

'wie, ähnlich, gleich'. — 1680: *ümidvār* (ümīdwār) 'spem habens, sperans, spe fultus' (Men. 429); 1838: *ümidvar* (umidvar) 'plein d'espérance' (Hind. 67); 1863: *ümidvar* (umidvar) 'qui espère' (Mall. I 118).

Zus.: 1680: *ümidvār etmek* (ümīdwār e.) 'spem facere' Men. 429). — 1680: *ümidvār olmak* (ümīdwār ol.) 'sperare, esse in spe' (Men. 428).

TOMASZ MARSZEWSKI

THE PROBLEM OF THE INTRODUCTION OF „PRIMITIVE” MAIZE INTO SOUTH-EAST ASIA

(Part II)

In the first part of that study (1975)¹ the present author having juxtaposed several botanical, linguistic and ethnogeographical data, advanced a tentative hypothesis aiming to throw some light on the very enigmatic and controversial question of the time, the place and the way of introduction into South-East Asia of some „primitive” forms of maize. He suggested namely:

1. that these forms could have been picked up in one or another sector of the pacific coast of the northern part of South America or southern part of Central America at an indefinite as yet time of the pre-Columbian era;

2. that it could have been done by some aboriginal sailors coming from the shores of the northern part of South Vietnam and belonging perhaps to the Cham or other akin people, who having succeeded on a difficult return voyage introduced these maizes into their homeland together with their appellations.

The author insisted also that all premises of that hypothesis must be subject to a rigorous verification through detailed and extended investigations.

In the present, second part of his study the author:

1. undertakes a more detailed confrontation of diverse categories of the botanical data concerning either „primitive” or some

¹ T. Marszewski, *The Problem of the Introduction of „Primitive” Maize into South-East Asia (Part I)*, „Folia Orientalia”, Vol. XVI, 1975, pp. 237—260.

„specific” Asiatic maizes with the earliest alleged testimonies of their cultivation to be found in the local written sources;

2. gives an ampler review of opinions by specialists and his own assumptions concerning the above mentioned questions.

It is the author's intention:

1. to approach gradually a more comprehensive elaboration of the investigated problem, non-existent so far, though preliminary tentatives or studies of the whole complexes of data have been done already by some specialists and by himself².

2. to carry on the inquiries which would allow to admit the most feasible *terminus ante quem* of the introduction of „primitive” maize forms into South-East Asia.

The evidence considered in that paper is limited to the northern periphery of that area and its western prolongation, i.e. South China and the Himalayan zone, from which, at the present stage of research, the most important data for the whole problem are derived. It is just in that belt that are grown the most puzzling races of the „Persian” type of maize, considered to be the „purest” or most „primitive” extant varieties of that crop; several races of the „Aegean” type of maize, supposed to be an adaptation of the former type to the less favourable climatical conditions and some forms of the waxy type of maize — we may call it „Chinese” or „Burmese” — being a specific mutant variety which has developed from certain of the above mentioned races. Inside that belt is lying the region in which has been found the only one, up till now signalled, alleged subfossil remains of maize in Asia. For that areas we have also the earliest and most numerous, indisputable or possible references to that crop, so far detected in the old Asiatic local sources.

BOTANICAL DATA

The taxonomical and phytogeographical data concerning the peculiar forms of maize cultivated in Asia began to be collected

² See: T. Marszewski, *The Age of Maize Cultivation in Asia (A Review of Hypotheses and New Ethnographical, Linguistic and Historical Data)*, „Folia Orientalia”, Vol. IV, 1963, pp. 243—295; idem, *The Age of Maize Cultivation in Asia (Further Investigations)*, „Folia Orientalia”, Vol. X, 1969, pp. 91—192; see also: note¹.

in a more systematic way and discussed more amply since the early years of the present century (Collins, Wagner, Kuleshov, Anderson, Mangelsdorf, Brown, Carter, Merrill, Sutô & Yoshida, Ono & Suzuki, T'ang Ch'i Lin, Dhawan, Vishnu-Mittre, Kupzow, Lu'u Trọng Nguyễn, Jain & Gupta etc.)³. Unfortunately, as regards the Far East and the Himalayan areas considered here, only for some regions of South China, Sikkim and Central Nepal they are more or less satisfactory, being obtained from scientific research which in some cases, however, did not go farther than preliminary investigations. For South-East Tibet, Arunachal, Bhutan, East and West Nepal etc., as far as it is known to the author, poorly surveyed or not at all investigated in that respect, only scanty information, coming from brief reports, occasional observations and even indirect testimonies, must be considered. The author should add that certain publications, giving that kind of data, were not available to him and possibly there are still some others which may contain them too.

As regards China, the successive studies⁴ dealing with diverse regions of that country have permitted to recognize approximately the share of the „primitive” and other forms of maize in the local agriculture. Thus, Collins (1909) was the first who described in detail the waxy corn, grown in the Shanghai region in East China;

³ See: Marszewski, *The Age of Maize...*, 1969, pp. 92—103; idem, *The Problem of the Introduction...*, pp. 238—246; *infra*.

⁴ G. Collins, *A New Type of Indian Corn from China*, U. S. Department of Agriculture, Bureau of Plant Industry, „Bulletin”, No 161, 1909, pp. 7—16, 24—25; N. N. Kuleshov, *Nekotorye osobennosti kukuryzy Azii*, BABGPB, Vol. XIX, 2, 1928, pp. 326—332, 336—341, 366—367; T. Sutô & Y. Yoshida, *Characteristics of the Oriental Maize*, in: H. Kihara (Editor), *SRJENH*, Vol. II, Kyoto 1956, pp. 377, 412, 463, 474, 493, 505, 509; T'ang Ch'i Lin, *Yü Mi*, Shanghai 1956 (not available to the author); A. J. Kupzow, *Histoire du maïs* (deuxième partie), „Journal de l'Agriculture tropicale et de Botanique appliquée”, Vol. XV, Nos 1—3, 1968, pp. 48, 49, 55—56; T. Chiba, *Mindaibunken ni arawareta Chûgoku no tômorokoshi*, „Aichi-daigaku Bungaku-ronshû”, No 36, March 1968, pp. 79—96; No 40, March 1969, pp. 1—22; idem, *Chûgoku ni okeru tômorokoshi no to sono chiriteki igi*, „Chirigaku-hyôron” (Geographical Review of Japan), Vol. 43, No 11, 1970, pp. 687—690; Lu'u Trọng Nguyễn, *Đặc điểm phân loại ngô*, in: *Một số kết quả nghiên cứu về Cây Ngô*, Tập I, Hà Nội 1972, pp. 195—203, 209, 211.

⁹ — Folia Orientalia, t. XIX

Kuleshov (1928) proved that it is cultivated even in the north of Manchuria and examined also some maizes from West China; Sutô and Yoshida (1956) in their comparative studies of the Asiatic maizes included twenty races from North China; T'ang Ch'i Lin (1956) has done a more comprehensive study on the spread and cultivation of the Chinese maizes; Kupzow (1968) in his history of maize dispersal inserted some remarks on certain of its types grown in China; Chiba (1968—1969, 1970) in his studies on the maize introduction into China tried to identify its races mentioned in the local sources from the Ming and Ching times; Lu'u Trọng Nguyên (1972) gave a somewhat more detailed review of maize varieties and races cultivated now in that country.

In the light of all these investigations it appears that:

1. The „Persian” type races — differing from each other in their various traits, the colour of grains (white, yellow, purple, violet) or stigma (white, scarlet) among them — now only spottily cultivated mostly in South and North-West China, in the 16thc. were widely cultivated, as attested by written sources (Chiba), in the southern (mainly in Yünnan) and possibly also in the central-eastern provinces of China, and were probably introduced into that country from beyond its south-western frontiers ⁵.

2. The „Aegean” type races, representing several very distinct forms, predominate now in China, particularly far off the sea shores ⁶;

3. The „Chinese” or „Burmese” type (waxy corn) races, differing mutually, among others, by the colour of their grains (white, yellow), cultivated now in Kwangsi, Chekiang and as far as Manchuria, have been suspected either having been introduced from Burma (Collins, Kuleshov, Kupzov) — possibly through the Yangtze valley (Kupzow) — or having evolved in Yünnan or Kwangsi (Lu'u Trọng Nguyên) ⁷.

4. The „Carribean” type forms, prevailing on the sea coasts

⁵ Chiba, *Mindaibunken...*, 1968, pp. 80—85, 92—94; 1969, p. 20; Lu'u Trọng Nguyên, *op. cit.*, p. 196.

⁶ Sutô & Yoshida, *op. cit.*, pp. 492, 493, 505, 509; Chiba, *Mindaibunken...*, 1968, pp. 84—85.

⁷ Kupzow, *op. cit.*, pp. 55—56, cf. pp. 53—54; Lu'u Trọng Nguyên, *op. cit.*, pp. 200—201.

of China, expanded into the interior, reaching Yünnan through Kweichow (Chiba) ⁸, and have intercrossed with the „Aegean” type maizes giving several hybrids (Yoshida) ⁹.

5. The great diversity of maize races differing from each other by their respective time of maturity, general habit, grain colour etc., attested by the local gazetteers — running since the late Ming up to the late Ching dynasty — for South and Central China, attained its extreme in Yünnan and Kweichow (Chiba) ¹⁰.

As concerns Tibet, strictly its southern zone to which maize cultivation is confined, the present author does not know any survey of its races, only brief reports or intermediary indications about some forms grown in certain regions of the south-eastern part of that country. So, if we consider trustworthy the traditions of Monba and Dafla from the Arunachal according to which they received maize from Tibet ¹¹, we may expect that similar races are or were cultivated on both sides of the Indo-Tibetan border. It is just the case with one large-seeded race (*kakung*) from Kameng which, as reported by Stonor ¹², was also an article of trade in the adjacent part of Tibet. Further, if we admit as reliable the Chinese testimonies of the 16thc., it seems that some small-grained races of the „Persian” type were grown at that time on the area including South-East T'bet and North Burma from where they might have been introduced into China ¹³.

For Arunachal (former NEFA, North Assam) a preliminary survey of maize forms grown by the mountaineers in some regions of Kameng (Monba, Aka), Subansiri (Apa Tani, Dafla), Siang (Padam, Minyong) and Lohit (certain groups of Mishmi) was done by Stonor ¹⁴. According to him all these peoples seem to cultivate

⁸ Chiba, *Mindaibunken...*, 1968, p. 92.

⁹ Sutô & Yoshida, *op. cit.*, pp. 492—495, 501—505.

¹⁰ Chiba, *Chûgoku...*, pp. 687, 688 and the map (fig. 1 on the p. 688).

¹¹ The author is greatly indebted for that information to Mr Shron Singh (Assist. Director of the Agriculture of NEFA), Shillong, March 24, 1960.

¹² C. R. Stonor and E. Anderson, *Maize among the Hill Peoples of Assam*, AMBG, Vol. 36, 1949, p. 371.

¹³ Cf. Chiba, *Mindaibunken...*, 1969, pp. 20—21, 22 (note 7).

¹⁴ Stonor & Anderson, *op. cit.*, pp. 368—372, 375.

only „coarser types” with large grains (e.g. a race with flint type golden-yellow or sometimes red kernels most willingly grown by Monba, Padam and Minyong) — maybe preferred for storage — and possibly had never grown the forms with several ears on a stalk and small grains. It seems, however, that only more comprehensive investigations would show whether that opinion, based on uncomplete data, was correct or not.

For Bhutan the detailed data concerning the local maize races are not known to the author and the general ones at his disposition are very scanty and fragmentary. Stonor reported¹⁵ only a form with large ears and yellow grains which „is said to be the most widely grown”. However, according to the information the present author received in Paiyung, a Bhutanese hamlet in the Darjeeling district near the Bhutan border, five races of maize grown there were introduced from that country, one of them (*dasum*) with small ears and yellow grains considered to be an early import¹⁶.

For Sikkim already Hooker (1854) reported¹⁷ a popcorn type with small grains, drooping panicle and occasionally hermaphrodite inflorescence, grown in the north of that country. Stonor remarked¹⁸, however, that we do not know whether that botanist „actually saw such plants or if he was recording from hearsay”. At present we may guess that this information most probably concerned the enigmatic maize forms (Sikkim Primitive 1 and 2) cultivated in some isolated pockets of Sikkim, at an altitude of ca 2100 m¹⁹. They have been recognized by Dhawan (1964) from the Indian Agricultural Research Institute who indicated that they exhibit „strikingly primitive features” and one of them

¹⁵ *Ibidem*, p. 372.

¹⁶ Information received from a group of Bhutanese farmers from Paiyung and Sakiung near Algorah (Darjeeling district, West Bengal), who were so kind to be the author's informants during his trip to the first of these localities, he undertook in November 10, 1960.

¹⁷ T. D. J. Hooker, *Himalayan Journals*, London 1854, Vol. I, p. 157.

¹⁸ Stonor & Anderson, *op. cit.*, pp. 372—373.

¹⁹ B. K. Mukherjee, N. P. Gupta, S. B. Singh and N. N. Singh, *Metroglyph Analysis of Indian and Exotic varieties of Maize*, „Euphytica”, 20, 1971, p. 117.

(SP 1) he has described²⁰. Later on, collections of samples of these maizes were supplied to that Institute by J. K. Thapa (Director of the Agriculture of Sikkim)²¹. They have been grown there, crossed and compared as to their morphology, cytology, genetic and physiology with some „primitive” forms from Colombia and Mexico as well as with certain advanced ones from India and North America. The results of these studies — undertaken chiefly by H. K. Jain and D. Gupta, but also by B. K. Bhat, N. L. Dhawan, N. R. Gupta, B. K. Mukherjee, K. R. Sarkar, N. N. Singh and S. R. Singh etc. — have been published in several papers (1964—1974). The most important observations are the following²². Both Sikkimese races under consideration are extremely late in maturity, give very low yield, have hermaphrodite inflorescence, reduced length of chromosomes and specific pattern of their knobs. Besides, they bear up to 6 ears on a stalk, their mean height is ca 105 cm (SP 1) and ca 93 cm (SP 2); the mean length of ear — 7,30 cm (SP 1) and 5,67 cm (SP 2); the mean pollen grain diameter — ca 66 μ (SP 1) and ca 79 μ (SP 2), while the compared American „primitive” forms have no more than 4 ears on a stalk, the mean height of the lowest of them, i.e. Nal-Tel (Yucatan 7), is 169 cm; the mean length of their ears varies from ca 10 to 12 cm and the mean pollen grain diameter in Palomero Toluqueño is ca 85 μ etc. Summing up, as regards the general habit and several characters (particularly the hermaphroditism) these two Sikkimese races (especially SP 1) resemble astonishingly

²⁰ N. L. Dhawan, *Primitive maize in Sikkim*, „Maize Genetic Cooperation News Letter”, 38, 1964, pp. 69—70.

²¹ D. Gupta and H. K. Jain, *Genetic Differentiation of two Himalayan varieties of Maize*, „Indian Journal of Genetics and Plant Breeding”, Vol. 33, No 3, November 1973, p. 414.

²² D. Gupta, *A cytogenetical Study of some Primitive and Evolved Types of Zea Mays* (A thesis unpublished), November 25, 1970, pp. 5; 8—10, 49, 93, 111—112, 138—139, 146—147, 153—154; Mukherjee, Gupta, Singh & Singh, *op. cit.*, p. 116; Gupta & Jain, *Genetic...*, pp. 403—407, 410—414; K. R. Sarkar, B. K. Mukherjee, D. Gupta and H. K. Jain, *Maize*, in: Sir J. Hutchinson (Editor), *ESWC. DCIS*, Cambridge University Press, 1974, pp. 122—123, 124. Cf. Addendum.

The author is very grateful and indebted to Dr Dwijendra Gupta for his kind permission to quote his unpublished thesis of 1970.

the progenitor of maize reconstructed by Mangelsdorf and are much closer to it than any of the Mexican (Nal-Tel (Yucatan 7), Palomero-Toluqueño, Chapalote) or Colombian (Pollo Segregaciones) races considered previously to be the most primitive known.

For Nepal, strictly for some regions of its central part, we have detailed data concerning the maize races grown there. A remarkable set of their samples collected (1952—1953) by S. Nakao of the Japan Himalayan Expedition near the foot of Manaslu, Annapurna, Ganesh Himal and Himalchuli²³ have been studied subsequently by T. Sutô, Y. Yoshida, T. Ono and H. Suzuki. Thus²⁴, typical races of the „Persian” type on the investigated area occur rather seldom. They have 1—2 well developed and 2—3 accessory ears, and small, predominantly light yellow, but sometimes also white, orange, purple or red grains, which are mostly flint, though the pop ones occur also, while in one of the races there is an admixture of waxy kernels. The forms ranged to the „Aegean” type, the majority of which represent various intermediates with the „Persian” type, belong to the most frequently cultivated. Besides, there are also some alleged hybrids between the „Persian” and the „Caribbean” type.

The palaeobotanical data so far discussed (in the publications available to the author) are confined to the north-western Kashmir and only to the alleged subfossil maize pollen from the deposits in the Haigam lake and from two mires (in Braman and Walanwar) on the northern slope of the Pir Panjal range²⁵.

²³ Sutô & Yoshida, *op. cit.*, pp. 376, 379—380, 508.

²⁴ Sutô & Yoshida, *op. cit.*, pp. 376, 399, 412, 422, 464—465, 474, 481, 490, 501—505, 507—509; T. Ono and H. Suzuki, *Chromosomes of Maize*, in: H. Kihara (Editor), *SRJENH*, Vol. II, Kyoto 1956, pp. 365, 371, 372.

²⁵ G. Singh, *A Preliminary Survey of the Post-Glacial Vegetational History of the Kashmir Valley*, „The Palaeobotanist”, Vol. 12, No 1, 1964, pp. 80, 89, 91, 106; Vishnu-Mittre and H. K. Gupta, *Pollen Morphological Studies of Some Primitive Varieties of Maize (Zea mays L.) with Remarks on the History of Maize in India*, „The Palaeobotanist”, Vol. 15, Nos 1—2, 1966, pp. 183—184; B. D. Sharma and Vishnu-Mittre, *Studies of Post-Glacial Vegetational History from the Kashmir Valley, 2. Baba Rishi and Yus Maidan*, „The Palaeobotanist”, Vol. 17, No 3, 1969, p. 243; Vishnu-Mittre, *Palaeobotanical evidence in India*, in: Sir J. Hutchinson (Editor), *ESWC. DCIS*, p. 22.

One should add, however, that diverse possible difficulties in a correct „interpretation” of such kind of findings have been discussed. Thus:

I. Several obstacles may rise on the way to an indisputable taxonomical identification and they will be drastic, if one considers only the size of the pollen grains which:

1. may be approximately the same in diverse plants²⁶ or result from a genetic variability inside the same taxon²⁷;

2. may depend on sediment conditions, environmental changes, the state of preservation of specimens and their treatment in laboratory examination²⁸.

So, for the identification of the pollen grains three interrelated methods are usually applied, in which diverse indices are considered. To such an investigation have been also submitted the most important specimens from the Haigam lake²⁹. Having thus in view that the lowest extreme size of these subfossil pollen grains is equal to *ca* 70 μ ³⁰, we may expect, it seems, that at least some primitive forms of maize might have been grown in that region.

II. The question arises sometimes whether the cereal pollen found in deposits reflects indeed the local set of crops and the actual extent of cultivation. Thus:

1. Though „cereal pollen grains are usually not disseminated

²⁶ The range of pollen grains diameter of primitive Indian maize (e.g. SP 1 having *ca* 66 μ) overlaps that of three Indian wild grasses (*Coix lacryma* Jobi L., *Bromus inermis* Leyss., *Phyllostachys bambusoides* Sieb. et Zucc.) — see: Vishnu-Mittre, *Cereal Versus non-cereal Grass Pollen and the Inference of Past Agriculture*, Trudy III Mezhdunarodnoy Palinologicheskoy Konferencii, S. S. S. R., Novosibirsk 1971, Leningrad 1973, pp. 26, 28.

²⁷ Vishnu-Mittre, *Cereal Versus...*, pp. 26, 28, 31; J. R. Rowley, *Identification of modern and fossil Maize Pollen*, „Grana Palynologica”, Vol. V, 1964, No 3, p. 406.

²⁸ E. S. Barghoorn, M. K. Wolfe and K. H. Clisby, *Fossil maize from the Valley of Mexico*, „Botanical Museum Leaflets, Harvard University”, Vol. 16, No 9, 1954, p. 238; Tsukada & Rowley, *op. cit.*, pp. 406, 410.

²⁹ Tsukada & Rowley, *op. cit.*, p. 406; Vishnu-Mittre & Gupta, *op. cit.*, pp. 179—181.

³⁰ Vishnu-Mittre & Gupta, *op. cit.*, p. 184.

over long distance", as indicated by Vishnu-Mittre and Guzder ³¹, in the case of the subfossil maize pollen from the Pir Panjal Range mires Singh ³² has not excluded that they were blown by the wind from a more or less distant place. As that possibility depends first of all on the size of the pollen grains, we may regard it more conceivable for some primitive forms of maize — to be expected just in the Kashmir mountains — than for the evolved ones;

2. Considering that cereal pollen grains are produced in comparatively small number ³³, their amount in deposits may not be adequate to the extent of cultivation of a given crop. So, as emphasized by Vishnu-Mittre ³⁴, in „modern surface samples and moss cushions in the Kashmir Valley, where maize is cultivated profusely, its pollen is rarely obtained". That fact reduces also, it seems, the chance of finding in deposits a subfossil maize pollen.

III. The dating of the subfossil or fossil pollen grains is frequently uncertain or vague, since:

1. an absolute chronology of the sediments in which they are found cannot be always determined;

2. the possibility of a contamination (stratigraphic, atmospheric or laboratory) ³⁵ cannot be always excluded.

As concerns the maize pollen from the Haigam lake sediments (assigned to the stage „e" and „f") Vishnu-Mittre and Gupta admitted first (1966) ³⁶ that they permit to suppose that „maize cultivation in Kashmir began in the thirteenth-fourteenth century" but they emphasized simultaneously that, their dating being indirect, it cannot be considered as quite sure. Later on, Vishnu-Mittre and Sharma assumed (1969) ³⁷ that the introduction of maize into the Kashmir Valley „cannot be considered more than four hundred years old". Recently, Vishnu-Mittre wrote (1974) ³⁸

³¹ Vishnu-Mittre & S. Guzder, *The Early Domestication of Plants in South and Southeast Asia — a critical Review*, „The Palaeobotanist", Vol. 22, No 2, 1973, October 1975, p. 84.

³² Singh, *A Preliminary...*, p. 106.

³³ Vishnu-Mittre & Guzder, *op. cit.*, p. 84.

³⁴ Vishnu-Mittre, *Cereal Versus...*, p. 25.

³⁵ Barghoorn, Wolfe & Clisby, *op. cit.*, p. 237.

³⁶ Vishnu-Mittre & Gupta, *op. cit.*, pp. 183—184.

³⁷ Sharma & Vishnu-Mittre, *op. cit.*, p. 243.

³⁸ Vishnu-Mittre, *Palaeobotanical...*, p. 22.

that „Pollen evidence from the Kashmir Valley is dated by conservative estimate to the fifteenth century A.D.". As regards the maize pollen from the Walanwar mire, Vishnu-Mittre and Gupta ³⁹ estimated that the sediment in which it was found (assigned to the stage „h") cannot be older than 200 to 300 years.

The discussed peculiar forms of maize from South China and the Himalayan zone along with similar ones from other regions of the East and South Asia have stimulated a vivid discussion, creating many controversies, on the time of their introduction into that part of the world. One should remark, however, that among the agriculturalists and botanists who have studied them in detail in respect to their morphology, genetics, physiology and distribution, almost all inclined to admit their pre-Columbian occurrence in some at least of the above mentioned regions. Thus:

Collins (1909, 1920) ⁴⁰ admitting as plausible that maize with waxy kernels to the neighbourhood of Shanghai was introduced from Upper Burma and considering that the present-day representatives of that type in both these regions do not resemble mutually in other traits, assumed that such a differentiation demanded a sufficiently long time. In this connection he emphasized also the importance of the investigation of maize varieties from the Himalayan regions. Besides, taking into account the Chinese testimonies of the 16th c. concerning maize introduction into China, he was even inclined to localize it in the pre-Columbian times, though he did not exclude also an early post-Columbian transfer.

Kuleshov (1928) ⁴¹ stressed the vast area of distribution of several distinctive traits of some Asiatic maizes as well as the fact that waxy form appeared in Upper Burma, a region of difficult access, from where it must have reached Philippines and North Manchuria. He found also that all this may suggest a remote time of maize introduction into Asia.

Anderson (1943, 1945, 1949, 1953) ⁴² considering a set of peculiar

³⁹ Vishnu-Mittre & Gupta, *op. cit.*, p. 183.

⁴⁰ Collins, *A New Type...*, pp. 20—25; idem, *Waxy Maize from Upper Burma*, „Science" N. S., Vol. 52, No 1333, July 16, 1920, p. 51.

⁴¹ Kuleshov, *op. cit.*, p. 367, cf., p. 374.

⁴² E. Anderson, *A Variety of Maize from the Rio Loa*, AMBG, Vol. 30, No. 4, November 1943, pp. 472, 475; idem, *What is Zea*

Asiatic maizes, but especially the popcorns grown spottily in the mountain zone stretching from the Aegean sea to the Pacific, thus also in some Himalayan regions (Nepal, Sikkim, North Assam), indicated that their nearest counterparts are testified to in South America for the pre-Inca times as the only type of maize on the western shore and for the present time in a few isolated places. The popcorn type (race A), in his opinion, was transferred plausibly across the Pacific either from or to Asia before the European colonization.

Mangelsdorf (1951)⁴³ expressed an opinion that the distinctive traits of some Asiatic forms of maize were overestimated as to their possible importance for the problem of the age of that crop in Asia. So, waxy maize could appear, according to him, in a short time as a result of the predominance of the recessive genes, of the predilection of some peoples to such type of maize and of the isolation in which they often cultivate that crop. As concerns the Asiatic popcorns, the lack of their prehistoric traces in the mountains speak for him against the supposition of their pre-Columbian occurrence in Asia, while an alleged lack of their present cultivation on the coasts does not favour it. He emphasized also together with Oliver that so far no evidence, botanical or other, is known, which would indicate such a possibility.

Sutô and Yoshida (1956)⁴⁴ pointed out the wide distribution of the „Persian” type maizes in the mountain solitudes of South Asia — thus among others in Tibet, Bhutan, Sikkim and Nepal — and the lack of traces of their cultivation in its coastal regions. Having in view that and other arguments they inclined to admit a pre-Columbian introduction of that type of maize into the Far East, though they agreed that in the present stage of research it cannot be asserted.

Mays? A Report of Progress, „Chronica Botanica”, Vol. 9, 1945, p. 90; Stonor & Anderson, *op. cit.*, pp. 355—356, 368—373, 385—395; E. Anderson and W. L. Brown, *The Popcorns of Turkey*, AMBG, Vol. 40, No 1, February 1953, p. 35.

⁴³ P. C. Mangelsdorf and D. L. Oliver, *Whence came Maize to Asia*, „Botanical Museum Leaflets, Harvard University”, Vol. 14, No 10, 1951, pp. 269—278, 288—289.

⁴⁴ Sutô & Yoshida, *op. cit.*, pp. 502, 503—504, 509.

Gupta and Jain (1970, 1971, 1973, 1974)⁴⁵ basing mainly their views on the cytogenetical data and pointing out the great difference in many important characters between the Sikkim primitive races of maize and the American forms of that crop — particularly the advances types, but also the primitive ones — suggested that the separation of the two groups must have taken place a long time ago, possibly in the pre-Columbian times. They assumed too that these Sikkimese races represented an earlier stage in maize evolution than its primitive races known from America.

Vishnu-Mittre and Gupta (1966)⁴⁶ considering the findings of the subfossil maize pollen from Kashmir and the alleged maize imprints on a pot-sherd from Madhya Pradesh as well as ten primitive maize forms from Assam, have admitted the possibility that this crop spread to India in the pre-Columbian times as a result of the transpacific contacts with South America. Later on, Vishnu-Mittre (1974)⁴⁷, basing mainly on the archaeobotanical findings from Madhya Pradesh and indicating also the distinctive maize forms grown by the aborigines in China, Tibet, Assam, Burma, Siam and particularly the „living fossil maize” from Sikkim, found all this to speak in favour of the pre-Columbian occurrence of that crop in Asia. Then, adding to his arguments the vernacular maize names, he inclined to admit that to India proper maize could have been introduced by the Arabs, but for the enigmatic maize forms from Sikkim and Assam he suspected another origin, at present unknown.

WRITTEN SOURCES DATA

The references to maize in the old Asiatic sources since long have been searched for and discussed⁴⁸. However, as concerns the Far East and the Himalayan countries, the testimonies that

⁴⁵ Gupta, *A Cytogenetical...*, pp. 147, 153—154; Gupta & Jain, *Genetic...*, pp. 410, 413—414; Sarkar, Mukherjee, Gupta & Jain, *op. cit.*, pp. 122—123.

⁴⁶ Vishnu-Mittre & Gupta, *op. cit.*, pp. 176, 181, 183, 184.

⁴⁷ Vishnu-Mittre, *Palaeobotanical...*, pp. 22—23, 28.

⁴⁸ See: Marszewski, *The Age of Maize...*, 1963, pp. 246—250, 257—262, 280—284, 290—291, 294—295; idem, *The Age of Maize...*, 1969, pp. 110—118, 176; *infra*.

have been considered (Bonafous, Hance & Mayers, de Candolle, Laufer, Wagner, Swingle, Mangelsdorf & Reeves, Humlum, Weatherwax, Merrill, Jeffreys, Ho Ping-ti, T'ang Ch'i Lin, Heine-Geldern, Amano, Chiba, etc.) were limited only or mainly to the Chinese ones. Quite neglected in that respect have been the Tibetan sources an inquiry of which has been postulated and initiated (Marszewski, Thapa) and on which the first obtained data have been discussed just recently (Kuznetsov, Kania). Similarly, the Nepalese testimonies, though known earlier, for the first time were involved into the investigated problem fourteen years ago (Marszewski). Finally, one should mention that not all publications discussing Chinese sources were available⁴⁹ to the author and that there may be some dealing with the testimonies concerning other regions.

As concerns China, the first record⁵⁰ to be considered here is that from *Yin shih hsü chih*, a work inserted in *Hsueh hai lei pien*, compiled by Ts'ao Jung (1613–1685), but assigned to Ku Ming⁵¹ (died ca the year 1373), a native of the Hai Ning district

⁴⁹ May I express here my sincere gratitude to Mr Tokimasa Sekiguchi, B. A., who was so good as to prepare for me, devoting much of his time and care, an exact translation (into English or Polish) of both papers of Prof. Tokuji Chiba (see: *supra* note 4) considered here as well as to Mr Yasuyuki Kobayashi, B. A. for being so kind to elaborate scrupulously and send me an English transcription (after Sir Thomas Wade's system) of all Chinese names and titles of works mentioned in the present paper.

⁵⁰ The earliest alleged testimonies of maize occurrence signalled so far, represent an ideogram to be found on a oracle bone from In-sü (An-yang) in Honan, a late Shang capital. Thus, as mentioned briefly in a work on the Chinese history edited by Shang Yüe (see: Szang Jüe (Editor), *Dzieje Chin — Zarys*, Warszawa 1960, p. 23) attempts were made at recognizing in that sign a symbol designating that plant. However, not in any of the papers known to the present author, published subsequently by the specialists — Chinese among them — discussing the problem of the time of maize introduction into China, that possibility has been considered at all. Furthermore, that unverified testimony seems rather doubtful (cf. Marszewski, *The Age of Maize...*, 1963, p. 294), if we compare its cultural and geographical context with that of the more plausible or even quite sure references to „primitive” maize forms in the much later Chinese sources.

⁵¹ Other English transcriptions of that name: Kia Ming, Chia Ming.

in Chekiang⁵². In that treatise is to be found namely a notice about 玉蜀黍 *yü shu shu* or 番麦 *fan mai*⁵³. Chiba, who has discussed that mention, was not convinced, however, that both these appellations denote necessarily maize in that context, though he did not seem to rule out such a possibility. In any case, he opposed the view of Amano according to whom a reference to 落花生 *lo hua shêng*, i.e. peanut — in Goodrich's opinion being probably an interpolation of the 17th c. (possibly done by Ts'ao Jung) — may prove that the mention about *yü shu shu* = 'maize', must be also a later addition. He pointed out that the reference to peanut formed here a quite new catch-word, while *yü shu shu* was mentioned at the end of the catch-word about millet⁵⁴. At present we may add new items to that question. So, as concerns peanut (*Arachis hypogaea* L.) — after the prevalent opinion introduced into South-East China in the post-Columbian times, i.e. in the early 16th c. (Ho Ping-ti) or early 17th c. (Goodrich)⁵⁵ — we should consider now its archaeological specimens found in two pre-Shang sites, one in Chekiang, another in Kiangsi⁵⁶. Having that in view, we are authorized to expect that plant being recorded in the early Chinese sources referring to these provinces, though, as emphasized by Goodrich⁵⁷, even the pre-1608 gazetteers of Chekiang, Fukien and Kwangtung he had an opportunity to examine „are all silent on the peanut”. Summing up, we should

⁵² L. G. Goodrich, *Early notices to the peanut in China*, „Monumenta Serica”, Vol. II, No 2, 1937, p. 409 (note 11); cf. Chiba, *Mindaibunken...*, 1968, p. 81.

⁵³ All Chinese phytonyms mentioned here are rendered in the transcription usually applied in the publications. According to Sir Thomas Wade's system *fan* = *pan*.

⁵⁴ Chiba, *Mindaibunken...*, 1968, pp. 80, 81 (note 4); Amano Motonosuke, *Chügoku Nôgyô-chi Kenkyû*, Tokyo 1962, p. 54; Goodrich, *op. cit.*, p. 409 (note 11).

⁵⁵ Ping-ti Ho, *The Introduction of American Food Plants into China*, „American Anthropologist”, Vol. 57, No 2, April 1955, pp. 195–196; Goodrich, *op. cit.*, p. 409.

⁵⁶ Kwang-chih Chang, *The Beginnings of Agriculture in the Far East*, „Antiquity”, Vol. 44, No 175, 1970, pp. 178, 179, 184; idem, *The Archaeology of Ancient China* (Revised and enlarged edition), New Haven and London 1971, p. 157.

⁵⁷ Goodrich, *op. cit.*, p. 409 (note 11).

not be astonished, it seems, if both these references from the *Yin shih hsü chih*, one concerning certainly the peanut, another a variety of millet or may be maize, appear to belong to the original version of that work.

The reference, which undoubtedly seems to concern maize and under some provision is considered by Chiba⁵⁸ to be the earliest so far known in Chinese literature, occurs in the pharmacopoeia *Tien nan pên ts'ao* of Lan Mao (1397—1476), where among the drugs described there 玉麦鬚 *yü mai hsü* (i.e. maize stigma) is mentioned, recommended for diverse diseases and pains. Lan Mao, born in Sung Ming chou in the region of Tali fu in Yünnan prefecture of the Yünnan province, was a scholar expert among others in the medicine and geography, and his main activity falls to the years 1435—1449. Unfortunately, the original of the *Tien nan pên ts'ao* is not preserved either in a manuscript or in printed form. At present two versions (*fang pên*) of that work, each of them with some variants, are known. One of them, considered to be the older, is represented for instance by a variant, bearing no date, published in 1914 in the *Yünnan ts'ung shu* series, edited by the Yünnan Library; the other, more recent — by a variant published in 1877 by the Wu-pên t'ang, an Editorial House of Kun Ming⁵⁹. In such a situation arose diverse, sometimes quite controversial, opinions about the date of composition and the authorship of *Tien nan pên ts'ao*, those quoted by Chiba⁶⁰, being the following ones. Thus, *Yün nan t'ung chih* (for 1821—1851) and *Kung Ming hsien chih* (for 1875—1908) indicated its variant with a foreword bearing the date 1634, and considered therefore that Lan Mao could not be the author of that pharmacopoeia. Then, Chao P'an in an introduction to the *Yün nan ts'ung shu* wrote (1913) that the older *fang pên* had some comments added by Liu Kan, whose time of life and origins are not known, while the new *fang pên* is chaotic and has interpolations. However,

⁵⁸ Chiba, *Mindaibunken...*, 1969, pp. 10, 18; idem, *Chügoku...*, p. 686.

⁵⁹ Chiba, *Mindaibunken...*, 1969, pp. 10—13.

⁶⁰ *Ibidem*, pp. 10—12.

already Wu Chi Hsün in his *Chih wu ming shih t'u kao* (1848)⁶¹ mentioned a variant of the older *fang pên*, bearing the date 1436, and considered it to represent the original version. Later on, Wu Nai Ch'a and Wu Lan Fu, after exposing some arguments, admitted⁶² (1957) that there is no reason to doubt Lan Mao's authorship of the discussed work. Having all this in view, Chiba⁶³ insisted on the necessity of a detailed inquiry aiming to solve the question, whether the passage concerning *yü mai hsü* belongs to the original work of Lan Mao or is a later interpolation. For that purpose he compared the old *fang pên* (named by him Ts-p) with the new one (named W-p) and found many differences, particularly apparent in the first part of the first volume. Thus, in the W-p version that part has drawings, detailed botanical descriptions, some catch-words and expressions not to be found at all in the Ts-p version. Besides, the Ts-p and W-p versions discord mutually in the internal arrangement and in some ideograms of the adnotations which, incidentally, are written in a language nearer to that current at the time of break between the Ming and Ching dynasties (which is particularly accentuated in the W-p) than the alleged original text. Finally, though in both versions the content of the catch-words is similar, their succession as well as the alternation of the qualities described in each, are different. Thus, W-p first mentions the character *sing*, and then the taste *wei* (in the first part of the first volume even only the latter) of the particular drugs, while in Ts-p the situation is reversed. For Chiba all these differences prove evidently that next to the original appeared the Ts-p version, then most of the W-p version and finally the first part of the first volume of the latter, representing an attempt at an elaboration according to more scientific methods. In any case, the original written by Lan Mao included in Chiba's opinion the description of the taste, and

⁶¹ After an edition of 1963 (see: Chiba, *Mindaibunken...*, 1969, pp. 20, 22 (note 6)).

⁶² See: Chiba, *Mindaibunken...*, 1969, p. 14 (note 3) after: Wu Nai Ch'a and Wu Lan Fu, *Tien nan pên ts'ao té Hsiao chéng yü Ch'u pu p'ing chia*, in: „I hüh shih yü Pao chien tsu tsu”, 1957, No 2.

⁶³ Chiba, *Mindaibunken...*, 1969, pp. 11—13, 15, 17—20.

character as well as some recommendations concerning the application of the particular drugs, while some supplements and comments have been added subsequently. In the present situation, he concluded, there is no reason therefore to consider the catch-word about the *yü mai hsü* — which is essentially the same in the Ts-p and W-p versions — as an interpolation. Thus, according to Chiba, it may be treated as a testimony of the occurrence of 玉麦 *yü mai* variety of maize in Yünnan in the 15th c., unless an argument will be found proving that it has been added later on.

The references to maize inserted in a few works written by certain eminent authors of the second half of the 16th c., up to recent times, were almost unanimously considered to be the earliest known in Chinese literature. Thus, even now and notwithstanding some alleged earlier mentions, they retain their great relevance to the discussed problem.

The first to be issued was *Liou Ch'ing jih cha* by T'ien I-hêng (born 1524)⁶⁴. He was a native of the Chien T'ang district in Chekiang and might have had an acquaintance with agriculture and the rustic life in general. His work, written plausibly, as supposed by Laufer⁶⁵, in the mid-16th c., was edited in 1573. From the passage⁶⁶ concerning maize we learn first that this crop had come to China from 西番 *Hsi fan*, that its former name was 番麦 *fan mai*, and that it has been named later on 御麦 *yü mai* on account of it being brought as tribute to the Chinese emperor. Further, come some details of its morphology, like resemblance in general habit to the panicle millet, the scarlet colour of the beards (i.e. stigma) and the white of the grains.

Next is *Hsio pu tsa shu* by Wang Shih-mou (died 1591). In that work published in 1587 we find a quite similar mention about maize, named 西番麦 *hsi fan mai*, which reference according to Laufer was obviously based on the T'ien I-hêng's relation⁶⁷

⁶⁴ Chiba, *Mindaibunken...*, 1968, pp. 79—81; W. T. Swingle, *Maize in China*, „Nature”, Vol. 133, No 3359, March 17, 1934, p. 420.

⁶⁵ B. Laufer, *The Introduction of Maize into Eastern Asia*, Congrès International des Américanistes, XV^e Session tenue à Québec en 1906, Québec 1907, Vol. I, p. 232.

⁶⁶ Chiba, *Mindaibunken...*, 1968, pp. 79—80; Laufer, *op. cit.*, pp. 232—233.

⁶⁷ Laufer, *op. cit.*, pp. 232—233; Swingle, *op. cit.*, p. 420.

Somewhat later was *Pên ts'ao kang mu* by Li Shih-chên (1518—1593). He was born in a village near the Ch'i town in Hupeh, in a family of physicians, being himself one of them. He had an outstanding knowledge of botany and pharmacology, based on a thorough acquaintance with the former Chinese literature in these domains as well as on his own travels and scientific explorations in diverse regions of China from Hopei up to Kiangsi. The above mentioned compendium was elaborated between 1552 and 1578, then supplemented in the succeeding years and first edited in 1596⁶⁸. In the passage concerning maize, named here 玉蜀黍 *yü shu shu*, we read that seeds of that crop were introduced from *Hsi t'u*, i.e. a western territory, and that in some traits it resembles sorgho, in some others job's tears, is about one meter high, has an ear similar to that of a kind of wheat, white or yellow grains and a sheat from which a white beard (i.e. stigma) grows out. To that text corresponds also a woodcut picture, said to be drawn by one of Li Shih-chên's sons⁶⁹.

For the interpretation of these three testimonies one of the most important question is the correct localization of the geographical designations they bring. In respect to the *Hsi fan* (or *Si fan*) country the opinions differed mutually to some extent. Thus⁷⁰, according to Mayers that term was applied to the present Inner Mongolia as well as a land bordering Szechuan and Kansu; Laufer considered it as adequate above all to the broadly conceived proper Tibet; Ho Ping-ti thought that as an ethnonym it

⁶⁸ Chang Hui-chien, *Li Shih-chên — Great Pharmacologist of Ancient China*, Peking 1960, pp. 1, 14—16, 19—22, 30—53, 57—60, 64, 67; Lu Gwei-djen, *China's greatest naturalist — Li Shih-chên*, „Actes du XI^e Congrès International d'Histoire des Sciences”, Varsovie — Toruń — Kielce — Cracovie, 24—31 Août 1965, Vol. V, Wrocław — Warszawa — Kraków, 1968, pp. 50—51, 53; Chiba, *Mindaibunken...*, 1969, p. 20.

⁶⁹ H. F. Hance and W. F. Mayers, *Introduction of Maize into China*, „The Pharmaceutical Journal and Transactions”, December 31, 1870, pp. 524—525; *Mindaibunken...*, 1968, pp. 83—84; Lu Gwei-djen, *op. cit.*, p. 53.

⁷⁰ Hance & Mayers, *op. cit.*, p. 523; Laufer, *op. cit.*, pp. 232—234, 249; Ping-ti Ho, *op. cit.*, pp. 194—195; Chiba, *Mindaibunken...*, 1968, pp. 82, 88, 90; 1969, p. 20.

designated the tribes from the western peripheries of China, stretching from Kansu to southwestern Szechuan, eastern Sikang and northern Yunnan; Chiba, taking into account the Ching-Hai (Kokonor) region, inclined to extend the meaning of that term to the whole East Tibet from Kansu up to Yunnan and even to the northern confines of Burma. As regards the term *Hsi t'u*, though certain authors, e.g. Mayers and Bretschneider, understood it as signifying „The lands beyond the Western Frontiers” and applied it to Central Asia, Laufer thought that it meant only „Western China” and concerned first Szechuan, then also a wider territory englobing Kansu and Yunnan⁷¹. As to the maize appellations etymologically related to these geographical designations, one should add that, as indicated by Chiba⁷², *fan mai* appears already in Ku Ming's work of the 14th c., *hsi fan mai* in the gazetteers *Ping Lien fu chih* of 1560 and *Yün nan fu chih* of 1696, while similar names are still to be found, for instance *fan ta mai* in Fukien and *fan shu* in Chekiang. In Chiba's opinion the basic variant *fan mai* was even widely current previously in the provinces south of Yangtze.

The problem arises also to what extent the diversity of maize appellations reflects the dialectical or vernacular differences, and to what the actual taxonomical differences between the particular varieties, subvarieties or races. As concerns the names *yü mai* from *Liou ch'ing jih cha* and *yü shu shu* from *Pên ts'ao kang mu*, according to Chiba⁷³ they both evidently denote the maize forms that may be ranged to the „Persian” type. However, the difference in the colour of maize stigma, as shown by the respective passages, proves for him that T'ien I-hêng and Li Shih-chên observed other forms of that type of maize. Besides, some details in the de-

⁷¹ W. F. Mayers, *Maize in China*, „Notes and Queries on China and Japan”, Vol. I, No 6, June 29, 1867; E. Bretschneider, *On the Study and Value of Chinese botanical works*, Foochow 1870, p. 18; Laufer, *op. cit.*, pp. 233—234.

⁷² Chiba, *Mindaibunken...*, 1968, pp. 80, 81 (note 2), 92; 1969, pp. 22 (note 7); cf. Laufer, *op. cit.*, p. 233.

⁷³ Chiba, *Mindaibunken...*, 1968, pp. 80—81, 83—84, 86 (note 5), 88, 95.

scription of maize given in the *Pên ts'ao kang mu*, in Chiba's opinion may suggest that it could represent a mutant waxy form. As to the woodcut, though, as Chiba remarked, it is not excellent, the irregularity of the rows of grains to be seen on it is one of the traits which, he emphasized, fits very well with the characteristics of the „Persian” type of maize. One should add here that Mangelsdorf and Reeves, basing also on the woodcut from one of the editions⁷⁴ of that pharmacopoeia, indicated⁷⁵ that it showed a maize greatly resembling the „homozygous form of pod corn”, while Sutô and Yoshida, considering the description given by Li Shih-chên, identified⁷⁶ it as „a kind of pod corn belonging to the Aegean type”.

Another category of Chinese sources taken into account in the search for the earliest references to maize are the gazetteers of the Ming dynasty. That has been done by Ho Ping-ti (1955), Mo Kuo-ting with his collaborators (1961), Amano (1962) and Chiba (1968—1969, 1970)⁷⁷. However, the scope and methodological approach of these investigations were not the same. Thus, Mo Kuo-ting and his team made the most comprehensive studies, Ho Ping-ti and Amano — more limited ones, Chiba — the most detailed inquiries of the copies preserved in the Japanese libraries. Then, if usually the investigators had deduced the time of introduction of a given crop into the discussed area from the date of the first reference to that plant in a local gazetteer, Chiba admitted that an isolated testimony, confined to a single area and not

⁷⁴ Most probably they might have seen one of the two editions considered by Mayers (Hance & Mayers, *op. cit.*, p. 524), in which the woodcut seems just to represent such a type of maize.

⁷⁵ R. C. Mangelsdorf and R. G. Reeves, *The Origin of Indian Corn and its Relatives*, „Bulletin. Texas Agricultural Experiment Station”, No 574, May 1939, p. 240.

⁷⁶ Sutô & Yoshida, *op. cit.*, p. 503.

⁷⁷ Ping-ti Ho, *op. cit.*, pp. 194, 199 (note 8); Mo Kuo-ting and Amano — see: Chiba, *Mindaibunken...*, 1968, p. 85 (note 2), 86, 91 (note 1); idem, *Chûgoku...*, p. 687 (note 11) (after: Mo Kuo-ting et al., *Wu ku shih hua*, Peking, 1961 and Amano Motonosuke, *Chûgoku Nôgyô-shi Kenkyû*, Tokyo 1962, pp. 53—58); Chiba, *Mindaibunken...*, 1968, pp. 86—94; idem, *Chûgoku...*, pp. 687—688.

supported by similar ones for the adjacent or not distant regions as well as not repeated in the later gazetteers of the same region, should not be considered as fully reliable ⁷⁸.

Mo Kuo-ting et al., as the earliest testimonies of maize occurrence in China signalled the references to be found in the *Anhwei hsing Ying chou chih*, a gazetteer of the Ying district of the Anhwei, published in 1516 and in the *Kwang hsi t'ung chih*, a general gazetteer of Kwangsi, edited in 1531. They indicated too, that in the light of the gazetteers studied by them, during the Ming dynasty maize became a farm product in Yünnan, Kwangsi, Kiangsi, Anhwei, Honan, Shensi, Shansi, Shantung, Hopei and Kansu ⁷⁹.

Ho Ping-ti, as the earliest reference to maize in the Chinese records considered the mention about 玉麦 *yü mai*, inserted in the *Kung hsien chih*, a gazetteer of the Kung district in western Honan, edited in 1555. As the next he indicated those from the *Tai fu chih* of 1563 and *Yün nan t'ung chih* of 1574, according to which maize was grown at that time in six prefectures of the western and northwestern Yünnan ⁸⁰.

Chiba incidentally mentioned a reference to 西番麦 *hsi fan mai* occurring in the *P'ing Lien fu chih* of 1560. However, as the earliest description of that crop among the most reliable ones, he had found in the gazetteers, he considered that which appears in the *Yün nan t'ung chih* of 1576, attesting 玉麦 *yü mai* cultivation for the prefectures of Ta li, Yüng Ch'ang, Meng Hua, Hao Ch'ing, Yao An and Ching Tung in Yünnan ⁸¹. On the other hand he pointed out ⁸² that this crop was not reported by the Ming period gazetteers of Szechuan, Hunan, Hupeh, Chekiang and Fukien. But he recalled simultaneously, that Chekiang was the

⁷⁸ Chiba, *Mindaibunken...*, 1968, p. 88; idem, *Chûgoku...*, pp. 686—687.

⁷⁹ Chiba, *Mindaibunken...*, 1968, pp. 83, 89; idem, *Chûgoku...*, p. 687 (note 11).

⁸⁰ Ping-ti Ho, *op. cit.*, pp. 194, 199 (note 8).

⁸¹ Chiba, *Mindaibunken...*, 1968, pp. 79—80; idem, *Chûgoku...*, p. 687 (note 15).

⁸² Chiba, *Mindaibunken...*, 1968, pp. 80, 81, 89, 90; idem, *Chûgoku...*, p. 687 (note 11).

home of Ku Ming (Hai Ning district) and T'ien I-hêng (Chien T'ang district), while Hupeh was that of Li Shih-chên (Ch'i district), whose works, as we know, include respectively a possible allusion to maize for the 14th c. (Ku Ming), and some references evidently concerning that crop for the 16th c. (T'ien I-hêng, Li Shih-chên). Thus, in Chiba's opinion ⁸³ there is a possibility that a small-scale cultivation of a crop could have not been noticed in the gazetteers, which might have been caused, he supposed, by the competition of other cultigens. More astonishing is, we may add here, the lack of references to maize in the Fukien gazetteers of the 16th c., since a rather extensive cultivation of that crop in the Chüan chou region in that province, was testified to in 1577 by a Spanish monk Martin de Herrada ⁸⁴.

As concerns the two above mentioned maize appellations occurring in the discussed here gazetteers of the Ming dynasty, the problem arises, as previously, whether they designate the same or a different variety. In this connection, Chiba ⁸⁵ has drawn attention to the fact, that in the *Yün nan fu chih* of 1696 玉麦 *yü mai* and 西番麦 *hsi fan mai* appear side by side, which according to him suggests that the varieties they denote might have had a different habit. Then, resorting for comparison to the later gazetteers, he indicated ⁸⁶ that in the *Ta Yao hsien chih* of 1845 and the *Hsü Yün nan t'ung chih kao*, edited in 1902, two forms of maize are described: 玉麦 *yü mai*, low, with several ears on a stalk, irregular rows of small grains, evidently representing the „Persian” type and 包穀 *pao ku* with a height surpassing two meters and ears in every internodes, belonging most probably to the „Carribean” type.

As concerns Tibet, the present author, following the indication he received in 1960 in Kalimpong from the lama G. Rigzin Vang Po, initiated (1963, 1969) ⁸⁷ a discussion about the possibility of a refer-

⁸³ Chiba, *Mindaibunken...*, 1968, p. 81.

⁸⁴ Laufer, *op. cit.*, p. 235.

⁸⁵ Chiba, *Mindaibunken...*, 1969, pp. 21, 22 (note 7).

⁸⁶ *Ibidem*, pp. 92—94.

⁸⁷ Marszewski, *The Age of Maize...*, 1963, p. 274; idem, *The Age of Maize...*, 1969, pp. 128, 129—130, 180.

ence to maize, to be found perhaps, under some provisions, in a version of the legend on the descent of the Tibetans, narrated in the *rGyal rabs gsal ba'i me long*. The time of the composition of that chronicle has been variously estimated. Thus⁸⁸, Laufer (1913), Thomas (1935) and Schulemann (1958) indicated the year 1328; Kuznetsov (1961, 1966) — ca 1368; Wang i nou ngan (1949, 1957) — 1388; Vostrikov (1936) considered that it took probably place in the mid-15th c.; Tucci (1949, 1950) and Stein (1962) — not before or in 1508. Its compilation has been also assigned to diverse authors, thus by Vostrikov to Legs-pa'i-ses-rab, while by Kuznetsov to Bsod-nams-rgyal-mtshan⁸⁹.

Thus, at the end of the seventh chapter of that chronicle⁹⁰ there occurs repeatedly a term *ma smos (rmos) pa'i lo thog*, which in identical or similar variants is attested for the modern times since Ladak through Central Tibet up to Khampa as a common appellation of maize. Having all this in view the present author suggested⁹¹ that the above mentioned term, appearing in the *rGyal rabs gsal ba'i me long* may also denote maize, but he insisted

⁸⁸ B. Laufer, *The application of the Tibetan sexagenary cycle*, „T'oung Pao", Vol. XIV, 1913, p. 588; F. W. Thomas, *Tibetan literary texts and documents concerning Chinese Turkestan*, Part I: *Literary Texts*, London 1935, p. 292; G. Schulemann, *Geschichte der Dalai-Lamas*, Leipzig 1958, p. 481; B. I. Kuznetsov, *Tibetskaya Letopis, Svetloye zercalo carskikh rodoslovnikov*, Foreword, translation and commentaries by B. I. Kuznetsov, Leningrad 1961, pp. 8—9; idem, *Rgyal Rabs Gsal Ba'i Me Long (The Clear Mirror of Royal Genealogies)*, Tibetan Text in Transliteration with an Introduction in English edited by B. I. Kuznetsov, Scripta Tibetana, Vol. I, editio J. W. de Joong, Leiden 1966, p. IX; Wang i nou ngan — see: V. A. Bogoslovskij, *Essai sur l'histoire du peuple tibétain ou la naissance d'une société de classes* (traduit du russe), Paris 1972, pp. 16, 418 (note 21); A. I. Vostrikov, *Tibetskaya istoricheskaya literatura*, Moskva 1962, p. 61; G. Tucci, *Tibetan Painted Scrolls*, Roma 1949, Vol. I, p. 141; idem, *The Tombs of the Tibetan Kings*, Roma 1950, p. 79; R. A. Stein, *La civilisation tibétaine*, Paris 1962, p. 258.

⁸⁹ Kuznetsov, *Rgyal Rabs...*, pp. VII—VIII; Vostrikov, *op. cit.*, p. 60.

⁹⁰ Kuznetsov, *Rgyal Rabs...*, pp. 44—45.

⁹¹ Marszewski, *The Age of Maize...*, 1969, pp. 130, 180—181.

simultaneously that it must be verified by tibetologists. That was done by Kania (1974)⁹² who, after analysing the whole context of the discussed passages as well as some other ones from the first chapter of the chronicle where similar expressions occur, denied such a possibility and admitted that *ma smos pa'i lo thog* „cannot mean here 'maize' nor any defined sort of cereals" but only „uncultivated crops" or 'fruits', 'crops (fruits) grown up without being sown [by the hand of man]". A similar opinion was expressed by Kuznetsov⁹³ according to whom that term in the context of the above mentioned chronicle means 'wild grains', i.e. grained crops, growing in a wild state without any human help, thus, above all rice. Kania⁹⁴ drew also attention to the fact that according to Waddell *ma rmos pa'i lo thog* tantamount to self-sprung crops in the traditional Tibetan images of the Universe, the Wheel of Life and Maṇḍala are usually represented by maize. That could have been the reason, he suggested further, that in course of time the general denomination of the 'self-sprung crops' was associated with, and shifted to maize. „A thorough research of Tibetan iconography — concluded Kania — would permit perhaps to establish, with a certain degree of accuracy, the epoch in which this semantic shift took place".

However, another possibility of a reference to maize in the seventh chapter of the *rGyal rabs gsal ba'i me long* has been also discussed. It arose in connection with the following phrase, relating how Avalokiteśvara granted the request of the monkey progenitor of the Tibetans:

*'phags pas yar bzengs te | nas | go | sran ma | bra'o | so ba rnams
ri rab kyi khong seng nas blangs te | sa la gtor bas | ...*⁹⁵

⁹² Ireneusz Kania, *The Seventh Chapter of the rGyal rabs gsal ba'i me long and a Problem of Tibetan etymology*, „Folia Orientalia", Vol. XV, 1974, p. 251 (text and note 14).

⁹³ The author is very thankful to Academic B. I. Kuznetsov for his opinion he kindly communicated him in his letters of December 28, 1972 and January 2, 1973.

⁹⁴ Kania, *op. cit.*, p. 252.

⁹⁵ Kuznetsov, *Rgyal Rabs...*, p. 44.

Kuznetsov (1968)⁹⁶ rendering in a free and abbreviated translation the content of that phrase (a full translation of the whole chapter had not yet been done at that time) wrote: „он встал, взял с горы Сумеру семена ячменя, пшеницы, кукурузы, бобовых и т. п. и бросил это на землю”. This has stimulated the present author to carry on further inquiries and consultations with the specialists. So, he addressed to Kania and Kuznetsov a new question, i.e. whether the word *so ba*, appearing as a crop name in the above quoted passage of the chronicle, cannot mean maize in that context. In support of this suggestion he indicated⁹⁷ that during his trip to Paiyung near Algorah, a locality lying to the north-east of Kalimpong, he was informed by a group of Bhutanese farmers inhabiting that hamlet (and the neighbouring village Sakiung) that among the five races of maize they cultivate there is one recently introduced from Bhutan, bearing a similar name i.e. *se bu*.

Kania who has just finished the first translation into English of the seventh chapter of the *rGyal rabs gsal ba'i me long*, the discussed passage concerning Avalokiteśvara translated as follows⁹⁸: „Afterwards he rose, and, having drawn from a cleft in the Mount Sumeru some seeds of barley, wheat, peas, buckwheat and thick-shelled barley threw them onto the earth”. However, in a comment to this translation⁹⁹, though following S. Ch. Das he rendered *so ba* by ‘thick-shelled barley’ he found that term as „far from being absolutely clear” and its meaning „subject to changes in function of time; and, perhaps, space (e.g. dialectical areas)”. Thus, after indicating that according to R. V. Semičov (et al.) it means ‘unhusked grain’ and according to E. Richter —

⁹⁶ B. I. Kuznetsov, *Tibetskaya legenda o proishozhdenii cheloveka ot obezyany*, „Doklady po Etnografii”, Wyp. 6, Geograficheskoye Obshchestvo SSSR, Otdeleniye Etnografii, Leningrad 1968, pp. 28, 30.

⁹⁷ Marszewski, *The Age of Maize...*, 1963, p. 273; idem, *Sprawozdanie z badań w Indiach Północno-Wschodnich w 1960 roku dotyczących problemu dawności uprawy kukurydzy w Azji*, „Etnografia Polska”, Vol. VIII, 1964, p. 350; Kania, *op. cit.*, p. 247; see also: *supra*, p. 132.

⁹⁸ Kania, *op. cit.*, p. 257.

⁹⁹ *Ibidem*, pp. 250—251, 251—252.

‘rye’¹⁰⁰, taking into account the author’s notation of *se bu* in a Bhutanese village, he considered as possible that in the discussed context *so ba* „can signify ‘maize’, if there is any question of maize whatever in a text dating from the 14th century”¹⁰¹. The main arguments advanced by Kania in support of this were as follows¹⁰²:

1. the Tibetan *so ba* (*so’a*) and the Bhutanese *se bu* seem to derive from the Tibetan *so* (‘tooth’), which might have been associated with the maize grains;

2. **so bu* or *so ba* may be the prototype of *se bu*, being an archaism, preserved on a peripheral area;

3. the grammatical — semantic relation of *so ba*: **so bu* (*se bu*), having several analogies, may represent a relation of a generic plant name to its produce.

In conclusion he wrote that *so ba* „could have been blurred on account of the phonetical development and polysemy in central areas” and may be for that reason replaced for instance by *ma rmos pa’i lo thog*.

Later on, the present author reexamining the data concerning the vernacular maize names collected by him in Paiyung (Darjeeling district), found information according to which in the local dialect *se bu*¹⁰³ means yellow and *ka bu* white, while the maize

¹⁰⁰ One may indicate here also, without however any further inferences that *soba* in Japanese means ‘buckwheat’ (see: *Sekai dai hyakka Jiten*, Tokyo (Heibonsha) 1966, Vol. XIV, p. 14).

¹⁰¹ In the *Blon poi bka t’ang*, the fifth part of the *Pad mai bka’ t’ang sde lnga* — a work after Tucci’s opinion compiled in 1347 (Tucci, *Tibetan Painted...*, Vol. I, pp. 112, 114; Vol. II, p. 713) — in a variant of the legend on the descent of Tibetans, we find a passage (see: Lhasa edition, Soto de Potala, Zol par Khang. Printed under XIIIth Dalai Lama in the year earth-ox, folio 68, line 5) which according to the transliteration of Prof. Ceshe J. S. Ati — who was so good to prepare it to the author (November 1974)) — runs as follows: „*Bra-wo, Yuns-dkar, so wa* [so *ba*, *so’a*] *zar-la-skyes*”. According to Mr I. Kania M. A., who was so kind to translate this passage on the author’s request (1975), *so ba* may have here also the same hypothetical meaning, as mentioned above.

¹⁰² Kania, *op. cit.*, pp. 250—251, 251—252 (text and note 15).

¹⁰³ It may be interesting to note that a toponym *Sebu-la* is attested for the North Sikkim (see: Fosco Maraini, *Tibet Secret*, (Arthaud) Paris—Grenoble 1958, pp. 54, 55).

races denoted by these appellations have the grains of just such colours, respectively. Thus, the question arose, which is the relation of these appellations to the Tibetan literary designations of these colours. Kania, to whom the author presented that problem, suggested ¹⁰⁴ a possibility that the forms *se bu* and *ka bu* are the result of the disappearance of the auslaut *r* and have a common etymology with the literary Tibetan *ser po* and *dkar po*, meaning, respectively, 'yellow' and 'white'. In that case *se bu* would not be, according to him, related with the Tibetan literary *so ba*. However, he indicated simultaneously that the above mentioned phonetic process has not been, as yet, indisputably attested for the less investigated south-eastern Tibetan dialects, to which the above referred Bhutanese dialect belongs.

Kuznetsov in his reply ¹⁰⁵ to the author's question took into account two names, i.e. *so ba* and *bra bo*, admitting that in the text of the *rGyal rabs gsal ba'i me long* they are to be translated respectively 'thick-shelled barley (?)' or 'millet (?)' and 'buckwheat'. He remarked, however, that as concerns the ancient and medieval Tibetan, though both words denote some grains, it is not quite clear which ones exactly. He did not exclude either that one of these appellations could have been applied by the Tibetans to maize and indicated that *so ba* could designate „a grain resembling by its shape the tooth”.

Then, having an opportunity to proceed with his inquiries in the Istituto Italiano per il Medio ed Estremo Oriente in Roma, the present author consulted in that matter Ceshe J. Sanghe Ati, a Tibetan scholar attached to that institution. According to his opinion ¹⁰⁶ the Tibetans have always designated by the word *so'a* (*so wa*, *so ba*) a variety of barley — rather not to be found in

¹⁰⁴ Mr I. Kania, M. A., has precised and kindly communicated that opinion to the author during two interviews (November 17 and December 30, 1976).

¹⁰⁵ The author is greatly indebted to Academic B. I. Kuznetsov for all information and remarks, he kindly inserted in his letter of December 28, 1972.

¹⁰⁶ The author is very thankful to Professor Ceshe JampSaal nghe Ati for all information and opinions, he kindly communicated to him personally (November 14 and 30, 1974).

Central Tibet, but in South Tibet near the border of Nepal and in East Tibet — differing from the more widespread variety called *nas* by its shorter and thicker ears and harder grains. Ceshe J. Sanghe Ati considered therefore that the only correct translation of *so ba* in the texts of the *rGyal rabs gsal ba'i me long* and the *Pad mai bka' t'ang sde lnga* is 'thick-shelled barley'.

Further data have been supplied by the pharmacopoeia of Jam-dpal-rdo-rje, a Mongol lay physician, who as supposed by Smith ¹⁰⁷ flourished probably at the beginning of the 19th c. That work has been compiled from several sources, some of them of the 18th c. and 17th c., some others even earlier. Thus, we find there an image of *so ba* — which leaves almost no doubt that it represents barley — and a short comment to it confirming such an identification and informing that the variety concerned has long ears and small spikelets. Along with it, three other varieties of barley (*nas*, *sred*, *khra ma*) ¹⁰⁸ are also represented ¹⁰⁹. One should add here that the occurrence of diverse species and varieties of barley in Tibet is attested by the botanists ¹¹⁰.

Having in view all these facts and opinions, the present author considers that the actual stage of investigations and prospects for further inquiries of the discussed problem may be presented as follows:

I. The exact meaning of the word *so ba* (*so wa*, *so'a*), appearing in the two variants of the legend on the descent of Tibetans, narrated respectively in the *rGyal rabs gsal ba'i me long* and the *Pad mai bka' t'ang sde lnga*, cannot be as yet settle indisputably.

¹⁰⁷ *An Illustrated Tibeto-Mongolian Materia Medica of Ayurveda of 'Jam-dpal-rdo-rje of Mongolia*, edited by Prof. Dr Lokesh Chandra from the Collection of His Holiness Z. D. Gomboev with a Foreword by E. Gene Smith, International Academy of Indian Culture, New Delhi 1971, pp. 1—2.

¹⁰⁸ The author is very much grateful to Mr I. Kania, M. A., for all these identifications and translations he was so kind to prepare for him (July 1976).

¹⁰⁹ *An Illustrated Tibeto-Mongolian...*, p. 16 (VII G, 1: a, c, d, (212); h (213)).

¹¹⁰ See for instance: S. Nakao, *Transmittance of Cultivated Plants through the Sino-Himalayan Route*, in: H. Kihara (Editor), *SRJENH*, Vol. III, Kyoto 1957, pp. 403—405, 413.

1. A possibility that it designates 'thick-shelled barley' seems to be plausible, if we lay stress on its present semantic value. That supposition is strengthened also by the testimony of the pharmacopoeia of Jam-dpal-rdo-rje where the catch-word *so ba*, denoting there evidently a variety of barley with long ears, is associated with its image. Nevertheless, the problem arises, whether and in what sources, from which Jam-dpal-rdo-rje has drawn his information, that crop is considered under such an appellation and particularly in association with such an image.

2. A possibility that it means 'maize' cannot be, however, ruled out, if we consider some of the arguments advanced by Kania who suggested tentatively its derivation from the Tibetan *so* 'tooth' and gave some examples indicating that this term might have undergone semantic changes. May be certain indices give us also the names of maize (or its particular varieties) resembling more or less *so ba*, which are current among several Tibeto-Burman peoples of the Arunachal and adjacent regions, e.g. *tsibie* (Aka in Kameng), *sepa* (Hill-Miri in Subansiri), *sapa* (Padam and Minyong in Siang) and *tchetum-sopfu* (Lhota in Naga Hills)¹¹¹ as well as the traditions of some tribes of that area (Monba in Kameng, Dafla in Subansiri) according to which they have obtained that crop just from Tibet¹¹².

3. Thus, we cannot exclude, it seems, that *so ba* in a certain period:

a) could signify 'maize' in a part of South Tibet and in such meaning could even penetrate to the literary language of some centres, or

b) might have been used to designate that crop on a very limited area adjacent to the Himalayas of Bhutan and Arunachal among the illiterate tribes. In any case that appellation or its variants could have been either introduced by some of them when they migrated to their new seats to the south of the main chain

¹¹¹ J. D. Anderson, *A short Vocabulary of the Aka language*, Shillong 1896; J. N. Lorrain, *A Dictionary of the Abor-Miri Language*, Shillong 1910, p. 322; Sachin Roy, *Aspects of Padam-Minyong Culture*, Shillong 1960, p. 285; Stonor & Anderson, *op. cit.*, p. 359.

¹¹² See: *supra*, p. 131—132.

of the East Himalayas or borrowed, along with the crop itself, by certain tribes who inhabited there already; in both cases undergoing some phonetic changes.

The problem also arises, when *so ba* with this alleged semantic value could have been replaced, as suggested by Kania, by *ma rmos pa'i lo thog* — and we may add — by its vernacular variants.

II. As regards the word *se bu*, attested as a name of one of the maize races on the border of West Bhutan, in the light of the possibility discussed lastly by Kania, it may have indeed a common etymology with the Tibetan *ser po* and not with *so ba*, which he was inclined to admit previously. Nevertheless, the present author, though not a linguist, thinks himself justified to advance the following question for further detailed inquiries *in situ*. Is it not thus impossible that *se bu*, designating a maize form with yellow kernels, was derived from *so ba* after all, but has been associated and confounded with a similarly sounding local term for yellow colour, etymologically linked with the Tibetan literary *ser po*. Further process could have dimmed the awareness of the real etymology of *se bu* to which has been attributed a „folk etymology“, deriving it, due to a phonetic resemblance, from *ser po*, while to the form with white grains a term *ka bu* has been applied *per analogiam*, as an equivalent of the Tibetan literary *dkar po*.

III. Independently of the above discussed problem of the possible meanings of the word *so ba* in the old Tibetan texts, pre-16th c. references to maize in these sources are to be expected, if we consider the testimonies of several Chinese works of the 16th c., indicating, it seems, south-eastern confines of Tibet as the country from which that crop was introduced into China¹¹³.

For Nepal the oldest reference to maize known to the present author occurs in a Buddhist version of *Vamśāvalī*¹¹⁴, a chronicle compiled ca 1800 in the Parbatiya language by a monk from

¹¹³ See: *supra*, pp. 144—146. Cf. Addendum.

¹¹⁴ *History of Nepal* translated from the Parbatiya by Munshi Shew Singh and Pandit Shri Gunanand with an introductory sketch of the country and people of Nepal by the editor Daniel Wright, Cambridge 1877, p. 190.

Patan. Thus, in a passage (V, 14) devoted to the rule of Jagat Jyotir Malla (ca 1617—1633) the king of Bhatgaon, we read what follows: „In this reign some Indian corn (maize) was by chance brought from the east mixed up among a quantity of mās or urd dāl (a kind of pulse). The clever people of the country were immediately assembled, and decided that this new grain would cause a famine so that it was thought best to send it back whence it had come, and to destroy all the ill luck it might have left behind”. Though the English translation of *Vamsāvali* was published already in 1877 and several specialists like Lévi (1895), Landon (1928) and Kawakita (1957)¹¹⁵ indicated the above mentioned relation when writing about the reign of Jagat Jyotir Malla, it has been overlooked in the polemics on the antiquity of maize cultivation in Asia and for the first time it was involved into that problem by the present author (1963, 1969)¹¹⁶. It seems that this reference may be considered as giving the *terminus post quem* for the introduction of that crop into the Kathmandu Valley, and the *terminus ante quem* of its introduction to some territories lying further to the east. However, it cannot be excluded that on the north-western peripheries of that country it could have been known even earlier. That concerns especially the Jumla region, which since the 11th c. up to the 14th c. belonged to a kingdom embracing also an adjacent part of South-West Tibet and where maize cultivation was attested by Hamilton (1819)¹¹⁷, so comparatively earlier than in several other parts of North India. On the eastern peripheries of Nepal, instead, from where most probably maize was brought, it might have been grown much earlier.

Among the data supplied by the East and South-East Asiatic

¹¹⁵ Sylvain Lévi, *Le Népal — Étude historique d'un royaume hindou*, Vol. II, Paris 1905, p. 240; P. Landon, *Nepal*, London 1928, Vol. I, p. 56; J. Kawakita, *Ethno-Geographical Observations on the Nepal Himalaya*, in: H. Kihara (Editor), *SRJENH*, Vol. III, Kyoto 1957, p. 13.

¹¹⁶ Marszewski, *The Age of Maize...*, 1963, pp. 280—282, 291; idem, *The Age of Maize...*, 1969, pp. 131—133, 180, 192.

¹¹⁷ F. Hamilton, *An Account of the Kingdom of Nepal...*, Edinburgh 1819, pp. 178, 284.

written sources the above discussed Chinese testimonies have played so far a most important role in the polemics on the time, route and way of introduction of maize into the Far East. One is struck also by the fact that professional sinologists or other specialists who acquired competence to study Chinese sources have advanced opinions diverging in that respect considerably. But we must add that besides the pharmacopoeias and encyclopaedias of the late Ming times, which have been considered by all of them, other records on which they have also based their views were not always the same. Let us give here some examples.

Mayers (1867, 1870)¹¹⁸ found as highly improbable the introduction of maize into China by the Portuguese during their activities in that country between 1517 and 1560 and expressed an opinion that this crop was certainly known in China long time before the arrival of the first Europeans. In his two papers on that subject he suggested successively two hypothetical possibilities of maize introduction into China, i.e. from Japan — but without advancing any argument — and from *Hsi-fan* country, as a result of the expedition of general Ma Yüan in 36 A.D.

Laufer (1907)¹¹⁹ admitted that maize, which to the western part of India has been most probably introduced by the Portuguese in the early 16th c., spread across Sikkim, Bhutan and Tibet up to Szechuan, where it must have appeared in 1540, then, further to the east, south and north, reaching finally Fukien between 1560 and 1570, where its extensive cultivation was allegedly recorded for its southern part in 1577 (Martin de Herrada). Besides, he indicated too that there is no written evidence that maize has been brought to China by sea either by the Portuguese, Spanish or Chinese mariners.

Ho, Ping-ti (1955)¹²⁰ taking into account the *Tali fu chih* (1563), *Yün nan t'ung chih* (1574) and *Liou ch'ing jih cha* (1573) considered that overland introduction of maize into China is well proved, though he found questionable Laufer's identification of

¹¹⁸ Mayers, *Maize in China...*, pp. 89—90; Hance & Mayers, *Introduction of Maize...*, p. 524 (note II).

¹¹⁹ Laufer, *op. cit.*, pp. 224, 232, 234, 239—241, 250—251.

¹²⁰ Ping-ti Ho, *op. cit.*, pp. 194, 195, 197, 199 (note 8).

Hsi fan with Tibet proper. On the other hand the testimony of Herrada about the maize cultivation in Fukien in 1577 — the extension of which was according to him exaggerated — and almost complete lack of such evidence for the territories stretching to the south of Yangtze between the extreme west and east provinces until the 18th c., led him to suggest a separate, maritime route of maize introduction. Then, admitting that the earliest Chinese reference to maize is that from the *Kung hsien chih* (1555), he supposed that this crop must have been brought to China two or three decades before 1550, but in any case in the post-Columbian times.

Mo Kuo-ting and his collaborators (1961)¹²¹ as the earliest Chinese record of maize cultivation indicated the one to be found in the *Anhui hsing Ying chou chih* (1516) and supposed that this crop was probably introduced to China ca 1500 and by 1640 diffused all over that country.

Chiba (1968—1969, 1970)¹²² accumulated several data in favour of the pre-Columbian occurrence of maize in China. The most reliable, amongst the eventual direct evidences, he saw in the reference to *yü mai* variety of maize inserted in the *Tien nan pên ts'ao* (15th c.). Besides, he discussed some data which he considered as possible indirect evidences. Thus, he took first into account — though under some provision — the alleged reference to maize in the *Anhui hsing Ying chou chih* (1516) and drew attention to some relations about the first, very turbulent, contacts of the Portuguese with the mainland China, which were recorded in several gazetteers and other sources. In the light of all these testimonies, an introduction of maize into that country by these Portuguese pioneers — who just in 1516 arrived to Guangzhou (Canton) — seemed to him not very probable. Furthermore, an immediate notation of that crop, if really introduced during these contacts, in the local records, he thought almost inadmissible. Afterwards, he considered the data supplied by the *Yün nan t'ung*

¹²¹ Chiba, *Mindaibunken...*, 1968, p. 83; idem, *Chûgoku...*, p. 686 (after: Mo Kuo-ting et al., *op. cit.*, pp. 29—34).

¹²² Chiba, *Mindaibunken...*, 1968, pp. 83, 90—92; 1969, pp. 3—8, 20, 21, 22 (note 7); idem, *Chûgoku...*, pp. 686, 687 (note 11).

chih (1576), attesting maize cultivation in a great portion of the north-western Yunnan. He found also that this testimony makes difficult to admit that maize, after being introduced on the western coast of India by the Portuguese in the early 16th c., within 50—60 years could reach the above mentioned province of China and acquire there a considerable extension. In conclusion, he supposed that some forms of the „Persian” type of maize could have been obtained from the tribes living on the border lands of Tibet and Burma. He suggested even a possibility that during the campaign of general Wang Chi in Yunnan in the years 1439—1449, some of his troops penetrated up to the interior of Burma from where they could have brought samples of that type of maize, subsequently under the names *hsi fan mai* or *fan mai* propagated as far as Kiangsu, Chekiang and Anhwei, by the returning soldiers, most of whom had originated in these provinces.

The data of the Tibetan sources have been completely neglected, as mentioned above, in the studies on the age of maize cultivation in the Himalayan zone. Recently, however, the author drew successively attention (1969, present paper) to certain phytonyms occurring in the *rGyal rabs gsal ba'i me long* and the *Pad mai bka' tang sde lnga* and in connection with them formulated some questions. Then, diverse opinions in that respect were expressed (1972—1974) by certain specialists (Kania, Kuznetsov, Sanghe Ati). As to the most puzzling of these phytonyms, i.e. *so ba*, Kania developed (1974) a tentative hypothesis concerning its possible meaning 'maize', while the present author resorting to some comparative data, recapitulated afterwards (see above) the actual stage of research and advanced some further suggestions. For the time being, the discussed name — its meaning in the above considered texts being not fully clear — cannot give a basis for any inference as concerns the antiquity of maize in Tibet. Nevertheless, if associated with other data, that name indicates the line of further investigations and shows, it seems, that we should not exclude a possibility that in a certain period — may be before the 16th c. — and on a limited area of South Tibet it designated that crop.

The data of the Nepalese sources have been overlooked, as mentioned already, in the investigations of the discussed problem.

Thus, though the reference to maize introduction into the Kathmandu Valley in the early 17th c., occurring in the *Vamśāvali* (18/19th c.) has been repeatedly referred to by several authors, in connection with that problem it has been first analyzed by the present author (1963, 1969, see also above). Unfortunately, that information is too laconic to permit, if considered separately, to draw more detailed or far-going assumptions concerning the time of the first appearance of maize in Nepal. If we confront it, however, with the testimonies of Chinese sources as well as with other categories of data, and take into account that this relation — one of the earliest so far known reports of maize occurrence on the Indian subcontinent — concerns a mountain territory lying far off the sea coasts, we may see in it, under some provision, an indirect evidence of the pre-European cultivation of that crop in the Himalayan zone.

CONCLUSIONS

Summing up, it seems, that the present stage of research permits to admit what follows:

1. In the light of all botanical data accumulated here, but especially those concerning the „primitive” maizes from Sikkim (SP 1 and SP 2), the pre-Columbian transfer of such and akin forms into the more or less isolated regions inside the Himalayan zone by some aboriginal peoples, is more plausible than its post-Columbian introduction there by the Europeans.

2. In the light of the data of the Chinese written sources — particularly (though under some provisions) those supplied by the *Tien nan pên ts'ao* — supported to some extent by the data of the Nepalese *Vamśāvali*, in the border land englobing certain parts of North Burma, South-East Tibet, Arunachal, Bhutan and Sikkim, maize, most probably belonging to the „Persian” type had been already cultivated before the 16th c.

3. The two above mentioned categories of data support each other. However, an indisputable proof of the pre-Columbian maize cultivation in the South China and the Himalayan countries, which could be provided first of all by palaeobotanical findings, is very much desirable.

ABBREVIATIONS

- AMBG — Annals of the Missouri Botanical Garden.
 BABGPB — Bulletin of Applied Botany, of Genetics and Plant Breeding.
 ESWC. DCIS — *Evolutionary Studies in World Crops. Diversity and Change in the Indian subcontinent.*
 SRJENH — *Scientific Results of the Japanese Expeditions to Nepal Himalaya 1952—1953.*

ADDENDUM

When the present paper has been already in press the author received (through the kind courtesy of Prof. dr B. C. Ray, Dr G. Panigrahi and the Director of the Sikkim Research Institute of Tibetology to whom he is greatly indebted) the following paper not available to him previously: J. K. Thapa, *Primitive Maize with the Lepchas*, „Bulletin of Tibetology” (Namgyal Institute of Tibetology, Gangtok), Vol. 3, 1966, pp. 29—31. According to the opinion of Thapa:

1. A primitive race of maize, revealed in various parts of Sikkim in 1962 to E. W. Sprague and N. L. Dhawan, bears „the closest resemblance to the wild maize of which an actual specimen in fossil was uncovered (1960) in the lower levels of San Marcos Cave in Mexico” (*op. cit.*, p. 30, figs. 1, 2).

2. There is also a certain possibility to find the archaeological remains of maize in the Himalayas and Trans-Himalayas and even its living wild form „in some remote areas” on the east of the Himalayan zone (*op. cit.*, p. 31).

3. There is „more than an element of chance that adequate references to maize plant may be found in ancient Tibetan literature” and one such a reference (after: S. Ch. Das, *Tibetan-English Dictionary*, p. 949) is just occurring in the *rGyal-Bod-yig-tshang* which, he emphasizes, „dates back to a period before the discovery of America” (*op. cit.*, pp. 29, 31).