Scientific exchange on Pomology and Germplasm with China, 1982
M. N. Westwood, Northwest Plant Germplasm Repository and
National Technical Advisor for Clonal Germplasm

September 1, 1982.

The trip over consumed 26 hours beginning at 5:15 a.m. August 31, arriving 10:15 p.m. September 1. I took the long route and flirted with fate by checking my bags through to Beijing from Eugene: Corvallis—Eugene—San Francisco (change)—Los Angeles (change)—Tokyo (change)—Shanghai—Beijing. Mr. Zhang Juang-zhong English interpreter for PRC Ministry of Agriculture (M of A), Bureau of Science and Technology found me at the baggage room even though there were 39 other Americans on the flight. Two other M of A people were there including pomologist Mr. Xu, Wei-sheng. Because of them they (customs) simply stamped my declaration sheet and passed me through with no baggage inspection. We rode to town in a nice new black car - many bicycles along the road with heavy loads. The cars use only parking lights for night driving, turning on bright lights only to signal or when more light is wanted. I am in a nice apartment (2 rooms and a bath) at the Friendship Hotel where many visiting scientists stay. Mr. Zhang stays here in another room. I am to call him by phone 4151 if I need anything at all. He will come in the morning to take me to breakfast and to meet the M of A group.

The road from the airport was lined with trees. The low round ones near the edge they said were willow and the tall ones behind poplar - the bark is white and looks like Populus tremuloides, in the dark at least. (Some other species is apparent by daylight).

September 2, 1982 - Beijing.

The "western" breakfast was scrambled egg, two pieces of heavy bread slightly toasted, coffee and a fried rice cake with raisins. At 9 Mr. Wang Youtian, Deputy Chief of Division, Science and Technology Exchange (M of A) came to go over my final itinerary. He was not able to contact Professor Yu De-jong at the Botanic Garden so I may not get to see him. He knows many of the wild species of China.

Then Mr. Xu discussed the pears of China and said 50% of China's 1.4 million tons pear production comes from the Yangtze River valley and the crescent bordering the Bohai Gulf (includes parts of Liaoning, Hopei and Shantung). He then gave 7 zones where pears are grown:

1. Frigid Zone (-33 to -45 degrees C winter)
2. Cold-arid NW China (-22.5 to -31 degrees C)
3. Temperate Zone (-15 to -29.5 degrees C) most important one
4. Warm-temperate (-5 to -13 degrees C) second most important
5. Sub-tropical (17 to 20 degrees C) special varieties
6. SW Plateau 1300-1600 m elevation, special varieties
7. Qinghai-Tibet plateau 4000 m elev., short season

Because of the distinct climates listed, the varieties grown in each area must be genetically different to thrive in that area.

In 1966 pear was the leading fruit of China, but today apple is ahead at more than 2 million tons. Pear still amounts to 20% of all

fruits produced here.

While at the Kunming Lake, newly picked local pears were on sale and I bought six. They are crisp, juicy and only moderate in quality compared with the best oriental varieties. It is called Xue Hua Li (Snowflake pear).

September 3, 1982 - Beijing

The roast duck party given in my honor last night was magnificent but had to skip breakfast and lunch to recover.

This morning we went to the Peace People's Commune near the airport. It was established in 1958 when 27 villages organized with 30 production brigades and 60 production teams. It consists of 3400 ha (8400 acres) cultivated land, with a resident population of 30,000. The total area covers 50 square km. Besides grain and vegetables, they grow 57 ha of apples, pears and peaches. Other things they have are cattle, ducks and other poultry, plus a brick kiln, cast iron foundry and 17 schools (5 middle and 12 primary) enrolling 8000 students.

The main apple is Winter Banana, already picked, plus Delicious, Golden Delicious and others. The main peach is a white-fleshed Japanese variety. Pears are mostly Ya Li (Tienjin strain), now ripe, and Chien Pai Li (Peking White pear). A few North American grapes are grown too. The soil is clay, pH above 7. Peaches look sick and pears, apples and walnut show moderate lime-induced chlorosis. The grapes look healthy. Rootstock for apple is unknown seedling. All pears are on *Pyrus betulaefolia* roots, which accounts for the chlorosis. *P. communis* would have prevented it.

Manure is placed in a trench on one side of the tree each year. The alternate side will be treated next year. Weeds are disced down in one direction, those under the trees are cut down by hand.

At 2 p.m. we went to Beijing Agricultural University where I gave a slide talk on orchard systems and the principle of limiting factors and its use in fruit growing. Then during the one hour discussion they asked many questions about the new clonal repository, so I took the opportunity to give them the full background, status and objectives. Delicious pears, apples and peaches were served along with tea. They were pleased to accept some reprints and a copy of my book and thanked me heartily for talking to them and said they were happy to meet the celebrated Dr. Westwood whose wonderful pomology book they had read in their studies.

At 7 p.m. Dr. Xu Yuntian, Director of the PRC Crop Germplasm Resources Institute, came to my room to visit for an hour. He speaks excellent English and will be a key person in establishing plant germplasm exchanges. He has visited the U.S. and knows such people as George White, Quentin Jones, John Creech, Warren Kronstad and Louis Bass. Flow of germplasm in and out of PRC should be through his institute regardless of by whom or where it is collected. He wants to help us in our work, so we should be sure to keep in touch.

September 4, 1982 - Beijing

The Ministry of Agriculture, in order to permit me a view of Chinese culture and history, alotted this day to visit the Great Wall (70 km from here) and a side trip on the return to see the tombs of the 13 rulers of the Ming Dynasty. This Dynasty lasted about 300 years, from the 1300s to the 1600s.

Mr. Zhang Juang-zhong, interpreter and Mr. Xu Wei-sheng accompanied me and a driver was provided also. The car was a black compact 5-passenger Chinese model which performed very well. We passed through a vast agricultural area before entering a mountainous canyon a few km before reaching the wall. The two largest crops seen were corn and rice, but there were also extensive plantings of French bean (snap beans), cabbage, lotus (the root is eaten), sweet potato, garlic and others I didn't recognize. They grow such a vast array of vegetables, I find something new at every meal. The corn crop looks good here. They rotate corn with soybean and other legumes to provide nitrogen. In some fields I noted some marginal burning of the corn leaves and some red and purple pigmentation, possible indications of K or P deficiency. The cabbage and bean crops are the second crop for the year, Mr. Zhang tells me. The first might have been garlic or scallions.

As we left the plain and entered some hilly uplands, we saw small plots of soybeans, sorghum and corn in irregular areas near creeks and rivers. Also in this area are extensive peach orchards, many too young to bear fruit, which appeared to be in good health. The few pear and apple orchards seen here did not appear thrifty and some disease or insect had largely defoliated the apples. (The only fungicide I've seen in use here is Bordeaux mixture). Also in this area we saw several old orchards of persimmon (kaki) grafted to rootstocks of the wild Diospyros lotus. The local kaki variety is called 'grindstone' because it is shaped like the stones used to grind grain.

As we entered the steeper canyon leading to the mountains, I could see a number of native trees. Locust and poplar were abundant and one species of pine. Also there were several wild Prunus, some possibly escapes, and a few apples, probably M. baccata.

At the wall (elevation about 1000 m) we found peach and Prunus tomentosa near the parking lot (probably planted) but on up the ridge on both sides of the wall we found numerous wild apricot trees. They appeared in good health with no sign of previous winter injury. There was no fruit on them but Mr. Xu said it is yellow. Thus the species is likely Prunus mandschurica.

At the Ming tombs we saw two interesting trees. One called cherry apple appears to be Malus prunifolia which I was not able to find in Korea last year. The leaves look plum-like and the fruit is oblate, yellow, persistent calyx and about 2 to 2.5 cm diam., stem 3 to 3.5 cm; slender. The other, near the entrance gate to Cheng Ling Tomb was a magnificent old tree of Pyrus betulaefolia about 50 feet tall. spread ca 60 ft. The trunk was about 20 inches in diameter. It showed some signs of cedar rust on the leaves but no sign of winter injury. Local name for it is Tu Li or Du Li.

Tomorrow Mr. Zhang, Mr. Xu and I will leave at 8 a.m. by train for Xingcheng, northeast of Beijing in Liaoning province.

September 5, 1982 - Xingcheng

Mr. Zhang and Mr. Xu came to pick me up at 8:30 in front of Friendship Hotel #4. Also there to see that I got safely on the train was Mr. Liu Shutin a clerk from the Bureau of Science and Technology. Being Sunday the bike and truck traffic was light. This is the day off for most of the workers. Just before we reached the railway station we passed through Tian'anmen Square with the imposing Great Hall along one side. It was impressive, but not so much so as the

Great Wall.

We (Zhang, Xu and I) had a 4-passenger compartment which was clean and comfortable. The ride was smooth and quiet, equal to the trains of Japan and Taiwan. The radio monologue and music piped into each compartment was much too loud. In fact it was plenty loud when we turned ours off and listened through the wall to the one next door. One note about the music. One series sounded a lot like the tunes and chants used for our southern square dances. Mr. Zhang said it was music from South China.

The trip was interesting because it took us through a varied but rich agricultural area. Field crops were primarily corn, sorghum and rice, with a fair amount of alfalfa and sunflower. Vegetables seen were eggplant, beans, cabbage, greens, garlic, and possibly hops and castor bean. Orchard crops near enough to recognize were peach, apple, pear and possibly grape. The crescent of the Bohai Gulf, through which the train passed, is one of the two main areas of pear production in China.

After an elegant 6 course meal in the dining car my friends took a 2 hour nap while I studied my book on China. Then I got my friends to teach me the Chinese names of the common fruits and nuts:

Apple - pingo	Berry - Mei
Pear - Li	Strawberry - Thsou mei
Plum - Liz, Li	Raspberry - Shu mei
Cherry - Yin tau	Blackberry - Hei mei
Peach - Tau, pin tau	Currant - swizhuli
Apricot - Xiu	Gooseberry - Zhuli
Almond - Xinren	Blueberry - Yuejiu
Hazel - zhenz	Grape - Pu tua
Walnut - He tau	

Late in the afternoon Mr. Xu pointed out on a mountain the eastern terminus of the Great Wall. This point is more than 6 hours' train ride from where we saw it yesterday, and this is only a small segment of the total length.

Mr. Pu Fu-shen and 3 others were at the station to meet us. We drove directly to the Pomology Institute, where 3 boys tried to unbar the main iron gate when the driver honked his horn. It finally came unstuck and we came in to the living quarters where they had fixed a banquet for me (the others disappeared somewhere and I ate what I could alone). They've fixed a nice room for me here only a little way from a bathroom. Mr. Pu told me this place (Xingcheng) is just a small town, not equipped for visitors. I asked the population and he said 300,000! I don't think he was trying to be facetious. There are hot springs nearby, however, and they plan to gear up for tourists from abroad.

<u>September 6, 1982 - Xingcheng</u>

This morning Mr. Zhang outlined my itinerary at this stop which includes a half day reviewing the research at the Pomology Research Institute (PRI), a half day looking at pear and apple germplasm collections, a half day reviewing fruit breeding programs and a final half day giving two lectures, on germplasm evaluation and rootstock studies, followed by a 3-hour discussion period.

Mr. Pu Fu-shen gave a brief account of the PRI and its history.

It was started in 1959, led by the Chinese Academy of Agricultural Science. It was the first National pomology institute in China. In 1970 the policy changed and the National Institute was moved to Shansi province during an amalgamation. In 1973 a Pomology Experiment Station was set up here under the Chinese Academy of Agriculture and forestry science. Then in 1978 the National Pomology Research Institute was moved back to Xingcheng and restored to its original organization.

Xingcheng lies at 40 degrees 37 minutes North latitude and 124 degrees 44 minutes East longitude. It is 4 km from the coast of Bohai Gulf at 10 m elevation and is 529 km northeast of Beijing and 321 km southwest of the capital of Liaoning province, Shengyang. Railway traffic is convenient to Xingcheng because a major line from Beijing passes through. Both the hot springs and the gulf coast give Xingcheng great potential for tourism. Till now only a few foreigners have found it. The climate and soil make this general area good for growing hardy varieties of apple and pear. The winters are cold (-15 to -29.5 degrees C) because the prevailing wind is from the northwest out of Siberia.

PRI objectives are:

1. Solution to key problems of apple and pear growing and coordination of research throughtout China.
2. The training and guidance of pomology technicians.
3. Provide general plans and organization for the long term.
4. To do surveys of soil, climate and water suitable for orchards along the ancient course of the Huanghu (Yellow) river and the Yellow Plateau. As a result of this work the basis for growing apples commercially was established in these areas.
5. To write appropriate books on pomology, e.g. a book on the diseases and insects of fruit trees in China, two books: NE China pears and Pear Annals (edited by Mr. Pu), colored plates of the main varieties of pear, apple and grape, a technical bulletin on apple tree pruning, and a bulletin on pest control of apple, pear and grape.

The leading apple variety of this area is 'Ranier' an older variety grown because of its resistance to Valsa mali trunk canker and is hardy. The breeding program at PRI has produced 'Early Golden Delicious' (open pollinated seedling of Golden Delicious) that ripens one month ahead of its parent, and a new red variety 'Shionghung' (Golden Delicious x pollen of 6 cvs mixed).

The pears Ya Li, Chien Pai Li and Bai Li are grown here but are subject to winter injury. Six hardy varieties under test for this area are ussuri types Chin Be Li, Nango Li and Senbu Tse, and P. bretschneideri types Tze Li, Pingo Li and Shinnong Ma Li. Pingo Li appears promising for west Liaoning and can be stored till May or June.

The PRI contains 220 ha of cultivated land and has a staff of 368 (includes 9 research scientists, 77 mid-level researchers and 16 primary level researchers). It has two experimental farms and the following 6 departments:

1. Culture Studies include close spacing of dwarf apple trees, close

spacing of vigorous apple trees, chemical thinning of apples, environmental factors affecting apple culture, and development of high stable yield of pear.

2. Variety and germplasm resources (Breeding) Work here covers survey and collection, study and utilization of wild and domestic apples and pears, apple and pear breeding, grape breeding and selection, and study of watermelon varieties.
3. Plant Protection This work deals with apple viruses and control of *Valsa mali*, apple mites, *Carposima niponensis* and *Grapholitha molesta*.
4. Plant Physiology Meristem, embryo and endosperm tissue culture, flower initiation of apple, post-harvest physiology and apple storage.
5. Soil and Manure Nutrition and diagnosis, and soil management in orchards.
6. Information Collection of information and book publication.

The PRI is one of three National Pomology units. The citrus unit is in the south, that for stone fruits is at Zhengzhou (Henan), and the nut unit is in Shandung province. Small fruits are handled at various stations.

A trip to a nearby pear plot was made just before noon. Here 5 varieties were planted at each of 5 different spacings. Rootstocks are seedling *P. ussuriensis*.

Varieties: Ya Li, Chisha Li, Da-shong Sui Li, Zou-su Li, and Chinfon Li (the latter 2 are PRI selections)

Spacings: 5 x 4, 4 x 3, 4 x 1 x 2, 3 x 1 x 2 meters

Parameters studied were fruit yield, maturity and quality, and tree size, shoot growth and branching. Highest yield at 6 years was 15,700 kg/ha against a target of 37,000 kg/ha.

In the afternoon we drove several miles to a station on the slope of a high hill. This station is called Laxishan. Mr Zhang Zou Ming is director. Here in 1951 Dr. Shen Tsuin started work on the feasability of growing fruit on what was then wasteland. This work went far in promoting fruit growing in such areas throughout China.

Laxishan Station has a total of 180 ha, 66 of which are in orchards and 26.6 are used for germplasm resources. The soil is redish, sandy to rocky, pH 6.8 to 7.3. There are 595 pear varieties here, mosty Asian. Most of them are *P. ussuriensis* or hybrids of it, with a few *P. pyrifolia* types and a very few *P. communis* (most of them died of *Valsa* canker of the trunks).

The nearly (?) pure *P. ussuriensis* here are said to be drought resistant and the fruit like *P. communis* is picked firm and requires storage before softening.

One strange variety from Shansi called Ching Li has leaves the shape and size of *P. pyrifolia* but the margins are crenate rather than setose serrate. The fruit is large, pyriform, solid brown russet, with deciduous calyx. It looks like a *P. communis* hybrid but they doubt that it could have happened in Shansi by chance.

Another noteworthy clone here is an apparently pure *P. betulaefolia* from west of Liaoning. It is hardy here where that species does not naturally grow.

The apple germplasm collection at this station consists of 33 varieties planted 2 years ago, all on *Malus baccata* rootstock. Another 200 varieties are being propagated for next year's planting.

In neither apple nor pear collection have thy made any attempt to collect wild species germplasm, but Mr. Pu thinks they will start on it soon.

September 7, 1982 - Xingcheng

This morning we took another trip to the field plots. First we saw apple cultivar spacing trials:

Starking/M. baccata spaced 4 x 3 m
Starkrimson/M. baccata spaced 4 x 2 m
Goldspur/M. baccata spaced 4 x 2 m
Starkrimson/MM 106 spaced 4 x 2 m

They said that M 9 and M 26 stocks could not be used because they were not hardy in their very dry winters with no snow cover.

Next we looked at pear species seedlings collected from various areas of China. Several lots labelled P. betulaefolia were obviously hybrids with other species. Two lots look like pure P. betulaefolia but the one from Hubei has brown pubescence on the shoot tips while those from Gansu have whitish pubescence. This latter type resembles the ones we collected as rootsprouts in the old Culbertson orchard in Medford. The brown pubescent type looks like the ones obtained by Reimer from near Yichang, Hubei in 1917.

The wild P. ussuriensis here have large dark green leaves rather than the smaller pale green ones in our collections. This difference could be due to soil differences as these have pH above 7 while ours in Oregon are about 6.5.

Two lots labelled P. phaeocarpa and P. xerophylla were variable in leaf size, shape, pubescence and marginal teeth. Also the trees were not uniform in size. From this I guess that they are hybrids.

Trees of P. calleryana seem to be pure, as were those of P. pashia from Western China.

Mr. Pu is much interested in dwarf rootstocks for pear and wants to obtain some OH x F from Oregon. He has obtained some quince (Cydonia) from Xinjiang province which he will test here for adaptability to the soil and for hardiness. In their own rootstock breeding program here they have grown many hybrids of Chin Bei Li x Winter Nelis and have selected a number of growth-controlling clones to be tested further. These have been grafted with a very vigorous variety and some trees have grown 3 meters this year, while some dwarfing clones have grown only about 30 cm.

The pear variety breeding is mostly with the better P. ussuriensis parents. Besides quality they want hardy varieties resistant to diseases and that mature their crop early. They have selected one hybrid of Ya Li x Bartlett. The tree is hardy and resistant to Valsa mali trunk canker. The fruit is large, pyriform and ripens with soft flesh like Bartlett. The quality is only fair to my taste and texture is a bit coarse.

I asked to see Malus prunifolia and they showed me an old grafted tree, the scion of which came from Shansi province years ago. Except for its red color, the fruit resembles the cherry apple we saw at Ming tombs, but the leaves are completely different. As yet we have but one slight clue of a wild population. In the herbarium here I saw a specimen that was recorded as a wild form from central China. Another specimen from Shandung province is of real interest. It is from wild

trees of M. asiatica and appears similar to those I collected near Seoul, Korea last year.

Herbarium specimens of wild species filed here are as follows:

Malus

M. pumila, Mill.
M. sieboldii, Rehd.
M. baccata, Borkh.
M. prunifolia (Willd) Borkh
M. transitoria, Schneid.
M. halliana, Koehne.
M. kansuensis, Schneid.
M. asiatica, Nakai
M. sieversii (Ldb.) Roem.
M. mandshurica (Maxim) Komarov.
M. spectabilis, Borkh.
M. toringoides, Rehd.
M. micromalus, Mak.
M. ombrophila, Hand. Mazz.
M. pumila, Mill. Var. Niedzwetskyana, Dieck.
M. honanensis, Rehd.
M. soulardii, Brit.
M. rockii, Rehd.
M. hupehensis (Pamp.) Rehd.
M. pumila x M. asiatica, Nakai
M. yunnanensis, Schneid.
M. sikkimensis (Hood.f.), Koehne
M. adstrigans, Eahel
M. sylvestris, Mill
M. platycarpa, Rehd.
M. zumi

Pyrus

P. pyrifolia (Burm.)Nakai
P. calleryana, Dcne.
P. phaeocarpa, Rehd.
P. sinkiangensis, Yu
P. armeniacaefolia, Yu.
P. pashia, D.Don.
P. betulaefolia, Bge.
P. communis, L.
P. serrulata, Rehd.
P. bretschneidri, Rehd.
P. hopeiensis, Yu.
P. ussuriensis, Maxim.

Crataegus

C. pinnatifida, Bge.
C. hupehensis, Sargent.
C. pinnatifida, Bge, Var.major N.Br.

Chaenomeles

C. lagenaria, Koid.
C. tibetica, Yu
C. sinensis, Koehne.
C. cathayensis (Hemsl.) Schneid.

Cydonia

C. oblonga, Var. pyriformis Schneid.
C. oblonga, Var. marmarata, Schneid.
C. oblonga, Var. maliformis, Schneid.

Amygdalus (Prunus)

A. ferganensis, Kov.et Kost.
A. kansuensis, Skeels.
A. tangutica, Korsh.
A. persica, L.
A. communis L.
A. mira, (Koehne.) et Kost.
A. davidana (Carr) Yu

Armeniaca (Prunus)

A. vulgaris, Lam.
A. sibirica, L.
A. mume, Sieb.
A. holosericea (Bata.) Kost
A. mandshurica (Maxim.) Skvortz.

Prunus

P. pissaedi
P. salicina, Lindi.
P. simonii, Carr.
P. ussuriensis, Kon et Kost.

P. cerasifera, Ehrh.
P. salicina x domestica
P. domestica, L.

Cerasus (Prunus)

C. vulgaris, Mill.
C. serrulata, Lindi.
C. avium (L.) Moench.
C. tomentosa, Thunb.
C. pseudocerasus (Lindi) G.Don.

Vitis

V. quinquangularis, Rehd.
V. amurensis, Rupr.
V. rupestris, Scheele.
V. davidii, Foex.
V. labrusca, Linn.
V. vinifera x labrusca.
V. ficifolia, Bunge.
V. pentagona, D. et S.
V. romanetii, Roman.
V. labrusca, Linn.
V. thunbergii, Sieb. et Zuce.
V. vinifera, L.

Ampelopsis

A. humulifolia, Bge.
A. aconitifolia, Bungo.
A. heterophylla, Sieh. et Zuu.
A. brevipedunculata,Trauevetter
A. aconitifolia, Bungo var. glabra, Diels and Gilg.
A. delanayana, Franch.

Parthenocissus

P. quinquefolia, Planch.

Ficus

F. carica, L.

Diospyros

D. kaki, Linnf.
D. rhombifolia, Hemsl.
D. lotus, L.

Punica

P. granatum, L.

Fragaria

F. nubicola, Lindl.
F. gracilis, A. los.

Rubus

R. mesogaeus, Focke.
R. corchorifolius, L. F.
R. biflrous, Buch-Ham.
R. allegheniensis, Porter.

Ribes

R. maximowiczii, Batal
R. longeracemosum, Fr.

Castanea

C. mollissima, Bl.
C. seguinii, Dode

Corylus

C. avellana, L.
C. tibetica, Batal.
C. mandshurica, Maxim.

Juglans

J. regia, L.

Carya

C. pecan Engl. et Graebn. C. cathayensis, Sarg.

Pistacia

P. vera, L.

Citrus

C. reticulata, Blanco. C. reticulata, var. tanka.
C. reticulata, var. Taukan. C. reticulata, var. sunki.
C. reticulata, var. subcom Pressa
C. reticulata, var. unshiu C. reticulata, var. erythrosa
C. reticulata, var kinokuni C. reticulata, var. Poonensis
C. reticulata, var. Ruhoiemsis
C. reticulata, var. chachisnsis, Hore.
C. reticulata var. tangerina, Tauaka
C. reticulata, var. sunwuitien, Cheng.
C. aurantium, L. C. grandis, Osbeck.
C. paradisia, Mac. C. pyriformis
C. medica, L. C. limonia, var. hunglemo, Wong
C. limon, Burm. C. ichangensis, x Grandis
C. ichangensis, Swingle. C. sinensis, Osbeck.
C. junos, Tanake C. aurantifolia, Swingle
C. limonia, var. moyerslmon C. microcarpa, Bge.
C. reticulata, var. Suhoiensis

Fortunella

F. obovata, Tanaka F. crassifolia, Swingle
F. margariea, Swingle

Poncirus

P. trifoliata, Raf. P. trifolia x C. sinensis

Myrica

M. rubru, Sieb et Zuco.

Eriobotrya

E. japonica, Lind.

Litchi

L. chinensis, Sonn.

Euphoria

E. longana, Lam.

Persea

P. americana, Mill.

Artocarpus

A. heterophyllus, Lam. (integra-Merr).

Achras

A. sapota, L.

Xanthoceres

X. sorbifolia, Bge.

Elaeagnus

E. angustifolia, L.
E. pungens, Thunb.
E. moorarofeel, W. et S.

Dracontomeeum

D. sinerse, Stapf.

Olea

O. europaea, L.

Syzygium

S. samarangense (Bl.) Merr et Perry

Averrhoa

A. carambola, L.

Hovenia

H. dulcis, Thunb.

Zanthoxylum

Z. simulans, Hance.

Kerria

K. vaponica, Dc.

Syringa

S. persica, Linn.

Sorbus

S. alnifolia, K. Koch.
S. zahlbruckneri, Scheic.
S. pohuashanensis, Hedl.

Cotoneaster

C. microphyllus, Wall.

The man in charge of the Soil and Manure department, Chou Hou-ji, just arrived here yesterday from Beltsville where he has been working with Dr. Miklos Faust on mineral nutrition research. The laboratory here has new analytical instruments with the capability for determining N, P, K. Ca, Mg, Mn, Fe, B, Zn and Cu. This unit should be a big help in solving several soil-related problems, such as chlorosis, noted in some orchards.

Some of the lab units are in process of moving to a new building so we didn't visit them.

From 2 p.m. till 5:30 I presented seminars on our U.S. germplasm system and the utilization of germplasm in breeding for superior rootstocks. Follwing this was a two-hour question/discussion period. They thought it was a great success but I felt we were bogged down in translation difficulties a good deal of time.

September 8, 1982 - train from Xingcheng to Dalian

The trip took 11 hours, so it was dark before we arrived. The train made 13 stops en route as it took us on a route shaped like an inverted horseshoe. This area borders the northern half of the Bohai

Gulf. Crops in the lowlands along the coast are sorghum, corn, rice and beans primarily, while the uplands near or on the slopes of the mountains are planted to pear and apple orchards. Other crops seen along the way were sunflower, buckwheat, sweet potato, castor bean, millet, cabbage, eggplant, peanut and cotton.

A few of the places we passed through are worthy of note. At 10:20 we stopped at Gou Bang Zi where were piled a medium sized mountain of white cloth bags along the tracks. Mr. Xu told me they were filled with nitrogen fertilizer from a large plant in that city. At 11:05 we passed Da Hu Shan which Xu told me meant Big Tiger Mountain. At 12:50 we came to Shenyang city, the point at which we turned south toward the peninsula. Shenyang is one of the largest cities in China, with 4 million people (double the population of Oregon). At 2:00 p.m. we passed through Liaoning City, one of the oldest cities in the area. They pointed out an ancient temple built on a high prominence, somewhat like Malheur Butte.

We arrived at the Dalian Hotel just as the dining room was closing. The waitress spoke no English, so Mr. Zhang asked what I wanted. I told him I was weary of 5 or 6 meat dishes and no vegetables, so he ordered up fried peanuts, steamed wax beans mixed with mushrooms and cabbage, all laced with cloves of garlic. Then came white dough rolls filled with red bean paste, the finale was egg flower soup with numerous vegetable bits. For dessert I went back to my room and ate two Tsu Li pears that had been pressed upon me as we were leaving Xingcheng.

September 9, 1982 - Dalian

Dalian, a city of 1.36 million, lies at the point of a peninsula at about 39 degrees north latitude, nearly midway between Tianjin on the west and P'yongyang, North Korea to the east across the Yellow Sea.

At 8 this morning an entourage of officials came with a mini-bus and took us to the Yachang people's commune to see a large commercial pear orchard. Being near the city this commune grows a lot of fresh market vegetables along with field crops and about 800 ha of fruit including apples, peaches, grapes. There are 126 ha of pears, mainly Ya Li, Tsu Li and Xue Hua Li. The Tsu Li pear here is not the same as the Tsu Li at O.S.U. This one is less pyriform, has smaller lenticels and less firm flesh and is of better overall quality, but a bit smaller.

The soil here is sandy derived from granite, pH 6.0, and is about 1 meter deep. The trees appear in good health but some are weak. It gets to 35 degrees C here in summer and sometimes goes to -30 degrees C in winter, and is relatively dry, so there is no snow cover. The rootstock they use is Du Li (P. betulaefolia) which appears hardy in this situation. They get their seed from wild trees in Jilin province north of here. They will put me in touch with someone there who perhaps can collect seed for us. This type seems to have whitish rather than reddish pubescence on the shoot tips. Some of these stocks are not pure but are crossed with P. ussuriensis, the only other pear growing that far north.

The orchard manager said they had imported some Doitsu pear trees from Japan and they seemed to be hardy. This is the only P. pyrifolia variety they have, as others are not hardy.

Here as at the other communes, workers bury the manure in pits by

the trees, going in sequence to the four sides in four years. Weed control is by hand hoeing about 6 cm deep. In fall just before frost they hoe deeply to about 20 cm to "loosen the soil for winter".

I found a species of hops at the roadside here. No one knew what it was, but they said some unkind words about it being a bad weed. I took a photo of the leaf to compare with Humulus japonicum when I get back.

This commune is doing very well and is building a big new brick hospital for the 30,000 members. When yields are high the workers get more wages, so they have an incentive to produce more.

At mid-morning we drove to the Agricultural Research Institute to review the germplasm and rootstock work. The soil here is a deep sandy loam of pH 6.0. They also use P. betulaefolia as a rootstock. It was obtained from the town of Yun Bin in Jilin province and they suggested writing to the Research Institute of Agricultural Science for seed. Rootsprouts in these plots also show that some Du Li stocks are hybrids.

The germplasm collection here includes a number of P. communis varieties and hybrids such as Kieffer and Garber which are more resistant to Valsa canker than P. communis. Of the 184 oriental varieties, 17 are P. pyrifolia, and the rest P. ussuriensis and P. bretschneideri. Many of the P. communis varieties appear to have stony pit virus; at least the symptom is similar.

Other fruits grown here are apple, peach, sweet cherry and grape. The apples are all on Malus baccata rootstock ans seem to be healthy. The peach trees don't seem too thrifty. A new yellow cling canning peach has been developed here which seems to me to have the flavor, firmness and appearance of the better California varieties. Cherry trees on Prunus serrulata from Japan are dying throughout the orchard, while those on P. pseudocerasus look healthy. The latter was obtained in Shandung province and probably could be collected there. They said it isn't hardy enough here during some winters, so I suggested trying the Siberian steppe cherry Prunus fruticosa. Grapes are grown here as rooted cuttings. Most varieties are Vitis vinifera from Europe and Japan, but they have one North American variety, Concord. None of them knows of any wild Vitis in this area.

Other wild species in this area are Fragaria in the mountains, Vaccinium in Jilin. Assistant Professor Hao Rui at Jilin Agricultural University is a specialist in Vaccinium of north China. Also hazelnuts are found in Fuxin county near the NE mountains in Liaoning province.

Most of the afternoon was taken up with a lecture and discussion they asked me to present on pear culture and pear rootstocks in the U.S. As usual the questions/discussion continued until the Deputy Director Mr. Wang Fang-shou ended it by thanking me and saying we must now get ready for supper.

Dr. Fred Hough of Rutgers University spent one month lecturing at this research institute last year and might give us further details on the breeding and germplasm work that I was not able to glean in two days' time.

September 10, 1982 - Dalian-Shenyang

The first half of this day was spent at two parks on the shores of the Yellow Sea near Dalian. Mr. Zhang said that the coast of Korea is only about 400 km east of here. It was a year ago almost to the

day that I spent Korean Thanksgiving at Chollipo Arboretum. As I looked west toward China I wondered what it was like on the other side of the Yellow Sea.

At Starry Sea Park we found some interesting fruit species, some planted, some natural. A small cherry tree here Mr. Wang said is Prunus maximowicii and is native here. He says it is very dwarfing as a rootstock. He has hybridized it with Prunus pseudocerasus for testing, but says that it is not pollen compatible with Prunus tomentosa. We also found planted trees of Prunus serrulata and Prunus tomentosa in this park. The latter is perfectly healthy here, indicating that the bacterial disease Pseudomonas syringae, to which it is very susceptible, does not occur in this region. Several Du Li pears here all are hybrids, but the native horticulturists don't distinguish between hybrid and pure P. betulaefolia.

At the edge of the cliff leading down to the sea we found a natural apricot tree, which Mr. Wang says is Prunus mandshurica. Also near the same place we found a grape (or close relative). They said it was sometimes used for wine but never eaten.

At Hu Tan Park we found a planted hazelnut which Mr. Wang said is native to this area. It has a small leaf of distinctive shape. See tracing and photo. Then we found planted Malus prunifolia trees, with very dark green, leathery leaves (see photo), whose fruit were like those at the Xingcheng station, except they were somewhat smaller and were yellow/green and not red. In both cases the calyx was persistent and the carpel number was five.

Just before noon I bought an apple for lunch at a roadside stand. It was a local variety and was starchy, astringent and lacked good apple flavor. Yet people were buying them. The price is very low. At 4 p.m. we boarded a train for Shenyang and arrived at 11 p.m.

September 11, 1982 - Shenyang

At 8 a.m. Mr. Suen Shou-you from the regional agricultural office came to take us to some parks before flight time. We went to the tomb of Emperor Huang Tai Ji, built in 1651 during the Ching dynasty. Among the old ornate buildings and grounds we found a wild apricot, a narrow leafed mulberry, a purple-leafed Mentha plant used as a border ornamental, and a peach tree with bark like a cherry. There was no fruit but Mr. Suen said it is a small leathery peach (see leaf tracings and photo). He also said there is a wild strawberry growing in the suburbs of Shenyang, which he might collect next year.

On the way to the airport we stopped at a fruit vendor and I bought 4 small Nan Guo Li pears and 2 medium size Starking apples at a cost of less than 15 cents. The pears were round, 3.5 cm diam, with persistent calyx and a red blush. The flavor was good but 2 of the 4 had worms in them. The Starking apples had just been harvested and were immature and starchy. Their quality control needs some extra effort.

On the plane to Nanking (Nanjing) today we passed some good fertile farmland and some steep rocky hills where little will grow. But from the Beijing area south to Nanjing the entire area is solid with large productive farms. The area is dotted with many rivers, canals and lakes or ponds. At irregular intervals were clusters of low houses (several long buildings with many small apartments), some trees, small garden plots, pig pens, duck ponds, etc. These are the people's communes which cover the entire farmable land in China, each

of which contains 20,000 to 30,000 people. Such communes make up 80% of China's 1 billion population.

September 12, 1982 - Nanjing

We were brought from the airport by the local agricultural officer and Mr. Wang Zu-hua, Director of the Horticulture Institute of the Academy of Agricultural Science, Jiangsu province. We are lodged in the Nanking Hotel which houses a wide variety of assorted foreign visitors and tourists. Most of the clerks and waiters here speak English in contrast to the northeastern cities where most do not.

At 8 a.m. we drove to the Academy to meet the horticulture staff. Mr. Wang gave a brief history of the Academy. It was established in 1931 and named "The Central Agriculture Research Institute". After China's liberation, forestry and animal husbandry was combined with it to form the "Northeast China Agricultural Research Institute". In 1958 it was changed to a branch of the Academy of Agricultural Science, Jiangsu province. In 1977 it was given its present name. Its aim is key basic research and applied development in solving problems in agriculture and forestry.

The Academy has 10 Institutes:

1. Grains
2. Cotton, oil bearing
3. Horticulture (Pomology)
4. Vegetable Crops
5. Animal Husbandry & Vet. Sci.
6. Agriculture biology and genetics
7. Agricultural Modernization
8. Soil and Manure
9. Plant Protection (weeds, pests)
10. Electricity in Agriculture

The Academy has a staff of 1200, half of whom are technical staff and engineers supporting the scientists. At Nanking they have 80 ha of land in experiments.

The Horticulture Institute is for fruit trees and flowers and has 3 departments:

1. Breeding and Selection (peach, strawberry, flower bulbs)
2. Fruit Culture (peach, apple, strawberry, citrus, grape)
3. Disease and Pest Control (emphasis on apple and peach)

The peach breeding here is aimed at white eating fruit of early maturity and later yellow clingstones for canning. The earliest variety Yhualu ripens June 15, and Zhouzao the end of June. One of the latest white peaches is Yunching, ripe September 15. The name means "Welcoming National Day" which is October 1.

This department also is working on precocity of apple. Varieties from the north are too vigorous in this climate and often do not begin fruiting for 5 to 8 years.

Other studies are pruning of peach and apple, and hardiness of citrus through cultural manipulation.

September 13, 1982 - Nanjing

This was the first of 2 days we will visit the Nanjing Botanical Garden, Memorial Sun Yat-sen. In addition to an extensive herbarium, the garden contains 3706 species, 186 families, and 993 genera. Woody species number 1317, of which the following are of interest to our national clonal repositories.

ANACARDIACEAE

Pistacia chinensis

BETULACEAE

Corylus avellana
Corylus heterophylla
Corylus heterophylla sutchuenensis

CAPRIFOLIACEAE

Viburnum dilatatum

CARICACEAE

Carica papaya quercifolia

EBENACEAE

Diospyros glaucifolia
Diospyros kaki
Diospyros sylvestris
Diospyros lotus
Diospyros oleifera
Diospyros rhombifolia
Diospyros virginiana

ELAEAGNACEAE

Elaeagnus argentea
Elaeagnus multiflora
Elaeagnus pungens
Elaeagnus umbellata

ERICACEAE

Vaccinium bracteatum

FAGACEAE

Castanea mollissima

JUGLANDACEAE

Carya cathayensis
Carya illinoensis
Juglans cathayensis
Juglans mandshurica
Juglans regia
Platycarya strobilacea
Pterocarya stenoptera

LABIATAE

Mentha haplocalyx
Mentha poperita
Mentha pulegium
Mentha spicata

MORACEAE

Ficus carica
Ficus elastica
Ficus pumila
Ficus religiosa
Humulus scandens
Morus alba
Morus nigra

MUSACEAE

Musa basjoo
Musa paradisiaca
Musa sapientum

OLEACEAE

Olea europaea

RHAMNACEAE

Zizyphus jujuba
Zizyphus sativa
Zizyphus spinosus

ROSACEAE

Chaenomeles lagenaria
Chaenomeles sinensis

Cotoneaster microphyllus	Crataegus cuneata
Crataegus hupehensis	Crataegus pinnatifida
Duchesnea indica	Eriobotrya japonica
Malus adstringens	Malus baccata
Malus halliana	Malus hupehensis
Malus melliana	Malus micromalus
Malus pumila	Malus sylvestris
Mespilus germanica	Photinia beauverdiana
Photinia davidsoniae	Photinia glabra
Photinia parvifolia	Photinia serrulata
Potentilla chinensis	Prunus amygdalus
Prunus armeniaca	Prunus buergeriana
Prunus japonica	Prunus mume
Prunus pendula	Prunus pseudocerasus
Prunus salicina	Prunus serrulata
Prunus subhirtella	Prunus tomentosa
Prunus triloba	Prunus yedoensis
Pyrus betulaefolia	Rubus corchorifolius
Rubus occidentalis	Rubus palmatus
Sorbus folgneri	

RUTACEAE

Citrus aurantium	Citrus benikoji
Citrus grandis	Citrus junos
Citrus limon	Citrus medica
Citrus reticulata	Citrus unshiu
Citrus wilsonii	

VITACEAE

Ampelopsis brevipedunculata	Vitis amurensis
Vitis davidii	Vitis vinifera

The garden is contained in a 168 ha area. The director, Chang Yu-ho told us he has seed exchanges with 22 U.S. universities, including the Oregon State taxonomy group. The garden contains fruit and nut trees, forest trees, forage crops, medicinal plants, and ornamentals.

The first day we were confined entirely to a study of herbarium specimens, making notes of places of origin of fruit and nut species and of possible mistakes in nomenclature. I looked at numerous specimens of pear, apple and hazel. The following is my evaluation of them:

Original Name	M.N.W. comment
Pyrus	
P. phaecarpa (revision P. hopeiensis Yu)	P. betulaefolia hybrid
P. xerophila Yu	Like our 'Kansu'
P. calleryana	Many types, all O.K.
P. pyrifolia	Many types, some hybrids
P. pashia	Correct
Malus	
M. prunifolia (revision M. asiatica)	More like prunifolia?
M. formosana	O.K., Fukien, Kiangsi
M. hupehensis	O.K., Kiangsi, other provs

M. kansuensis	O.K., Kansu, Shensi
M. melliana Rhd.	Looks like M. formosana
M. formosana (revision M. melliana)	Chang says latter has priority
M. prattii	O.K. Szechwan province.
M. yunnanensis (revision M. ombrophila Yu)	First name right?
M. sieboldii	O.K. Szechwan Prov.
M. sieversii	Singkiang Prov. O.K.?
M. spectabilis	Shantung Prov. O.K.?
M. toringoides	Kansu, Szechwan, O.K.?
M. transitoria	Kansu, Shensi, O.K.?
M. sargenti	Looks O.K.

Corylus

C. chinensis	Husk closed
C. fargsii	Kwiechow, Hupeh, Husk frilled, closed
C. ferox	Spiny husk, closed
C. tibetica (revision C. ferox)	same as above, Szechwan
C. heterophylla	Open husk, O.K.?
C. sieboldiana (revision C. mandshurica)	Long beak, closed, first OK
C. yunnanensis	Looks like C. heterophylla

For want of time the following specimens also found in the herbarium, were not examined:

Juglans

J. cathayensis Dode.	J. mandshurica Maxim.
J. regia L.	J. formosana Hay.

Sorbus

S. alnifolia K. Koch.	S. amurensis Koehne.
S. aestivalis Koehne	S. aronioides Rehd.
S. beauverdana Schn.	S. caloneura (Stapf) Rehd.
S. discolor Hedl.	S. dunii Rehd.
S. spidendron HM.	S. folgneri Reh.
S. glomerulata Koehne.	S. glandulosa (Bert) Rehd.
S. helenae f. rufidula Koehne.	S. hoii Fang.
S. hupehensis Schneid.	S. hupehensis Schneid. var. aperta (Koeh) Schn.
S. koehneana Schneid.	S. keisseri (Schn.) Rehd.
S. megalocarpa Rehd.	S. megalocarpa Rehd. var. cuneata Rehd.
S. multijaga Koehne.	S. multijaga Koehne, var. microdonta Koeh.
S. ologodonta (Card) HM.	S. omiensis Fang.
S. pohuashansnsis (Hemsl) Hedl.	S. prattii Koeh.
S. prattii Koeh. var. tatsienensis (Koeh) Schn.	S. randaiensis Koidz.
S. rehderiana Koeh var. grosserrata Koeh.	S.rehderiana Koeh.
S. setschuanensis Koeh.	S. sargentiana Koeh.
S. thianschanica Rupr.	S. scalaris Koeh.
S. vilmorinii Schndr.	S. tapashana Schn.
S. xanthoneura Rehd.	S. tianhanica Rupr.
	S. wilsoniana Koeh.

Rubus

R. arbortivus O.Kze.
R. amabilis Focke.
R. amphidasys Focke.
R. aralioides Hce.
R. biflorus Ham.
R. buergeni Miq.
R. chiliadenus Focke.
R. chingii Hw.
R. clemens Focke.
R. conduplicatus Duthic.
R. corchorifolius L. var. oliver Focke.
R. coreanue Miq.
R. delavayi Banch.
R. ellipticus Smith
R. ellipticus Sm. var. subsp. fasciculatus Focke.
R. euphlebophyllus Hay.
R. feddei Levl. et Vant.
R. fimbriiferus Focke.
R. foribunda-paniculatus Hay.
R. flosculosus Focke. f. parvifolius Focke.
R. fraxinifolius Poir.
R. gilvus Focke.
R. glabricarpus Cheng.
R. glanduloso-calycius Hay.
R. hakonensis Fr.
R. hainanensis Focke.
R. henryi Hemsl.
R. hirsutus Thunb.
R. ichangensis Hemsl. et Kuntz.
R. idaeus L.
R. hunanensis HM.
R. incisus Thunb.
R. iunominatus S. Moore.
R. iunominatus S. Moore var. kuntzeanus Bailey
R. irenaeus Hce.
R. laciniato-stipulatus Hay.
R. japonicus Maxim.
R. kuntzeanum Hemsl.
R. lambertianus Ser. var. hakonensis Focke.
R. leucanthus \hance.
R. lieboldi Bl.
R. loropetalus Fr.
R. macilentus Camb.
R. maligolius Focke.
R. medicus Focke.
R. malifolius Focke.
R. mairei Levl.
R. micranthus Don.
R. modestus Focke.
R. adenanthus Focke.
R. ampelinus Focke.
R. ampliflorus Levl.
R. bambusanum Focke.
R. aspera Don.
R. calycinoides Hay.
R. chinensis Ser.
R. chrosepalus Focke.
R. cochinchinensis Tratt.
R. corchorifolius L.
R. corchorifolius L. var. typicus Focke.
R. crataegifolius Bge.
R. distantus Focke.
R. ellipticus Sm. var. obcordatus Focke.
R. eucalyphus Focke.
R. eustephenus Focke.
R. fasciculatus Duthie
R. flagelliflorus Focke.
R. flosculosus Focke.
R. formosensis O.K.
R. fruticosus L.
R. gentilianus Levl. et Van.
R. giraldianus Focke.
R. gracilis Roxb.
R. graldianum Focke.
R. halonensis Fr. var. glandulosus Migo.
R. hexagynus Roxb.
R. hirsutus Thunb. var. argyi Nakai
R. hui Diels.
R. hupehensis Oliv.
R. incisus Thunb. var. conduplicatus Koidz.
R. inopertus Focke
R. involucratus Focke.
R. iunoxius Focke.
R. jambosoides Hce.
R. kawakamii Hay.
R. lambertianus Ser.
R. lambertianus Ser. var. xanthoneurus Focke.
R. leucocarpus Arn.
R. lineatus Reinw.
R. lutescens Fr.
R. malachobatus
R. mecilentus Camb.
R. mesogaeus Focke.
R. malifolius Focke var. longipedicellatus Migo.
R. mingetsensis Hay.
R. moluccanus L.

R. neillioides (Focke.) Migo.
R. occidentalis L.
R. omeieusis Rolfe.
R. pacificus Hance. var. wingpoensis Focke.
R. parvifolius L. var. adenochlamys
R. pectinaris Focke.
R. pectinellus Maxim. var. triloba Koidz.
R. pileatus Focke.
R. piptopetalus Hay.
R. playfairianus Hemsl.
R. pungens Camb.
R. pyi Levl.
R. reflexus Ker.
R. rosaefolius Smith.
R. setchuenensis Bur. et Fr.
R. somai Hay.
R. sozostylus Focke.
R. stiunlans Focke.
R. subtiebetanus HM.
R. swinhoei Bean.
R. tengshiwei Chun.
R. thibetanus Fr.
R. trianhtus Focke.
R. triphyllus Thunb.
R. tridactylus Focke.
R. tsangii Merr.
R. xanthocarpus Bur et Fr.
R. yoshinoi
R. niveus Thunb.
R. occidentalis L. var. Japonicus
R. pacificus Hance.
R. parkeri Hce.
R. parkeri Hce. var. brevisetosus Focke.
R. pectinellus Maxim.
R. peltatus Maxim.
R. phoenicolasius Maxim.
R. pinfaensis Lev. et Van.
R. pirifolius Sm.
R. pseudo-buergeri Sasaki
R. pungens Camb. var. indefensus Focke.
R. refractus Levl.
R. semialata Murr.
R. shinkoensis Hay.
R. sorbifolius Maxim.
R. stans Focke.
R. subornatus Focke.
R. sumatranus Miq.
R. taiwanianus Mats.
R. tephrodes Hce.
R. thunbergii S. et Z.
R. tricolor Focke.
R. triphyllus Thunb. var adenochomys Focke.
R. vitifolius C. et S.
R. xanthoneura Focke.

Chaenomeles

C. japonica Lindl.
C. lagenaria Koidz. var. cathayensis Rehd.
C. lagenaria Koidz.
C. sinensis Koehne.

Prunus

P. acuminata Wall.
P. avium L.
P. brachypoda Batal.
P. buergerianus Miq.
P. buergerianus Miq. var. nudinseula Koehne.
P. cerasoides Don. var. campanulata Koidz.
P. conradinae Koeh.
P. glandulosa Thunb. var. purdomii Koeh.
P. glyptocarpa Koeh.
P. edentata HM.
P. humilis Bge.
P. macrophylla S. et Z.
P. marginata Dunn.
P. mandshurica Koeh.
P. microbotrys Koeh.
P. adenodonta Merr.
P. armeniaca L.
P. brachypoda Batal. var. pseudo-ssisori Koehne.
P. calycopadus
P. campanulata Maxim.
P. communis Hud.
P. conadenia Koeh.
P. glandulosa Thunb.
P. glandulosa Thunb. v. albiplena Koeh.
P. domestica L.
P. fordiana Dunn.
P. japonica Thunb.
P. macrophylla S. et Z. var. puberifolia Koeh.
P. matuurai Sasaki.
P. mongolica Maxim.

P. mume S. et Z.
P. padus L. var. pubescens Reg.
P. perulata Koeh.
P. perulata Koeh. var. pendula Dipp.
P. phaeisticta Maxim.
P. pilosiuscula Koeh. var. subvestita Koeh.
P. pseudocerasus Lindl.
P. pumila L.
P. rufomicans Koeh.
P. serotina Ehrh.
P. serrulata Lindl. var. alborosea Wile.
P. serrulata Lindl. var. lannesiana makino
P. serrulata Lindl. var. spontanea Makino.
P. setulosa Batal.
P. spinulosa S. et Z.
P. superblua Koidz.
P. tangutica (Batal) Koeh.
P. tomentosa Thunb. var. endotricha Koeh.
P. triloba Lindl. var. multiplex
P. twymaniana Koeh.
P. velutina Batal.
P. wilsoonii (Diels) Koeh.
P. yedoensis Mats.
P. padus L. var. commutata Dipp.
P. persica Stokes
P. perulata Koeh. var. nucipersica (L) Schneid.
P. pilosiuscula Koeh.
P. pleiocerasus Koeh.
P. pubigera Koeh. var. prattii Koeh.
P. punctata Hook f.
P. salicina Lindl.
P. serrulata Lindl.
P. serrulata Lindl. var. chosinhizakura Mats.
P. serrulata Lindl. var. murrayana
P. serrulata Lindl. var. sekiyama Wils.
P. spinosa S. et Z.
P. subhirtella Miq.
P. ssiori Fr.
P. tomentosa Thunb.
P. trichostoma Koeh.
P. tridentata Pursh.
P. triloba Lindl. f. simplex (Bge) Rehd.
P. venosa Koeh.
P. wilsoonii (Diels) Koeh. var. leibotrys Koeh.

Fragaria

F. chiloensis Duchene var. ananassa Bail.
F. indica Andra.
F. nilgerrensis Schlecht.
F. reptans L.
F. virginiana
F. elatior Ehrh.
F. hayatai Makino.
F. moupinensis (Fr.) Card.
F. orientalis Los.
F. vesca L.

Ribes

R. acuminatum Wall.
R. bureiense Fr. et Sch.
R. emodense Reh.
R. fasciculatum S. et Z.
R. fasciculatum S. et Z. var. chinensis Maxim.
R. grossularioides Maxim.
R. mandshuricum Kom.
R. meyeri Maxim.
R. moupinensis Fr. var. tripartitum Jancz.
R. pulchellum Trucz.
R. tenue Jancz.
R. triparititum Batalin
R. vilmorini Jancz.
R. roezlii Regel.
R. schlechtendalii Dge var.
R. alpestre Dcne.
R. davidii Fr.
R. emodense Rehd. var. verruculosum Rehd.
R. giraldii Jancz.
R. graciale Wall.
R. longeracemosum Fr.
R. maximowiczii Batalin.
R. moupinensis Fr.
R. orientale Desf.
R. piptopetalus Hayata
R. stenocarpum Maxim.
R. tricuspa Nakai.
R. triste Pall.
R. nevadaense Kell.
R. sanguieneum Pursh.
R. velutinum Greene.

glabellum Trautv et Mey.

Vaccinium

V. bracteatum Thunb.
V. carlesii Dunn.
V. caudatifolium Hayata.
V. chorchophyllum Rehder
V. conchophyllum Rehder.
V. donianum Wight
V. dunalianum Wight.
V. dunalianum var. virulare Chun var. nov.
V. hancokiae Merr.
V. iteophyllum Hance
V. japonicum Miq. var. sinicum Rehd.
V. laetum Diels
V. longicaudatum Chun sp. nov.
V. mandarinorum Diels.
V. merrillianum Hayata
V. moupinense Franch.
V. robustum Chun
V. setigerum Chun n. sp.
V. trichocladum Merr. & Metc. n. sp. Iso-type
V. truncatum Chun
V. viburnoides R. & W.
V. wrightii A. Gray.
V. bracteatum Thunb. var. longitulum Hayata
V. chengae Fang.
V. ciliatum Thunb.
V. delavayi Franch.
V. donianum var. brachybotrya Franch
V. emarginatum Hayata
V. fragile Franch.
V. henryi Hemsl.
V. iteophyllum Hance var. fragrans Rehd. & Wils.
V. kachinense Brandis
V. lactum var. undulatum Y.C. Yang var. nov.
V. mandarinorum Diels var. lactum (Diels) Metc.
V. pubicalyx Franch.
V. scopulorum W.W. Smith.
V. sprenglii (Don) Sleumer
V. trikorum Rehd. (V. buritolicum)
V. urceolatum Hemsl.
V. vitisidaes Ledum Palustre var. angustum

Director Chang will provide information on origin, names, or other details if we request it.

September 14, 1982 - Nanjing

We met at the Horticulture Institute during the forenoon to discuss fruit varieties and culture. Mr. Wang had assembled 7 pear varieties for tasting and for my brief appraisal:

1. Ya Li (P. bretschneideri type) susceptible to scab
2. Chi Li " susceptible to scab
3. Tsu Li susceptible to scab
4. Xue Hua Li " moderate scab resistance
5. Wan San Li (P. pyrifolia, persistent calyx) scab resistant, late maturing, round, russet skin.
6. Chi Sui (P. pyrifolia, deciduous calyx) scab resistant, round, russet skin.
7. Kwang Mi (P. pyrifolia, persistent calyx) scab resistant, round, russet skin.

Most of them were quite good flavor and texture for this type of fruit. Chi Li and Xue Hua Li (Snowflake) seemed a bit more coarse textured than the others, with perhaps more grit (stone cells) in the flesh. Tsu Li was the best to my taste. Unfortunately the variety we have at O.S.U. under that name is not true Tsu Li. All of the above listed varieties are old, some several hundred years. There is no pear variety breeding program here, but they were very much interested

in the new varieties released from the Tsukuba Station in Japan.

The rootstock used here for pear is P. betulaefolia, called Tan Li or Tu Li, propagated from seed by many families in the areas north of Jiangsu province. Most pears in this area are grown north of the Chang Jiang river (Inchang area) in sandy soil of pH 7 to 8. Trees are chlorotic during the rainy season but recover after the rains cease in August. No work is being done on leaf analysis, but soil analysis has been done for N, P, and K, presumably for diagnostic purposes. I told them that soil tests for nutrient availability had not been of value to us. P. calleryana is not native to this area and is not used as a rootstock. They said it is susceptible to diseases found here. By contrast, it is resistant to most of our North American diseases except Pseudomonas syringae and cedar rust.

The main disease of pear here is pear scab, for which they spray Bordeaux mixture. They said that codling moth is here but is not a serious pest of pear. They use an organo-phosphate for insect control.

Walnuts are collected from wild trees, and no hazelnuts are grown here. North American pecan seems to do very well in Jiangsu province and I saw no serious diseases or pests on them here. They don't plant them in orchards but they are being planted along parkways, driveways and as yard trees. The people think the nuts are superior to walnut.

Apple is a popular crop north of here and quite a lot of work is being done on its culture. M. baccata is not used as a stock here because it is not resistant to chlorosis. Both M. prunifolia and M. micromalus seedlings are used and are moderately resistant to chlorosis. Seed of these 2 species are obtained in markets, collected by villagers in Hubei province. M. asiatica occurs here as a cultivated form and was eaten for many years prior to introduction of larger-fruited European apples. M 7 has been a good stock for this area. The main varieties grown in the region are Golden Delicious, Starking and Ralls. The fist 2 mature in mid-September and Ralls October 1 to 15.

There is no complete collection in China of wild fruit species for any genus. Species surveys in China have shown that some have been lost since the 1950s.

The entire afternoon at the Horticultural Institute was used for my "learned report" on:

1. Worldwide systems for germplasm resources.
2. Collection, preservation, and evaluation methods for clonal germplasm in the U.S.

The electricity was off till 5 p.m., so we continued the discussion until 5:10; the electricity still was off, so we postponed the slides till tomorrow morning. During the day I heard Warren Kronstad's name pronounced 5 or 6 different ways, so he must have been here. Some of the people at this session had come in from the surrounding provinces so they may have met Warren somewhere else.

September 15, 1982 - Nanjing

This morning we completed the marathon discussion on germplasm, begun after lunch yesterday, then I was asked to give a report on rootstock germplasm, propagation and culture of pear and apple. At 10:30 we took a short rest, had tea and enjoyed canned peaches both white and yellow. The white was smaller but sweeter. We then continued the rootstock/culture discussion and considered written

questions turned in during my formal talk. They wanted to know more than I could tell them, and I promised to send some research publications. We adjourned at 12:10, with their saying they hoped I would return next year.

The entire afternoon was spent with Director Chang Yu-ho and others at the arboretum of the Botanic Garden looking at fruit and nut species of interest. Some of these are growing in several-tree groups isolated for other species of the genus, so I asked Mr. Chang to collect seed as they mature as follows:
Castanea mollissima, Vaccinium bracteatum, Malus micromalus, Photinia davidsonia, Chaenomeles sinensis, Citrus junos, Akebia quinata, Akebia trifoliata, Pistacia chinensis, Juglans mandshurica.

Several others we may be able to get in 1983, including large fruited jujube and wild Rubus (with white canes).

The following species were observed in the arboretum:
Corylus heterophylla, Pistacia chinensis (wild trees), Carya cathayensis, Juglans mandshurica, Castanea mollissima, C. henryi, C. seguinii (all 3 are pollen compatible), Malus micromalus, Pyrus betulaefolia, Photinia davidsonia (graft compatible with Eriobotrya), Chaenomeles sinensis, Crataegus crenata, Photinia serrulata, Vitis davidii (spiny stem), Rubus sp. (white canes), Rubus chingii (from Anhui Prov.), Prunus japonica, Diospyros lotus (standard kaki rootstock), Diospyros rhombifolia (dwarfing rootstock for kaki), Actinidia polygama, Akebia quinata, A. trifoliata, and Citrus junos (hardy down to -13 degrees C).

The only species found to be mislabelled was Rubus crataegifolia, which has a simple leaf. The specimen there has a pinnately compound leaf.

September 16, 1982 - Nanjing to Hangzhou

This day was spent on the train, from 9:40 a.m. to 6:20 p.m.. The distance from Nanjing to Hangzhou is not that far on the map. Unfortunately the railway does not go the more direct route but rather it goes east for 4 hours to Shanghai then west for 4 hours to Hangzhou. The whole journey we passed through rich agricultural lands. The crops seen were mature second crop rice, young immature third crop rice, cotton, hemp, cane, mulberry for silk culture, and numerous garden vegetables. The land is quite level and is reticulate with navigable canals and streams on which produce and other goods is transported on boats and barges. From what I saw this entire area must be the breadbasket of China.

We came through a blinding rainstorm on the way. It had stopped when we arrived at Hangzhou but the streets were wet and low spots were puddled. There is a well known saying attributed to Marco Polo that says "In heaven is paradise; on earth there is Hangzhou". We had earlier been told that it would not rain here in the fall. So when we met Zhejiang Agricultural University President Chu Tsu-Siang at 8 o'clock tonight at the hotel, he was mildly apologetic about their paradise on earth. But we had a good visit with him and with Vice President Chen, Zi-yuan, and O.S.U.-Zhejiang liaison Xu Bu-jin, Professor Shen Du-xu, fruit breeder, and others from the Horticulture Department. President Chu asked me to take greetings back to O.S.U. President MacVicar, Dean Ernest Briskey and to Dr. Beno Warkenton, a fellow soil scientist.

No pears, hazelnuts or berries seen today.

September 17, 1982 - Hangzhou

At 7:30 a.m. we set out by car to visit a state farm just outside the city. This farm is not run by a commune but by 448 people who are paid wages by the state. The main crops are pigs, tea and grain, with smaller amounts of vegetables and fruits. Some processing of plants for medicine is done here also. Total land is 171 ha, of which 18 ha is in pear, 9.5 in peach and minor plantings of apple and plum.

This area lies on the northern edge of the subtropical region at 29 degrees 30 minutes North latitude and 50 m elevation. The extreme winter minimum temperature is -9 degrees C and the average January temperature is 3.5 degrees C. Crops grown here are hemp, cotton, bamboo, taro, cane, rice, and mulberry for silk. It is a famous center of tea and silk production.

The pears grown here are mostly P. pyrifolia and seem well adapted to this climate. The main varieties are Ju Shei (from Japan), Xinshi Ji, Ba Yun and Hwang Hua, a variety developed at the farm by the cross Hwang Mi x San Hua. We sampled the Ju Shei and Hwang Hua varieties, which were good but not exceptional. Both are round, russet skin pears that mature in mid-August. Ju Shei has deciduous calyx but Hwang Hua has persistent calyx.

The main rootstock for pear here is Pyrus calleryana which they call Tan Li. The second stock used is P. betulaefolia which they call Dou Li. Both are collected from the mountains of Zhejiang province and both appear perfectly adapted to this soil and climate. The soil here is imperfectly drained clay loam of pH 5.5. To aid in drainage of this soil they have dug a main ditch alongside the orchard 1 meter deep, into which lateral ditches about 1/2 meter deep are drained. The laterals are placed at 15 to 30 m intervals throughout the orchard. The orchards appear in excellent health, but the trees are far too vigorous for the spacing, causing excessive overlapping of branches and shading of the lower half of the trees. The yield is only 30 tons/ha and could probably be increased by using better spacing, or by using dwarf rootstock. They have quince stock now but did not know it could be used with oriental varieties. I suggested they try it, using a compatible interstem of Old Home pear. They are trying some P. communis varieties but they don't seem to do well. Le Conte, a P. communis x P. pyrifolia hybrid seems to do well here, suggesting that only low-chilling types should be tried. They had just spread manure and night soil in the orchards in the past day or two and it cleared one's sinuses. The smell was bearable, however, when one saw the general health of the trees.

The peaches grown here are white fleshed and the most important varieties are Ta Chau, Shazizhausheng, Hangzhou Zhau Shu Min (June honey peach). The rootstock is wild seedling Mau tau from the local mountains. It would be worth getting this to see if it is more tolerant of wet clay soils than other peach. A wild plum also grows here but no one knew the species, perhaps Prunus simonii.

The apple effort here is minor but worth mention. The main variety here is a local one, Liaonfu, a green-white skinned small to medium size apple that blooms April 1 and matures in mid-June. The rootstock is Malus hupehensis which grows wild in this and the area north of here. Golden Delicious and Starking do poorly here but are better on dwarfing M 9, 7 and 2 stocks than on native seedling. The local variety probably does better because of a lower chilling requirement.

September 18, 1982 - Hangzhou

This morning was the appointed time for me to deliver my "learned report" at Zhejiang Agricultural University. The title, "Pear Germplasm, Breeding, Rootstocks and Physiology", seems more appropriate to a 2-week seminar. But they asked me to report on that title, so I organized it by categories of general concepts, with slides and chalk board drawings to give specific examples for each concept. We began shortly after 8 and ended the discussion at 12:30. On behalf of O.S.U. I presented the Horticulture Department with a copy of my "Temperate-Zone Pomology" and a Golden field guide to the "Trees of North America". Dr. Lee, department head, said they were pleased, not only for the token of friendship from their sister university, but for the great practical use they would make of them.

Before lunch, arranged for by President Chu who could not be there, Dr. Lee, Professor Shen Du-xu and others walked with me around the lake near the Horticulture building. I took a few pictures of the campus to take back to Oregon, then we met Vice President Chen, Zi-yuan and O.S.U. liaison Xu Bu-jin for a magnificent "lunch" of 5 fish and shrimp dishes, 2 of pork, and 1 each of beef, duck, chicken and limed egg, plus 3 of vegetables - bamboo sprouts, young soy beans, Chinese cabbage. For dessert we had a hot fruit sauce made from orange and bananas, cake and fresh apples, beer and wine. I must warn President Mac and Dean Briskey that their trim figures will be in jeopardy when they visit here this fall.

The p.m. was spent in the Hangzhou Botanic Garden with Dr. Lee and the whole entourage. This garden was established in 1954 on 150 ha of land near West Lake. It fell into disrepair during the cultural revolution but lately has been brought up to former standards. A new plant resources and herbarium building will soon be complete and ready to occupy. Besides the trees and shrubs they have a fine labelled collection of hundreds of medicinal plants.

Species of interest to me that we observed and photographed are: Pyrus calleryana, P. pyrifolia, Malus hupehensis, M. prunifolia (?), Crataegus spp., Chaenomeles lagenaria, Eriobotrya japonica, Prunus spp. (cherry, peach, plum), Castanea millissima, Juglans, cathayensis, Carya illinoinsis (pecan), Myrica rubru - strawberry tree, large tree, berry like Arbutus is canned and eaten like cherry or plum, Cornus spp. - red fruit, 2 cm. dia., Thea sp. with 5 cm. fruit - seed used to obtain a good vegetable oil in south China, Rubus parvifolius, Metaseguois sp., Curcurbit - large oval red fruit, used in medicine.

Then they took me to see the 2 Sequoia sempervirens trees given to them by Nixon in 1972. They said that Nixon was here last week and came to see the trees again. The tour was terminated at 5 when the rain started.

Back at the hotel Professor Shen Du-xu showed us 2 new Pyrus pyrifolia pear varieties he has developed for the Zhejiang area which is a temperate/subtropical climate:

Hwang Hua (yellow flower) - very productive

Hangzhou Hung (Hangzhou Red) - not so productive but good quality

Both have been planted in 20 provinces, north to Gansu. They are not hardy to the pear districts in the northeast. Both varieties are resistant to pear scab and also seldom have any worms in the fruit. Thus they are healthy trees with little care and are often planted as yard trees around farm houses and rural communes. The quality of both is better than some other Chinese varieties but not as good as Kosui

from Japan.

September 19, 1982 - Hangzhou to Shanghai

Today is Sunday and moving day again. It was a pleasant train ride through a vast sea of greenery - cotton, hemp, cane, mulberry, bamboo and rice. Both cotton and hemp were being harvested. After harvest the 2 to 3 meter hemp stalks are placed in ponds to ret. When the stems decompose the fibers are easily stripped out.

Most of the leaves of the mulberry plantings have been picked at this season. The process is started when the adult butterfly lays her eggs on a sheet of paper. Mulberry leaves are then picked, placed in bamboo vials and placed with the eggs in special rooms. After hatching, the larvae feed on the leaves until ready to spin the coccoon and pupate. When the silk is taken, the pupae are eaten as a delicacy.

They've put me up at the Jing Jiang Hotel, here in Shanghai. Tomorrow we spend the entire day at a people's commune in a suburb of this city of 11 million. They grow cotton, grain and fruits. On Tuesday morning I'm to tour the confluence of 3 great rivers here, in which lies China's largest seaport. In the afternoon I'm to present a seminar on germplasm resources to a group from the Agricultural Bureau of Shanghai.

September 20, 1982 - Shanghai

There are 260 people's communes in the Shanghai area. The one we visited this morning is in the SE corner of the city. Started in 1958, it covers an area of 32.5 square km, has 8000 households and a total population of 30,000. Grain, cotton and oil-bearing crops are the main crops, with 20 ha planted to pears and peaches, plus small acreages of citrus. The pear and peach must be selected for this subtropical area or else they would not get enough winter chilling to break rest. Of the 15 production brigades on the farm, 1 is devoted to fruit.

The peaches grown here are white fleshed. The main ones are Beifan, Beihua (White Flower) and Yi lu (Green Jade). They appear healthy despite the heavy clay soil, high water table and 7.3 pH at 50 cm. The rootstock is wild peach from Jiangsu.

The pears here are all from different areas but selected for early maturity and adaptability to the climate. They don't like the new varieties from Hangzhou. They say they aren't the right shape, lack flavor and ripen too late. The main varieties grown here are the Japanese Ergongbei, Ciyuan, Jincunchu. Others are Shan Li and a *P. communis* x *P. pyrifolia* hybrid, Ti tou Li from NE China. These all ripen in early August. They'd like to find July ripening sorts to get on the Shanghai markets ahead of anything from the big pear regions north of here. The lady pear breeder Xu Si-mei is also selecting for green skin and large fruit. She let me sample 3 early maturing selections she had saved. One was small (5 cm. dia.) but good quality, one was much larger but not as good quality, and one was medium size and poor quality. All were derived mostly from Japanese (*P. pyrifolia*) varieties.

Yield of pears at this farm is 22 tons/ha. They use one-third pollinizers to two-thirds main variety but do not introduce bees as pollinators. Tree spacing is 4 x 2 m and the main rootstock is *P. betulaefolia* but they also use a lot of *P. calleryana*, both obtained

from Zhejiang province. The elevation here is 4 m and the water table now stands at 1.5 m below the surface. The ground water is not brackish here at about 30 km from the ocean. Some trees are showing chlorosis, so perhaps P. communis rootstocks would be better here. I suggested some Oregon selections for testing. Barnyard fertilizer is used annually, applied to the surface under the tree spread.

Because of the large urban population nearby, these communes grow more fruits and vegetables than those more isolated from cities. In this area 80 kinds of vegetables are grown, including more than 400 varieties. About 2/3 of the workers here are in agriculture and 1/3 are in industry brigades. The income per person here (including wife and children) is 312 yuan per year, somewhat higher than average. Despite this, 78% of the commune income is from industry rather than farming. This is not unlike our own system in which the low cost of food tends to penalize the farmer and subsidize other segments of the economy. Commune directors get a salary from the government. Orchard or farm managers earn more money than the workers who do the actual labor.

In the afternoon we visited a second commune (Zhoucxi People's Commune) which they said was not as well managed as the first. This one has 101 family units, with 114 workers per brigade. Three fruit production teams operate 16.7 ha of peaches and pears. Two kinds of `Beifan` peach ripen in late June and July 10, respectively. Other varieties ripen in mid-August. All are marketed within a few km of the orchard.

Pears grown here are the same as those at the first commune, plus 'Zhei Xu' which matures in mid-August. Pear yield here is 22.5 tons/ha, slightly better than the "good" commune visited this morning. Tree spacing of older trees is 5 x 5 m and rootstocks are the same as the other farm. The trees here show less chlorosis and the clay soil contains more sand than the other one.

Each male worker here gets 80 to 100 yuan per month; females get about 60. Many workers want to work in the orchards because the produce brings more money in the markets of Shanghai and Hongkong. They told me that there are women farm directors but so far I've only seen one.

A seven-year-old orchard here spaced 5 x 3 m apart was said to produce 15 tons/ha. The trees had been grossly overpruned, and new shoot growth exceeded 2 meters in much of the upper parts of the trees. They asked me to suggest how they might improve yield, so I told them to do no pruning at all this year and very little next year and the next, and in 3 years the yield could double. The reply I got was, "The workers tend to overprune because they need the prunings for fire wood." So I said, "If wood is more valuable than fruit, then keep it up." They laughed, but I think they got the point. Too often it seems when they ask my advice, they expect some kind of profound Western magic. At another farm we visited last week they were digging a pit beside each tree in which to put the manure applied each year. I asked them how the trees would get the fertilizer if all the surface feeder roots had been cut off in digging the pit. Then it came to light that the workers had extra time at that season and needed something to do. But the 12th party congress just completed in Beijing has said that too much labor (80%) is used in agriculture and that they must modernize (I think this is a euphemism for mechanize) agriculture so as to release workers for work in construction and

industry.

September 21, 1982 - Shanghai

This, my last work day in China, was spent in a.m. on a boat tour of the huge Shanghai inland harbor and 10 or more major ports and loading/unloading docks along the Huangpu River which empties into the estuary of the mighty Yangtze 30 km from Shanghai near the sea. Half the goods shipped in and out of China are handled here. We saw large grain elevators which we were told handle more than 80 million tons of grain per year at this port. And since Shanghai is the hub of China's manufacturing industry, large amounts of cargo come from that activity. But later on September 22 I met a shipbuilder from Tacoma (Ray E. Nichols) who told me there is a major problem with the Shanghai port. Most of the docks are relatively shallow and will support 10,000 ton ships, but only 2 are deep enough for the large 40 to 50,000 ton ocean vessels. So the big ones must anchor offshore and be loaded or unloaded by smaller shuttles and barges. Recently I read that China is building a major port at Nanjing, on the Yangtze River just north of Shanghai, where the natural depth is about 70 feet. Perhaps this is in response to the need for a deep-water port.

The entire afternoon was spent on a seminar/discussion entitled "Germplasm resources, genetic traits and breeding of pears". The audience comprised scientists and technical agricultural workers from the Horticulture Institute of the Academy of Agricultural Science and from the Agricultural Bureau of Shanghai. They were very much interested in world germplasm resources and in the developments recently in the U.S. They promised to help me collect fruit germplasm from east Asia and I said I'd try to send them North American species on request. I left a book with them on the trees of North America because some of them had no idea which fruit and nut species are found there.

My return flight is tomorrow noon. Since I am to be at the airport by 10:45, no further trips or events are scheduled. Before leaving the hotel tomorrow morning, I will make a verbal report to Mr. Zhang and Mr. Xu. They want my comments and suggestions regarding Chinese agriculture as I was able to see it while here.