

Among the plant introductions during August, the most interesting and important, perhaps, are two large collections of seed received from Darjeeling, in the Sikkim Himalayas. One of these collections was made under the supervision of Mr. G. H. Cave, Director of the Lloyd Botanic Garden, at the request of Mr. Wilson Popenoe, of this Office, and the other by Mr. L. J. Mackintosh, at the request of Mr. J. F. Rock of Honolulu, traveling as a Collaborator of this Office. Many of the plants are of interest, several are quite new to this country, and one or two perhaps may prove quite worthy of continued cultivation in this country. All plants listed in this bulletin therefore are from Darjeeling, and the descriptions given are from Watt's Dictionary of the Economic Products of India, or Hooker's Flora of British India, unless otherwise specified.

Acacia catechu. (Mimosaceae.) 38991. Seeds of the cutch from Darjeeling, India. The various forms of the cutch tree all yield a gum, an astringent extract and a useful timber. The gum is of pale yellow color and often occurs in tears one inch in diameter. It is sweet to the taste, soluble in water, and forms a strong, pale-colored mucilage. Most of the superior qualities of gum arabic, especially those of south India, are very possibly obtained from this species of *Acacia*. The timber has yellowish-white sapwood, with heartwood either dark or light red, and extremely hard. It seasons well, takes a fine polish, and is extremely durable. It is used for all kinds of agricultural implements, wheelwrights' work, etc. In Burma it is used for house posts and very largely as fuel for the steamers of the Irrawaddy flotilla. The fuel of dead cutch or khair is much valued by goldsmiths. In northern India cutch wood is made into charcoal, and is regarded as one of the best woods for that purpose. It has been pronounced good for railway sleepers. A cubic foot of the wood weighs from 50 to 75 pounds according to the variety. The tree is chiefly important as furnishing the astringent catechu, so largely used in tanning. This is extracted from the chips by means of boiling water, the heartwood only being used. This necessitates the complete destruction of the trees, so that the Gujarat method of lopping the larger branches seems more economical and likely to recommend itself for general use.

Aconitum ferox. (Ranunculaceae.) 38993. Seeds of monkshood from Darjeeling, India. One of the numerous forms of the so-called "Nepal aconites," so largely used in Indian medicine. Of interest possibly for trial in this country as a producer of aconite, since this group of the genus furnishes a poison of unusual strength.

Aesculus assamicus. (Aesculaceae.) 39102. Seeds from Darjeeling, India. "A moderate-sized deciduous tree, found in northern Bengal, in the Khasia Hills, Assam, and Burma, ascending to 4000 feet. The leaflets are 5-7, shortly petioled. Panicles narrowly lanceolate, nearly equalling the leaves, lower pedicels longer. Petals white and yellow. The wood is white, soft and close-grained but very rarely used. It weighs about 36 lbs. per cubic foot."

Albizzia marginata. (Mimosaceae.) 39104. Seeds from Darjeeling, India. "A large, deciduous, fast growing tree, met with in the sub-alpine tract from the Indus eastward ascending to 4000 feet in Oudh, Bengal, Burma, and South India. This tree is attracting considerable attention in Assam. It has been found that tea flourishes better under it than when exposed to the sun. The most favorable explanation of this fact is that the leaves manure the soil; the roots, which do not penetrate deep, tend to open up the soil, while the shade is not so severe as to injure the tea, the leaves closing at night and during the early morning. The gum which flows copiously from the stem is used by the Nepalese for sizing their Daphne paper. The sapwood of this tree is large and white while the heartwood is brown and generally not durable. The wood is used in the manufacture of cart-wheels, wooden bells, and in Bengal it has been tried for tea boxes for which purpose it will probably be well suited."

Albizzia odoratissima. (Mimosaceae.) 38996, 39103. Seeds from Darjeeling, India. "A large deciduous tree, met with in the sub-Himalaya tract from the Indus eastward, ascending to 3000 feet in altitude. This tree yields a dark brown gum in rounded tears, tasteless but soluble in water. The bark is boiled by the Garo people together with the leaves of the dugal (*Sarcochlamys pulcherrima*) and the yarn of their cloth to give the latter a brownish color. As a medicine the bark is applied externally and is considered efficacious in leprosy and in inveterate ulcers. When boiled in ghi (clarified butter) the leaves are used by the Santals as a remedy for coughs. The timber made from this tree is used in the manufacture of wheels, oil-mills and furniture. The timber is excellent for all purposes requiring strength and durability and is considered one of the most valuable of jungle timbers."

Amoora rohituka. (Meliaceae.) 38998. Seeds from Darjeeling, India. "An evergreen tree with a large crown of branches, which is widely distributed over the Malay Archipelago and the Philippine Islands. The fruit is smooth, pale yellow or red in color, and from one to one

and one-half inches in diameter, rather soft and fleshy, three-celled and three-valved. A sort of economic oil is extracted from the seed.

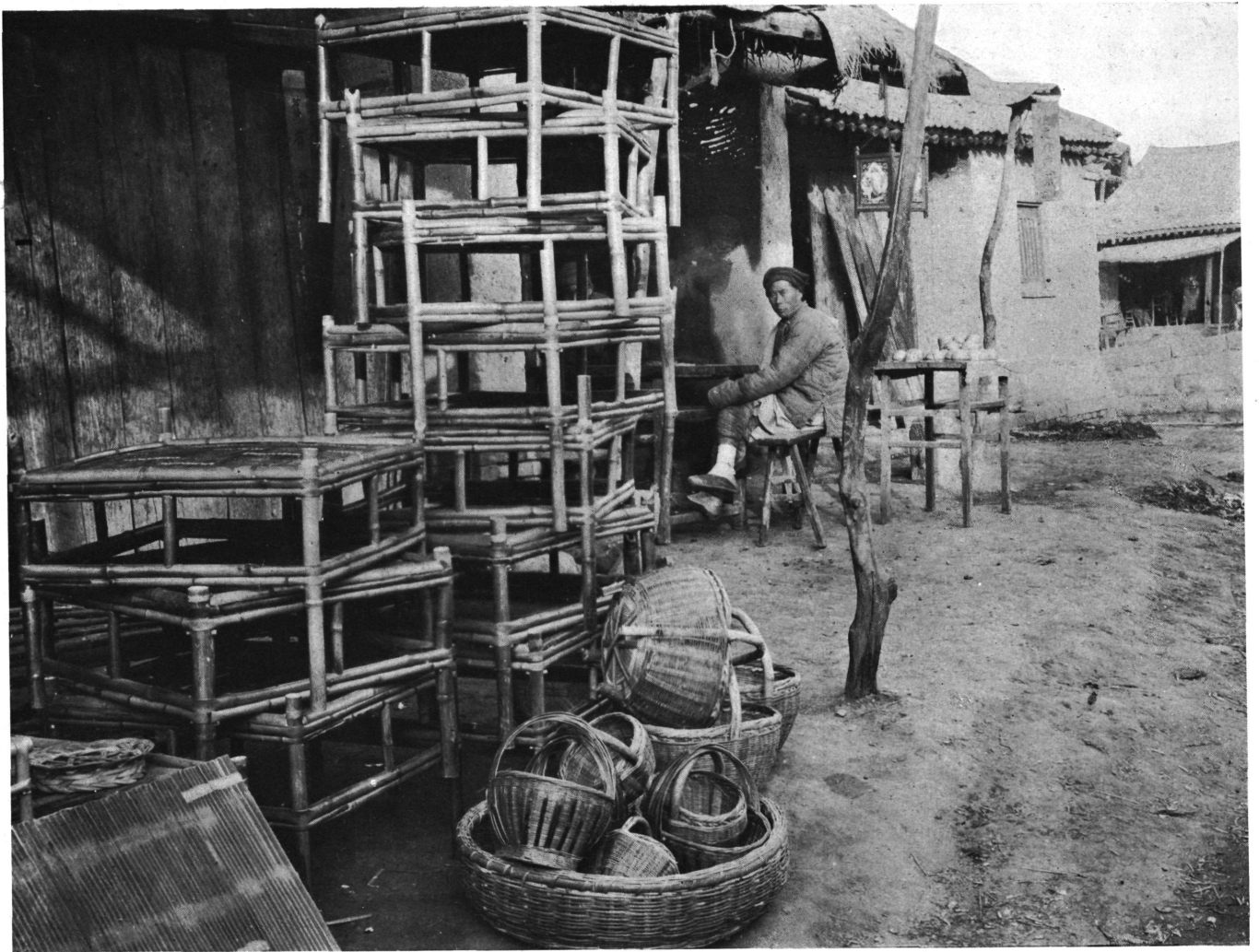
Betula cylindrostachya. (Betulaceae.) 39002. Seeds of a birch from Darjeeling, India. "A pink-barked birch native of the Himalayas and found growing there at altitudes of from 3000 to 10000 feet. It reaches a height of about 60 feet and thrives well along forest streams. The wood is hard, strong, and durable." (Mueller, Select Extra Tropical Plants.)

Corylus ferox. (Betulaceae.) 39106. Seeds from Darjeeling, India. "A small tree native of Nepal and Sikkim found growing at altitudes ranging from 8000 to 10000 feet. The fruit which has an edible kernel is covered with a prickly cup. The wood is pinkish-white in color, moderately hard and even grained."

Cotoneaster microphylla. (Malaceae.) 39008. Seeds of a cotoneaster from Darjeeling, India. "An ornamental plant recently introduced into Indian gardens. It is known as Khariz luni in Kashmir and as Garri in Kumaon. The wood of this species is used in the manufacture of walking sticks and baskets. When mixed with Parrotia it is used in the construction of twig bridges in Kashmir. The fruit is sweet."

Dillenia pentagyna. (Dilleniaceae.) 39109. Seeds from Darjeeling, India. "A deciduous tree of Oudh, Bengal, Assam, central, south and western India, and Burma. In the younger trees the leaves are sometimes as much as two feet in length and the flowers, buds, and fruit when green are eaten by the natives. The tree flowers in March and April and later produces a berry which is said to have an agreeable acid flavor resembling that of *Grewia asiatica*. The wood is tough, moderately hard, and of a reddish-grey color. It is used in ship construction, in rice-mills and in the manufacture of charcoal of very good quality. The leaves of this tree are sold in the bazar at Poona as a sub-stratum for thatching."

Eriobotrya petiolata. (Malaceae.) 39111. Seeds from Darjeeling, India. "This tree is a native of the eastern Himalayas and is found growing in Sikkim and Bhotan at elevations of 5000 to 9000 feet. The leaves are firmly coriaceous and vary from 6 to 9 inches in length and from three to three and one-half inches in width. The panicles are from three to six inches in length and broad, branched from the base, very spreading and clothed with a rusty



BAMBOO TABLES AND BASKETS.

The successful growth which the experimental groves of Oriental Bamboo have made in Florida and Louisiana has raised many questions regarding the use of the bamboo canes by the Southern farmers. This Photograph taken by Frank N. Meyer shows a number of low Chinese tables made from bent bamboo, costing only 10 to 15 cents apiece. The woven bamboo baskets, used to wash rice in, cost from 5 to 20 cents apiece. Hua yin miao, Shensi, China. Dec. 27, 1913.



Bamboo Utensils from Shantung, China. *Phyllostachys* sp.

Cups and jars from bamboo joints, obtained in Tsao chou fu, Shantung, China. Photo by Mr. Frank N. Meyer, Peking, China, April 24, 1914. These utensils, apparently turned on an ordinary lathe, show some of the possibilities of bamboo, not usually considered in this country. It may be that the turning by removing the epidermis makes the dishes less likely to crack in a dry atmosphere. In American steam-heated houses bamboo utensils appear at a decided disadvantage because they dry unevenly and crack. Such as are used for outdoor purposes, however, last a long time, are exceedingly cheap and light and pleasing to look at.

tomentum as are the very young leaves on both surfaces. The flowers are one-half inch in diameter, shortly pedicelled and not crowded." May possibly have some value as a stock for the loquat.

Ficus bengalensis. (Urticaceae.) 39113. Seeds of a fig from Darjeeling, India. "A large tree found in the sub-alpine tract and the lower slopes of Deccan, and so common in Mysore that it may be said to be characteristic of the arboreal vegetation in many parts of that province. This tree attains a height of from 70 to 100 feet, and sends down roots from its branches, thus indefinitely expanding its horizontal growth. This tree yields an inferior rubber and lac is also collected from it. A coarse rope is prepared from the bark and the aerial roots. Paper is also reported to have been formerly prepared in Assam from the bark and to a small extent is still so prepared in Madras. The milky juice is externally applied for pain and bruises, and as an anodyne application to the soles of the feet when cracked or inflamed. It is also applied to the teeth and gums as a remedy for toothache. The wood is of a grayish color, is moderately hard, and as it is durable under water, it is used in the manufacture of well-curbs. It is sometimes used for boxes and door panels."

Fraxinus floribunda. (Oleaceae.) 39014, 39115. Seeds of an ash from Darjeeling, India. "This *Fraxinus*, commonly known as the Nepal ash, is a large deciduous tree found in the Himalayas at altitudes ranging from 5000 to 8500 feet, and attaining a height of 120 feet and a diameter of 5 feet. A concrete, saccharine exudation called manna is obtained from the stem of this tree and is employed as a substitute for the officinal manna. The sugar contained in this exudation, called mannite, differs from cane and grape sugars in not being readily fermentable, though under certain conditions it does ferment and yields a quantity of alcohol varying in strength from 13 to 33 per cent. Like the officinal manna this is used for its sweetening and slightly laxative properties. The wood is white with reddish tinge, soft to moderately hard in structure, resembling in some respects the European ash. The wood is very valuable and is used in the manufacture of oars, jampan poles, ploughs, platters, spinning wheels, and for many other purposes, while the tree itself is a fine avenue ornamental."

Indigofera dosua. (Fabaceae.) 39119. Seeds from Darjeeling, India. "This is a shrub of the temperate, central and eastern Himalayas, from Simla to Bhotan and Assam at altitudes ranging from 6000 to 8000 feet. The flowers

of this *Indigofera* are said to be eaten in Kangra as a pot-herb. This species is prized as fodder for sheep and goats, and buffalos are also said to be very fond of it".

Jasminum humile. (Oleaceae.) 39120. Seeds of a jasmine from Darjeeling, India. "A small, erect, rigid, yellow flowered shrub, native of the sub-tropical Himalayas from Kashmir to Nepal, at altitudes of from 2000 to 5000 feet; found also in south India and Ceylon, from 2000 to 6000 feet. It is widely cultivated throughout the gardens of India. In the Kurram valley a yellow dye is extracted from the roots. Like many other jasmines, this species bears flowers which yield an aromatic essential oil used in native perfumery."

Meconopsis wallichii. (Papaveraceae.) 39022. Seeds from Darjeeling, India. "This is undoubtedly one of the finest of the poppyworts in cultivation. It is an extremely handsome herbaceous perennial, and is remarkable, being one of the few, if not the only true blue-flowered poppy in cultivation at the present time. It attains a height of from 4 to 7 feet and forms a perfect pyramid. It is exceedingly beautiful when in full flower. The blossoms are about three inches in diameter, broadly saucer shaped, pendent and of a lovely shade of blue. The blooms always commence to open at the summit of the stem, then gradually from day to day expand until the lowest and last bud is reached." (The Garden, July 12, 1913.)

Pedicularis spp. (Scrophulariaceae.) 39031-037. Seeds of seven varieties of lousewort from Darjeeling, India. Many of this interesting genus are handsome perennials suitable for borders' but in cultivation almost all have proven short-lived' perhaps because of some dependence on the root systems surrounding plants in their native habitats.

Picrorhiza kurroa. (scrophulariaceae.) 39041. Seeds from Darjeeling, India. "A low, more or less hairy herb, with a perennial woody, bitter rootstock, common on the alpine Himalayas from Kashmir to Sikkim at altitudes of 9000 to 15000 feet. The root of this species is used in medicine in case of fever and dyspepsia, and as an ingredient of various purgatives."

Piptanthus nepalensis. (Fabaceae.) 39043, 39128. Seeds from Darjeeling, India. "A shrub ten feet high with loose racemes of large yellow flowers, found on the temperate slopes of the Himalayas at an elevation of 7000 to 9000 feet, from Simla to Bhotan."

Polygonum vacciniifolium. (Polygonaceae.) 39048. Seeds from Darjeeling, India. "Apparently a common Himalayan plant which has proved sufficiently hardy to bear the open air of this climate (England). It is a low-growing neat plant, and by its numerous slender stems trailing along the ground and rooting at the joints it soon becomes a spreading compact patch. The leaves are quite concealed by the copious spikes of bright rose-colored flowers, which continue blooming from August to November uninterruptedly. It is well adapted for the front part of rock work, in situations where it will not be subject to drought in summer. This plant continues to become a great favorite in our gardens as a bedding-out plant, especially where autumn flowers are desired." (Curtis's Botanical Magazine, pl. 4622.)

Rheum acuminatum. (Polygonaceae.) 39049. Seeds of wild rhubarb from Darjeeling, India. "This is the common rhubarb of the Sikkim Himalayas, and very closely resembles in most respects the well-known *Rheum emodi*. It inhabits rocky places, often amongst brushwood in the sub-alpine regions of the Himalayas of Sikkim and East Nepal, at elevations of 9000 to 13000 feet. The stems are pleasantly acid, and, though more dry and stringy than those of *R. emodi*, may be used for tarts. The root is spongy, and but slightly, if at all, medicinal." (Curtis's Botanical Magazine, pl. 4877.)

Rheum nobile. (Polygonaceae.) 39050. Seeds of wild rhubarb from Darjeeling, India. "A handsome herbaceous plant, with a stem three to four feet high and as thick as the wrist at the base. It is found in the inner ranges of the Sikkim Himalaya at altitudes between 13000 and 15000 feet. The root resembles that of the medicinal rhubarb but is spongy and inert. The acid stems are eaten raw and boiled and the dried leaves afford a substitute for tobacco."

Rhododendron spp. (Ericaceae.) 39051-068. Seeds of eighteen Himalayan rhododendrons from Darjeeling, India. *R. campylocarpum* and *R. dalhousiae*, considered as among the most beautiful and interesting of the Himalayan forms, *R. anthopogon* and *R. lepidotum*, two species used in Indian medicine, and the rare yellow-flowered *R. wightii* are among the lot.

Saxifraga purpurascens. (Saxifragaceae.) 39074. Seeds of a saxifrage from Darjeeling, India. "This beautiful and hardy species comes from the temperate regions of the Sikkim Himalaya, where it was discovered growing in wet

places at an elevation of from 10000 to 14000 feet. Though closely allied to the Himalayan *S. ligulata* and the Siberian *S. crassifolia*, it is extremely different from, and far more beautiful than either of those species. Nothing indeed can exceed the bright glossy green of the leaves which are elegantly margined with red, or the deep, bright, vinous, red-purple of its scape and inflorescence." (Curtis's Botanical Magazine, pl. 5066.)

Sorbus spp. (Malaceae.) 39133-135. Seeds from Darjeeling, India. Three species, all native of the higher Himalayas, and one with small edible fruit. May be of value for stocks for other malaceous fruits.

Vaccinium glauco-album. (Vacciniaceae.) 39141. Seeds from Darjeeling, India. A shrub with large white persistent bracts under the pinkish flowers which are borne in dense racemes, found on the slopes of the Himalayas at an elevation of from 7500 to 10000 feet, from Sikkim to Bhotan.

NOTES FROM CORRESPONDENTS ABROAD.

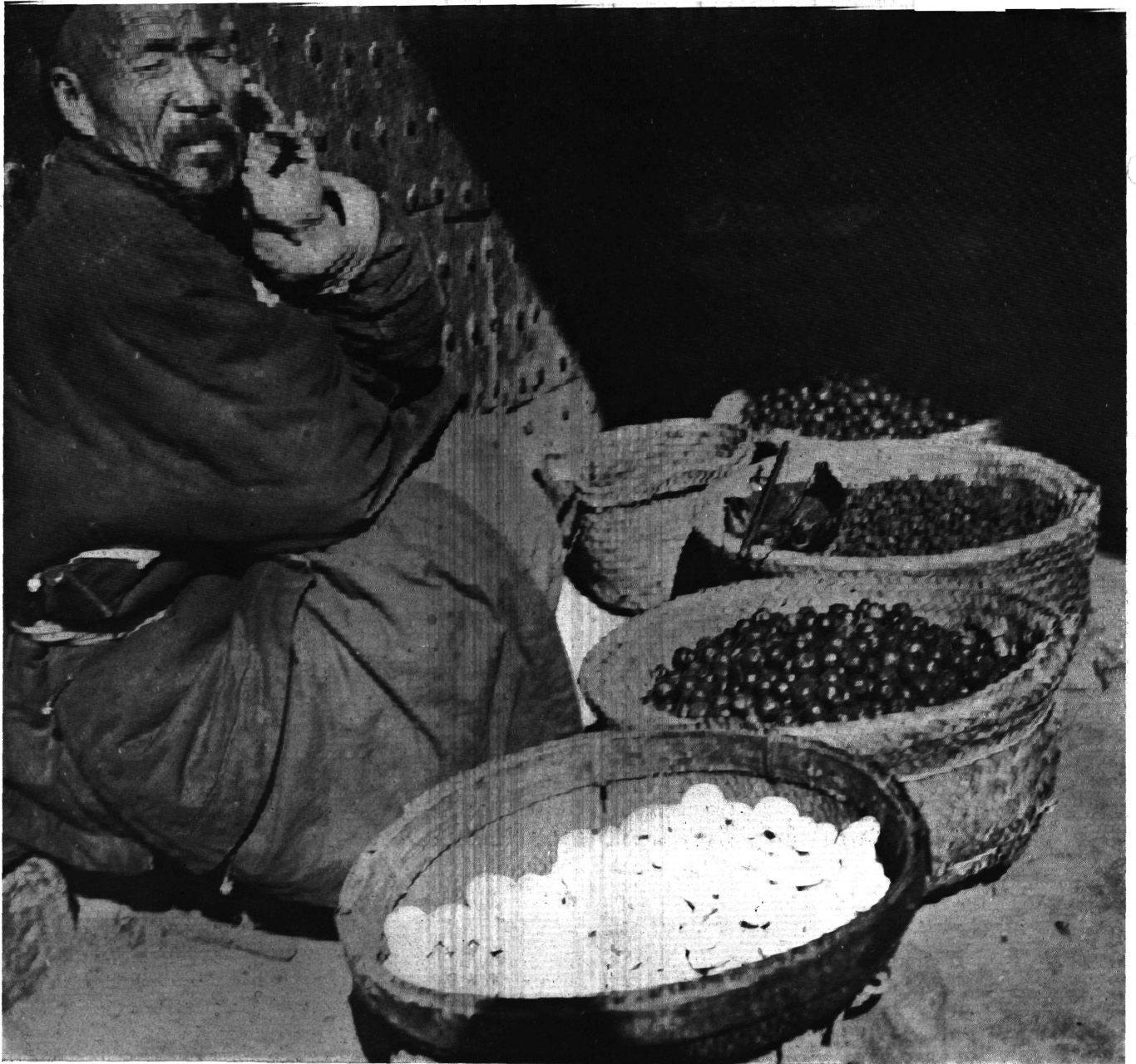
Frank N. Meyer, Agricultural Explorer, writes from Ping yang fu, Shansi, China, August 1, 1914: "It is about one month ago since I wrote you last and so far as real distance is concerned I have not advanced much, but we went over some very interesting territory and I was lucky to discover the *real wild peach*, growing in loess ravines some 2-3 days to the East from here, near a village called *Tchao yu*. The plants are of smaller dimensions than our cultivated strains and the stones are somewhat different as regards shape and grooves, but still on the whole there is little difference between a very poor seedling peach and this wild one.

These wild peaches are locally cut for firewood, for the fruits are pretty near inedible, being small and having hard, sourish flesh. They grow at the edges of deep loose ravines and on the steep, sloping bottoms of such ravines, in company with such plants as *Pyrus betulæfolia*, *Hippophae rhamnoides*, *Prunus armeniaca*, *Prunus bungei*, *Xanthoceras sorbifolia*, *Syringa oblata*, *Ziziphus sativa*, *Celtis sinensis*, *Elaeagnus multiflora*. All of these plants are very drought-resistant and do well in semi-arid regions. The Chinese locally do not call this peach "yeh tao or "shan tao" but "mao tao," meaning "hairy peach." In the vicinity where they grow, no peaches are cultivated, although half a day's journey lower down, one meets with some poor looking trees in gardens.



Bamboo Shop, Sianfu, China.

A bamboo shop on one of the main streets of Sianfu, Shensi, China, making an exhibit of its various wares. Americans have as a rule no conception of the handiness of bamboo timber for the manufacture of many small articles useful around a country home. Such a shop as the above illustrates some of the uses which are made by the Chinese of this peculiar hollow timber. Photo by Mr. Frank N. Meyer, January 18, 1914.



A Fruit Merchant at Tai an fu, Shantung, China.

A fruit merchant sitting at one of the city gates of Tai an fu, selling the fruit of a species of haw (*Crataegus pinnatifida*) of which orchards are often planted in Shantung, China. From these haws one of the best preserves of China is made. The tree has proven hardy in the Eastern United States where it has been distributed. The haws are in the second basket whereas dried persimmons are in the first one. Photo by Mr. Frank N. Meyer, March 20, 1914.

The elevation I found them was almost exactly 4000 feet a. s. I gathered some fruits, but they are not quite ripe: I am trying to ripen them off, however, so that we may obtain at least a few ripe seeds. As a stock however it has not the value the *dauriana* peach has, not being as vigorous and apparently being attacked by the same pests that infest cultivated peaches. This "find" is of great interest however, showing that wild peaches exist much nearer the coast than we suspected and that the peach naturally is a native of semi-arid regions. Whether China is the real home or whether it is only one of the homes of the peach is a question we cannot solve as yet. Will it prove to be that the peach occurs also in Persia and Afghanistan, like the walnut, which is found wild in the Caucasus, Persia, Western China and N. E. China?

There are some more plants occurring here in North Eastern China, which are found also on the other side of the Continent, like the Apricot, *Diospyros lotus* (Crimea, Caucasus, India, etc.), *Ziziphus sativa* (North Africa and North China), *Buxus sempervirens* (Western Caucasus and Western Hupeh), *Nelumbium speciosum* (Lake Hanka, E. Siberia and Caspian Sea, at mouth of Volga), and on this last trip I have found so much real wild alfalfa on the whole way from Lin hsien in Honan, almost up to this place here and in such out-of-the-way places and so utterly out of reach of men and of animals and often in company with other medicagos, like *M. lupulina*, that we safely can say that the common crawling and spreading strain of *Medicago sativa* is a real native of this country. The tall, upright form might have been brought from Central Asia, no doubt, as is stated in Chinese chronicles.

We have had some very hard days on that whole trip from Changte fu, over Lin hsien, and Luanfu to here (Ping yang fu), for the whole country, with a few exceptions, is very mountainous and most of our travel had to be done with packmules and the heat!--Great Scott!--All of our candles are molten together and the sealing wax inside of a small case, within one of my trunks, had fraternized with leadpencils and rubber bands, and the whole thing has become one fantastically looking mass. The alcohol in an iron tin, which is inside a wooden case, became heated, and we had to let the gas pass off to prevent an explosion. Now however I find that this alcohol has been reduced considerably in volume and worse yet it has no strength anymore. The fruit I had in the tin, as peaches, plums, apricots, etc., have all become dissolved and only the stones and some pieces of skin are left on the bottom.

I conclude, therefore, that in the heat of the summer one cannot carry fruits in alcohol with one. This winter I'll try it again.

We had been warned in Luanfu to be very careful, for there was a band of 35 to 40 robbers on the road; well, of course, we carried our firearms all of the time, but luckily we had no encounter and all we saw was a human head hanging in a little wooden cage, hanging in a wild apricot tree along the roadside and grinning at us with its white teeth, showing partly through the dried-up blackened skin. Beneath the cage there dangled a wooden tablet with the man's name on it, as a warning to other evil-minded mortals.

The whole thing didn't impress us much, for we were passing through a wild and lonely landscape; rugged mountains everywhere and wild apricot trees in full fruit and the five soldiers we had with us a convoy over the bad place and we ourselves also, we would have liked to see some robbers come up and test our strength. As nobody came however, we turned to the wild apricots, but they were not good enough to satisfy our tastes or quench our thirst.

As you may imagine the stopping places we halted or spent the night at were often the "limit". And oh, those fleas by night and the flies by day! Really, I cannot find any good uses for both these pests in the curriculum of our earth. We also had great difficulty in obtaining sufficient nourishing food. As you know, in summer the Chinese eat exceedingly little meat, and the main food is noodles, from wheaten flour and bird's seed; well a white man cannot derive sufficient strength from such a diet and one does not wish to deplete one's supply of canned goods too rapidly when on such a long trip as this.

My new interpreter and the new coolie are holding out fairly well. The interpreter is by far not as clever as the former one. He is more of an office man; with some training however, we may be able to transform him a bit. Yesterday morning the two were given a beating by some villagers some 10 lis from here and now we are negotiating with the local magistrate to have this beating business returned to the proper parties. I suppose we will be successful at it. So many things here in old China go differently from what they do in other lands!

Now as to my plans. Within a few days I hope to be on the road to Wen hsien and Pai hsiang chen to the South of here, then back to Chiang chou and along the Fen river to the Hoang Ho; by ferry across it and then over Tung kwang to Sianfu. From there on S. W. Shensi and to Kansu for Potanin's wild peaches.

I have collected quite a stack already of herbarium material and as time goes on this will increase many fold these coming months. If it now soon will turn cooler then everything will be all right.