested.

Hydrogen peroxide is also under investigation as a fuel for airborne weapons, for submarines, and for torpedoes.

c. Aeronautics.

The most significant Swedish airplane, now undergoing component and model tests, is the J-29 — a single seater, mono-jet fighter, powered by a de Havilland Ghost II engine with air intake in the nose. The original design specifies a mach number of 0.87 but the maximum obtainable speed will probably be closer to 0.8.

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* Data on maximum range/altitude, trajectory velocity, operating altitude, guidance, warhead and fuze, et cetera, are given in a more detailed report being prepared by OSI.

Project 1100 is a joint Air Force-SAAB effort. Although "1100" has been active for some time, progress has been retarded by lack of agreement between the two cognizant organizations. Preliminary plans have been drawn up for testing Project 1100 in the 6-by-5-inch wind tunnel at the Royal Institute of Technology.

The Swedish Air Force has under development a new pulsejet engine consisting of ten ducts joined to form a cylinder. A small experimental model is now under construction with the ultimate objective of using the final production design as a power source for guided missiles.

Also under development and test is an axial flow turbine having eight stages of compression and a single stage turbine. In July of 1948, in an actual run at 7,800 RPM, tests results gave a compressor ratio of 3:1 and an efficiency of 86 percent. The turbine efficiency was 88 percent.

One phase of Sweden's efforts to develop its own turbojet engine is the production of an alloy suitable for turbine blade and wheel operations at temperatures up to 800° C. Present attempts are centered on a steel alloy with varying percentages of Ni, Cr, Mo, W, Cb, and Fe, similar to alloys developed for this purpose in the United States and England.

There have been no reports on the development of ceramic materials for high-temperature use in air weapons and jet engines.

d. Wind Tunnels.

All operating Swedish wind tunnels are located in or near Stockholm, at the Royal Institute of Technology or the Aeronautical Research Institute (FFA). These seven tunnels allow tests in speeds up to Mach 3; a proposed new tunnel for the Defense Research Institute (FOA) will allow tests up to Mach 4.

At the Royal Institute of Technology, the Division of Aeronautics operates a low speed tunnel (10 to 100 mph), built in the early 1930's after German designs of that time. The hand-operated six-component balance system, while extremely slow, is very accurate.

The Division of Steam Engineering has three tunnels, "A," "B," and "C," operating from a common compressor chamber. Tunnel "A" was built primarily for dynamic problems (Flygmotor AB), tunnel "B" for aerodynamic problems (Swedish Air Force), and tunnel "C" for ballistic investigations (Bofors).

The Aeronautical Research Institute has three wind tunnels in operation, providing air speeds from 224 mph to Mach 2.50. The supersonic tunnel (Mach 1.4 to 2.5) is designed to take schlieren photographs.

By the autumn of 1948 the Royal Institute of Technology expects to have completed a supersonic tunnel which will be equipped for schlieren photography.

After studying wind tunnels in other countries, the Aeronautics Research Institute recommended to the Defense Research Institute (FOA) that three new tunnels be constructed. Essentially, the recommendation specifies a combination of one subsonic, continuous-operating, return-circuit type coupled to two supersonic induction types so as to use the closed-throat return circuit of the former as a pressure chamber. The estimated power requirement for the combined installation is 40,000 hp.

e. Ship Propellers.

Significant advantages are claimed for the variable pitch propeller, "Kamewa," produced by the Karlstad Mekaniska Werkstad. When used in submarines, the propeller's efficiency can be adjusted to varying conditions, as with Schnorkel and electric-motor operation. The hydraulic system for varying the blades will operate against any pressure, moving the blades from one extreme to the other in 23.5 sec. The variable-pitch propeller installation is about twice the weight of the standard installation.

APPENDIX E

BIOGRAPHICAL DATA

GUSTAV V.

King of Sweden. Born 1858, ascended to throne 1907. Highly respected and held in great affection by the Swedish people; possesses much personal dignity; social position more democratic than that of the King of England, and with fewer ceremonial trappings. Gustav's long reign has given him the status of a Swedish institution and he has considerably more influence in State affairs than is usual with European constitutional monarchs.

During World War II the King was personally pro-German but neither pro-Nazi nor anti-democratic, extremely anti-USSR and convinced of the merits of Swedish neutrality. He was and is determined to go down in history as Sweden's Peace King, and thus is opposed to any policy which might upset the neutrality of the country.

GUSTAF ADOLF.

Crown Prince and heir to the throne of Sweden. Born 1882. Extremely well liked; his second wife, Crown Princess Louise (Lady Louise Mountbatten) has contributed to his popularity in Sweden and is held in great affection for her numerous charitable works. The Crown Prince is a recognized archaeologist and a well-known sportsman. He is intelligent and well-informed and exercises some political influence, but this is naturally limited by the authority of the King and the Crown Prince's own great filial reverence. He is friendly to the US and very pro-British. Between West and East he is definitely pro-West.

ANDERSSON, SVEN.

Minister without Portfolio and Secretary of the Social Democratic Party. Born in Göteborg in 1910. Trained as a carpenter; formal schooling ceased before university level. Possesses 20 years of practical political experience, starting with the Göteborg Labor Association for which he eventually became representative from 1938 to 1940. Member of the Lower House of the Riksdag in 1940, moved to the Upper House in 1944 and became temporary party secretary in 1945. Andersson is energetic, pleasant, and direct, and his leanings appear to be definitely anti-Communist. He is understood to have long favored military cooperation in Scandinavia, and his recent cabinet appointment appears to have placed him in line to succeed Allan Vougt as Defense Minister in the near future.

BÖÖK, KLAS.

Recently appointed Executive Director of the Bank of Sweden, replacing Ivar Rooth who resigned in protest against government financial policy. Previously Chief of the

Commercial Division of the Foreign Office; considered to be a financial and banking expert. It is believed that his policies with respect to the bank will follow closely the socialist economic theories of Finance Minister Wigforss.

ERLANDER, TAGE FRITIOF.

Prime Minister. Born 1901. Educated at Lund University. Although he had held cabinet posts prior to his appointment as Prime Minister, he was chiefly known as an intellectual and loyal party man. Served in the Lower Chamber of the Riksdag from 1933 to 1935, entered the Ministry of Social Affairs in 1938 (as an under-secretary) and was appointed Minister without Portfolio to handle labor problems in 1944. Became a member of the Upper Chamber of the Riksdag and Minister of Education and Ecclesiastical Affairs in 1945. Became Prime Minister in 1946, and was elected chairman of the Social Democratic Party; is likely to retain both positions as long as the Social Democrats stay in power.

An able and diligent administrator, Erlander's rapid rise can be attributed to the early recognition given him by Wigforss. At the time of his appointment he was considered to be a figurehead for the influential Wigforss; subsequent events have shown him capable of independent action.

His leanings are anti-Communist and he is opposed to formation of power blocs and alliances, preferring to work through the United Nations Organization, but on the question of neutrality he is less doctrinaire and more resilient than Foreign Minister Unden.

HAMMARSKJÖLD, DAG HJALMER AGNE CARL.

Vice-Chairman, Executive Committee, Organization for European Economic Co-operation (OEEC) and until recently Chairman, Board of Directors, Bank of Sweden. Born July 29, 1905. Has Ph.D, 1934, from Uppsala University. One of the most important and influential men in Sweden, exercising almost unquestioned authority over Swedish foreign financial matters. Politically non-partisan, he enjoys the full confidence of the government, as evidenced by the great number of missions he has headed. Definitely pro-Western, he is said to lean over backwards to be fair in dealings with United States officials. He is described as a man of thorough scholarship, unusual technical competence, and great resourcefulness in reaching solutions to economic problems.

JUNG, HELGE VICTOR (GENERAL).

Commander-in-Chief of the Armed Forces. Born in Malmö in 1886 of a middle class family. Commissioned in 1906; instructor at the Staff College in 1926. Chief of the Army Staff in 1937. Promoted to Major General in 1938; afterwards commanded the II and IV Military Districts. In 1944 promoted to Lieutenant-General and then to Commander-in-Chief of the Swedish Armed Forces.

No aristocrat, Jung is a self-made man. He lacks polish and has made many enemies, particularly in the naval hierarchy, although all admit that he is clever and

dynamic. A disciplinarian and a driver, he has constantly worked to foster military preparedness. Politically Jung is anti-Communist and now appears strongly pro-US. He reportedly has considerable influence with the Minister of Defense and the Riksdag, but in practice keeps out of all matters which do not directly concern the military establishment. General Jung has high professional ability which is not, however, as outstanding as that of some other Swedish officers.

LAGER, FRITJOF.

Secretary of Swedish Communist Party (appointment announced November 1948). Born 1905. Previously political editor of *Ny Dag;* has steadily risen in power within the Swedish Communist Party (SKP) since the end of the war and is reported to be the real head of the party, although Sven Linderot remains the titular leader. Member of the Lower Chamber of the Riksdag for Stockholm district and in last general election (September 1948) headed SKP election ticket over his Riksdag seniors. Generally considered the SKP's most faithful "Moscowite," and reportedly the Cominform's liaison with the SKP.

LINDEROT, SVEN.

Chairman of Swedish Communist Party (SKP) since 1933. Born 1889. Officially Linderot is the party leader but he is probably subordinate to Fritjof Lager, newly appointed Party Secretary, who is reportedly considered more reliable by Moscow and the Cominform. Linderot represents the more moderate "nationalist" wing of the party. Communist member of the Upper Chamber of the Riksdag; his greatest asset in Swedish politics is his pleasant personality, a quality which has made his position as a revolutionary leader less frightening to his non-Communist political opponents.

MYRDAL, GUNNAR.

Executive Secretary of the United Nations Economic Commission for Europe (ECE). Born December 6, 1898. Has an LL.B. from the University of Stockholm and an honorary LL.D. from Harvard University, 1938. Myrdal has long been a prominent figure in Swedish public life and has been recognized as a financial, economic, and sociological expert. He is one of the leaders of the left wing of the Swedish Social Democratic Party. In general, an admirer of the United States, he has criticized various aspects of American life. He is not strongly pro-Russian, although as Sweden's Minister of Commerce, together with Finance Minister Wigforss, he pushed through the generally unpopular Swedish-Soviet credit agreement of 1946, arguing that Sweden should not tie herself to the American economic cycle which he felt was headed for a postwar depression. He is still criticized for unwarrantedly seeming to favor Soviet views in his present position on ECE. His considerable ego leads him to believe himself uniquely fitted to gauge the temper of the Russian people, whom he describes as a primitive, simple folk who can be handled if properly understood.

OHLIN, BERTIL.

Chairman, Liberal Party, and as such virtual leader of the non-Socialist opposition to the present Social Democratic Government. Born April 23, 1899. Received Ph.D.

from Stockholm University; studied at Cambridge and Harvard. Though not a profound scholar, he has an international reputation as an economist. He served as Minister of Commerce for a short period under the wartime coalition government and has been a member of many government boards and delegations. As a member of the Lower Chamber he is leader of the Liberal Party group in the Riksdag. He is essentially pro-Western and pro-American but not a strong leader on international affairs. Ohlin is described as a free trade economist who favors government interference with economic processes only to the extent necessary to preserve the capitalistic system. Thus, he favors both the social legislation of the Social Democratic Party and free enterprise as advocated by the Conservative Party; consequently, he is trusted by neither group. Ohlin is described as an intellectual opportunist with a great deal of political shrewdness.

SVEDBERG, THEODOR.

Born 1884. Ph.D., Uppsala, 1908; Professor of Physical Chemistry, Uppsala, 1912. Member of the Swedish Royal Academy of Sciences, 1913. Professor of Colloid Chemistry, University of Wisconsin, 1923. Collaborated with Gard and Tiselius on the production of an anti-polio vaccine.

Member: Royal Society of London, 1944; Swedish Military Academy, 1946; and the Scientific Society of Uppsala, The Royal Academy of Engineering Sciences (IVA), and the Physiographical Society.

Honorary doctorates from practically every large university in the world.

TINGSTEN, HERBERT.

Editor-in-chief, Liberal newspaper *Dagens Nyheter* (Sweden's most widely read daily). Born 1896. Formerly professor of political science at Stockholm University and one of the leading members of the Social Democratic Party; as such he enjoyed high reputation for integrity and clarity of thought. In 1945 he withdrew from the Social Democratic Party on the grounds that planned economy as advocated by the Social Democrats was incompatible with political freedom; joined the Liberal Party and in 1946 became chief editor of *Dagens Nyheter*. He is an outspoken opponent of all forms of totalitarianism, very pro-US, and writes vehemently against present-day Soviet policies. His paper is one of the few powerful advocates in Sweden of an alliance with the Western Powers, and Tingsten personally is the most vociferous member of the group within the Liberal Party opposed to neutrality.

TISELIUS, ARNE.

Born 1902. Ph.D., Uppsala, 1930; Professor of Physical Chemistry, Princeton, 1934-35; Docent, 1938; Professor of Biochemistry, Institute of Physical Chemistry, Uppsala, 1938. Member of Swedish Royal Academy, 1939; Chairman of the Board of Wenner Gren's Institutet, 1941; Member of the New York Academy of Sciences, 1943; was Chairman of Sweden's Atom Committee in 1945, resigned in 1947. Chairman of

the National Science Research Council, 1946. Received Nobel prize in chemistry November 4, 1948 for discoveries in biochemistry and inventions of important laboratory apparatus. Author of numerous publications, including those on the analysis of mixtures of fatty and amino acids and on physiologically important albumin substances. Collaborated with Gard and Svedberg in the production of an anti-polio vaccine.

UNDEN, ÖSTEN.

Minister for Foreign Affairs since July, 1945. Born 1886. Received LL.D. from Lund University, 1912. Since latter date has either taught law or been connected with government primarily in legal capacities. His rather inflexible emphasis on the legal rights and duties of States has made it difficult for him to adjust himself in the midst of recent sharp Great Power differences. As Foreign Minister he has continued to demonstrate his lifelong belief that international cooperation is the best solution to world political problems. Because of increasing East-West tension, however, he has gradually lost faith in the ability of the UN to preserve peace and has fallen back on an obstinate and academic adherence to Sweden's traditional policy of neutrality. In his dogmatic defense of neutrality he has shown recent indications of slight wavering, possibly owing to a belated and more realistic concept of Soviet aims and policies. Personally, Unden is described as an upright and high-principled man with marked intellectual and personal reserve. He is not really sympathetic with any foreign civilization, and though not anti-American can certainly not be described as strongly pro-American.

SIEGBAHN, KARL MANNE GEORGE.

Born 1886. Dr. Sc., University of Lund, 1911; Nobel Prize in Physics, 1924; Honorary Doctorate, Freiburg University, 1931; awarded Hughes Medal by the Royal Society of London, 1934; Director of Research, Nobel Institute for Experimental Physics (in charge of cyclotron there, with a staff of about 40 technicians of whom 20 have had academic training); awarded Rumford Medal, 1940; Honorary Doctorate, University of Bucharest, 1942; Honorary Doctorate, University of Oslo, 1946. Member of Sweden's Atom Committee. Probably Sweden's foremost nuclear physicist.

VOUGT, ALLAN.

Minister of Defense. Born in Stockholm in 1895. Studied at Uppsala University and in England and France. Since 1928 has held various posts in the Riksdag, including that of Social Democratic leader in the Lower Chamber. Became Minister of Defense in 1945, and is considered a strict adherent to the party line. He is anti-Russian, and though reported unenthusiastic about the United States, he has made special efforts to cultivate both the United States and Great Britain. Vougt is extremely capable but has been subject to severe criticism from the public because he was the chief spokesman for the appeasement policy of the Riksdag toward the Germans in 1940-42. In the months just prior to the September 1948 elections, he was bitterly

attacked by his old critics on foreign policy and strategic problems. It is generally expected in Sweden that he will be replaced as Defense Minister at an opportune time.

WIGFORSS, ERNST JOHANNES.

Minister of Finance, a position he has occupied on three different occasions: 1925-26; 1932-36 and from September 1936, to date. Born 1881. Educated at Lund University. Member of the governing body of the Swedish Social Democratic Party since 1920; member of the Lower Chamber of the Riksdag since 1929. One of the most influential men in the Swedish Government, but because of his doctrinaire socialism also one of the most controversial. His theories have evoked a great deal of criticism from the business community. He is very pro-British, friendly to the United States and although anti-Soviet, he favors extension of Swedish-USSR trade, partly for the purpose of keeping on friendly terms with the USSR.

SCANDINAVIA

TERRAIN AND TRANSPORTATION

STANDARD GAUGE RAILROAD

BROAD GAUGE RAILROAD

NARROW GAUGE RAILROAD

RAILROAD UNDER CONSTRUCTION

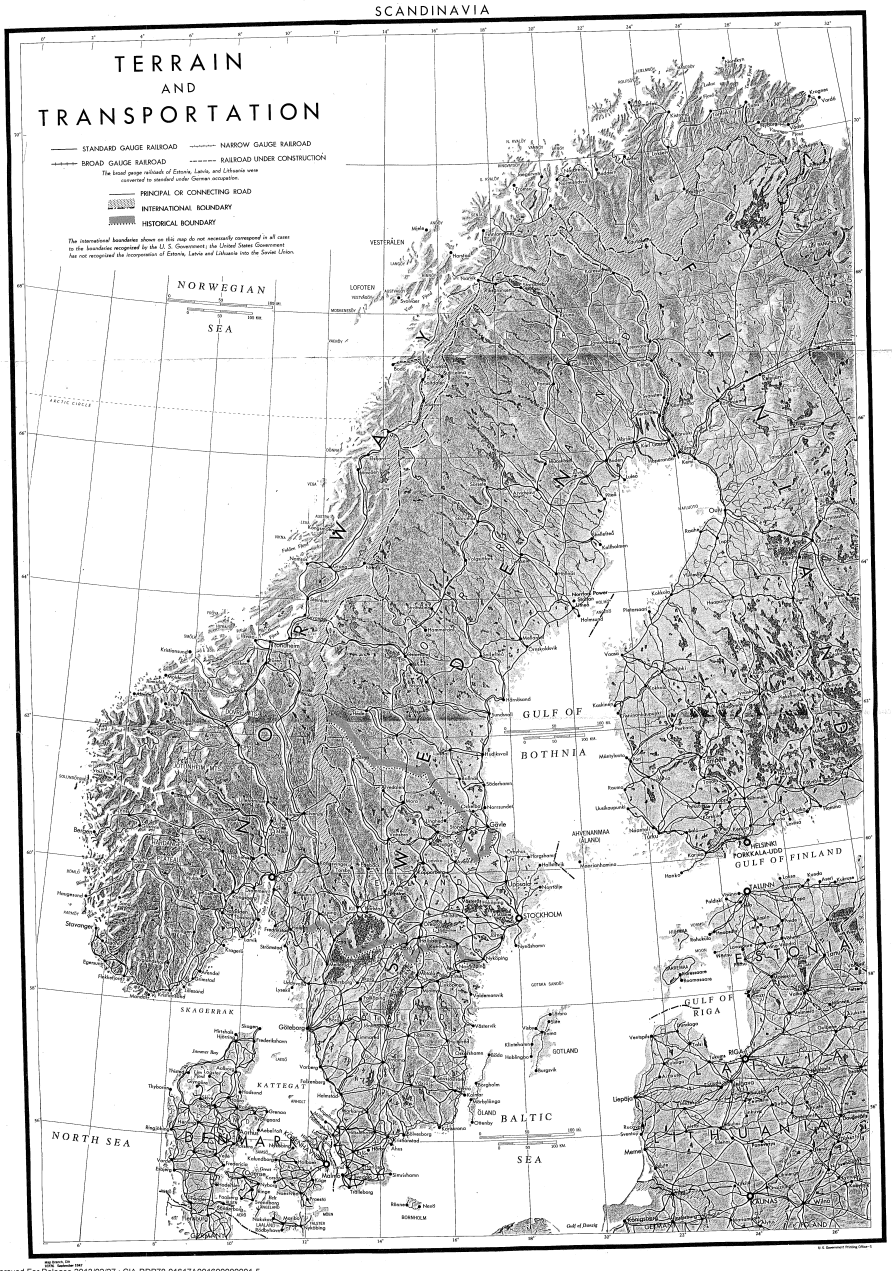
The broad gauge railroads of Estonia, Latvia, and Lithuania were converted to standard under German occupation.

PRINCIPAL OR CONNECTING ROAD

INTERNATIONAL BOUNDARY

HISTORICAL BOUNDARY

The international boundaries shown on this map do not necessarily correspond in all cases to the boundaries recognized by the U. S. Government; the United States Government has not recognized the incorporation of Estonia, Latvia and Lithuania into the Soviet Union.



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