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PLANS AND UTILIZATION OF CHINA'S TIMBER INDUSTRY, 1951

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(A Collection of Essays on Forestry in China),
Peiping, 1 Oct 1952, pp 241-312

/Summary: This report deals with practices and policies in the Chinese lumber industry, particularly in the Northeast, 1949 - 1951. It covers timber production in general, methods and faults of production, production quotas, transportation, utilization, and problems of supply and demand.

Data on rubber-bearing plants and on bamboo plants is appended./

Misuse of Forests in 1950

Especially in the newly liberated areas, wasteful cutting and inordinate buying by government agencies and private companies has wasted resources, disturbed prices, and resulted in exhorbitant profits for opportunists, over-stockpiling by agencies (in the Northeast 700,000 cubic meters of timber is still found in inventories), reduced the turnover of capital, and interfered with economic reconstruction. Many agencies are using the best timber for secondary purposes or unnecessarily cutting large-size timber into small sizes.

In 1950, too many government agencies demanded only red pine and rejected deciduous lumber. They used such pine for temporary structures or for firewood. These practices call for centralized planning and control.

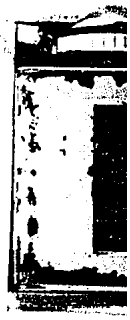
During 1950, only 26 percent of lumbering was done in the best way, namely complete ownership of production facilities and control of a stable permanent labor force by the /government/ lumber production agencies. Thirty percent of production was carried on by the less effective method of calling out peasants under local leadership for temporary service during the slack season. Forty percent of the 1950 production was carried out by contracting with groups of local peasants organized under the leadership of local cadres. This method is even more unsatisfactory than the second.

On the other hand, reducing the stump height from 70 centimeters to 30 centimeters saved 250,000 cubic meters of timber. The practice became quite general. In some areas all top material 6 centimeters or more in diameter was utilized. This, while not carried out generally, saved 50,000 cubic meters of timber. Full utilization could save 120,000 cubic meters.

Outstanding weaknesses of the 1950 program were, slow planning, poor surveying, failure to reach the goal on special timber, [illegible] loss of men and animals through accidents, and poor labor organization. A permanent labor force must be developed. Dependence on temporary labor from the cities or farms is no longer feasible, nor should the labor force be moved [illegible] from one lumbering area to another.

Forestry Production, 1949 - 1950

From November 1949 to early March 1950, production exceeded goal by 5.1 percent. Some 128,226 peasants and [illegible] were employed in felling the timber to the central collection yards.



Problems of 1951 Timber Production and Distributions

Production goals for 1951 in various regions, in terms of percentage of the national total, were as follows:

Region	Percentage
Northeast	65.9
Inner Mongolia	6.9
Central - South China	14.5
Southwest	2.5
Northwest and Sinkiang	negligible

The Northwest is a timber short area, the Southwest can provide only for its own needs, but the Northeast and Inner Mongolia have some surplus above their own needs. Hence, only 37.2 percent of production is available to the Central People's Government for controlled distribution.

Current requests to the government from industry, mining, communications, and commercial agencies amount to 131 percent of the amount at the disposal of the Central People's Government. This means reducing the timber provided for all consumers in 1951.

The 1951 production goal was less than the 1950 goal, but the work of cleaning up the forests was added. However, because of better operational methods, 13,755 fewer men and 11,273 fewer animals were employed. There was thus a great saving in labor costs and better control with 70 percent less loss by accidents.

In 1951, most of the production was carried out directly by labor hired and animals owned by the production agencies. Diet and living conditions for the workers were greatly improved in 1951. Medical facilities were stepped up. Much advance was made in saving timber by using dead timber and commercially less valuable timber for camp constructions and fuel purposes.

Timber Transport by Railways

In 1949, there were 1,137 kilometers of main line railways and 302 kilometers of sidings in use for the transportation of timber. In 1950, there was a net gain of 226 kilometers of main lines and of 67 kilometers of sidings for a total addition of 293 kilometers. In 1950, 708,012 ties were replaced with new ones (20 percent of the total). In addition 242,580 cubic meters of ballast rock was added permitting speeds up to 14 kilometers, a 30 percent increase over 1949.

The matter of extending the useful life of railway ties is very important in the present program of efficient timber utilization. The following table shows the replacement rate for railway ties in 1937 on several main rail lines.

Line	Kilometrage	Ties in Use	Ho Replaced	Percent
Ching-P'u	1,009	1,724,798	179,130	10
Lung-Hai	1,382	1,354,791	149,040	11
Ching-Han	1,218	1,912,701	178,565	9
Ao-Han	1,9[illegible]	1,756,000	378,120	21

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As an example of the possibilities of using timber according to climatic conditions; ordinary tie timber produced in other areas lasts about 6 years on the Canton-Hankou Railway whereas timber produced in western Hunan and Kweichow will last over 20 years.

Water Transport of Forests Products

In 1949, water transport required 1.9 man-days per cubic meter. The season was from mid-April to the end of October. During this period only 77 percent of the work was completed and the timber loss was 7 percent. In 1950, the season was from mid-March [the Soviet method of early ice breaking was employed to advance the start of the season] to mid-August. The whole job was finished in this period. Timber loss was only 3 percent. Labor mounted to 1.2 man-days per cubic meter, 0.8 man-days below the goal. The chief credit for the improvement in 1950 is due to the use of advanced Soviet techniques of taking advantage of the best rafting season.

Proper Cutting and Utilization of Forests

Fifty-two percent of the nation's timber area is in the Northeast with three fifths of the reserves. Of the reserves in the Northeast, 58 percent are needle-leaf types and 42 percent are broad-leaf types. The timber of the Northeast is the most suitable for industrial, mining, transport, and construction purposes. Hence it is a great treasure. If a proper balance can be maintained between growth and exploitation ample supplies for China's national reconstruction program will be available.

Suggested methods for improvement are:

1. Low Stumps

Stumps no higher than 30 centimeters are now being left. According to the best practice now being followed the stumps average about 20 centimeters. This has already resulted in a saving of 25,000 cubic meters of timber. The 20-centimeter average has now been established as the standard requirement in the Northeast.

2. Utilization of Top Wood

The Northeast Bureau of Forestry Affairs has decreed that all top wood over 6 centimeters in diameter shall be utilized. [illegible] this policy has already resulted in an annual saving of 10,000 cubic meters. By complete application, 70,000 cubic meters more could be recovered. This small top wood can be used for mine timbers, and in the [illegible] fields. Its use will reduce the cutting of small pole timber.

3. Selection of Seed Trees

The forestry authorities in the Northeast have decreed that [illegible] selected healthy seed trees [illegible] per hectare [illegible] juvenation of the forests. In the Greater [illegible] 15 per hectare. Furthermore, the selection [illegible] trained foresters rather than [illegible].

4. Selective Logging According to [illegible]

To meet the future timber needs [illegible] adopt the scientific practice of selective [illegible] development and harvest them by [illegible].

possible at present because of urgent timber needs it should be the goal. The Northeast forestry authorities are already planning to initiate the plan on an experimental scale right away. Study must also be given to substitution of poplar, willow, and other less desirable types for more valuable types wherever possible.

5. Timber Utilization

Timber utilization must be based on scientific and economic principles. Boles should be used for long timber, upper parts for railway ties, and top wood for mine timbers. Only white pine, deciduous pine, and fragrant pine should be used for rail ties. Red pine and other harder woods should be reserved for important construction materials. White pine should no longer be used as it now is in the Northeast for pulp wood.

6. Cleaning Up Cut-Over Land

Scientific practice in lumbering requires proper cleaning up after logging operations, particularly to prevent forest fires.

Long-Range Provision for Timber Supply

Timber is as important as steel and cement to China's long-range reconstruction program. Hence, the government considers its proper production and utilization as of prime importance.

1. Basic Supply Situation

Under the old system of imperialist control of Chinese markets whoever had money could buy foreign fir which was preferred because of its superior quality. The new people's China cannot be tied by so much as a thread to the imperialist economy, hence must plan for self-sufficiency in timber resources. While 30 percent of the area of a nation in forests with a proper distribution is the minimum for self-sufficiency for any country, China's timber resources cover only 5 percent of her area. Furthermore, most of this small amount is extremely inaccessible which makes its exploitation very expensive and difficult. Hence, the problem of sufficient timber supply is very acute and calls for heroic measures to correct the situation.

2. Significance of Consistent Lumbering

At present, especially where transport facilities are good, forestry areas are being blindly exploited with no thought for the future. Scientific exploitation calls for giving overexploited stands a period to recover under proper supervision, and for provision of transport facilities to make it possible to exploit less accessible areas. However, this must be done scientifically, leaving a sufficient number of seed trees to insure replenishing the forests. Cutting should be on the basis of taking out no more each year than can be reproduced in a year.

Timber consumers desire red pine, white pine, and deciduous pine in that order. However, nearly all natural Chinese forests have a mixture of all types. In the Northeast, at present, needle-leaf types constitute about 50 percent of all reserves, of which red pine constitutes only 9 percent. However, under present lumbering practices needle-leaf types constitute 74 percent of the total cut, of which 36 percent is red pine.

Continuation of this practice will soon deplete needle-leaf types, especially red pine, and leave the broad-leaf types still standing. Cutting ought to be on the basis of using all good timber as it comes, and should include clearing out dead and partially decayed timber, leaving a sufficient number of the

very best types as seed trees. Although broad-leaf timber and toppings present problems in exploitation, consumers should realize the importance to the national economy of a long-range timber-growing program and not refuse these types.

Under present supply conditions it is necessary to suit the supply of timber to the importance of the need. The present national priority policy is, national needs, industrial needs, and commercial needs, in that order.

In 1950, of the timber output of the Northeast, 50 percent could be called third class. To find suitable use for it, it is necessary that centralized distribution control be exercised by the central and regional authorities.

3. Consistent Timber Utilization

Consistent utilization of timber calls for local and temporary needs to be subordinated to the over-all national requirements. For instance, the use of various hard woods is desirable in mining operations, but a wholesale use of these would deplete the supply in 5 years while a great amount of soft woods would be left to rot in the forests. Therefore, it is necessary for these soft woods to be used, even though they may not be as durable as the others, to even up the consumption of timber resources.

Less desirable timber, such as fragrant pine, fish-scale pine, and broad-leaf trees such as poplar and basswood should be used for construction purposes. To promote freer use of the less desirable timber by consumers a greater price differential than now exists should be established.

4. Lumbering for Essential Uses

With many production agencies the completion of production quotas is the prime objective without reference to the consumers' demands. This results in piling up of huge inventories of timber.

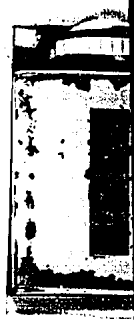
Heretofore, producers and consumers of timber have had too little understanding of each other's problems. Under the present austerity program of the Central People's Government the establishment of such liaison and mutual understanding is indispensable. Contracts with definite specifications should be employed so that production agencies can know how to meet consumers' requirements and exactly what to expect.

Coordination of Supply and Demand

The Northeast is the chief base of supply for the reconstruction of the nation's timber needs. During the last 2 years, the production agencies have been following government policies on quantities, types of trees, and types of timber. Why is the reconstruction program still suffering seriously from improper supplies? The main reason is a lack of coordination between supplies and consumers.

1. Producers and Consumers

As a result of efficient educational propaganda by forestry agencies, producers in the Northeast are now following government policies on cutting, and on providing for the proper replacement of forests. This has resulted in production of only about 10 percent of nonuniform materials. However, the forestry authorities have failed in educational propaganda directed toward consumers on the matter of austerity of consumption, and so consumers are dissatisfied with the products supplied. Consumers are much more particular in their specifications than they were in the past. Costs, quality, delivery schedules, and selection of timber types have all become live issues. Producers are not yet changing their production processes swiftly enough to meet these new demands. Correction here is definitely called for.



Because of lack of log-yard storage space and direct railway facilities, it is impossible to store up timber for an emergency. Consequently, it is necessary for all stages of the production process to move smoothly to prevent holding up important construction prospects.

Log storage yards were reduced in 1951 from 153 to 46 [sic] and mills from 34 to 28, but production was not adjusted to this change. Hence, conditions in the storage yards are chaotic due to lack of space and incompetent labor force. Better controls should be instituted in the storage yards.

Past lumbering operations have been largely small-scale seasonal operations. The present situation demands steady large-scale production. More comprehensive plans should be laid for providing adequate supplies well in advance of need. Furthermore, mechanization of production and transportation facilities should be provided as rapidly as possible to overcome dependence on seasonal factors.

2. Need for Organization and Planning

In 1950, after the lumbering season was past, the Ministry of Industry ordered 30,000 cubic meters of red pine and deciduous pine telephone poles, each 13 meters long, and 70,000 cubic meters of mine timbers, 6-10 centimeters in diameter. Naturally the order could not be filled. At the same time, there was a large quantity of ordinary mine timbers on hand. Orders cannot be filled readily on short notice. For instance, the rejection of white pine for railway ties by leading cadres of the Northeast railways and their demand for more than 80 percent red pine ties represents an impossible situation.

Many agencies, after presenting their requirements, fail to take delivery on time. The producers are not free to distribute the timber elsewhere; hence it backs up in storage yards and hinders deliveries to other consumers. The Lu-ta ship industry failed to take delivery of 10,000 cubic meters of boat timber, ready in December 1950, until June 1951. The Ministry of Light Industry failed to take delivery of 35,000 cubic meters of their first-quarter pulp-timber order on the pretext of budget shortage. According to figures compiled in July [1951], from April to June, 219 consumer agencies had failed to live up to their contracts in taking delivery.

The leaders of a great many consumer agencies make unreasonable demands as to type or quality of timber. They want red pine of great size and length or, as a concession, agree to take white pine or deciduous pine, refusing any mixture with other timber. Production of pine in 1950 was only 64 percent of the total timber production. There was no available surplus after meeting the minimum requirements for railway ties. The demands of consumers that fail to take into consideration the stumpage situation are patently unreasonable.

Many of the inspectors sent out by consumer agencies to take delivery are not acquainted with the timber business, and they do not follow the standard classifications set up by the government. They reject timber according to their own ideas. Inspectors should be thoroughly indoctrinated in the standard specifications.

Many consumers demand they be supplied only timber as it comes from the woods. At present, processing facilities are ample and a certain amount of processing before delivery could save 32,000 cars that are now required for transporting logs. Another factor making it necessary to transport logs is the lack of definite specifications by consumers. Consumers that fail to specify their needs carefully or are dilatory in doing so should be warned that they cannot be guaranteed delivery. Some consumers are continually revising their specifications; this

hinders production. In the future, except for a small number of consumers whose specifications are peculiarly complex, requiring them to do their own processing, a strict embargo should be placed on transporting unprocessed timber out of the production areas.

Signing and observance of contracts is a great aid in stabilizing supply activities. In 1950, a form contract was drawn up in the Northeast by a conference of forestry authorities and representatives of consumer agencies, after which the latter signed such contracts with the suppliers. Since then, the incidence of refusal to accept deliveries has dropped off greatly. Lack of cars for transport is now about the only cause for refusing to take delivery on time. Unless there is a contract signed by the Ministry of Industry, some large consumers quibble over various matters, so the necessity for firm contracts is very evident.

Since there are now over a hundred consumer agencies it is necessary for them to abide by the production system in force. This is especially true in dealing with the wages of crews loading cars. On one occasion, to expedite the loading of cars at Kirin City, the Coal Mining Bureau of the Ministry of Industry promised the workers double wages. When the work was done the representative claimed the log yard authorities refused to permit double pay; this aroused the wrath of the workers against the local authorities.

Determining Production Norms for Lumbermen

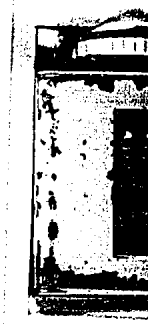
The formula for determining an over-all practical norm for timber cutting efficiency is:

$$\frac{\text{Stakhanovite Performance} + \text{Ordinary Average Performance}}{2}$$

The time for felling a tree, trimming, and cutting it into 5-meter lengths is as follows:

	Diameter (cm)	Time (minutes)
Cutting down	56	11
Cutting off 5 meters up	50	10
Cutting off 10 meters up	42	8
Cutting off 15 meters up	36	6
Cutting off 20 meters up	24	4
Trimming		6
Total time		45

	Timber Obtained	
Diameter (cm)	Length (meters)	Cu M of Timber
50	5	1.11
42	5	0.81
36	5	0.61
24	5	0.29
Total		2.82



Time used per cubic meter $\frac{45}{2.02}$ = 15.[illegible] minutes

The time schedule for cutting the same tree into 10-meter lengths is as follows:

	Diameter (cm)	Time (minutes)
Cutting down	56	11
First cut	42	8
Second cut	24	4
Trimming		6
Total		29

	Timber Obtained	
Diameter (cm)	Length (meters)	Cu M of Timber
42	10	1.80
24	10	0.70
Total		2.50

Time required per cubic meter $\frac{29}{2.50}$ = 11.6 minutes

The formula for determining the average daily output per man-day is: Hours worked per day divided by time consumed per cubic meter in felling and cutting up, equals output per man-day.

Progress of Production Controls in the Northeast

The forestry authorities of the Northeast have become very conscious of the importance of the wage scale in the processing timber. The Central Bureau of Forestry, in 1949, organized field teams of cadres to study the [illegible] a scientific wage scale in the various lumbering areas. Preliminary wage scales have now been set up on a piecework basis of so much pay per cubic meter of production provided quality standards are met. This plan has greatly stimulated the interest of the workers in higher production and [illegible] has simultaneously greatly reduced the problems of supervision.

The national standard is 4.5 cubic meters a day. Some workmen were able to double, triple, and even quadruple it, at the same time maintaining required standards of cutting stumps low and utilizing top [illegible]. The more timber produced the more he earns, while at the same time the [illegible] per unit to the nation's economy is reduced.

For example, at [illegible] monthly production of 1,250 cubic meters [illegible] At a monthly wage rate of 360,000 [illegible] tion of 1,250 cubic meters of timber would be [illegible] per man-day is stepped up 25 percent only ten men would be employed to produce the same amount of timber. If their monthly [illegible] total cost of producing 1,250 cubic meters of timber would be [illegible] as compared with 4,428,000 yuan before. The resulting saving could be used for reinvestment in the industry. Thus the [illegible] more.

APPENDIXES

1. Rubber Plants -- Resources For National Defense and Reconstruction

It is extremely important that new China develop domestic sources of rubber. The two types of rubber-bearing plants with possibilities of rapid development in China are the silver latex chrysanthemum (Compositae) and the perennial dandelion (Taraxacum kok-saghyz).

The latter was discovered by Soviet scientists in the Kazakn area adjoining Sinkiang in 1931. In 1950, the Central People's Government of China sent investigators to Chao-su Hsien, in Sinkiang, to look into the possibilities there. They brought back a quantity of seeds and roots from the T'e-k'o-su Ho valley. Research revealed that this plant is the same as that discovered by the Russians in 1931.

Beside this perennial dandelion and the Compositae, many other latex-producing plants in China are worthy of research. Out of about 2,000 plants with latex-producing possibilities only eight are of sufficient importance for research. They are:

1. Sang-hao, Moraceae
2. Tu-chung-k'o, Eucommiaceae
3. Ta-chi-k'o, Euphorbiaiceae
4. Wei-mao-k'o, Celastraceae
5. Shan-lan-k'o, Sapotaceae
6. Chia-chu-t'ao-k'o, Apocynaceae
7. Kuan-mo-k'o, Asclepiadaceae
8. Chu-k'o, Compositae

Types of rubber-bearing plants native to China are shown in the following table:

Name		Class (K'o)	Original Habitat	Nature	Type of Rubber Produced
	Taraxacum kok-saghyz*	Chü K'o		Grass	
Hsiung-chiao-ts'ao	Dichopsis micramtshana	Shan-lan K'o	Central Asia	Tree	Tu-chung-chiao
Tu-chung	Eucommia ulmoides*	Tu-ching K'o	China	Shrub	Tu-chung-chiao
Ta-hsien-jung	Ficus altissima	Sang K'o	China	Tree	--
Yeh-li	Ficus pumila	Sang K'o	China	Creeper	--
Ta-niu-nai-mo	Ficus species	Sang K'o	China	Tree	--
Hsiao-t ou-kuo	Gymnema species	Lo-ma K'o	China	Creeper	--
Ch'in-shih-[illegible]	Parabarium chunianum	Chi -chu-t'ao K'o	China	Creeper	--
Yuan-t'eng-ho[illegible]	Parabarium micranthum	Chi -chu-t'[illegible] K'o	China	Creeper	--
[illegible]	[illegible]barium species	Chi.-chu-t'[illegible] K'o	China	Creeper	--

[illegible] portant rubber plant already [illegible] gely cultivated.

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The plants indicated as growing in China are worthy of research. There are at present [1951] in Hainan some 600,000 Brazilian type rubber trees, of which 360,000 are in production. This is still insufficient for national needs. Culture of this tree in China is practicable only in Hainan and southwest Yuannan. With the exception of the mountainous interior the climate of all Hainan is suitable for culture of rubber trees. The soil may not be sufficiently fertile everywhere, but this can be overcome by proper fertilization.

In Yunnan, the Yu-li-ka'i Chiang and the Ta-yan Ho valleys west of K..-liang-kung Shan and the valley of the Lan-ts'ang Chiang (Mekong River) are the most promising areas for cultivation. Here conditions are even more favorable than in Hainan.

Yin-tu-jung (Fiscus elastica Rox. b) is grown for ornamental use in Szechwan, Kwangsi, Kwangtung, Yunnan, Fukien, and Hainan. The variety grown in the Chungking area has shown yields of rubber content of 19.6 to 21.4 percent of its milk, about equal to the content of that grown in eastern India. The same area in Yunnan in which the Brazilian rubber tree flourishes is also good for Fiscus elastica.

The Yin-se-hsiang-chiao-chu (Parthenium argentalum) is a small shrub native to altitudes of 4,000-7,000 feet in north central Mexico and southern United States. Plantings of this shrub yield from 240 pounds of rubber per acre when one year old to 2,400-2,700 pounds per acre when 10 years old. The most suitable places in China for growing this shrub are: Kwangtung, Kwangsi, Szechwan, Yunnan, Kweichow, and Sikang. Culture should be undertaken in these areas. In the Azerbaydzhan SSR of the Soviet Union 4-year old plantings are bearing around 600 pounds of rubber per acre.

Hsiang-chiao-ts'ao (Taraxacum kok-saghyz Rod), as discovered in Sinkiang, yields about 30 percent of its dry weight in rubber, hence it is economically profitable to develop. It is a perennial of the chrysanthemum family. It thrives in nonsaline soil, slightly alkaline and mixed with plenty of moist humus. It is easily cultivated and is highly resistant to [illegible] pests.

The native habitat of kok-saghyz is the T[illegible] Shan area at elevations of 1,800 to 2,000 meters, in 79 83 E, [illegible] N. [illegible] continental climate. In China the natural growth area is in Chao-su Hsien, Sinkiang, in the T'e-k'e-ssu Ho valley. Under good conditions, it produces [illegible] quintals of roots per hectare. A model grower in the Soviet Union in 1950 is reported to have produced 193-200 quintals per hectare. The latex yield is 3.7-5.79 percent of the weight of fresh roots. According to incomplete statistics, production of latex may run from 30 to 60 pounds per acre, the highest yields not more than 200 pounds.

Other rubber plants being given attention and experimentation in China are:

Lo-mo-t'eng (Cryprostegia grandiflora). A latex substance of good quality is produced from the stems and leaves of this plant, but extraction is difficult. It has not passed the experimental stage.

Castilla elastica and Castilla [illegible] are native to South America and second only to the Brazilian [illegible].

Euphorbia intisy is native to Madagascar. It has been introduced in some areas, but has not been cultivated in significant quantities.

Funtumia elastica and Funtumia latifolia are plants of small trees native to Africa. The latex quality is good. [illegible] and have run out in their native habitat.

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Many varities of Solidago of the chrysanthemum family are rubber producers. The rubber is in the leaves (the ratio of latex is 63 percent of dry weight). It has two drawbacks; the latex quality is poor, and quickly deteriorates on exposure to sunlight. It has not been much exploited.

The Scorzoneratau-/Ceratophorum/-saghyz, discovered in the USSR in 1929, yields from its roots 30 to 40 percent by dry weight of latex. It is, however, highly sensitive to diseases and insect pests. It is still in the experimental stage.

K'o-li-mu rubber grass (Taraxacum hybernum) is native to the Crimea. It produces 1-2 percent of latex from first-year roots and 5-8 percent from second-year roots, but it is very sensitive to cold and so has not had wide culture.

Pelagonium glutinosum grows in Malaya. It has to be cut down to secure the latex which is of the Tu-chung-chiao type particularly used for coverings for undersea cables. Lately a new variety has been developed with latex in the leaves.

Of the various types of latex-producing plants native to China, a number produce good quality latex but most are still in the wild state. If steps are taken to develop them, a decade hence they may become economically important. With the variety of climatic conditions found in China the cultivation of several varieties of rubber plants is feasible. A unified research program should be immediately set up and research and exploitation pushed vigorously.

2. Names and Uses of Varieties of Bamboo in Three Hsiens of Western Chekiang

Name	Local Names	Uses
Mao-chu	Mao-chu, Meng-chung-chu, Mao-t'ou-chu, Chiang-han-chu	Building timber, masts, pipes, strainers, rafts, carrying poles, paper pulp
Kang-chu	T'ai-chu, Huang-chu Kuei-t'ou-chu	Farm implements, furniture, fencing, mat shed [illegible]
Tan-chu	--	Clothes line [illegible], [illegible] traps, fans
Hou-chu	Hou-chu, Li-chu Yu-chu	Fencing, bamboo sprouts, cannot be split
Huang-ku-chu	Hung-kao-chu	Splints, [illegible] stretchers in tanneries
Shui-chu	--	Pulp, splints
Tsao-chu	Fu-chi-chu	[illegible], cannot be split
Ku-chu	--	[illegible]
Huang-chu	--	[illegible]
Tzu-chu	--	[illegible]
Jo-chu	--	[illegible]

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