

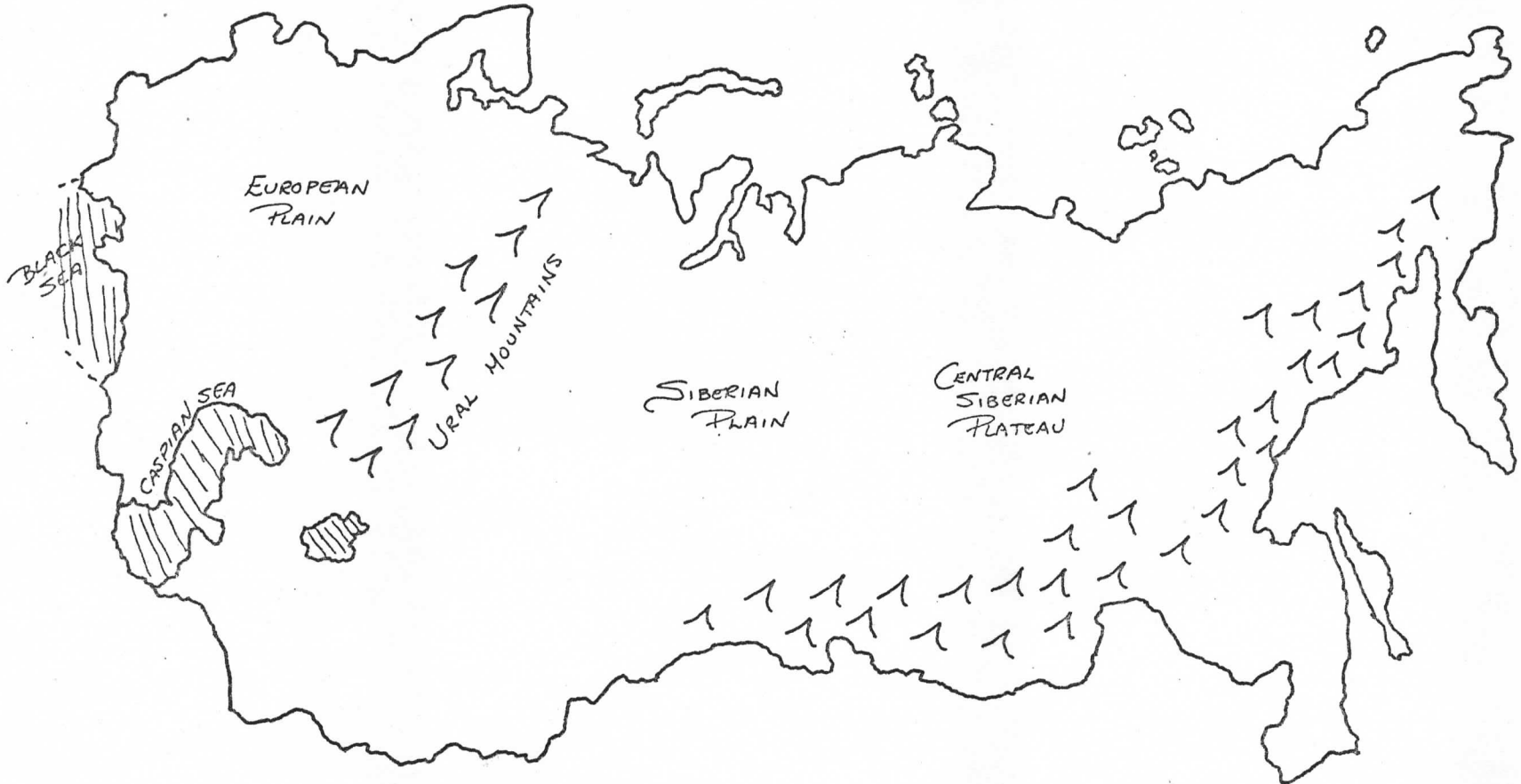
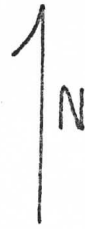
FORESTRY IN THE SOVIET UNION

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U.S.S.R.



Introduction

Organised forestry has been evolving in Russia for over 150 years. The vastness of the country, the volume and distribution of forest reserves, and the sweeping ideological changes over the years have all had deep influences on forest activities and management. The size of the country and varied regional conditions have effected modes of timber production in different areas, and the large reserves of forests lying a great distance away from population centers has influenced patterns of exploitation and production. The most profound effect on forestry accompanied the ideological changes of the October Revolution of 1917. Preceding the revolution, the primary objective of forest management was reasonable profit and sustained yield; afterwards it became the satisfaction of a planned economy and expanding yield. As the supreme planning authorities of the Soviet state determine the direction of production and distribution of resources as well as domestic consumption and product exports, all too often economic and political interests conflict with wise management. The Soviet Union's ideological goal is to become a world power through rapid economic growth and industrialization. This goal is reinforced by the political economy of the country and illustrated through industry's quantitative role in the economy. Therefore, the forest industry is based on the exploitation of its resources and there is little incentive for preserving the quality of the environment.

Natural Geography of the USSR

When discussing the land mass of the USSR, one must keep in mind the large area it encompasses. This country is more than six thousand miles across, with an area of about eight and a half million square miles. It has the largest single reserve of fresh water in the world, plus more than eleven thousand miles of navigable rivers.

The country can be divided into five basic regions. The eastern and southern sections are mostly mountains, averaging 5,000 meters in altitude. Due to these mountain ranges, the climate for these areas tend to take on a micro-climate form. Each hectare of land could have a different temperature or varying amount of precipitation due to its location within the mountain system. A good example of this would be the difference between a north facing slope and a south facing slope on the same hill. The north slope would be exposed to the harsher environment due to the reduced sunlight. In general, precipitation in these regions would be greater, while cold temperatures and rugged terrain would reduce its vegetation producing ability.²

Inland from the eastern mountains, heading west is the Central Siberian Plateau, and adjoining that to the west is the Western Siberian Plain. Both these areas are less mountainous than their counterparts to the east and south. The plain is nearly flat and lies very close to sea level. This partly explains the marshy characteristic that it possesses. On the other hand, the plateau is over 400 meters above the plain with mountains up to 2,000

meters and the constant terrain of small hills covering it. These two sections receive little precipitation during the year, but with the cold temperatures common to the area, have a very long period of snow cover. Also important is the great amount of permafrost and the thin active layer of soil native to this region.

Separating the country latitudinally in the western section are the Ural mountains. Although they are relatively low, they form a divide in the water shed. Many of the important rivers are a means of transportation, and a source of water hydropower for the densely populated European Plain area. This plain is well suited for the large amount of agriculture and industry practiced there.

To the south is the Black Sea and the Caspian Sea, both have an effect on the resources of the area, and also the climate. In the southern part of the plain the temperatures are the warmest of the country due to the influences of these bodies of water. Along with the warm air currents from the Atlantic, the European plain is preferable for habitation over the major part of the USSR. It does, however, have limited resources and potential, as we shall see later in this paper.

In general, the climate of the USSR is more harsh than that of the United States. This is not only due to its location latitudinally, but to its size and location from the oceans. Also the type of ocean currents and air currents will effect mean annual temperature and precipitation. As one can see from table 1, the mean temperature for January is well below freezing for all parts of the country, thus the long snow cover duration. The growing season, determined mostly by the frost free days, is slightly below normal for agriculturally oriented lands. And, noted by the examination of summer temperatures, the January-July range is quite wide in some areas, almost sixty degrees in Yakutsk.

Soil types throughout the USSR will vary with amounts of moisture, extent of grade, temperature, and vegetation. In a macroscopic view, soils are less than exceptional. In the northern regions where glaciation was a big factor, soils are thin and rocky with poor drainage. Loess occurs throughout western European Plain mixed with sand near the Black and Caspian seas. Two advantages that the European Plain does have in this respect are 1) deposits from the rivers in this area, and 2) the lack of permafrost. The second point is a major factor in the poor drainage found in the northern sections of the Siberian plain and plateau. The usable water table in these areas occurs only in the active layer which could be as little as a meter deep. Any snow covers that melt during the warmer season merely collects, making the ground swampy. This is an unsuitable situation for agriculture, as well as for many tree species.³

Table 1. Climate Data for Selected Towns in the USSR ⁴

Town	Latitude North in °	Temperature in °C			Duration of snow cover in days	Frost-free period in days	Mean annual precipitation cm
		Jan. mean	July mean	Jan.- July range			
Riga	57	- 5	17	22	100	150	60
Kiev	51	- 6	20	26	90	165	52
Moscow	55	-10	18	28	150	130	57
Volgograd	49	-10	24	34	100	175	36
Tashkent	41	- 5	26	31	60	180	25
Omsk	55	-19	19	38	160	115	34
Krasnoyarsk	56	-18	18	36	180	95	40
Yakutsk	62	-40	18	58	210	90	20

Forestation

When looking at vegetation in the USSR, as in other parts of the world, it can be seen that all vegetation is divided into zones. *Natural zonality, occurs due to types of areas, altitudes, and climate. There are other minor factors that vary with each example. In the USSR we can point out four basic types of zones, with many ecotones separating them.⁵ Zones of the type we are about to mention, are usually found progressing from north to south in the Northern Hemisphere, but can also be seen in micro situations within hill side communities. This type is no less important, but commonly found on a smaller scale.

The first zone we encounter is that of the tundra. Here we find almost no plant life greater than small shrubs, low grasses and mosses. In extreme cases of northern areas, micro organisms, although present, may be hidden beneath the soil or snow. Areas such as these are known to have permafrost either at ground level or slightly beneath that level most of the year. Trees of any size tend to have trouble first locating, then growing in places such as this, due to poor conditions in the soil, e.g. swampy areas, or desiccation; and harsh conditions above ground, e.g. high winds, or cold temperatures. The tundra does support wildlife and the necessary plants to sustain them.

The next zone, and the most important to our study, is the forest zone. It is linked with the tundra by the forest tundra zone. This zone contains plants and conditions found in both zones. The forest zone has cold winter temperatures, but warm summer temperatures provide considerably better growing conditions by allowing the ground to thaw to a greater depth, releasing the ground water for circulation. Better drainage prevents extreme swampy areas from forming and helps circulate nutrients and oxygen through the soil. Precipitation is more prevalent in this zone, as are lower wind speeds and greater amounts of solar radiation.

The plants of the forest zone range from mosses and low bushes

*Natural zonality is claimed to be an original doctrine by the Russians.

to trees of heights of more than 75 meters. When concerned with the trees of this zone, the zone itself is commonly divided in to three parts, the taiga, the mixed forest, and the broad-leafed forest. All three zones are of economic value for the lumber industry. While the broad-leafed zone produces hardwood which is important, it is smaller than the taiga zone. The taiga contains most of the conifers that are cut and used. The mixed forest zone is, of course more diversified and as a result, much more stable in respect to forest ecology.

The last two vegetation zones, while important, are of less value to the forest industry. They are the steppe zone and the desert zone. These two zones are caused for the most part by precipitation patterns. Although they do get enough precipitation in the steppe zone to support forest growth, it is not constant throughout the season. This, coupled with an increase in evaporation, is enough to prevent the growth of large trees. Small trees are dominant in these areas, while well adapted shrubs and grasses also exist.

The desert is an arid area with only a few species of plants. They must be able to withstand extreme temperature and little precipitation throughout the year. The growing season, like that of the far north, is short, and maximum growth must be obtained during that time.

The zones occur in a direct relationship to north-south latitudes. In the USSR the most common zone is that of the forest type, especially the taiga zone. This extends across the northern part of the country, and in the east, down along the Mongolian border. Above it is the tundra which comprises only a small percentage of the total area. In the western section all the zones are present. Throughout the mountainous regions all the zones can be found in some quantity, although the height of each mountain would determine the extent of this. Even though the taiga extends over much of the country it varies in density. Its densest regions are in the northern part of the European Plain and in the southern part of the central and eastern sections. This is not to say that other areas are not fit for wood production and harvesting, but these areas are by far the most suited for it.

The types of trees that we are concerned with are those having an important effect on the lumber industry. These include not only conifers, but also some hardwoods and softwoods of the broad-leaf type.

The three main conifers are pine, spruce, and larch, with fir as a secondary source of timber and fuel. All three are native to the taiga zone in certain areas.

Pine forests occur throughout the taiga with a large percentage in the western and central sections. There are basically two types found here, Scots Pine (*Pinus silvestris*) and Cembran Pine (*Pinus cembra*). Both do well in sandy soil or in wet areas with a lot of ground litter or moss. While Scots Pine is tolerant of fire, (it aides in reproduction), Cembran Pine will usually perish. The two pines are used in industry for low grade lumber and also for oil which is obtained from their cones.

Spruce stands are most common in the western section. Spruce

can grow in wet or dry areas, but the process is slowed by a lack of moisture. Its roots are quite close to the ground, thus it is vulnerable to blow down. Also any change in climate or surrounding conditions will be detrimental to this tree. Here again it is used for lumber and building materials.

Lastly, larch is an important tree to the economy, like pine and spruce, though its exploitation has only begun. Part of the reason for this is that it occurs mainly in the central and eastern sections, away from the population centers. One other problem occurs when transporting this wood, it has a tendency to sink while enroute in a river, thus a large percentage of larch is lost.

The broad-leafed trees also play an important role in wood production in the USSR. Trees such as oak, birch, aspen, and poplar are used for veneer, plywood, tanning oil, furniture, and for the cooperage industry. These trees are found in the southern parts of the taiga and sometimes in the steppe zone. Their ages at maturity are greater than those of the conifers, and thus they take longer to regenerate. This is an important factor in considerations of exploitation and reforestation.⁷

History of Forestry and Conservation in Czarist Russia

Forest management prior to the October Revolution of 1917 fluctuated with the personalities of the Czars. For the most part, policy reflected a pragmatic approach to resource management. The idea of conservation (okhrana pirody) was narrowly defined as the 'protection of nature' and was most often connected with the establishment of preserves. On the other hand, the objectives of resource management in Czarist Russia were directed to satisfying and protecting the resource requirements of the State, rather than protecting natural systems. During the 'pre-capitalist period' (prior to Catherine the Great) forest policy was concerned with providing timber for ship building, and later, in the 'capitalist period' (from Catherine the Great on), with ensuring a reasonable profit to the State through sustained yield.⁸

The State owned approximately 90% of the forested land in Czarist Russia and, until Catherine II, retained legal control of forest activities on all lands. Ownership was divided between Crown lands, monastery and church lands, State estate lands held temporarily by gentry as payment for military service, private lands inherited by gentry, peasant community lands, and unsettled land. All unoccupied forests, including State and church forests, were considered common property by the peasants to be used in common. As early as the 16th century, a Code of Laws was issued by Czar Alexis directed toward protecting private interests from common exploitation. These laws involved some severe penalties for forest arson and trespass for woodcutting, but were primarily concerned with hunting and beekeeping regulations and the establishment and protection of private ownership.⁹

Organized forest management began under Peter the Great in

the late 17th and early 18th centuries. He modeled his forest management and legislation after that in the more silviculturally advanced countries of western Europe--primarily French policy of the 17th century. He was perhaps the first to appreciate the idea of conserving a natural resource under a long term policy, though his only concern was ensuring a supply of timber for ship building to establish a strong navy. Peter considered all land and forest products needed for State purposes as State property. He placed the forests under the responsibility of the Admiralty Collegium to emphasize timber's importance to the navy. He divided forests into restricted and non-restricted categories, declared the establishment of forest reserves along navigable rivers to be overseen by forest rangers and guards, and ordered timber companies to divide their land into 23-30 sections, only one of which would be cut per year. The penalties for violation were severe, including capital and corporal punishment and banishment to Siberia, but were neither well-heeded nor well enforced due to a long tradition of communal use and unrestricted exploitation.⁹ It should be noted also that all timber products not within the State's interests were not subject to regulation.

During the short reign of Catherine I, Peter's cutting restrictions were annulled, which began the devastation of forests near cities. Czarina Anna again enforced restrictions--including the use of only saws for felling and processing-- and began regeneration with the establishment of a few oak stands. The forests were still considered State property, however all timber not required by the State could be used by anyone free of charge.

In the late 18th century, Catherine the Great largely rescinded all forest restrictions. The interests of the nobility and the advancement of liberalism had a great influence on Catherine's policy and the right's of private property holders were considerably strengthened. Soviet policy based on that of western Europe was considered inappropriate for the wealth of forestry in Russia. During her reign forests which were privately owned, and had previously been under the direct supervision of the State, came under the full control of the property owners. In 1762 the gentry renounced their obligations of military service to the State, and State estate lands merged with private patrimonies. The State forests were considered sufficient for the demands of the navy and it was believed that "careful estate owners" would manage their forests to their own advantage. All trade restrictions were abolished, however the timber merchants were required to pay the stumpage value of cut timber to the State. Catherine ordered that:

1. "All forests growing on the land belonging to the gentry shall be the full private property of the owner, even if they have been marked and registered as reserves.
2. "Everyone shall be entitled to sell forest products both at home and abroad after having paid the levie fixed by the State.
3. "Henceforth it shall be forbidden to cut timber without the permission of the estate owner for the cutter's own use or even for the use of the Admiralty, and a reasonable price shall be paid for the timber."¹¹

From the time of Catherine the Great until the Forest Protection Law issued by Alexander III in 1888, the State would not interfere with private lands, forest owners and timber merchants were

essentially unrestricted in their felling of timber--which is the probable cause of the early disappearance of much of the timber in populated areas of European Russia.

In 1798 Czar Paul established a Forest Department independent of any other State Ministry. Under Alexander I, at the turn of the century, the Forest Department was subordinated to the Ministry of Finance to emphasize the economic aspects of forestry and its importance as revenue for the exchequer. The government continued a *laisse-faire* policy towards private lands and with the coming of the industrial revolution and increased demands of the domestic and foreign market, the goal of forest management became based on financial exploitation. Standing timber was considered a marketable commodity and much of the forested land owned by the State was turned over to a variety of government departments for administration and profitable exploitation. During the early part of the century, decentralization of administrative responsibilities was considered important, and under the idea considerable forest area was turned over to various industrial departments-- especially the Central Administration of Mining Industry; and the Crown Appanages were given an administration of their own. Public land was also held under the Cabinet of the Czar, the Cossack Army and various towns.¹²

Public forests were divided into forest districts, ranger districts beats supervised by forest supervisors, forest rangers and forest guards, respectively. Their size depended on the intensity of management required, which in turn was decided by the marketing opportunities, transportation available, population density and distribution of forests. The forest department was not responsible for logging the land themselves, rather they sold the standing timber by auction; some in restricted biddings open only to the inhabitants of a particular locality, others in public biddings open to all. A fixed tax was applied to stumpage sales-- a practice still used by the Soviets.¹³

With the Emancipation of the peasants in 1861, land was turned over to peasant communities to utilize and manage as common property in return for payment for compensation to the State. This land was distributed between households and individuals and redistributed at regular intervals. Distribution was often by shares, by number of individual trees, or by volume of processed product per individual, but it became common to sell all the timber to a timber merchant and distribute the profit between individuals. These merchants and entrepreneurs often put pressure on peasants to sell because of limitations on exploitation on State lands, and the contracts often allowed the purchaser to cut the entire growing stock within the period fixed without any regard with keeping the forests in a productive condition. Much of the forested area belonging to the landed gentry was also passed on to timber merchants in this period and "the change usually involved the rapid and complete liquidation of merchantable timber."¹⁴

As timbering increased in the 19th century, the lightly forested and densely populated areas of European Russia became nearly depleted of forest resources. Deforestation and poor agricultural practices of the emancipated peasants led to serious erosion problems. In response to widespread devastation of forests, Alexander III passed the Forest Protection Law in 1888 which reflected a new attitude towards forest management and effectively brought a halt to excessive

cutting period. The main provisions of the Forest Protection Law were aimed at preventing the clearing of forests for land use, promoting organized forest management, and conserving forests period. Its restrictions were directed mainly toward peasant communities and only in those where regulations were critically necessary. It applied only to forests in European Russia and the Caucasus, which were the most densely populated and lightly forested areas at the time. Under the Forest Protection Law, the Forest Department was put under the supervision of the Ministry of Agriculture. In each province and county Forest Protection Committees were established which played a primary role in the development of soil conservation and establishment of forest reserves. The idea of sustained yield became of central importance to forest management and was sought in practical application through "working plans" which contained a survey of the area to be forested from which were determined the annual cut and yield regulations. Awards were established to encourage the use of working plans although the expenses were paid by the owner. Rotation periods were standardized at sixty years for conifers and thirty years for deciduous trees. However, such short rotation periods and the size of logged areas left to the discretion of the owner, inevitably resulted in continued over-cutting.¹⁵

The emphasis of forest regulation in the early part of the 20th century, as defined by the Forest Regulation Instructions of 1911, was to realize "the highest net income under conditions of a continuous utilization of forest crop."¹⁶ Around the turn of the century a growing concern over the manner and regulation of exploitation of Russia's resources was developing among the scientists, and through the first decade of the century a genuine movement of environmental awareness was spreading out to the public. However, this movement, which continued developing in Europe and the United States, was brought to a complete halt with the drastic changes accompanying the October Revolution of 1917.

It has been illustrated that resource policy in the Czarist period was influenced by western conceptions of management and the growth of liberalism. After 1917, a complete change in ideology and political economic structure placed control of all land and resources in the hands of the State.

The Soviet Political-Economic System

The definition of the Soviet economy is fairly simple; it is an economic system based on public ownership of the means of production and is organized in such a way that production is directed according to a plan designed to satisfy the needs of the people of the society. In the Soviet Union this economic system functions through the control of the Communist Party.

In this kind of an economy with a single authority, it is implied that the central administrative body knows what the people

'really' want, and they are in the business of giving it to them through the planned use of the means of production. There exists no free market and the planning system, teleological in its conception, decides upon the focal point, because the bureaucracy does administratively what the free market does automatically. In other words, the State has taken over all functions in the economy except the consumer's freedom of choice. The State directs and administers all enterprises and controls their work. The State plans the country's national economy; the State distributes man power as well as material and financial resources; the State determines the pace and the increase of productivity of work, the extent and structure of the production, as well as both domestic and foreign trade turnover; and the State controls prices and wages. Probably the most salient feature of the Soviet economy is the fusion of political and economic leadership. This in turn means unity of political and economic management, and the subordination of the operational goals to the general objectives of the Communist Party.¹⁷

It should also be added that the State, through its control of all means of production, and since it is not bound by any restrictions in its decisions, can exploit its power position much more intensely than private owners of the means of production. The latter must pay special attention to competition from other producers, and cannot ignore the demands of the labor force which in general is organized through trade unions. While workers in a free economy influence their wages through unions by the right to strike, Soviet workers have no such opportunities.* In other words, the State has an authority as final and complete in labor management as it has over every phase and aspect of the functioning of the economy.

Soviet economic planning is based upon the maxim of planned development. Theoretically this is derived from the reproduction theory as presented by Karl Marx, that is "the process of perpetual reproduction on an enlarged scale."¹⁸ However, planned development cannot be applied alone if the ultimate objective of that development is not known. Therefore, it should be noted that the planned economy is concerned not only with the compilation of the plans, but also with their fulfilment. But the Soviet economy is not planned pure and simple, in the sense that plans must merely be fulfilled. The goal seems to be fulfilment and over-fulfilment of the plan quotas, and the reduction of planned production costs. It is a horative economy. The work of managers and leading personnel is often stimulated by cash rewards. These bonuses depend on the extent of their over-fulfilment of planned quotas as measured by output and costs of production. Demotion can follow from deficiencies in keeping up with the plan.

Thus, the theoretical requirements of the maxim of "production on an enlarged scale" and as its consequence, the practical application of a horative economy are important in understanding Soviet forest economics because it becomes increasingly evident to us that this system-- over-fulfilment of planned output, and the reduction of the planned costs of production-- imply features which are incompatible with responsible forest management.

Theoretical and Actual Objectives of Socialism

Karl Marx wrote that the future of the communist society, under

* Trade unions exist in the Soviet Union, but have different means and ends.

conditions where workers would have the opportunity to develop social consciousness, would write on their banners "From each according to his ability, to each according to his needs."¹⁹ The equalisation of rewards for different kinds of work in reality has never worked. Yet, in order to save the situation it was announced that "The Soviet Government cannot consider as its task the immediate realisation of this equality at the present moment when only the first steps are being made towards transition from capitalism to communism."²⁰ Under conditions when productivity has not risen enough so that everyone gets as much as they need the slogan becomes "From each according to his capacity, to each according to his labor."²¹

This represents a more realistic approach to the situation and the application of this slogan and illustrates one of the main principles of the Soviet system. Vozhessenksky, a former head of the State Planning Commission (Gosplan), says "In the Soviet economic system, peoples actions are mobilized for the execution of the state plan, and the work of every toiler is, in the final analysis, subordinate to the common goal."²² Consequently, the focal point is the exploration of the economic and social ends which the Communist party is pursuing. A State plan, as an expression of economic policy must be directed towards the desirable future--political, economic and social ends--as defined by the Communist party. All in all, the real aim of the Soviet economy becomes more clear: it is the long-term objective of building up the Communist party of the future, as a world competitor and industrial power; though the intermediate goal is rapid economic growth.

The administrative organization of the USSR is comparable to that of a huge enterprise or corporation. The board of directors is the Council of Ministers of the USSR and its executive agency since 1963, the Supreme Council of National Economy. Actually, the "top management" or "owner" is the Praesidium of the Central Committee of the Communist party. The Central Committee is elected and removed by the party, just as a board of directors of a corporation is elected or removed by the shareholders. The Party Praesidium, like a board of directors, has management functions, and thus has the power to make decisions at any and all levels of the industrial bureaucracy. Thus, it is the Party-State which guides the Soviet economy as one, unified enterprise.

Histry of Forestry in the Soviet Union

All lands and natural resources became the exclusive property of the Soviet State under the decree on land of Nov. 8, 1917. It was held that a socialist state would best manage and properly utilize natural resources and that problems during Czarist control were a result of the capitalist economic system. The Bolshevichs did not necessarily understand all the complexities of long term management.

The turmoil of the revolution and civil war, and a breakdown in transportation after 1917, resulted in widespread destruction of the forests in European Russia for fuel. Lenin's decree on forests of May 27, 1918, and supplementary laws in 1920 and 1923, sought to protect the forests and parks from exploitation and destruction in the search for fuel. The decrees gave local authorities the responsibility of preserving outstanding forest areas, of reforesting and managing forest practices. Urban parks were to be preserved from destruction, and lumbering activities were to be prohibited in areas suitable for future national parks. By 1921 the Soviets had established the basic regulations for utilization of resources, however, internal strife restricted their enforcement. One might note that the Soviets often point to Lenin as the progenitor of environmental awareness and legislation in the USSR, however, with the government and country focused on economic development, Lenin also passed laws which "approved the wholesale destruction of many forests" and other natural resources when economic need demanded. For about thirty years following Lenin, conservation legislation was virtually ignored.

Stalin's goal was rapid industrialization for the USSR and resource policies were formulated with large-scale exploitation in mind. Rapid growth and inefficient management inevitably resulted in waste and destruction of forest resources. During World War II, the forests were particularly hard hit: "approaches to Leningrad were almost completely denuded of vegetation during the siege of that city."²⁴ In the 1940's Stalin conceived the "Great Plan for the Transformation of Nature" to make agriculturally productive a large semi-arid area in European Russia through river control and irrigation and a network of shelterbelts: belts of forest planted to act as a moisture retainers and as protection from wind and snow. Parts of the plan were begun, but the tremendous economic and environmental costs of transforming entire climatic regions prevented most of the plan from being realized. Such a domineering attitude toward nature continued, however, and is still prevalent today.

After Stalin a gradual appreciation for the complexities of proper utilization and management of natural resources grew within the Soviet government. The late fifties and early sixties plethora of laws "for the protection of nature" and all the Union republics established comprehensive legislation for resource management. Sections of the criminal code stipulated penalties for violations of conservation laws, however through a "tolerance policy" and a widespread belief in the respect held for the Soviet government by the populace, these laws were not rigidly enforced. Thus, when the first laws were not fulfilled, the government simply passed more laws.²⁵ This seems to be a problem endemic to most governments.

Current Organization of Forestry

Throughout Soviet history the administration responsible for forest management has been continually changed or reorganized-- since World War II on the average of every four years. At present,

the agency in charge of forests is the State Forestry Committee under the USSR Council of Ministers. The Union republics have State forestry ministries subordinate to the State Forest Committee and each autonomous republic has its own forest administration. On the local level are forest establishments divided into several forestry sections which are directly responsible for forest management and supervision. The size of the forest establishments and sections varies with how intensively an area requires work, but they average 500,000 hectares and 100,000 hectares respectively. The forests are collectively considered the State Forest Preserve (Goslesfond) and comprise some 1,238 million hectares, more than half of the land area of the USSR-- of which 738.2 million hectares are actually forested. Some 36.4 million hectares of this belong to collective farms and are thus the responsibility of the Ministry of Agriculture, 15 million hectares are attached to other ministries, and 686.8 million hectares are the ultimate responsibility of the State Forestry Committee. Some 93% of the forests of the Soviet Union lie within the RSFSR, the remaining 7% are scattered among the other 14 republics.

The stated aim of Soviet forestry is to ensure "that forest resources and forest areas are fully and rationally used and that forests are regenerated raising the quality and productivity of forests" for the "continued use of future generations."²⁶ Under Article 5 on forests in the 1960 law "On the Conservation of Nature in the RSFSR" foresters are required "to carry out a complex of forestry measures designed to quickly reforest cut-over areas with valuable tree species, and to protect forests from fires, unauthorized cutting, trampling by cattle, and harmful insects; they are also to clear cut-over areas promptly." Specific regulations and restrictions are further detailed in the 1960 laws and the Forest Code of the RSFSR.

Environmental regulations are instituted, as one Soviet official put it "as a sign of what the socialist system can do," however, "enforcement of such standards would cripple all industrial and municipal life."²⁷ As economic and industrial growth is the primary concern of the Soviet Union, a double standard seems implicit in all resource policy.

The operational goals in forest management and forest industry are derived from the political and ideological objectives for general economic growth in terms of industrial expansion. The general objectives of the forestry sector is repeated and reiterated by most sources as simply to satisfy the growing demand for wood products in the economy. As regards this agenda and the production of roundwood it should be stated that Soviet output has kept up with demand from the economy. For example in 1913 the total amount of timber removed from the woods was 67 million cubic meters; in 1930 147 million cubic meters; in 1940 290 million cubic meters; 1950 366 million cubic meters; in 1960 400 million cubic meters; 1965 450 million cubic meters and over 500 million cubic meters in 1970. Such an increase in the output of forest products is remarkable. In a country where all forest products were produced under

a pure sustained yield basis, increases of timber output like this would not be possible, even if all merchantable growing stock were cut.²⁸

The increased timber output in the USSR does not necessarily imply that tree growing has increased. As it is known, that type of increased production can only be achieved within certain limits, determined specifically by natural growth conditions. In other words, the increase in cutting amounts is not counter-balanced by an increase in biological forest production. The reason for the increase lies in the special conditions of Soviet forests. There exists in the country massive virgin forests which were not utilized earlier because of their inaccessibility.

To keep pace with planned industrialization and consequently growing demand for timber products by the economy, timber removals during the first industrialization period beginning in 1926 took place mainly in areas closest to populated centers. The forests in these areas although the decree of 1918 called the "Collection of Laws and Regulations of the Worker's and Peasant's Government" which stated that forests must be managed "a) in the interests of the general welfare and b) on a basis of planned regeneration", were still managed under the Czarist way. Therefore, timber output could only be multiplied by ignoring the principle of sustained yield and by abolishing all cutting restrictions. The result was of course, that the timber stock in the poorly forested areas was depleted even further. To maintain the roundwood supplies to satisfy the ever growing planned demands of the national economy it became necessary to extend logging operations to the far away virgin forests. As it can be seen, the primary consideration of forestry is to adhere to the plans of the State, to satisfy increasing demands for timber, and to fulfill the production plan.

Expanding Reproduction versus Sustained Yield

Sustained yield has traditionally been the guiding light to organized forestry. "The compilation of working plans or management plans, which is the main purpose of forest regulation, has inevitably been linked in the past as well as at the present time with the problem of rotation, which in turn is linked directly to the principle of sustained yield."²⁹ According to Karl V. Algvere, a denial of the principle of sustained yield is also a denial of the science and art of organized forestry.

Sustained yield is derived from a static view of the course of events. That is, when it was introduced the originators imagined an unchanging world where conditions would remain the same not only during one rotation, but indefinitely without interruption.

The criticism by Marxist forest economists of the sustained yield principle is primarily that it is a capitalist notion, thus it is ideological. But, the most important law in the development of Soviet forests, as well as all parts of the national economy is, as mentioned earlier, the law of expanding reproduction. The fundamental difference between expanding reproduction and capitalist production is that the former takes place in the ever-growing context of socialist production conditions.

In the socialist economy, no branch independently pursues economic growth. For this reason the law of expanded reproduction, when applied to separate sectors of economic activity, including forestry, indicates a development in which each individual sector--on the basis of expanded reproduction in its own product--participates in the aggregate economic growth of a country. Consequently, the development of forest management, under the law of expanding reproduction, demonstrates its "progressive development" which secures a continuous increase in forestry and thus the general expansion of the economy.³⁰

As concerns sustained yield versus expanding reproduction, it could be said that sustained yield is the dogma of forest management. The Soviets however, have tried not to accept this dogma and by doing so have ignored traditional views of forest management and embraced the exploitation of their forests according to the fulfillment of the planned economy.

Conclusion of Soviet Forestry Practices

Both the profit motive of the Czarist capitalist period and the satisfaction of planned requirements of the Soviet period have conflicted with endeavors to retain the production capacity of the forests. However, the necessity of forest conservation as a means of producing was known in both periods. The institutions and political measures regarding the forests under Czarist Russia to neutralize the effects of profiteering proved practical and effective. This is proven by the volume of timber stock in the more densely populated regions which the Soviets inherited after the revolution. However, the institutions of the Soviet economy, could not avert the short-term objectives of immediate satisfaction for the need for timber and thus the forests of European Russia fell to their needs.

This illustrates how the Soviet leaders in conjunction with the plan of the central economy have from time to time acted like the owners in the capitalist's laissez-faire economy. For this reason, it seems justified to compare the Soviet Union to a giant capitalist enterprise. As a commercial organization it has a uniform leadership and the various branches of the economy act, broadly speaking, like branch officers of a corporation. As is also true in private enterprise, the all embracing State demands that its branches, i.e., the various sectors of economic life, must adapt their activities to the overall objective of the organization. The ultimate goals of the State run system are primarily political and economic. The satisfaction of the general social needs are secondary. Such neglect can have catastrophic results in the Soviet Union because it concerns the country as a whole, and not a single company as in the capitalist system.

Therefore, the Soviet forestry industry cannot always protect its long-term ideological goals of rapid economic growth and industrialization because it, like all the industrial sectors is subject to the political situation. Sudden and variable institutional changes are incompatible with the lengthy process of growing trees. Since a characteristic feature of the forest administration under the Soviet system has been extreme change with respect to politics, this excludes the continuity necessary for forest management.

Resources and Planning

The existing economic system, the pace of economic progress, standard of living and population are all important factors which usually determine timber consumption. But conditions are different in a centrally planned and directed economy. In such a system, consumption is not regulated by potential demand, but by the plan governing the whole of the economy. Economic developments, like those mentioned above, e.g., standard of living, are directly dependent on the plan which regulates production and consumption. The authority which determines the pace of economic progress in the USSR is the State Planning Commission (Gosplan). It determines which forest products shall be produced and consumed each year, and in what quantities; it also decides what changes will be made in the consumption structure in the long-run. The Gosplan also decides which forest products shall be replaced by alternative materials, and what savings measures shall be applied.

In the short-run, it is the Gosplan that determines the need for timber as a raw material, which is subsequently determined by the production and use of end products. The output targets for finished end products are of great importance to timber harvesting and to the distribution of timber products among the wood consuming industries. Therefore it is impossible to ignore the internal supply of roundwood, the volume of which has a low elasticity, and which in the long-run is slow in increasing its supply naturally or artificially. In other words, the consumption plan is devised on the basis of raw material. In the Soviet economy very little consideration has been paid in the past to the necessity of continuity in the production of forest crops. This is because of the country's reliance on their vast virgin forests. All in all, it can be said that Soviet forest planning is centered around the aspect of supply, i.e., the timber resources which are currently possible to exploit. "It might be said that the key to the entire planning system is in organization of material supply."³¹

Input and output calculations are connected directly to the planning process. Thus, a contradiction which is inherent in the centralised economic system must be pointed out when supply and demand are being considered. While the general plan is determined centrally, in order to achieve coordination in the targets for the whole economy, the actual managers of each production unit must participate in the planning. This is because otherwise, unrealistic production goals for individual enterprises would exist and

they must be eliminated or else planned quotas would be thrown off. "Soviet theorists define the problem as the need for planning from above and from below."³²

Therefore it can be said that the central planners primarily take into consideration the broad objectives set for the general expansion of the economy; but they must also account for actual production potential. For example, the output of roundwood must be large enough to meet the demands of all those who require it for producing their special output(s), like the paper and building industries, otherwise, there could be a paper and housing shortage. The planners are responsible for achieving the balance between supply and demand in the most efficient way. Producing lumber for housing would not be the most efficient way if alternative materials are more economical than wood. Thus, the criteria for efficiency is that the smallest possible input of resources should be used to meet required output, and the output required should be the largest possible amount.

Exports

In the 1920's and 1930's the net exports of forest products accounted for 20% of all Soviet exports and were an important source of foreign trade. However, since WW II the net exports of forest products have accounted for only 4 to 5% (see table 2). Furthermore, there has been a change in the complexion of the distribution of products. For example, the export of roundwood has increased from 0.7 million cubic meters in 1950 to 18.7 mil. cu. meters in 1973 (table 3). Since then there has been a small decline, due probably to the recession in the western capitalist countries. But half of this growth in roundwood was absorbed by Japan which in 1955 took 1.5% but in 1973, nearly 50%.

Whereas exports of roundwood increased about 27 times between 1950 and 1973, lumber has increased 8 times (table 4). However, lumber exports have continued to grow in the last few years and are growing closer to the gains in roundwood exports.

The reason for this state of affairs lies in the distribution and availability of Soviet resources with respect to home consumption centers and exports markets. First, it has been pointed out the forest resources of northwestern European USSR are being used to the maximum and over-cutting is taking place. Those resources being closest to European markets explain the Soviet reluctance to increase roundwood and to some extent lumber exports there. The forest stands of both Western and Eastern Siberia are needed to satisfy home consumption. The forests of Far Eastern USSR are so distant from home consumption centers that it has become more economical to either use the products for local needs or to ship them to Japan, than it is to transport them over land.

Soviet exports of pulp, paper, newsprint and cardboard (table 5) are more than offset by imports. But whereas imports are primarily from capitalist countries, exports are mainly to east European or Third World countries.

Concerning the overall composition of Soviet foreign trade in forest products (table 6) it can be seen that roundwood and lumber account for 75% of all the exports, while pulp, paper and cardboard make up about the same percentage of the imports.

The present Soviet policy of fostering economic integration with eastern European countries has required the Soviet Union to set aside certain quantities of roundwood and lumber for these partners. Hungary and East Germany particularly rely on their roundwood, while Hungary, East Germany and Cuba absorb most lumber. In 1976 the east European countries took about 80% of the Soviet pulp export, 70% of the newsprint, 60% of the cardboard and 47.5% of the plywood.³³ Remember, the Soviet Union imported nearly the same amount of pulp, paper and cardboard products from the capitalist countries as they in turn exported to east European and Third World countries. One can see that exports of forest products play some political role for the Soviet Union.

In a planned economy, the economic vitality of an industry depends on the availability of resources and on the degree of priority allocated to that industry; and for a number of years the forest, wood-processing and pulp and paper industries have been low on the list. This can be seen in the perennial shortage of industrial capacity to initiate, maintain, or complete pulp and paper, or other wood based industrial projects. These difficulties are aggravated by shortages of labor, and location of population centers. In 1976 there were approximately 600,000 people employed in the forest industry. Of these, 380,000 are engaged in logging.³⁴

Thus, the future of the forest industry will continue to be determined by the priority allocated to it by the resources available. In both these respects the industry is poorly placed for future growth. The present concentration of effort on the construction of the Baikal-Amur Trunk Line railroad will continue through at least 1984 absorbing immense industrial capacity, finances and man power. It will also provide only a little benefit to the forest industry because only 5 million cubic meters of wood is to be logged annually from the areas served by that rail system. Difficulties in agriculture and the needs of the oil and gasoline industry will also require large subsidy and forestry will suffer at their expense. Deeper utilization of the available resources is needed for expansion in the forestry industry. However, it will encounter difficulties because it will need investment, finance and labor allocations to ensure its growth. Presently the fulfillment of these needs will not be possible. Consequently, the industry will have to reconcile itself to a growth only large enough to meet its present urgent needs of the planned quotas.

Distribution of Logging Practices

In 1943 the country's forests were divided according to their economic significance into three groups. Group I includes forests of special protective importance. These forests are not intended for logging. They include State preserves, green-zones in cities,

health-resort forests and protective strip forests along rivers, highways and railroads. They occupy about 95 million hectares.

The second group, Group II forests, are valuable as protective, as well as economic forests. They are located in thinly wooded areas as well as heavily wooded areas. In these forests a great deal of work is done to regenerate and improve the stands. These forests are heavily regulated. There are approximately 48 million hectares of Group II forests.

Group III forests are made up of forests in the most densely wooded areas which meet most of the economy's demand for timber. These forests are logged fairly indiscriminately. They are located mainly in northeastern USSR and in West and East Siberia. They account for approximately 518 million hectares.

When considering resources it is important to note the disparity between the location of the forest resources, the location of logging practices and the location of the population centers. For example, Siberia and the Far East have 70% of the usable resources, accounting for 31% of the logging and have only 10% of the population. The Northwest and the Urals have 23% of the resources, 42% of the logging and 11% of the population. The rest of the country holds 7% of the resources, has 27% of the logging and 78% of the population. One can see that this awkward distribution necessitates the transportation of large quantities of wood over long distances to population centers.³⁵

Timber transport has consisted of trucks, railroads, and log floating on navigable rivers. Lack of an extensive transportation system has severely limited operations in the Far East and Siberia, and caused a pattern of heavy exploitation and serious forest depletion in easily accessible areas close to the workforce. If the USSR is to utilize their vast forest reserves they must first deal with the expense of extending a network of roads and railroads into the east.

Timber Harvesting

Technical timber harvesting in the USSR seems to be developing as fast there as it is in this country. They are, however, slightly behind the United States and may always stay in that position due to a lack of original technical ideas. It is common practice in the USSR to acquire equipment from the US and Canada. Nevertheless, it must be noted that the people of the USSR do on occasion, come up with some unique and worthy modifications for the equipment.

Although the most recent reports on harvesting techniques are dated in the 1950's it is safe to assume that their systems are approaching a similar state as ours. Originally, logging in the USSR was a seasonal occupation occurring in the winter, due to the areas in which much of the logging takes place. Now logging takes place throughout the entire year with the introduction of more advanced equipment. As a result the industry has become more productive for two reasons. The first, the longer amount of time equals more work per year, and secondly, the workers are permanently employed, thus raising the skill of the work force.

The actual cutting is done in a few different styles depending on the location and the intended use. Clearcutting seems to have just as much opposition in the USSR as in this country, but is often employed. Strip cutting is also done to aid in the natural reseeding of an area. It is also mentioned that preservation of streams and rivers is a must, but there is no evidence that this is adhered to. They do note that by using a suspension yarder in all areas and cuts, regeneration will increase dramatically.

As in this country, most of the logging is done by machine, thus creating more possibility for cutting costs. Cutting is done with hand power saws or by power saws mounted on tractors. Skidding, or transport of the wood is carried out through the use of tractors or in certain cases, by yarders. As mentioned, some of the cutting is done by tractor mounted saws, thus reducing the crew to one, and eliminating the need for the operator to be exposed to the elements, an important factor in winter harvesting. Otherwise each crew would require at least seven men, and at the same time increasing the risk of accident. Harvesting machines also load and skid the trees without the need to limb. In mountainous regions much of the logging is done with power saws and yarders. Unlike the yarders found in the US, these machines suspend the logs in the air while being moved, thus preventing the destruction of the undergrowth. The tree is then taken to a central location where limbing takes place. This is to maximize the efficiency concerning the limbing process, (an average larch contains 10% of its wood in its crown), and the usage of the slash. With the wood in a central location, it can be sorted and shipped by railroad, truck, and in some cases, river to the mill or processing plant.³⁶

Differences in logging between the US and the USSR are few. Many of the techniques found throughout the world are a result of common research between countries. The major difference found in the USSR is that of the timber transporting. It must be moved much farther there, than in the US. Plants for processing are not found in the cities or at major seaports, but in the areas of cutting. Then the products must be moved, sometimes hundreds of miles to the population centers for use.

Wood Products

The purpose of the forest industry in the USSR is to provide the necessary wood products to enable the communist society to become the most powerful society in the world. This is accomplished through the highly developed mechanization of saw mills, paper and pulp mills, and wood by-product processing plants.

Of all the wood that comes into the mills, most is used for construction in some form or another. This can be cut lumber, plywood, chip board, or wood fiber products. (roofing felt, masonite., etc.) Also, materials for railroad construction such as sleepers, (railroad ties), switches, and bridges. The paper

industry uses much of the wood, but usually only specific types and of certain grade. Here, some waste can also be used. Furniture manufacturing, also a wood consumer, uses high grade hard woods to fill most of its needs, although plywood is being used more and more.

Today the industry is looking towards alternative wood products instead of the traditional types. Particle boards and plywood are being used extensively throughout all wood product use areas. Also, there is great advancement in utilizing many types of trees for the same product. This can be seen in the paper manufacturing process, and in the production of felt and paper boards.

Lastly, many liquid and gaseous products can be produced with wood. Turpentine, oils, and a gas vapor are made through the process of heating and drying wood chips. Also, the wood chip by-product of this process along with bark can be formed into charcoal and other heating products.³⁷

Current Problems in Forestry

Fines and penalties may be demanded for not complying with regulations, but they are minimal and usually paid by the industry, or timber firm as a whole. On the other hand, the Party and government continue to stress the meeting of planned production quotas and reward the fulfillment or overfulfillment of quotas with premiums and bonuses to individuals. Thus, there is little incentive for compliance with laws which would restrict production.

Logging operations are nomadic and may harvest a particular area for an average of 14 years. Since loggers will not have to harvest the same area again and therefore have no permanent responsibility for a given tract of land, there is very low incentive for careful management and rehabilitation work. A logging firm will typically extract only the most desired timber and leave the rest as waste to burn or rot. Leonid Leanov, in a plea for conservation in the Literaturnaya gazeta, March 30, 1965, wrote, "Each year approximately 300,000,000 cubic meters of state-plan timber and 50,000,000 cubic meters of timber cut on the collective farms are removed from the cutting areas of that county. Non-liquid assets of 100,000,000 cubic meters are disposed of on the spot. This figure includes- in addition to the stumps, boughs and crowns- deciduous varieties felled at the same time. Our fastidious industrial establishment demands only coniferous varieties, but stands are cleared to the last tree."³⁸ (Clearcutting accounts for 95% of Soviet cutting practices) Most harvesting is done in easily accessible areas- along rivers, roads, and railways, and near towns and cities- because of the lack of an effective, economical and extensive transportation system. A great deal of this cutting leads to soil erosion problems despite restrictions on the books. Floating logs down navigable rivers is still used

in many areas. Logs are floated unstripped and often singularly rather than in rafts. Bark, woodscrap, and whole logs sink to the bottom of the rivers and line the riverbeds with rotting debris which consumes the oxygen in the water and produces anaerobic zones. These zones can destroy the fishing in that area. In 1971 it was estimated that 5-10% of all floated timber sank to the bottom of rivers and lakes.³⁹ "Between 1958 and 1961, approximately 825,000 meters cubed of timber sank in the Kama alone, and in some places the river bottom was covered with a wooden roadway several rows deep."⁴⁰ In 1965 review of the fulfilment of the 1960 conservation law it was observed that because of log floating, "hundreds of rivers and bodies of water that used to have large fish reserves have completely lost their importance for the fishing industry."⁴¹ Only in some areas, however, has log floating been restricted or prohibited. It is apparent that strict regulations concerning log floating and transport systems are needed.

As timber is given no in site value, there is little reason for loggers to avoid wasteful or damaging practices. Losses are passed off to society in general and are not reflected in anyone's economic accounting. The loggers are paid salaries and bonuses for fulfilment of quotas rather than receiving the benefits of profit or costs of wastes, pollution, or a desimated forest. As Melekhov states, "Elaborated technical, forest-management, forest-industry, farm-forest land improvement measures cannot be effective until they are supported by a solid economic foundation."⁴² No one wants to, or needs to take responsibility for unwise use of natural resources in a socialist economy. The expansive structure of the bureaucracy and lack of coordination and cooperation among ministries results in endemic buck-passing.

The only independent check on poor management in a centrally planned economy is represented in the people themselves. However, there is little public awarness of proper conservation and resource utilization practices and the Soviet political system discourages public participation in policy dicussions. Environmental awareness is taught in school to younger children, but education in the higher institutions is narrowly confined to explortative development. Leonov wrote, " To our sorrow, the forestry institutes train students chiefly in the mechanical processing of wood- in the present methods of felling, splitting and breaking up logs. . . there must be a new people, many of them, with a more broad minded approach to forestry."⁴³

There are a number of public conservation organizations, usually in the form of societies within the Union republics. The All-Russian Society for the Conservation of Nature (whose 11,000,000 members are mostly school children in the youth division) is permitted to 'conduct' public conservation inspections and the government is required to review statements and proposals submitted by 'technically qualified advisors' within the society. Criticism is permitted if it is directed toward the administrative authorities, but "policy traceable to past Communist Party decisions is above reproach."⁴⁴ Organizations and individuals voicing objective concern and constructive criticisms can often be effective at the local level, but can do little to effect national policy.

Conclusion

The demands of a growing population and rapidly expanding industry in the Soviet Union has had a heavy toll on forest resources. Heavy cutting in areas of denser population, and clearing the land for agricultural purposes, have severely depleted the forests of European Russia and the Caucasus, forcing the forest industry to extend operations into more remote areas.

Consumption of wood has increased steadily as the economy has required larger amounts of forest products. However, consumption in the Soviet Union's economic structure is not regulated by potential demand, but by the general economic plans of the Gosplan. Exports have fluctuated over the years, during WW II they decreased, but in recent years have increased. Currently, the USSR is the world largest exporter of coniferous sawnwood.

The central planning system has not been able to bridge the gap between conflicting interests of the timber industry and wood consumers on the one hand, and the need for forest conservation on the other. This conflict between the productive and protective functions of the forest existed in capitalism in the Czarist period and under socialism in the Soviet Union.

With the ultimate responsibility for the management of public resources vested in the State, one could envision a meaningful policy enforced toward efficient utilization and conservation of natural resources. However, as Pryde states, "The question of environmental perception in the Soviet Union...becomes essentially a question of governmental perception".⁴⁵ There is no lack of appreciation for conservation and proper management procedures among the specialists in Universities and research institutions, and an awareness of that conservation should be defined as a concern of environmental quality rather than resource quantity is gradually spreading. However, as we have seen, there is a considerable dichotomy between the views of the academicians and the policies instituted by Soviet planners. There still exists a deep-rooted view that natural resources are to be utilized for economic exploitation and, and that forest resources are inexhaustible. A man versus nature attitude prevails in the belief that nature must be transformed by man to be useful and that the forces of socialism and technology will overcome any problems in resource utilization and development.

As long as the Soviet political economy continues to embrace its pro-growth ideology it will also produce environmental deterioration and resource depletion in the same unrelenting fashion as its western counterpart. The public, or State control of resource management is not an improvement over private control. The nature of the political institutions through which the environment is controlled makes little difference; in fact, if they are strongly committed to growth the State-run structure could be more deleterious to the environment. On the other hand, once the Soviets acknowledge the fact of resource scarcity, the structure and power of the Soviet system could be a great asset in making the transition to farsighted resource utilization.

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OVERALL EXPORTS AND IMPORTS OF FOREST PRODUCTS FROM THE USSR

Millions of Rubles

TABLE 2

Year	All exports	All imports	Exports of forest products	Imports of forest products	Net exports of forest products	%
1930	812.7	830.3	134.2	13.7	120.5	14.8
1946	588.3	692.0	25.3	27.1	- 1.8	-
1950	1 615.2	1 310.3	50.0	50.6	- 0.6	-
1955	3 084.0	2 754.5	157.0	83.6	73.4	2.4
1960	5 007.3	5 065.6	274.6	94.4	180.6	3.6
1961	5 398.6	5 244.9	325.6	111.9	213.7	3.9
1962	6 327.5	5 809.9	378.3	106.6	271.7	4.3
1963	6 545.2	6 352.9	372.7	107.0	265.7	4.0
1964	6 915.0	6 962.9	455.7	118.1	337.6	4.8
1965	7 357.2	7 252.5	534.2	135.3	398.9	5.4
1966	7 957.0	7 121.6	559.9	137.0	422.9	5.3
1967	8 687.1	7 683.0	555.6	168.6	387.0	4.4
1968	9 570.9	8 469.0	614.4	175.8	438.6	4.5
1969	10 489.7	9 294.1	651.9	196.7	455.2	4.3
1970	11 520.1	10 565.1	749.0	230.3	519.7	4.5
1971	12 425.6	11 231.9	778.2	233.5	544.7	4.3
1972	12 734.4	13 303.0	776.6	237.8	538.8	4.2
1973	15 801.8	15 540.8	1 020.4	250.2	770.2	4.8
1974	20 737.8	18 829.2	1 438.5	358.4	1 080.0	5.2
1975	24 029.6	26 669.2	1 378.2	572.8	805.4	3.3
1976	28 022.2	28 730.7	1 500.2	503.6	996.6	3.5

DISTRIBUTION OF ROUND WOOD EXPORTS BY PRINCIPAL MARKETS 47

Million cm.

TABLE 3

Year	Capitalist countries without Japan			Japan		East European countries	
			%		%		%
1930	7.500	-	-	-	-	-	-
1950	0.700	-	-	-	-	-	-
1955	1.630	1.086	66.38	0.021	1.28	0.288	17.60
1960	4.428	1.748	39.47	0.951	21.47	1.570	35.45
1961	5.700	1.516	26.59	1.341	13.41	1.439	25.24
1962	7.400	2.480	33.51	1.763	23.82	2.508	33.89
1963	8.000	3.407	42.58	1.763	22.03	2.084	28.16
1964	9.417	3.682	39.09	2.458	26.10	2.499	26.53
1965	11.138	4.288	38.49	2.603	23.37	1.797	16.13
1966	12.409	4.265	34.37	3.522	28.38	2.741	22.08
1967	12.361	4.058	32.82	5.029	40.68	2.992	24.20
1968	12.755	3.270	25.63	5.878	46.83	3.048	23.89
1969	13.627	3.749	27.51	6.099	44.75	3.229	23.69
1970	15.300	4.235	27.67	7.018	45.86	3.329	21.75
1971	14.600	4.698	25.32	6.986	47.84	3.371	23.08
1972	14.900	3.310	22.21	7.754	52.04	3.071	20.61
1973	18.700	4.620	24.70	9.220	49.30	3.254	17.40
1974	18.200	5.076	27.89	7.890	43.35	3.340	18.35
1975	16.869	4.395	26.05	8.016	47.51	3.178	18.83
1976	17.892	5.008	27.99	7.973	44.56	3.050	17.04

USSR EXPORTS OF LUMBER BY PRINCIPAL GROUPS OF COUNTRIES ⁴⁸ TB. ⁴⁴

Values: Million rubles.

Quantities: Million cm.

Year	Total forest indus. Export	Lumber Export Value	Lumber Export Quant.	Export to Cap'st countr.	%	Export to Japan	%	Export to Eastern Europe	%
1930	134.2	66.6	4,500	4,021	89.35			0.002	0.04
1946	25.3	9.2	0,300	0,193	64.33			0.001	0.33
1950	50.0	25.5	1,002	0,896	89.50			0.106	10.50
1955	157.0	84.9	2,337	1,885	80.65			0.089	0.38
1960	274.6	164.5	4,979	3,035	60.95			1.273	25.56
1961	325.6	185.9	5,203	3,005	57.75			1.522	29.25
1962	378.3	199.2	5,996	3,385	56.45			1.705	28.43
1963	372.7	211.4	6,525	3,833	58.74			1.875	28.73
1964	455.7	253.6	7,675	4,401	57.34			2.002	26.08
1965	534.2	281.0	8,001	4,059	50.73			2.109	26.35
1966	559.9	276.8	7,991	4,388	54.91	0.071	0.89	2.678	33.51
1967	563.7	254.3	7,443	4,003	53.87	0.140	1.73	2.616	35.14
1968	614.8	263.1	7,925	3,925	49.52	0.152	1.92	2.948	37.19
1969	651.9	275.8	7,919	4,060	51.26	0.109	1.38	2.895	36.55
1970	749.0	299.8	8,001	3,668	45.85	0.086	1.06	3.346	41.81
1971	778.2	317.4	7,900	3,360	42.53	0.099	1.25	3.526	44.63
1972	776.6	308.1	8,000	3,833	47.91	0.105	1.31	3.164	39.55
1973	1020.4	372.7	8,200	4,065	49.57	0.133	1.62	3.013	36.74
1974	1438.5	566.3	7,900	2,973	37.17	0.118	1.49	3.774	47.77
1975	1378.2	561.5	7,826	2,959	37.80	0.098	1.25	3.828	48.90
1976	1500.2	614.9	8,550	3,580	41.87	0.103	1.20	3.050	35.67

USSR EXPORTS OF PULP, PAPER AND CARDBOARD. Million Rubles. ⁴⁹

TABLE ⁵ ~~1~~

Year	1 Total Exports of forest products	2 Pulp	3 Paper	4 Card- board	Total 2,3 & 4	% of 1
1930	134.2	-	1.2	-	1.2	0.89
1946	25.3	6.1	7.0	1.9	15.0	59.2
1950	50.0	5.4	5.5	0.7	11.6	23.2
1955	157.0	17.6	14.0	4.1	35.7	22.7
1960	274.0	22.6	17.4	6.3	46.3	16.8
1961	325.6	26.4	20.4	10.2	56.6	17.3
1962	378.3	25.7	21.5	8.3	55.5	14.6
1963	372.7	23.0	21.3	10.1	54.4	14.5
1964	455.7	28.0	23.8	10.1	61.9	13.5
1965	534.2	29.6	28.7	9.8	68.1	12.7
1966	559.9	31.0	35.7	9.8	76.5	13.6
1967	563.7	38.3	39.3	13.5	91.1	16.1
1968	614.8	42.9	49.6	14.2	106.7	17.3
1969	651.9	48.8	57.3	21.4	127.5	19.5
1970	749.0	54.4	64.9	30.4	149.7	19.9
1971	778.2	61.9	68.2	29.3	159.4	20.4
1972	776.6	66.4	73.7	29.5	169.6	21.8
1973	1020.4	69.5	81.1	32.9	183.5	17.9
1974	1438.5	77.5	113.0	40.1	230.6	16.0
1975	1378.2	93.3	116.6	50.8	260.7	18.9
1976	1500.2	130.6	124.7	66.7	322.0	21.4

COMPOSITION OF THE USSR'S FOREIGN TRADE IN FOREST PRODUCTS ⁵⁰

TABLE 6

EXPORTS

Year	Total Mil.R.	Percentage distribution				
		Round Wood	Lumber	Round W. & Lumber	Pulp Paper Cardb.	Other
1930	134.2	42.2	49.6	91.8	0.9	7.3
1946	25.3	1.5	36.3	37.8	59.2	3.0
1950	50.0	15.2	51.0	66.2	23.2	10.6
1955	157.0	15.2	54.0	69.2	22.7	8.1
1960	274.6	20.0	59.9	79.9	16.8	3.3
1961	325.6	23.8	57.0	80.8	17.3	1.9
1962	378.3	28.1	52.6	80.7	14.6	4.7
1963	372.7	26.6	56.7	83.3	14.5	2.2
1964	455.7	27.8	55.6	83.4	13.5	3.1
1965	534.2	31.3	52.6	83.9	12.7	3.4
1966	559.9	31.4	49.4	80.8	13.6	5.6
1967	563.7	31.7	45.1	76.8	16.1	7.1
1968	614.8	34.1	42.7	76.8	17.3	5.9
1969	651.9	32.7	42.3	75.0	19.5	5.5
1970	749.0	33.9	40.0	73.9	19.9	6.2
1971	778.2	32.4	40.7	73.1	20.4	6.9
1972	776.6	32.5	39.6	72.1	21.8	6.1
1973	1020.4	40.0	36.5	76.5	17.9	5.6
1974	1438.5	39.2	39.4	78.6	15.9	5.5
1975	1378.2	33.7	40.7	74.4	18.9	6.7
1976	1500.2	31.4	40.9	72.3	21.4	6.3

* * * * *

IMPORTS

Year	Total Mil.R.	Percentage distribution				Paper prods.	1-4 Comb.	Others
		Pulp	Paper	Cardboard				
		1	2	3	4			
1930	13.7	26.2	51.1	0.7	2.91	80.9	19.1	
1946	27.1	22.9	34.3	7.0	-	64.2	35.8	
1950	50.6	0.4	9.7	1.4	-	11.5	88.5*	
1955	83.6	7.5	21.3	4.9	-	33.7	66.3*	
1960	94.3	13.5	16.5	6.7	8.9	45.6	54.4	
1961	111.9	15.0	19.3	9.0	9.3	52.6	47.4	
1962	106.6	16.2	18.7	7.8	8.4	51.1	48.9	
1963	107.0	13.3	19.4	9.3	14.8	56.8	43.2	
1964	118.1	18.0	19.2	8.2	16.3	61.7	38.3	
1965	135.2	24.3	23.2	7.5	14.8	69.7	30.3	
1966	136.9	19.8	25.9	7.0	16.7	69.4	30.6	
1967	168.7	23.9	29.4	5.6	14.7	73.7	26.3	
1968	175.8	19.9	33.2	6.5	16.8	76.4	23.6	
1969	196.7	20.0	34.9	5.9	18.1	78.8	21.2	
1970	223.7	21.7	37.8	5.0	16.6	81.1	18.9	
1971	333.5	14.4	25.7	4.0	12.7	56.8	43.2	
1972	237.8	16.8	39.2	5.0	19.4	80.3	19.7	
1973	250.2	16.6	21.2	3.5	18.5	59.8	40.2	
1974	358.4	15.0	39.2	5.9	21.4	81.5	18.5	
1975	572.7	15.9	46.8	6.2	23.3	92.2	7.8	
1976	503.6	13.6	39.0	9.3	20.5	82.4	17.6	

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