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INFORMAL REPORT--U.S. FORESTRY DELEGATION TO THE U.S.S.R.

During President Nixon's May 1972 visit to the Soviet Union, the Government of the United States and the Government of the USSR signed an Agreement to Cooperate in the Fields of Science and Technology. In March, 1973, the first meeting of the US-USSR Joint Commission on Scientific and Technical Cooperation was held in Washington, D. C. Following a review of bilateral activities already underway the Joint Commission considered proposals for new areas of possible cooperation under the Agreement. It was decided to establish a Joint Working Group on forestry under the leadership of the U.S. Forest Service in the United States and the USSR State Committee on Forestry in the Soviet Union.

These were the events that led to travel by a 6-man U.S. forestry delegation to the USSR from August 26 - September 7, 1973. Our mission was to meet with forestry counterparts in the USSR, to determine areas of mutual research and technological interest, and to develop proposals for specific cooperative programs that would prove of benefit to the United States.

August 24 - Friday

On the day of departure for the USSR the State Department held a briefing session in Chief John McGuire's office. Members of the forestry delegation present were: Mr. McGuire, Chief, Forest Service; Dr. R. Keith Arnold, Deputy Chief, Research; Dr. R. W. Brandt, Plant Pathologist; Dr. Eric Ellwood, Dean, School of Forest Resources, North Carolina State University, Raleigh, North Carolina, and Mr. Lynn Biddison, Assistant Regional Forester, R-3, Albuquerque, New Mexico. State Department was represented by Dr. Oswald Gangley, Executive Secretary; Dr. Roy Wald, his Deputy, and Mr. Sol Polansky, all of the Bureau of International Scientific and Technological Affairs. The briefing lasted some 50 minutes. Shortly thereafter we left for Dulles Airport. We departed from Dulles at 1930 on PA flight 106 to London and had a smooth, uneventful flight.

August 25 - Saturday

Arrived at London's Heathrow Airport at 0730 London time (6 hour time change). Took the airport bus service to the Skyline Motel where we rested for a while and then met at 1400 in Arnold's room for discussion of plans for the USSR forestry meetings.

August 26 - Sunday

In the motel lounge following check-out we were joined by Mr. Oscar Traczewitz, Director of Woodlands, International Paper Company and Mr. Alexis Tatistcheff, our interpreter. Following introductions and a short conversation, we boarded the bus for Heathrow airport, cleared the necessary check points and departed for Moscow aboard Aeroflot flight 581. The plane (an IL-64) was crowded with Japanese enroute to Tokyo. We arrived safely and precisely at the scheduled 1810 local time. The flight was 3½ hours with a 2-hour time change between London and Moscow.

We were met at the plane by a party of Russian Foresters led by Professor G. I. Vorobyov, Chairman of the State Forestry Committee, and by Mr. G. Stanley Brown, Agricultural Attache, American Embassy in Moscow. Flowers were given to the Chief and Mrs. McGuire and we boarded a bus for the VIP lounge. Our passports and baggage tickets were collected by Mr. E. Shushkov, Chief, Department of Foreign Relations, State Forestry Committee, and all necessary check-in procedures were handled by the Russians as we conversed in the lounge. Present from the Russian side were: Dr. V. Nikolaiyuk, Deputy Chief, State Forestry Committee; Dr. Nikolai Moisseyev, Chief, Department of Science, Introduction of Advanced Methods and Foreign Relations (Dr. Arnold's counterpart in the State Forestry Committee); and Dr. Viktor Atrokhin, Director, Institute for Advanced Training of Management Personnel and Forestry Experts, and Deputy Director, All-Union Research Institute for Forestry and Mechanization.

When Mr. Shushkov (who was to handle all our departures, arrivals, hotel arrangements, and local transportation) indicated we were cleared, we were driven into Moscow. Enroute we passed the monument where the Russians stopped the Germans at the edge of the city in WW II. Our hotel, the Rossiya, was a large 3,000-room hotel overlooking the Kremlin and capable of housing 6,000 people. While we were there it was filled with young people participating in the University Games in Moscow. The hotel has 11 main resturants and several snack bars. We were told space was limited and that we would have to share a room. Actually the rooms turned out to be 3-room suites containing bedroom, sitting room (with TV and refrigerator) and bathroom.

Shortly after 2000 we met again in the lobby and were escorted to the 21st floor for a reception dinner hosted by Professor Vorobyov. The view over the city and particularly over the Kremlin and Red Square was magnificent. A dance band and succession of vocalists made it very difficult to converse except with one's immediate neighbor. The music was largely rock and roll with a few Russian cossack pieces for variety.

The dinner began with slices of cold meats (sausage, ham, beef, smoked fish), and cheese, bowls of peeled cucumbers and sliced tomatoes, brown bread and caviar. Mineral water and wine (red and white) were available throughout the meal as was a generous supply of vodka and cognac. Small cups of hot mushrooms in sauce were served as a separate course. The main course of beef, potatoes, and fried onions, was followed by a good vanilla ice cream and then coffee or tea. Very few speeches were made because of the competition from the band. Most of us were in bed by midnight.

August 27 - Monday

We all met for breakfast in one of the hotel dining rooms. A breakfast of tomato juice, bread and jam, omelet and tea cost 78 kopecks ($1.00 = 71 kopecks).

We borrowed our passports (the hotel administration had not finished "checking them in") so we could change some money. We were asked for our customs declaration of funds and, of course, our VIP treatment had neglected this very important item. After some discussions in which the words "U.S. forestry delegation" and "USSR Ministry for Forestry" were repeatedly stressed, we were permitted to change money on the promise that we would spend all that we converted into rubles. This lack of a declaration was to be of considerable worry for us as we traveled but actually caused no real problem. (That it didn't, we owe to the fact that both the State Forestry Committee people and Ag. Attache Brown were at the airport when we departed).

Our delegation visited the American Embassy to discuss the details of our stay in the USSR with Mr. Brown. We returned to the Rossiya Hotel at 1330 and an hour later the cars arrived to take us to our first formal meeting with the State Committee for Forestry. A conference table in Mr. Vorobyov's office was set with U.S. and USSR flags, bowls of fruit and assorted soft drinks, such as mineral water and what was laughlingly called "Baikol Coke." During this session the members of the delegations were introduced to each other. In addition to Vorobyov, Moisseyev, Atrokhim, and Shushkov, mentioned previously, the USSR delegation included: Dr. D. Stolyarov, Director, Leningrad Forestry Research Institute; Mr. D. Godin, Chief Expert, Department of Forest and Building Industry, State Committee for Science and Technology, USSR Council of Ministers; and Mr. S. Bychkov, Head Expert, Department of Forestry, State Planning Committee (GOSPLAN). Miss Nadya Fomochkin, of the State Forestry Committee, and our own Alexis Tatistchoff served as interpreters.

A general discussion of scientific interests and a review of the schedule for our stay in the USSR revealed that no arrangements had been made for contacts with the pulp and paper and wood processing ministries. At our

request, the State Committee people promised to try to set up meetings with the Ministry of Pulp and Paper and with the Ministry of Wood and Wood Working Industry following our return from Leningrad the following week. It was planned that we would begin discussions on details of scientific and technical cooperation the next day.

During the course of the afternoon, Dr. Ellwood asked some questions of the State Committee on their educational system. It appears that the State Forestry Committee operates or administrates some 12 institutes and 56 experiment stations. They have in their employ approximately 2,000 scientists involved directly in the field of forestry, another 1,000 who have some application of their research to forestry, and another 500 who are considered as candidates for forest science. The Ministry of Higher Education is responsible for training at the doctorate degree level. There are 13 institutions, such as the Forest Academies in Leningrad, Moscow, and Kiev, which give higher training in forestry and forestry related areas. Approximately 5,000 students are graduated each year in the various institutes of higher education in the fields of forestry. The State Committee of Forestry also has responsibility for preparing and educating forest technicians. There are about 100 institutes involved in this program in the Soviet Union.

We were driven to the hotel at 1800 and were picked up at 1830 to attend a performance of the ballet Gizelle by a Bolshoi Company at the 5,000-seat Congress Hall in the Kremlin. It is the normal custom at intermission for the audience to go upstairs for a buffet style supper. It is quite competitive to get to the stalls serving various foods and drinks, manage to eat, and make it back to one's seat before curtain time. Following the ballet we walked back to the hotel through Red Square, passing Lenin's tomb and St. Basil's enroute.

August 28 - Tuesday

At 0930 we returned to the State Committee for Forestry offices. Dr. Moisseyev made the opening remarks and introduced people. In addition to the delegation listed above there were 12 technical people present; Dr. Alex Moltchanov, USSR Academy of Sciences Laboratory of Forestry (Silviculture); Dr. Pasternak, Director Ukraine Institute; Dr. Ozolin, All-Union Research Institute of Agromelioration, Volgograd; Dr. I. Khanbekov, Deputy Director, All-Union Forest Research Institute; Dr. A. Pobedinsky, Chief, Laboratory of Silviculture, Pushkino; Professor B. Tropin, All-Union Research Institute for Forest and Mechanization, Pushkino; Dr. E. Artsibashev, Leningrad Forest Research Institute; Dr. S. Ivannikov, All-Union Research Institute for Forest and Mechanization, Pushkino; et al.

Chief McGuire introduced the U.S. delegation again and we then discussed the areas of interest for our respective sides to see where we might carry out fruitful cooperative exchange. Fire was the first obvious area

of mutual concern. Inasmuch as the State Forestry Committee is responsible for protection and management of all forest lands in the USSR, it has authority to close the forest to use. The planes and helicopters used in fire control are rented from Aeroflot by the State Committee. Dr. Artsibashev, as the top USSR fire control expert expressed interest in the use of large helicopters and larger planes for dropping water and retardants. He also cited infrared detection, comparison of fire danger rating systems, fire behavior modeling and slash control by fire as being of interest to the Russians.

Other bits of information arising from these fire discussions were: (1) small water scooping air tankers had been tried but were unsuccessful because of the lack of lakes in the regions of large fires, (2) water thickeners are not used in fire suppression but a "freon-emulsion" is used that is reported to be 4-5 times as effective as water, (3) until recently the USSR has not considered lightning to be an important cause of fire, and (4) the Soviets claim to have artificially induced rainfall on forest fires.

The Russians expressed interest in the gypsy moth and its integrated control. We indicated we could work in this problem area. We expressed interest in techniques of aerial application for viruses, bacilli, and chemicals. Brandt and Professor Tropin left the main meeting and discussed further details of cooperation in these areas. Tropin is an entomologist, head of plant protection at the All-Union Institute in Pushkino, and is particularly interested in insecticides and their application. He indicated that most of the work on microbial insecticides was being done under the direction of Dr. I. D. Avramenko, Ukrainian Research Institute of Forestry. The USSR would be interested, in future years, to cooperate with the U.S. on Dutch elm disease and Fomes annosus research. These topics may be three years away from cooperative effort. Biogeocenosis, harvesting and afforestation were discussed in the main meeting.

At 1880 we finished a draft of a cooperative program, left it with the State Committee people for typing and returned to the hotel. Shortly after 1900 we went to the 21st floor restaurant. The service was very slow. Following dinner, Arnold and Brandt reviewed program areas of agreement and made tentative assignments of scientists in each cooperative area.

August 29 - Wednesday

Following breakfast we all moved our baggage into McGuire's room and checked out of all but the one room.

At 1000 the State Committee provided cars for a short tour of Moscow. We had an official Intourist guide but the young lady was rather uncommunicative. We stopped at the Theater area near the Peking Hotel, the Smolenska Convent where the wife of Peter The Great lived, a cemetery with the graves of many notable Russians, and then drove to the overlook in front of the University. The gardens were immaculate and the view of the city beyond the stadium and sports center was very spectacular. We

rushed back to the hotel and then to the State Committee offices for our 12 o'clock meeting. Professor Vorobyov and Mr. McGuire led discussions during review of the cooperative program document and preparation of the minutes of the meeting. The Russians suggested adding the training of people and the tending of forests. Neither item received much enthusiasm from our side. Chief McGuire indicated the exchange of scientists in 5 areas was enough for FY 1974. He also suggested that the Joint Committee for Science and Technology had to approve our forestry submission and the next meeting therefore could hardly be less than 6-8 months away. At this meeting Mr. McGuire presented the Russian delegation with presents of books from the U.S. All were inscribed by the Chief.

Following return to the Rossiya Hotel, Arnold, Brown, and Brandt took the group's excess baggage to the Embassy for temporary storage. We managed to get a short walk through the Kremlin and returned to the hotel through GUMM's department store.

At 2030 the cars arrived to take us to the railroad station for our trip to Kiev. Professor Vorobyov and Nadya went with us. The Station was a beehive of activity with people of all ages and races. There appeared to be many tearful separations and many people had large plastic mesh bags of fruit, clothes, or household goods. Each compartment of the train had upper and lower birth. Two compartments shared a washroom between. The train was electric, very clean and smooth riding. Tea was served shortly after departure and again the next morning about an hour before arrival.

August 30 - Thursday

We awoke to a landscape quite similar to southern Michigan or northern Wisconsin. A mixture of scrub hardwoods, an occasional scots pine planting, a few swamps and generally sandy soils. As we neared Kiev, we saw numerous new apartments being built on almost pure white "beach" sand.

We arrived in Kiev precisely on schedule at 0900. We were met (with flowers) by Minister Boris N. Lukianov of the Ukrainian Forestry Ministry and an associate. A bus took us all to the 10th floor where the baggage awaited us. We pointed out our bags and these were delivered to our rooms. There were flowers and fruit in each room. We had no check-in except for turning in our passports. At 1000 we met in the 2nd floor restaurant where our breakfast awaited us. This breakfast included cucumbers and tomatoes, apple juice, fish, bread, white wine, omelet and coffee.

At 1120 we met in Minister Lukianov's office, looked briefly at a large wall map of forest types, then moved to a conference room across the hall. The minister introduced his staff as follows: G. Babich, Deputy Minister; I. Boiko, Chief, Kiev Forestry Region; Sunitsky, Head, Science and Technology; Gysenko, Specialist in Science and Technology; and Kruvoropski, Assistant to the Minister; Konanchuk, Chief, Planning and Economics; Vakuyuk, Chief, Afforestation.

Minister Lukianov told us that The Ukrainian Republic is the size of France and has a population of 1.8 million. Ten million hectares of the Ukraine are in forest. Seven and one-half million in State forests and 2½ million in collective farms. Approximately half of the forests are coniferous: scots pine, spruce and fir. The deciduous forests are largely oak and beech with some birch, maple, ash, carpinus, aspen, poplar and alder. Some 56 percent of the forests are young forests and the main task for Ukraine foresters is afforestation. Better than 100,000 hectares are planted annually with 84,000 h in forests and 16,000 h in shelterbelts. Forest income from Ukrainian forests was reported to be 3,447,000 rubles in 1960. A program of total tree utilization has been introduced to nearly double this figure. Income is said to reach 28 rubles per cubic meter of wood. The main use of land in the Ukraine is for the production of wheat. Therefore, the extent to which forestry is practiced is limited by the demand for wheat growing land.

Thirty percent of the forests belong to Group I and make up the protective green zones around some 700 towns. There is a 50 km. green belt around Kiev, for instance, which includes 70,000 h. of pines.

Ukraine's forests yield 5.5 million cu. m. of wood annually. Thinning of the young stands yields another 5.5 cu. m./ year. Logs and timbers are shipped by rail and truck. Branches, tops, and stumps are used locally, largely in particle boards. The aim is for complete utilization.

Another valuable product of the forests is the game animal. It is estimated there are over 50,000 boar, 20,000 moose, 17,000 elk, 140,000 roe deer, and 1,000 bear. Two thousand five hundred metric tons of mushrooms were harvested in 1972, as were over 2,000 metric tons of berries. Income from the forest is 160 million rubles/year.

The Ukraine has 2 forestry schools--The Wood Technology Institute and the Forestry Faculty of the Agriculture Academy. The Ministry alone employs 150 specialists in forestry. Each of the 25 regions is headed by a forestry officer. There are 260 forest and wood enterprises in the republic. Each enterprise has 30-40,000 hectares for its use.

There is no special institute for forest protection, but a protection program is conducted by Professor Runov under Dr. Pasternak in Agriculture. Apparently there are problems with a tip moth in scots pine and with a defoliator of oaks, the latter covering some 200,000 h. in 1972. Mention was made of use of a brown ant for biological control of insects. Five to 6 ant hills/h. controls insect levels and help reduce the pollution hazard by making insecticides unnecessary.

At 1145 we boarded the bus for the trip north of Kiev to the Teterov experimental forestry farm. Saw a logging operation--a clearcutting of pine and birch. Planting had been at 2½ meters between rows with .7 meter within the row. Most of the pines had been tapped prior to harvest. Stumps were cut at ground level. Trees averaged 1½-2 ft.

diameter and were 85 years old. Trees are logged in tree length down to a top diameter of 2-3 inches. All limbs to about 3/4" diameter and even pine needles were harvested. The hardwoods and much of the small materials were sent to other enterprises for use.

Felling is by the use of chain saws weighing 10 kilos and with a rotatable blade. The handle of the chain saw is above the saw and the operator can cut at ground level while in a standing position. There are two men in the felling crew, one using the chain saw, and the other using a long pole with a fork on the end which he pushes against the tree to make sure that it goes in the right direction. The men are paid by the day. They have a certain goal to reach or amount of timber to cut to receive their pay of about 180 rubles a month. If they can produce more, say up to 10 percent more than their quota, they can receive a bonus in payment up to 40 percent of their wages. The complete crew is four men; the two felling and two others hauling the logs out. The working day is from 9 until 6, hot food is brought in once a day, and the men work a five-day, 40-hour week. Transportation is provided for the workers to bring them in to the job and take them home again. The ground is left essentially clear but the clearcut areas are kept small. After logging, the area is burned over and in the spring planting takes over. The Forest Ranger district is 8,000 hectares. The Forest Ranger has a car and one technician assistant. The Forest Ranger is responsible for choosing cutting areas and operating (the management) procedures. Price of wood is determined by the government and is set on (1) the basis of the money necessary to run the operation, (2) the availability of the wood, and (3) current policy on material uses. For example, if another material seems better for a given use or given application, then the price of the wood might be raised. Generally speaking the price of wood has been climbing slowly over the years, but it is still pretty stable.

We drove to the village, Peshkova, site of a small forest enterprise. Most of the town folks were out to see us and girls had flowers for everyone. Red banners were flying, large signs urged the people on to greater production, and the hammer and sickle were very evident. We were ushered into a spotlessly clean workers dining hall for sandwiches, cookies, and coffee. The women came from the kitchen to send us on our way. The Chief thanked them and we clapped to show our appreciation. They clapped also and everyone was very pleasant. We were shown through the exhibit of products made by the enterprise and then visited the Director's office across the street. The Director was very new on the job, having just been brought in from a highly successful enterprise in the Urals to make a go of this one that was not succeeding. He reviewed his plans and outlined a number of areas of expansion and improvement.

The system of administration is rather complex but the Ukrainian Republic Forestry Division is responsible to both the Republic of Ukrainia and to the USSR State Committee on Forestry. The Republic of Ukrainia Forestry Division receives operating money from the State Committee on Forestry, and also is allowed to keep a share of its profits. This system of financing provides an incentive for the forestry division to produce or over-produce because they can get fair percentage of the profits back into their own operation as a result.

We visited the operation where the pine needles were processed--three tons of production per day. The animal feed plant operates intermittently because the production requirement is not especially high. Pine needles are crushed and dried. Five percent of the distilled pine needles in animal food gives a balanced vitamin diet. One ton of the crushed pine needles brings in 180 rubles as animal feed.

The next visit was to the facility where the pine needles were distilled for the benzine extraction of oil. Following grinding, small (5-6' high) pressure cookers cook the needles. It takes about 6 hours to extract the oil. It is left standing for 24 hours and the oil rises and is taken off the top. The material shipped from this factory is semi-manufactured. In the laboratory the carotene and chlorophyll is determined and the oil shipped for use in soap, shampoo, chemical manufacturing, toothpaste and as an antiseptic. Earnings amount to 4,000 rubles per ton of the extract. The pine oil extractive plant works day and night the year around.

We had given out a number of Woodsy Owl and Smokey Bear pins as we left the dining hall earlier and now as we left the shops at the other end of the village several youngsters stood along the road proudly wearing their new emblems. We drove to a nearby camp area. Behind the numerous bungalows and the recreation area was a forest lodge where we had a fine feast of several courses covering some 3 hours. One young woman did most of the waiting on tables. She seemed very cool and reserved. Mr. Lukianov began singing (with a very fine voice). We sang a few of the old U.S. standbys (voices not so fine). Soon two women from the kitchen and our waitress came in to join in song. The waitress suddenly blossomed. Her voice was not too good, but she really sang out. Alex Tatistcheff managed to do pretty well for both sides. We gave out some Woodsy and Smokey materials and they gave us some wooden plates and cuff-links from the enterprise we visited earlier. We boarded our bus and arrived back at the Hotel Kiev only to find that Mr. Lukianov had ordered a "small" snack for us. This proved to be baked yogurt, apple juice, curd-filled pancakes and wine. Needless to say, we didn't really need the snack.

August 31 - Friday

Our breakfast this morning included the usual sliced cucumbers and tomatoes, eggs, bread, sour milk, and wine, but also introduced most of us to our first drink of birch syrup. Birch trees are tapped in February just as our maples are here. The liquid is colorless, has a bitter-sweet taste (about 3-4 percent sugar) and is quite good except--one glass at a meal is plenty.

Our party drove in two mini-buses (Russian made) to the landing for the hydrofoil or "Rocket" as the Russians call it. We all shook hands with the Captain as we boarded. The crew consisted of one man who went between the pilot house and the engine room, and a woman who tended both the lines and the bar.

At 0930 we were underway on the Dneiper River at roughly 35-40 miles/hour. The Rocket is very smooth and highly maneuverable. Relatively little debris was seen in the river and the water appeared to be quite clean. Many small boats were evident along the banks, people were fishing and a few swimmers and sunbathers were scattered the length of our 130 kilometer trip to Kanev. The west bank is some 20-60 feet above river level but to the east there appears to be a limitless expanse of marshes, islands, and sandbars.

We arrived at the locks near Kanev and five minutes later were at the lower level to travel a short distance down river to the dock. It should be recorded that the only people aboard the Rocket were the delegation, Professor Vorobyov, Nadyia, Mr. Lukianov and a reporter, Mr. Oleg Gusev, with the Kiev branch of Pravda.

As we disembarked two lines of school children stood at the gangplank to greet us with flowers. There were many more children than visitors, so most of us ended up with at least two bouquets. We walked a short distance to minibuses and drove through the village of Kanev to the research station for soil erosion control. The staff was standing at the door with large bouquets. When they saw we already were well burdened with flowers they discreetly kept theirs and shook hands. In the conference hall, we sat at another long table loaded with fruit, breads, cavier, honey, and drinks. The Director of the erosion control project, Mr. Boris P. Stasuk, gave us a briefing on the work of the Station.

Following this briefing, we drove to several erosion control sites. The work underway included earth dams, terracing, afforestation, and concrete spillways. The two fellows driving tractors at the terracing site were stopped and introduced to the delegation. One had received the Lenin medal from President Podgorny for 15 years of making terraces. The cost of terracing and planting trees on the edge of each terrace was said to be about $68.00 per hectar, with $40.00 for the terracing alone.

We drove to the monument of the famous Ukrainian poet and painter Taras Shevchenko. Mrs. McGuire placed some flowers at the tomb and then we toured the museum with a young lady from the museum. We went then to a hotel within the park and had another excellent meal. We agreed that the Ukrainean borsch was the best we had ever had. There was no singing but there were many toasts and as we were leaving, we were presented with photos taken on our arrival and with small statues of the poet Shevchenko. We boarded our Rocket and were back through the locks by 1830.

While we were waiting for the water to raise us to the upper level of the river, Arnold and Brandt talked to Nadya about her forthcoming wedding. She and her bridegroom and two close friends will go to a Palace of Marriage on September 21. They will exchange vows in front of the friends, as witnesses, and before the state marriage official. Later friends and relatives will go to a restaurant. Nadya said it is permitted to go to a church afterward for a church ceremony but very few young people do so. She and her man, an electrical engineer, will have a weekend honeymoon and report to school and to work the following Monday.

According to Minister Lukianov, about 20 percent of his professional forestry people are women. About 30 percent of the unskilled forest workers are women.

The return trip was very smooth. Many tents and camp fires were seen along the banks. The captain had to change speed and blow his horn several times to keep from swamping the small boats criss-crossing the river ahead of us.

We arrived back at the hotel and were escorted directly to the restaurant for another lunch before bedtime.

September 1 - Saturday

Breakfast at 0830. Along with the usual items we had a crushed current jam for our toast and a large sausage with cabbage as the main dish. About 0930 we boarded the bus for a short tour of Kiev, stopping first at the Hotel Dnieper to permit some of us to change money. On the tour we visited a park overlooking the old city and the river, the church St. Sophia, the war memorial and a monastery. Our guide told us that the University of Kiev has about 26,000 students and is one of the best universities in Russia. It was established in 1836. Five years study is required for a degree, but foreign students must have a sixth year for language and orientation. Fellowships of 50 rubles a month are given to the students but can be doubled for excellent students.

The monastery we visited was constructed in 1036 by Yaroslav The Wise, the son of Vladimir who founded the city.

Interestingly enough, and in contrast with the 11th century background, the city has decreed that there must be at least 1 tree per person for a proper oxygen level. Proudly, Kiev citizens have exceeded this with 6 trees per person.

We returned to the hotel at noon, paid our bills, left the luggage with the "key girl" on our floor, and went to dinner. The outstanding items of this meal were a chopped egg salad with cod livers, the Ukrainian borsch, chicken a la Kiev, and a dessert of sour cream mixed with ice cream and orange slices.

Precisely at 1400 we were asked to leave the table so we could catch our plane. We arrived at the airport at 1530 and were ushered into the VIP center with the advice that our President Nixon had also used this room to await his plane. Wine and mineral water were served and the "Captain" of the airport was brought in to meet us. He explained that we would take an earlier 1610 flight to Leningrad because ours at 1630 would be delayed until 1730.

At 1600 a very attractive young lady came to get us. We loaded into two minibuses and drove to the plane. As we waited to board, a cart drove up with our luggage. After considerable discussion between the driver, some airport officials, and the baggage handlers, the latter began to unload luggage and put ours on. Obviously we were being squeezed on to an already full plane. We had the last 10 seats in the rear of the plane. After we were seated about 30 North Koreans got on and went to the front of the plane. All sported bright red badges with pictures of Mao.

On arrival in Leningrad at 1800, we were met by Mr. Kulakov, Deputy Chief, State Committee for Forestry and his staff. Kulakov is Deputy to Professor Vorobyov and is a "Hero" of the Soviet Union because of his efforts against the Germans in World War II. Again with no attention to luggage we were driven to the Hotel Sovietskya and quickly assigned rooms on the 12th floor with no check in other than turning in our passports to Mr. Varlyga of the State Forestry Committee. Our luggage soon arrived for identification and placement in our rooms. On the advice of the American Embassy and our interpreter, we did not drink the Leningrad water and even bought mineral water for brushing teeth. There is reportedly a very prolific amoeba in the water that can be a serious problem until one has become acclimated.

At 2030 we met our Russian hosts, Mr. Kulakov and staff, on the 2nd floor for the evening meal. Mr. Kulakov reviewed our schedule for Sunday and Monday and introduced those present as follows: Dr. Smirnov, Forester for the Leningrad region; Dr. Stolyarov, Director, Leningrad Forest Research Institute; Dr. Schutov, Deputy Director, Leningrad Forest Research Institute; Mr. Agapov, Chief, Forest Planning Office; and Mr. Varlyga, Forest Fire Control Officer. Chief McGuire introduced the delegation and we turned to the meal at hand.

Later in general conversation we learned that forestry in Russia started with Peter The First about 1730 with the planting of oaks in the Leningrad area. The forestry organization originated from 1836 when a Dr. Arnold (no relation to R. K. Arnold) from Germany, moved to the Leningrad area to head forestry research.

September 2 - Sunday

We met at 0900 for breakfast on the 18th floor restaurant. The view was partially dimmed by smog and generally rainy, overcast day. At 1030 we left the hotel and made a short stop at one of the few active churches in Leningrad. Nadya told us that only the old people go to church but even so it is one of the most financially successful enterprises in the city.

Following a rather wild four-car cavalcade to the Tsar's summer palace, Peterhof, we toured the grounds, the seaside villa, magic fountains, and part of the palace itself. The Summer Palace was located on the Gulf of Finland by Peter I or Peter The Great. It was virtually destroyed in the defense of Leningrad but has been reconstructed to give some idea of the former grandeur. Following the tour, we adjourned to the restaurant on the Palace grounds where we were hosted by Mr. Peter Sinyov, Director of the nearby park and palace Lomonosov. At 1500 we walked to the dock to take a Rocket back to Leningrad. We arrived in front of the winter palace, The Hermitage, which is now a museum with a wonderful collection of paintings. For example, The Hermitage houses twenty-six Rembrandts and over forty Reubens plus many Gainsboroughs and a number of paintings by the French impressionists. At 1700 as the museum was closing we were met by a young lady "Nina" of the Leningrad Forestry Research Institute. She served as our guide through the fortress prison, the church with the tombs of Peter the Great, Catherine the First, Catherine the Great, in fact the burial place of all the Russian Tsars except two. We drove to a small inn, called the Hunters Lodge,for coffee and cranberry juice to revive ourselves. Then on to the mass cemetary where the Chief, assisted by Dr. Arnold, placed a large wreath of flowers at the foot of an imposing statue of a woman with arms outstretched. It was raining slightly and rather cold. Nearly a half million people, civilians and soldiers, are buried here as a result of starvation and bombing during World War II seige of Leningrad. The mass graves contain no marker other than stones denoting the year of burial.

From the cemetary we drove back to the river front to view the academy, the University of Leningrad, government buildings, St. Peter and Paul's Church (now a museum), communist headquarters, and the Hotel Astoria. We returned to our hotel at 2015 and met for supper at 2045. Enjoyed a substantial meal with no surprises.

September 3 - Monday

Awoke to another rainy day. Breakfast at 0800 and at 0930 the delegation (15 strong including our Russian hosts) visited the Deputy Mayor of Leningrad. The Deputy was very knowledgeable in agricultural affairs and apparently was an Ag economist by training. He mentioned that over

fifty percent of the forest materials in the area were produced locally. All planting is done via seedlings. Eighteen percent of the Soviets pulp and paper industry is in the Leningrad region. Enterprises within the city are under pressure to produce better fertilizers and are working with peat and mineral fertilizers mixed.

At 1115 we drove to the Leningrad Forestry Research Institute where we were greeted again by Dr. Stolyarov. He introduced members of his staff: Dr. Artsibashev and Dr. Shutov, whom we had met earlier, and Professor Statinovic in charge of reforestation; Dr. Albyskov, mechanics of reforestation; Dr. Korolian, mathematical methods in forestry; Dr. Bilenkov, silviculture and biogeocenosis; Dr. Givgedov, Chief, Tree Breeding and Physiology; Dr. Treshov, economics; and Dr. Yakolov, Chief Pathology and Entomology.

Director Stolyarov told us that the institute was established in 1918 with 20 foresters. At present there are 330 foresters, some of them with responsibilities in substations some distance away. He then called on each of his staff to give a summary of their areas of interest. He opened this discussion with the comment that in silviculture the problem of reestablishing the forest following clearcutting was serious in the northwest region but that basically there are five major problem areas: (1) The fire control problem (Artsibashev) (2) Use of chemicals in the forest, especially fertilizers and herbicides in forest tree nurseries (Schutov) (3) reforestation of the Taiga region (Prof. Statinovic and Dr. Albyakov) including mechanization of planting (4) drainage of forest areas (Dr. Albyokov) and (5) the economics of labor problems (Treshov). In allthere are seventeen laboratories and departments in the institute. The Leningrad Region is considered to be part of the Taiga Forest.

Forest tree breeding is of importance with work underway on larch, pine, and spruce improvement. Specifically mentioned were Pices excelsior, Larix siberica and Pinus sylvestris.

The tree disease problems appear to be Lophodermium pinastri on Scots pine in the nursery, an unspecified needle disease of Larix siberica, damping off in nurseries, and Fomes annosus root rot in plantations. The latter is becoming increasingly important in the country at large and not just Leningrad.

Insect problems include bud insects in Larix, and Hylobius spp. in Scots pine.

Dr. Artsibashev said there were 20 people in the fire control research area, three with masters degrees, three technical people and thirteen engineers. The five major problems in the fire area include (1) study of the nature of forest fire (2) development of new chemicals as retardants and the methods for their use (3) development of forest fire equipment--especially aircraft and helicopters (with the Ministry of Civil Aviation) (4) improvement of radio technology for fire spotting and control. Includes the use of infrared techniques, and (5) weather modification or the use of artificial rains for fire control. A book on cloud seeding was presented to the Chief with the advice that it

was published one week prior to our visit. In response to a question, it was stated that an infrared system had been developed but was still experimental. It was currently in use in the Far East. The Russians have just completed a test of the U.S. system for spotting fires but the results of the test are not yet available.

Some other pieces of possible interest to U.S. fire experts are: (1) The Leningrad region averages 1,200 fires/year of 1.25 acres in size or larger. Forty percent of these are lightning caused. (2) Freon emulsions are apparently the only chemicals used in fire control work in the USSR. The emulsions are packed in polyethylene bags which are emptied into back pumps. The emulsions are mixed with water at the rate of 10 percent freon and 90 percent water. (3) The Leningrad region contains 6,000,000 hectares of forest land. For fire protection purposes, the region has 150 trucks and tractors, 5 aircraft, and 102 fire detection towers. (4) The Soviet Union developed its first air tanker in 1968. It was a water-scooping plane capable of carrying 1,300 liters of water. Apparently this has been discontinued. (5) Dr. Artsibashev wrote a book on fire equipment in the USSR. It will come from the publisher about January 1974. He will send a copy when available. (6) Fire people such as helitack crews and smoke-jumpers are year-long employees. (7) Smoke-jumpers (many of them women) carry explosives to build firelines. They use a material like cordite that is 20 meters long and makes firelines 40 cms wide and 10-15 cms deep.

Since World War II, six candidates of science workers have been assigned to organic herbicides. Their tasks are to: (1) develop a practical recommendation on herbicides (2) determine the effect of a useful herbicide on vegetation, soil (including soil fauna and flora), and wildlife, and (3) develop new machinery for application. Any chemicals used must be approved by the Forestry Committee as well as the Ministry of Health. In the USSR 200,000 h. are treated annually. The plan is to increase this use five-fold "over a period of time so as not to destroy the ecosystem."

Arboricides are being used to release conifers. Five methods are used: (1) aerial sprays (2) aerosols (3) basal treatment (4) injections, and (5) stump treatments. Experiments are underway using soil application. The most common use of herbicides at present is in the forest tree nurseries for weed control and as a labor saving device. Using techniques and data published by Professor D. White of Michigan State University, the Russians have increased growth rates 2.7 times in 13 years of experimentation in young forest stands treated every year with herbicides and with no fertilization.

In answer to questions it was learned that study of systemic insecticides and fungicides is done through the Academy of Science and particularly in Moscow at the Institute for physiology of plants.

Study of chemical residues in soil is being done at the Leningrad Institute. Rates of 20-25 liters of chemical/hectare are used to study the fate of chemicals. Experiments with 10 l/h were not effective.

The institute conducts no research on the development of equipment or materials for microbial or bacterial control of pests.

DDT and 245-T are prohibited throughout the USSR except for special uses. All such use is controlled by the Ministry of Health.

When asked about the new USSR method and/or material for stimulation of resin, the Russian answer was that sulphuric acid was used, and also sulfate residues from the pulp and paper industry. There seemed to be an evasion on this question. A list of materials used was promised us prior to departure but was not forthcoming.

Silvicultural problems were listed by Prof. Statinovic as: (1) reforestation on moist sites, (2) improving the use of fertilizer, (3) containerized planting in peat pots, (4) setting quality standards for seedlings, and (5) developing better planting equipment.

The primary objective is to achieve complete mechanization for afforestation and reforestation including site preparation. They are using containerized planting for conifers and have developed a machine that produced 1,400 peat pots per hour.

The mathematical methods section works for all other research divisions. Concern is with developing mathematical models for survey and inventory, developing fire detection and control systems and using computers to manage the entire fire appraisal and control activities. Data from previous fire seasons is used to estimate the kinds and numbers of equipment and people that should be dispatched to a fire. Each year the system is being updated and improved.

Dr. Bilenkov is involved with the entire biological problem of harvest cuts and specifically the influence of management on forest ecosystems. The study includes classification, determining potential productivity and the control of the changing ecosystems. A second area of work is recreational forestry with three phases: park and city forests, forest parks and republic forests. Part of these studies include determination of the effect of game animals on the forest and vice versa.

Our next visit was to the relatively nearby Leningrad Forestry Academy. We were met by Director Vladimir G. Yakovlev. He introduced a few of his staff: Assistant Director Akinokov, Dr. Muroctov (Forestry Dean) and Dr. Kataya (Entomology) and a Dr. Rikov.

The Director told us that the Academy was established in 1803 and up to 1917 only foresters trained there. After the revolution the forests were nationalized and the academy expanded. It is now one of the largest forest institutes in the USSR with a staff of 600 and a student body of 4,000. There are six faculties: (1) Forestry, (2) Greenbelts,

(3) Exploitation and Mechanization in Forests and Forest Industry;
(4) Technology of wood, (5) Chemical treatment of wood, and
(6) Economics of Forest Industry.

The normal course is 5 years. The students devote 2/3 time to classes and 1/3 to research. Night classes and correspondence classes are available for forest workers. These people can take exams and after one year can enter the academy as a regular student. This way they must spend six years for the degree. A total of 40 days a year must be spent at the academy. Most students are trained for practical work but some of the more outstanding can continue as a candidate. Day students receive housing, food, cultural programs and a vacation at rest houses. The Institute has a rest house on the Black Sea. The Experiment Stations are used to gain practical experience. Financing of the Academy comes from the State Committee and from Forest Industry.

There are 12 faculties with 52 professors and 350 candidates (research and teaching assistants). The Academy is on a semester system with 5 or 6 exams given each session. Vacation is normally two months.

The Department of Forestry has 600 full students and 900 corresponding students. There are 300 graduate students in the Academy with 40 of these in the Forestry Faculty.

Pathology and entomology are taught in the Forestry and Greenbelts faculty. All students in nature preservation are required to take the protection courses.

There are 31 Institutes of higher education in forestry and related fields in the USSR and 9,000 students studying forestry in the fall of 1973.

Two movies were shown. The first on fire showed use of fire towers, aerial spotting, building fire lines, mechanized equipment, pumps, smoke jumpers (some female) and mop-up operations.

The second movie by the Entomology Department, was in two parts. Part I on Dendronomus siberica contained beautiful time lapse photography on the development of the insect over two years time. Six molts are normal, each molt taking roughly 1½ hours with a 2-day passive period afterward. The pupal stage is three weeks long in late June and July. Male moths emerge first. Wings are short, white with brown flecks. The adult life span is one week. Following copulation the female lays 300--800 round green eggs, about 2mm. in size. The eggs are deposited in rows or groups along the needles and hatch out in 3--4 weeks. The young devour the egg shells prior to feeding on needles. The first and second instars feed along one side of the needle only. Later instars consume entire needles starting at the top of the needle. In the autumn the fifth stage larvae go into the liter for overwintering. They apparently can survive very severe frosts in this stage. Under favorable conditions maturation can occur in one year although two years is the norm.

Part II portrayed development of a wood borer Monochamus spp. The adult girdles twigs and eats young bark. The female lays up to 30 white, oblong eggs in the bark. These hatch in 15-20 days. Young borers often burrow 25 cm. deep into the trunk. Six instars are known and the last stage larvae are often 6 cm. long. Pupation occurs in late spring and the adult emerges in June following two years in development.

Following the movies we had a short tour of the Academy visiting a research laboratory with one small electron microscope, a classroom of beginning forest biology students (most of whom apparently knew some English), and a nature exhibit showing a typical Taiga forest.

Following this all too short visit, we traveled in a four-car caravan along the north shore of the local arm of the Gulf of Finland westward to view some 200 year-old larch plantings. These were near the village of Zelena Gorst where we stopped for a very late lunch featuring a thick venison soup. Director Markov of the Russina Forest Farm was our host. It was nearly dark before we arrived at the larch planting. Mr. Smirnov, from the Leningrad State Committee offices, explained that there are 36 enterprises under his direction. The Russina farm has 4 million hectares of forest under the supervision of the State Committee on Forestry. Some 47,000 hectares are reserved for recreation and the rest are cared for by other state farms. The forest is 30% spruce, 30% pine, some very young cedar and the larch. Nearly 8,000 people work in the area and some 700 forestry students get part of their schooling on the forest. Over 29,000 h. of land is drained each year. About 52,000 h. of forest thinned each year. Forest yield was given as 900,000 cu. m/year and the annual cut is 560,000 cubic meters per year. The forest farm has its own sawmill, produces novelties, ships mushrooms and berries. We were told that there was a forest tree nursery with greenhouses on the forest and that some 250 plus trees (pine, spruce, and larch) were selected in the Leningrad area and were being reproduced through grafting for seed orchards. Some 240 h. of orchard trees in the western part of the region and 300 h. in the east are beginning to give seeds. Sixty percent of all plantations are being established with five year old seedlings. Aircraft fertilization is used, but the program is limited by the short supply of fertilizer

Mr. Agapov indicated that planning was done 10 years ahead for each enterprise. Based on surveys and inventory data, plans are developed. Color aerial photographs are used to measure height, diameter, and volume of trees. One of the plans recently approved by the government was for the protection of Lake Baikol. Ground inventories are based on remeasured permanent plots using increment borings.

Annual growth of Scots pine in the area was given a 2.6 cu.m./h (roughly 1 cord/acre/year). In the Leningrad area the price of wood was 18-24 rubles per cu. meter, whereas veneer wood was at 32 rubles. Costs of operation is the cost of production plus a profit not to exceed 12%. Export wood gets the highest priority when transportation gets tight.

In Leningrad, tree growth starts in mid-May and ends in July. Planting is done from the last of April to the end of May, although in the eastern part of the Leningrad region planting may be continued to mid-June.

The larch plantation itself was established by Peter The Great in 1738. Seeds were brought from Archangel. Current height averages 37 meters, and diameter 96 cum. Volume is 1788 cu.m. per hectare. Fomes annosus is a serious problem. Regeneration is almost nil as the germinability of seed is about 2% and the people pressure is great. Some 200,000 people visit on an average summer weekend. There are 476 rest houses on the forests of Russina.

At 1915 we left the forest and returned in the rain to Leningrad. We arrived at 2015 and reported to the 18th floor restaurant for dinner at 2100. We were all quite subdued from the heavy schedule but did enjoy the delicious chicken a la Kiev. Small gifts were exchanged and at 2300 we departed for the train station. The train for Moscow departed precisely at the scheduled 1140 and although this time there were four of us per compartment, most of us rested well.

September 4 - Tuesday

The train arrived in Moscow at 0740 and we were met by Dr. Moisseyev and Mr. Shushkov. Cars were waiting to take us to the Hotel Ukrainia and within minutes after arrival we were in our rooms. At 1000 we were enroute to visit the All-Union Research Institute for Forestry and Mechanization at Pushkino north of Moscow. Although the road had three lanes, traffic was extremely heavy (almost all trucks) and we arrived at Pushkino somewhat late at 1115.

Mr. Leonid E. Miklaylov, Director; Mr. A. Khanokov, Deputy Director; Professor Tropin; and several other members of the staff, met with us in a large conference room. Director Miklaylov introduced Academicians Anuchin and Melenkov and then told us something of the role of the Academy of Science which has responsibility for all USSR "Theoretical" problems of forestry. The Academy also has some coordinating role for forest economics and technology assigned to the Moscow Institute of Technology, The Leningrad Forestry Institute and the Brionsk Institute in the Balkans. The coordination of forestry research is under the State Forestry Committee, Council of Ministers which has institutes in Moldavia, Armenia, Manchuria, Archangel, the Ukraine, etc. The All-Union Institute at Pushkino coordinates five large regions spreading from Leningrad to Sochi on the Black Sea and takes in a number of the western republics. The Institute cooperates with Council for Economic Assistance and with foreign countries in research matters. It also is headquarters for several enterprises including experimental pilot plants for forest industry, housing construction enterprises, a tree selection nursery, and the Zagorsk Experimental Station of some 100,000 hectares. Within the Institute proper, there are some 40 laboratories. Departments of Biology, Mechanization, Economics, Seed Production, and Genetics, Inventory and Mathematics, Protection of Forests and Automation of Forest Management were listed as active at Pushkino.

Work is underway on perfecting a USSR second generation computer. A professor Kusala of Finland had recently been in to work with the Russians and had showed them a U.S. film on computers and computer technology. IBM is beginning to make its presence known in the USSR. The city of Pushkin is the area center for fire protection, seed production, and general forestry.

Professor Anuchin, the founder of the Institute and its head for 12 years prior to his retirement, expressed concern about the relation between biology and economics in the forest. He expounded on the use of the individual tree approach in management decisions. He ended with a statement that the laws of mechanization and economics contradict the laws of biology.

Professor Melenkov, a leading forester of the USSR and active in IUFRO and World Forestry, stressed that the major problem facing both the U.S. and USSR was to raise the productivity of the forest in the face of less understanding of the forest than we previously had. We need an ecosystem approach along with the recognition of economic values.

We then were invited to see a movie on the Soviet Union's forests. This was prepared for and shown at the World Forestry Congress film festival in Buenos Aires. The film pointed out that USSR forests extended from the Baltic to the Kamchatka Peninsula. One third of the World's forests are in this belt of some 914 million hectares. The tundra is largely beyond the artic circle. A sparse tiaga forest extends over a considerable area south of that and the true tiaga with 6/10 of the wood resources of the USSR extends to the southern deserts. There is an estimated 250 million hectares of larch alone. Scots pine covers some 100 million hectares from the Karelian Peninsula to Lake Baikal. Other important conifers are spruce (European taiga and Far East), fir, and a Siberian stone pine (called cedar). Of the hardwoods, aspen covers the greatest area but oak, maple, elm, beech, and basswood are important. The hardwood forests lie largely in the Caucasus and Carpathian Mountains.

At this point in the movie the power went off. We were told that we missed the part covering the eastern forests but that we could see it next time we visited.

As we were considerably behind schedule, we went directly to the forest tree nursery Ivanteevka to see some equipment. The rain the previous day prevented us from getting into the field. The nursery specializes in production of deciduous trees on some 281 h. (Another nearby nursery, Zagorsk, produces conifers). Some 200 people work at the Ivanteevka nursery. Dr. Ivanakov, geneticist, handles selection for nut production and is working now with hazelnuts. It was said repeatedly that the oldest living people in the Carpathians lived almost entirely on nuts and the oldest productive parents in the USSR had come from this area. The father was 103 and the mother 85 at the time their last child was born.

Dr. Klima, machinery expert, conducted us among the 20 or so nursery cultivators, lifters, plows, etc., that had been arranged as an exhibit for us. Spring and fall seasons are the heaviest work loads. Winter is spent making boxes, souvenirs, woven goods, etc., more to keep people busy than any profit motive. The gross income for the nursery was said to be 700,000 rubles per year. The net income of 163,000 rubles/year was used to expand the nursery and develop work in crafts.

In the small arboretum adjacent to the nursery 20 year old spruce, Picea siberica grafted on 3-5 year old Scots pine understock exhibited growth several times greater than the Scots pine controls.

A burled birch, called Karelian birch, was being grown and reproduced vegetatively because of its wavey grain. The cause of burling is unknown but believed to be a virus. It appears to be heritable.

We traveled northward from Pushkino to a rustic restaurant, "Fairy Tale" for a late lunch. With the many toasts and several courses of "appetizers" we were all rather poor competitors for the main meal of steak and potatoes when it arrived. Following the main dish and a 10 minute rest period, we had ice cream and coffee. Fortunately, on our return to the Hotel Ukrainia at 1845, we were left to our own devices and not invited to face another meal.

September 5 - Wednesday

Dr. Arnold and Alex left for the State Forestry Committee offices about 0930 for review and consultations on the English and Russian versions of the agreement drafted earlier. The rest of the delegation had the morning to catch up on laundry, letters, shopping, etc.

At 1330 we all met in the lobby to go to our 1400 meeting with the Ministry of Pulp and Paper. Deputy Minister Krapivin indicated that 15 years ago sulfate pulp was produced for cartons, paper, tire cord, etc. Now some 250,000 tons of mixed sulfide-sulfate pulp are produced annually. Plans are to build plants that will produce 1,000,000 tons a year. Sulfite pulping is limited primarily because of the lack of chemicals with which to pulp. (In the U.S. sulfite pulping is limited because of associated severe pollution problems.) Waste products previously discarded are now used to produce alcohols, yeast, tars, and polyvinyl materials. About 400,000 tons of pulp yield 100 tons of yeast useful for cattle feed. Some cellulose materials are now being tested as road materials. Soaps and resins are being obtained from sulfite residues.

The Minister indicated a readiness to cooperate in the broad areas of (1) lignin and (2) by-products use. It was generally agreed to add to the agreement for future activities the titles: (1) research on lignin for the purpose of determining the best means of stabilization; (2) improvement of quality and creation of new types of wood pulp (chemical treatments). The U.S. side requested that a third topic be added: improvement of technology of the pulping process to reduce pollution of water and air. This brought out the idea of duplication of effort underway under the environmental agreement. Dr. Arnold promised that U.S. would investigate this problem with EPA.

At 1530 we arrived at the Ministry of Wood and Woodworking Industries. This ministry has responsibility for all industrial uses of wood outside of pulp and paper. Chief McGuire suggested studies on advanced logging and on particleboards. Mr. Michael Vikanevsky, Deputy Minister, said that these were of interest. The USSR is hoping to mechanize to eliminate men from the forest in logging operations. The USSR plans to increase particleboard production by 2.8 to 2.9 times. Arnold expressed the U.S. interest in skyline cable and balloon logging systems.

The Russians indicated they would prefer to have a broadly defined project for cooperation in the harvesting area as their interests were primarily automation and mechanization of logging and harvesting systems. The U.S. delegation asked the USSR to define a more specific area but they preferred to think about the broad field of mechanization and automation in logging and suggested we exchange thoughts by mail prior to a future meeting to design such a specific program.

In discussing problems of utilization of wood wastes and the manufacture of particleboard, the Russians indicated that their lumber and related production had increased about 4% a year in recent years but the particleboard industry had been increasing about 284%. They were agreeable to cooperation in the production and quality improvement aspects of particleboard and in studies to develop new particleboard types and applications.

The Russians suggested studies on improvement of plywood production and particularly for the use of larch in a large strong construction plywood. Mr. Baronage said that eastern larches had the texture of pine, but were much stronger and were more resistant to decay. The USSR has many species of larch and great reserves of this timber. It is figured to play an important role in the future of the country.

It was agreed that both sides should discuss this idea more fully with associates in the two countries, record the occurrence of our meeting in our minutes, and leave the substance of cooperation to be determined at a future date.

The Ministry people indicated that their research institutes covering logging, wood working, furniture production, veneer, particleboards, and the economics of production would be available for future cooperation. At 1630 we returned to the Ukraine Hotel and at 1740 left for the American Embassy.

Through the very generous assistance of Mr. and Mrs. Stan Brown of the American Embassy, we gave a reception for the Russians at the Brown's residence. In addition to almost the entire Russian forestry delegation,

the USSR was represented by Mr. B. A. Runov, Deputy Minister of Agriculture; Mr. Aleksandr Konygin, Counselor for Agricultural Affairs and Mr. and Mrs. Viktor Lishchenko, Agricultural Attache with the Soviet Embassy in Washington, D. C.; Mr. L. E. Mikhaylov, Director of the All-Union Institute at Pushkino (accompanied by his daughter); Mr. N. A. Berdennikov, Deputy Chief, Foreign Relations Department, State Committee for Science and Technology; Mr. E. A. Aykazyan, Deputy Chief, Section for U.S. and Canada, Foreign Relations Department; and Mr. Morozov, Assistant U.S. Desk Officer, Foreign Relations Department. The U.S. Embassy representation (20 strong) was headed by Charge and Mrs. Adolph Dubs. Mr. Brown told us later that this was the best Russian attendance at an Embassy function of this kind for several years.

September 6 - Thursday

Ellwood, Biddison and Brandt went to the American Embassy to deliver the books and papers we had collected during our visits. These were mailed to Washington by Mr. Brown's office. Arnold and Tatistcheff returned to the State Committee for final polishing of the agreement and minutes of the meeting.

At 1100, with the exception of Arnold and Tatistscheff, the delegation went to the forestry exhibition "Lesdrevmash - 73". We were escorted by Dr. Anatoliy Tistchenko, Chief, Department of Mechanization and New Techniques, State Committee for Forestry, and an assistant. The large geodedic central structure housed a number of large machines with the center piece being a revolving whole tree harvester with a 55-60 foot Scots pine in its grip. Cutting is done with a chain saw on an arm rather than shears used in similar U.S. machines. Other machines of interest were: small fire-fighting helicopter, tracked all-purpose ground and water vehicle, and planting machine designed for seedlings in peat containers.

We quickly visited several American exhibitors and then returned to a small tower near the fire fighting equipment. Here we found a nice lunch awaiting us. After lunch the young assistant to Dr. Tistchenko went to find our host. After some time we decided to leave and as we walked back through the exhibit we saw him with another group so we did get to thank him.

We arrived at the hotel at 1600 and in 45 minutes we were enroute to the State Committee for the signing of the agreement. Signing took place at 1730 with Chief McGuire and Dr. Arnold signing for the U.S. and Mr. Vorobyov and Dr. Moisseyev for the USSR.

By 1830 we were back at the Ukraine and at 1900 both delegations met in one of the Ukraine's small dining rooms for, as Nadya expressed it, "The Last Supper."

September 7 - Friday

We all packed and paid our hotel bill prior to going to the American Embassy to debrief with Ag. Attache Brown's office. We also delivered some more materials for mailing, picked up our tickets following their confirmation with the help of Brown's very efficient secretary, Miss Lu Sargent.

By 1140 we were back at the hotel and at 1200 State Committee cars drove us to the airport. Vorobyov, Moisseyev and Shushkov and Mya went with us. The fact that our delegation was breaking up for 3 different flights in 3 directions, caused considerable difficulty for our Russian hosts as we had entered the country as a single delegation and so should apparently leave the same way. Fortunately our forestry friends handled it all with the airport officials as we sat in the VIP lounge.

Traczewitz and Tatistcheff got off on a Pan Am flight to New York at 1430. Since the rest of us were scheduled for 1730 or later, we asked about going down to get some coffee and a sandwich. At 1500 we were escorted from the VIP lounge into the airport restaurant where our hosts once again treated us to a several course delicious meal with champagne.

Back in the lounge, we discussed some follow-up activities for US--USSR cooperation and at 1645 received our passports and tickets back from the ticket counter. At 1720 the hostess walked us to the bus and at the plane a very stern looking policeman-soldier type checked our passports, removed our visas and motioned us aboard.

The McGuires, Biddison and Brandt headed for London and the States. Arnold and Ellwood departed later for meetings in Helsinki prior to their return.