

TOMASZ MARSZEWSKI

THE AGE OF MAIZE CULTIVATION IN ASIA
(FURTHER INVESTIGATIONS)

In the first part of that study, published in 1963¹, the main hypotheses concerning the time when maize was introduced into Asia were reviewed and several ethnographical, linguistic and historical data — including those collected by the author during his field and library investigations in India — were juxtaposed. Besides, the author also put forward there some hypothetical suggestions, as well as postulates for further investigations. The aim of the present paper is to carry out some part of that research program and to give, if possible, a more precise shape to the tentative hypothesis. Then, the data of natural sciences, considered here in a wide range, include the first findings of an alleged sub-fossil pollen of maize in Asia, recently discovered and identified. The conjectured archaeobotanical and iconographical data are also presented or signalized. The data from written sources, to which most place is devoted here, are selected for the particular regions. The various ethnographical data collected here supplement those which were discussed in a previous paper. Finally, some linguistic data, including items which were not considered in the above mentioned paper, are tentatively analyzed. In that survey each category of data is reviewed following a similar scheme. First, the potential contribution to be expected from a respective line of research for the whole problem, is discussed. Further, the history of investigations is sketched in brief while the present

¹ Tomasz Marszewski, *The Age of Maize Cultivation in Asia (A Review of Hypotheses and New Ethnographical, Linguistic and Historical Data)*, „Folia Orientalia“, T. IV (1962), Kraków 1963, pp. 243—295.

stage of research, with all main lacunae brought out in full relief, is reported in a more or less detailed manner. Then, the selected data and their interpretations reported so far, are systematically examined. To conclude, all assumptions based on the particular categories of data are compared in an attempt to throw light on the antiquity of maize cultivation in Asia and to discover the most plausible ways of its early spread on that continent.

TAXONOMICAL AND PHYTOGEOGRAPHICAL DATA

A detailed comparative study of the external and internal morphology of the particular maize races cultivated by various aboriginal peoples of Asia, if combined with an inquiry into the geographical distribution of these forms, may give some idea on the succession of their introduction into that part of the world. The main achievements in that line of investigation, ranged in a chronological order, are as follows.

Thus Collins signalized (1909, 1920)² some peculiar forms of maize with a waxy endosperm grown near Shanghai, in the Philippines (Mindanao) as well as in Upper Burma (Shan States, Pokokku Hill Tract) which fact, he suggested, tends to support the early Chinese testimonies following which maize entered China from the West. In his opinion³ if waxy maize reached Shanghai region from East Himalayas it should happen sufficiently early to permit that variety to acquire its distinctive characters.

Then Kuleshov completed Collin's investigations publishing (1928, 1929)⁴ the results of his studies on maize collections from Turkey, Transcaucasia, Iran, Afghanistan, India, Central Asia, Eastern Siberia, Manchuria, Western China, and

² G. N. 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; idem, *Waxy Maize from Upper Burma*, „Science“, N. S. Vol. 52, July 16, 1920, pp. 48—51.

³ Collins, *Waxy Maize...*, p. 51.

⁴ N. N. Kuleshov, *Nekotorie osobennosti kukuruzy Azii*; idem, *Some peculiarities in the Maize of Asia*, BABGPB, Vol. XIX, 2, 1928, pp. 325—374; idem, *Geograficheskoe raspredelenie sortovogo raznoobraziya kukuruzy na zemnom share*, BABGPB, Vol. XX, 1929, p. 496.

Japan. First, he pointed out⁵ that a waxy endosperm is also present in the maize forms from Manchuria and Eastern Siberia (Spassk region). Furthermore, having found that a complex of specific traits is characteristic of the specimens from Turkey, Armenia, Persia, and Central Asia, he distinguished⁶ the so-called „Persian type“ of maize. He also emphasized⁷ that while certain of these properties are also shared by some ancient Asiatic crops like sorghum, Job's tears, paniced millet and flax, all of them are absent or very rare among the American forms of maize. Considering all these facts and especially the case of waxy maize (var. *ceratina*) Kuleshov concluded⁸ that it is difficult to conceive how an American plant could penetrate into such an inaccessible region as Upper Burma during a period of 300—400 years and produce there a mutant form with a waxy endosperm, as suggested by Collins, and then spread over such a vast area. For that reason he was inclined to admit the pre-Columbian introduction of maize into Asia.

Finan contributed new elements to the discussion pointing out⁹ (1948) that the European herbals of the XVIth and the XVIIth century contain information about two different types of maize, and that both these types labelled usually *Frumentum Indicum* and *Frumentum Turcicum* are described side by side in some later herbals, e.g. in *Neuw Kreuterbuch* of Tabernaemontanus (Jacob Dietrich of Bergzabern) published in 1588. *F. Turcicum*, as indicated by Finan, was first illustrated and described under that name in *De historia stirpium* of Leonard Fuchs published in 1542¹⁰ and from then on repeatedly by several other herbalists. According to Finan¹¹ that form is characterised by

⁵ Kuleshov, *Nekotorie...*, pp. 326—332, 336—341, 366, 371, 374.

⁶ *Ibidem*, pp. 341—358, 371, 374.

⁷ *Ibidem*, pp. 358—364, 367, 373, 374.

⁸ *Ibidem*, pp. 367, 374; see: Marszewski, *op. cit.*, p. 250.

⁹ John J. Finan, *Maize in the Great Herbals*, AMBG, Vol. XXXV, 1948, pp. 158—160, 168, 181—183; see: Marszewski, *op. cit.*, p. 250.

¹⁰ As pointed out by Finan (*op. cit.*, pp. 156, 168) the first European reference to maize, labelled *Frumentum Asiaticum*, was made in 1539 by a German herbalist Jerom Bock who thought that it came from India.

¹¹ *Ibidem*, pp. 160, 181—183.

a lack of prop-roots and ears with eight to ten rows with distinctly rounded kernels, and therefore is similar to a typical flint maize from the eastern part of North America. As to the introduction of that type of maize into Europe, Finan pointed out¹² that most herbalists believed that it came from Asia. But he was inclined himself to admit a New World origin of that form and he considered even a possibility of its transplantation from North America by Vikings early in the XIth century or by English explorers in the first quarter of the XVIth century or possibly from a Carribean area by Spanish pioneers of the XV/XVIth century. Nevertheless in his final conclusion he stated that without further studies one can only speculate upon that enigma.

Afterwards Anderson announced (1949)¹³ that some of the maize races cultivated by the mountain tribes of Assam, present certain peculiar traits like pendent tassels, several ears on a stalk, small isodiametrical kernels, waxy endosperm etc. Furthermore, considering few data which he could obtain for some other regions of South-East Asia and Himalayas as well as the results of studies of his predecessors, he found¹⁴ that a complex of similar traits is typical of the forms of maize cultivated more or less spottily and mostly by conservative peoples, on the area stretching from Iran up to Hainan. In America, as remarked by Anderson¹⁵, only some traits of that complex were testified and merely among some modern pop corns (var. *evarta*) of Northern Chile, Argentina and Eastern Bolivia as well as among the ancient forms of that variety from the coasts of Peru and Chile, where they dominated up to the late phase of Ica period¹⁶. Taking into consideration all these facts Anderson concluded¹⁷ that the discussed type of maize labelled by him as race „A“ must have been introduced into Asia or originated there in the pre-Columbian times.

¹² *Ibidem*, pp. 156, 167, 182—183.

¹³ C. R. Stonor and Edgar Anderson, *Maize among the Hill Peoples of Assam*, AMBG, Vol. XXXVI, 1949, pp. 382—386, 394.

¹⁴ *Ibidem*, pp. 386, 387/388, 389, 393, 395.

¹⁵ *Ibidem*, pp. 385, 386/387, 390, 394.

¹⁶ I.e. in any case before the great extension of the Inca empire.

¹⁷ Stonor & Anderson, *op. cit.*, pp. 391/392, 395; see: Marszewski, *op. cit.*, pp. 251/252.

Later Mangelsdorf polemizing (1951) with Anderson indicated¹⁸ that several traits of the „Assamese“ maize, are widely distributed among the American forms of that plant, while the greatest concentration of these characters is to be found in the pop corns grown in some regions of Colombia. As regards waxy endosperm he remarked¹⁹ that, though exceptional in America, it was detected e. g. as a natural mutant trait among the dent corns (var. *indentata*) from the U. S. A. He emphasized too that it is not at all strange that such a recessive character appears rarely in the centre of maize origin and frequently on its peripheries. He was, however, inclined to explain the particularly common occurrence of waxy maize in Asia by its isolation. According to him that isolation might be either due to the properties of that form of maize considered as more valuable, or due to a practice of growing its single plants among other cereals which promoted selfpollination. Therefore Mangelsdorf did not recognize²⁰ any taxonomical or phytogeographical data which could suggest a pre-Columbian introduction of that crop into Asia.

Again Anderson together with Brown presented (1953)²¹ the results of studies of 54 Turkish pop corns. Thus, besides several intermediates forms they distinguished also three extreme types, two of them evidently different from the pop corns actually grown in the U. S. A. and quite unlike each other. One of them bearing no close resemblance to any known type of maize they designated as „Aegean race“, pointing that it is commonest along the western shore of Anatolia. Another one, which they considered to be identical with pop corns from the mountains of Siam and Eastern Assam (Naga Hills, Lushai Hills) they labelled as „Asiatic race“ and found it to be mainly grown in the mountains of North-East Turkey. They indicated, too, its prehistoric and present counterparts from South America (Colombia, Peru, Chile,

¹⁸ Paul C. Mangelsdorf and Douglas L. Oliver, *Whence Came Maize to Asia*, „Botanical Museum Leaflets“, Harvard University, Vol. 14, No 10, April 18, 1951, pp. 266—269, 272/273, 276.

¹⁹ *Ibidem*, p. 269 f.

²⁰ *Ibidem*, p. 276; see: Marszewski, *op. cit.*, pp. 252/253.

²¹ Edgar Anderson & William L. Brown, *The Popcorns of Turkey*, AMBG, Vol. XL, Number 1, February 1953, pp. 33—35, 39 and map on the p. 40.

Argentina). As to the question when, where, and by whom the two discussed forms of maize were introduced into Turkey, Anderson and Brown taking into consideration all available evidence concluded²² that in the present stage of research it may be only stated that „Asiatic“ and „Aegean“ races of pop corns were brought to that country at different times and by different routes.

A further progress in the discussed field of research was made by Sutô and Yoshida who announced (1956) the results of their studies of 91 samples of maize, 43 of them collected at the foot of Mount Manaslu in Central Nepal, others from North China as well as North, Central and South Japan²³. Then, after an examination of 104 of the external and internal characters of all these forms and their comparison with the already studied samples from other regions of Asia, they classified²⁴ the known oriental races of maize into five main types giving their detailed description and geographical distribution. Besides, suggesting their hypothetical mutual relationship and ranging them tentatively in a phylogenetic order in respect to the pure form of maize they also discussed²⁵ the possible time of their introduction into Asia. The „Persian Type“, recognized already by Kuleshov and, as suggested by Sutô and Yoshida, probably corresponding to the Anderson's „Late Upright“, „Late Sidewise“ and „Drooping Waxy“ from Assam, as well as Anderson's and Brown's „Asiatic race“ from Turkey, was described²⁶ as a form with an extreme lack of vigor, prominent prop-roots, numerous ears and small spherical kernels. The Japanese specialists emphasized²⁷ too that it is „widely distributed in mountain solitudes far from arable lands in the southern part of the Asiatic continent“ with the purest representants testified for Upper Burma, Assam, Bhutan, Sikkim, Tibet and Turkey, but also known in Central Nepal, Afghanistan

²² *Ibidem*, pp. 39, 41.

²³ Tiharu Sutô and Yoshio Yoshida, *Characteristics of the Oriental Maize*, *SRJENH*, ed. by H. Kihara, Vol. II: *Lands and Crops of Nepal Himalaya*, Kyoto 1956, pp. 376, 377, 501, 508.

²⁴ *Ibidem*, pp. 483—496, 508—509.

²⁵ *Ibidem*, pp. 496—506, 508—509.

²⁶ *Ibidem*, pp. 489—490, 492, 502.

²⁷ *Ibidem*, pp. 491, 503 and map (fig. 67) on the p. 497.

and Transcaucasia, while unknown in coastal regions. That type was also considered²⁸ by them to be the purest form of maize in the Old World, derived from a similar form once common (late Ica period) in the Andean area and still spottily cultivated there. As regards the ancientness of that type in the Old World, they concluded²⁹ that its „wide cultivation by the herbarous people of Asia will never agree in that the introduction of this maize to the Orient is post-Columbian“. The „Aegean type“ compared to Anderson's „Early Slender“ from Assam as well as Anderson's and Brown's „Aegean“ pop corn from Turkey was considered³⁰ as similar in its general habit to the North American flint corn, though in most of its traits, closer to the „Persian type“. Besides, various intermediate forms between the „Aegean“ and „Persian“ type were indicated among the maize races from Nepal. As regards the distribution of the „Aegean type“, Sutô and Yoshida showed³¹ it to be wider than that of the „Persian type“, as it covers many regions around it and northwards up to 45°N. lat., though southwards not beyond North Indochina. In conclusion they suggested³² that the „Aegean type“ was developed already in pre-Columbian times as a mutant form from the „Persian type“ and then spread over some parts of North Asia, finally reaching Europe. They were also inclined to derive the „European type“ races, though in general appearance similar to Finan's first type, from the hybrids of the „Aegean“ and „Caribbean“ types. In that connection they recalled³³ that most of the early European herbalists believed that the „European“ form of maize was first cultivated in Orient, and then, still in the pre-Columbian times, spread to Turkey and Greece, and though the Danube basin up to Germany. As to the „Caribbean type“, known to have usually one or two effective ears and very large kernels, they found that it spreads at present almost in the whole South-East Asia³⁴.

²⁸ *Ibidem*, pp. 503/504, 504/505; comp.: p. 492.

²⁹ *Ibidem*, p. 503.

³⁰ *Ibidem*, pp. 491, 492, 505, 506, 509.

³¹ *Ibidem*, pp. 492, 493, 509 and map (fig. 67) on the p. 497.

³² *Ibidem*, pp. 506, 508, 509.

³³ *Ibidem*, pp. 500, 501, 503, 508.

³⁴ *Ibidem*, pp. 493, 494, 500, 501 and map (fig. 67) on the p. 497.

That type was supposed, they remarked ³⁵, to have been brought into Spain by the Spanish explorers or even Columbus himself in the years 1492—1494, and then, most probably by the Portuguese voyagers, to India, Burma, Siam, Indonesia, Philippines and South China early in the XVIth century (though the exact date of that introduction is not known) and to Japan (first into an islet of Tanegashima near Kyushu) in 1573. Further, in coastal regions of the Asiatic continent as well as in Java that type could hybridize, as suggested by Sutô and Yoshida, with some forms of „Persian“ and „Aegean“ types extant there already and not long afterwards penetrate into mountainous regions where such hybrids are testified, e.g. in Assam and Nepal. The „North American type“ characterized by a single effective ear, large kernels and lack of prop-roots, the Japanese specialists recognized ³⁶ to be spottily distributed in Asia and somewhere even (North China, North Japan) as a quite recent import.

Finally, an exciting discovery was made by N. L. Dhawan who found in Assam some living, extremely primitive, forms of maize. After the study of the polliniferous materials of these varieties, Vishnu-Mittre and Gupta considered ³⁷ that this discovery could likely reopen the discussion about the possible South-East Asiatic origin of maize, though according to them, the palaeobotanical evidences from America render that possibility quite remote.

CYTOGENETICAL DATA

Two lines of cytogenetical research have an importance for the problem of the ancientness of maize in Asia: the comparative studies on the Asiatic and American *Maydeae* and akin *Andropogoneae* as well as similar research confined to diverse Asiatic and American forms of maize alone.

³⁵ *Ibidem*, pp. 377, 500, 501/502, 507/508, 509.

³⁶ *Ibidem*, pp. 494, 495, 499, 508.

³⁷ Vishnu — Mittre & H. P. Gupta, *Pollen Morphological Studies of some Primitive Varieties of Maize (Zea mays L.) with Remarks on the History of Maize in India*, „The Palaeobotanist“, Lucknow, Vol. 15, Nos 1—2, 1966, pp. 176—181. I should like to express my gratitude to Prof. George F. Carter and Prof. Robert Heine-Geldern who were so kind to signalize me that publication.

Thus, the first of these studies made Anderson advance (1945) ³⁸ a hypothesis according to which maize could arise in Upper Burma from a hybrid of „something like a 5 chromosomed Sorghum“ with „some 5 chromosomed relative of Coix“, and then, through Indonesia reach America in pre-Columbian times. That hypothesis met a strong opposition of some specialists who, as Randolph (1955) ³⁹, interposed several contrarguments. However, some others considered it worth verifying. Then, Ono and Suzuki wrote (1956) ⁴⁰ that it requires further extensive studies, while Sutô and Yoshida found (1956) ⁴¹ that it even might be more correct than Mangelsdorf's view ⁴² who admitted an American origin of maize also on the cytogenetical basis.

As regards the second line of research, Anderson with a cooperation of Longley and Brown revealed (1949) ⁴³ that the Assamese forms of maize have some few chromosome knobs which occur in positions and combinations very rare or quite unknown among the American forms of that plant. Later on, Anderson and Brown announced (1953) ⁴⁴ that among the Turkish races of maize they examined, the pure „Asiatic“ forms have more chromosome knobs than the other ones. Again Weatherwax expressed (1954) ⁴⁵ an opinion that the comparatively high number of chromosome knobs among the Assamese and Burmese forms, if compared with an augmented number of these elements in the maize-teosinte hybrids,

³⁸ Edgar Anderson, *What is Zea Mays? A Report of Progress*, „Chronica Botanica“, Vol. IX, 1945, p. 90.

³⁹ L. F. Randolph, *Cytogenetic Aspects of the Origin and Evolutionary History of Corn* in: *Corn and Corn Improvement*, ed. by George F. Sprague, New York 1955, pp. 17, 19—20, 56.

⁴⁰ Tomowo Ono and Hiroshi Suzuki, *Chromosomes of Maize, SRJENH*, ed. by H. Kihara, Vol. II: *Land and Crops of Nepal Himalaya*, Kyoto 1956, p. 371.

⁴¹ Sutô & Yoshida, *op. cit.*, p. 508.

⁴² P. C. Mangelsdorf & R. G. Reeves, *The Origin of Indian Corn and Its Relatives*, Texas Agricultural Experimental Station, „Bulletin“, No 574, May 1939, pp. 70—203, 261—267.

⁴³ Stonor & Anderson, *op. cit.*, pp. 379, 380, 384, 393.

⁴⁴ Anderson & Brown, *op. cit.*, p. 34.

⁴⁵ Paul Weatherwax, *Indian Corn in Old America*, New York 1954, p. 181.

makes the whole picture more complicated. Afterwards Sutô and Yoshida emphasized (1956)⁴⁶ that the great diversity of the number of chromosome knobs among the „Persian“ and „Aegean“ samples of maize from Turkey, Central Nepal and China, where no teosinte or gama grass are grown, seems to contradict the Mangelsdorf's⁴⁷ view according to which the increase of chromosome knobs depends on the hybridization of maize with its above mentioned relatives. However, they pointed⁴⁸ too that the discussed phenomenon may be also explained in accordance with Mangelsdorf's hypothesis, as some races of the „Carribean“ maize could reach the mountains of South Asia early in post-Columbian times. Moreover Ono and Suzuki found (1956)⁴⁹ that the average number of the chromosome knobs in the Nepalese races of maize corresponds closely to that of the forms cultivated on the „non-Andean“ area of South America and differs distinctly from the low number of chromosome knobs of the „Andean“ forms.

PALAEOBOTANICAL DATA

A discovery on the Asiatic continent or on the neighbouring islands in the layers preceding the end of the XVth or early XVIth century of some kind of maize remains could answer the question, as it was emphasized already by Heine-Geldern⁵⁰, whether the first introduction of this plant into that part of the world was pre- or post-Columbian. The finding of cobs and kernels would have undoubtedly the greatest evidential value, as it would be more easy to determine whether they were found *in situ* or as an intrusion. The grains of maize pollen would be equally important if one could eliminate the possibilities of their pene-

⁴⁶ Sutô & Yoshida, *op. cit.*, pp. 481, 507.

⁴⁷ Mangelsdorf & Reeves, *op. cit.*, pp. 261—265.

⁴⁸ Sutô & Yoshida, *op. cit.*, pp. 507—508.

⁴⁹ Ono & Suzuki, *op. cit.*, pp. 370—372.

⁵⁰ Robert Heine-Geldern, *Kulturpflanzegeographie und das Problem vorkolumbischer Kulturbeziehungen zwischen Alter und Neuer Welt*, „Anthropos“, Vol. 53, 1958, pp. 373, 393.

tration from outside into the explored layer as atmospheric or stratigraphic contaminations during excavating or into the extracted samples during their laboratory examination⁵¹. An indisputable identification of the fossil or subfossil maize pollen remains also a controversial problem. Thus Tsukada and Rowley stated⁵² that „In spite of the importance of maize in tracing past agriculture and the attention given to maize pollen, fossil maize pollen cannot be conclusively identified“. Furthermore, though the combination of three diverse methods applied up till now in the attempts at such identification, according to the opinion of these specialists is „reasonably satisfactory“, it does not fit where the grains are atypical in diameter. Finally, they also pointed⁵³ to the influence of the environmental changes on the size of the maize pollen grains and indicated that many of its fossil specimens known from the American findings are much smaller than those of the modern varieties. A quite opposite point of view was expressed by Vishnu-Mittre and Gupta⁵⁴ according to whom „apart from the other characters the size of the pollen can alone be used to separate pollen of maize from that of other grass pollen“ and they concluded that „pollen grains above 90 μ could be safely referred to maize“.

In that context of opinions the samples of a subfossil cereal pollen, identified by the Indian palynologists as belonging to maize, which were discovered in a few places in Kashmir, are the most intriguing. Some of them reported by Singh (1963)⁵⁵ were detected by him in localities lying at an altitude ca 1650 m on the northern slope of the Pir Panjal Range. The specimens from

⁵¹ Comp.: Elso S. Barghoorn, Margaret K. Wolf and Kathryn N. Clisby, *Fossil Maize from the Valley of Mexico*, „Botanical Museum Leaflets“, Harvard University, Vol. 16, Number 9, 1954, p. 237.

⁵² Matsudo Tsukada & John R. Rowley, *Identification of Modern and Fossil Maize Pollen*, „Grana Palynologica. An International Journal of Palynology“, Stockholm, Vol. V, 1964, Number 3, p. 406.

⁵³ *Ibidem*, pp. 406, 410.

⁵⁴ Vishnu-Mittre & H. P. Gupta, *op. cit.*, p. 183.

⁵⁵ Gurdip Singh, *A Preliminary Survey of the Post-Glacial Vegetational History of the Kashmir Valley*, „The Palaeobotanist“, Lucknow, Vol. 12, No 1, 1964, pp. 80, 101, 106.

Braman (*ca* 9 km NW of Baramula) were found in a mire („B“) at a depth of 72,5 cm; those of Walanwar (*ca* 3 km E. of the former village) — again in a mire („W“), at the depth of 120,5 cm⁵⁶. Singh remarked⁵⁷ that though the pollen evidences from both sites reflect the vegetational changes on the northern slopes of Pir Panjal in particular and in Kashmir Valley in general, one should not exclude the contamination by a wind blown pollen coming either from the southern slopes of that range or even from other „far removed“ places. Finally, discussing the eventual importance of the above mentioned maize pollen findings for the Anderson-Stonor hypothesis⁵⁸ Singh stated⁵⁹ that „at present it is not possible to say anything about the antiquity of maize in the Kashmir Valley and its bearing on its origin, largely because of the shallow depth of the Mires B and W“. But in conclusion he wrote: „... it is hoped that pollen-analytical investigations of deeper mires from the valley might enable us to determine the antiquity of maize in Kashmir and to solve the controversial problem of its origin“. It may be added here that Vishnu-Mittre and Gupta discussing three years later⁶⁰ Singh's discovery pointed that „the pollen diagram from Walanwar was dated to stage „h“ representing the topmost part of the pollen sequence and which on conservative estimate could not be older than 200 to 300 years“. The finding of an alleged maize pollen from a deposit of the Haigam Lake (NW of Srinagar) investigated by Sharma and elaborated by him in 1964⁶¹ seems to be more meaningful. However, any cereal pollen from that deposit, as remarked by Vishnu-Mittre and Gupta⁶², was identified with maize until the upper part of the layer corresponding to the stages „e“ and „f“. Thus, according to their opinion considering the lowest extreme

⁵⁶ *Ibidem*, pp. 80, 89, 91.

⁵⁷ *Ibidem*, p. 106.

⁵⁸ See: Marszewski, *op. cit.*, pp. 251—252.

⁵⁹ Singh, *op. cit.*, pp. 105/106.

⁶⁰ Vishnu-Mittre & Gupta, *op. cit.*, p. 183.

⁶¹ The study of B. D. Sharma, *Studies of Vegetational History from the Lakes and Swamps of Kashmir* (1964) signalized by Vishnu-Mittre and Gupta (*op. cit.*, p. 184) as unpublished, has not been available to the author.

⁶² Vishnu-Mittre & Gupta, *op. cit.*, p. 184.

size and high pore-axis ratio of the pollen grains approaching that of maize, which was found there, „it may be said“ that the cultivation of that plant in Kashmir began in the XIIIth or XIVth century. Finally both these specialists concluded that the palynological material available up till now neither permit to „establish beyond doubt that maize is an indigenous crop so far as the valley of Kashmir is concerned“ nor, considering the fact that the dating of the sediments in which the discussed specimens were found is indirect, to determine the exact time of introduction of this plant into that region.

ARCHAEOBOTANICAL DATA

The imprints of maize kernels or other parts of that plant to be found possibly on artifacts are to be ranged here among that kind of data. Though up till now only the alleged findings of such imprints on the pottery have been considered and discussed⁶³, it seems, that in the area of South-Asiatic cultures we may expect them also on the clay elements of hut constructions. Anyhow the undoubtful specimens of that kind found somewhere in Asia in a cultural context from before the end of the XVth or early XVIth century, would be of first importance and could be regarded as evidence of a pre-Columbian maize cultivation in that part of the world, as it was already remarked by Hatt (1951)⁶⁴. However, a correct interpretation of imprints suspected to be made, for instance, by an impression of a maize ear or by rolling its whole cob on the wet surface of clay before it was baked, appears to be sometimes extremely difficult. It is well shown by some specimens known from West Africa as well as the unique up till now finding from India, which gave rise to serious contro-

⁶³ E.g.: W. R. Stanton & Frank Willett, *Archaeological Evidence for Changes in Maize Type in West Africa: An Experiment in Technique*, „Man“, Vol. LXIII, August 1963, pp. 117 f.; Vishnu-Mittre & Gupta, *op. cit.*, pp. 182—183.

⁶⁴ Gudmund Hatt, *The Corn Mother in America and in Indonesia*, „Anthropos“, Vol. XLVI, No 5—6, 1951, p. 902.

versies of opinions⁶⁵. On the other hand, far going prospects for an investigation of that kind of archaeobotanical data were demonstrated by Stanton and Willett⁶⁶ on the basis of the numerous samples of pot sherds from the Yorubaland, decorated by the alleged maize impressions. Thus, as seen from their studies, the undoubtful maize imprints not only offer a possibility for an approximate recognition of a variety, but, if found in a sufficient number in different cultural horizons of well stratified sites, may give eventually some idea about the types of maize predominating there in particular periods.

As regards India the only one alleged finding of that kind signalized up till now is represented by a single pot sherd bearing some imprints, which was found in Kaundinyapur (Madhya Pradesh)⁶⁷ in a layer dated to the Bāhmāni period⁶⁸. According to Vishnu-Mittre⁶⁹ two of these imprints look like impressions made by rolling a maize cob, an effect quite similar to that obtained experimentally. The only difference, the less contiguous rows of grains in the Kaundinyapur specimen, suggest to him that a primitive or poorly developed small grained form of maize might have been used there. Two other imprints seen on the same sherd appear for Vishnu-Mittre⁷⁰ to have been made by pressing the under-surface of a maize leaf. Besides, Vishnu-Mittre and Gupta announced⁷¹ the opinions communicated by

⁶⁵ M. D. M. Jeffreys, *Pre-Columbian Maize in Africa*, „Nature“, Vol. 172, November 21, 1953, p. 965; Paul Weatherwax, *Early History of Corn and Theories as to Its Origin*, in: *Corn and Corn Improvement*, ed. by G. F. Sprague, New York 1955, pp. 7/8; George F. Carter, *Archaeological Maize in West Africa: A Discussion of Stanton and Willett*, „Man“, May—June 1964, No 95, p. 85; Vishnu-Mittre & Gupta, *op. cit.*, pp. 182—183.

⁶⁶ Stanton & Willett, *op. cit.*, pp. 119—122.

⁶⁷ Vishnu-Mittre, *Kaundinyapur Plant Economy in Protohistoric and Historic Times*, „The Palaeobotanist“, Vol. 15, Nos. 1—2, 1966, p. 152.

⁶⁸ The Bāhmāni dynasty ruled at Deccan from 1347 to 1527.

⁶⁹ Vishnu-Mittre, *op. cit.*, pp. 152—154.

⁷⁰ *Ibidem*, p. 154.

⁷¹ Vishnu-Mittre & Gupta, *op. cit.*, p. 183.

several specialists to whom the photographs of the Kaundinyapur sherd were sent. Then M. E. D. Jeffreys found in it „support to his view of the pre-Columbian introduction of maize into India by the Arabs“. J. Griffin, P. Mangelsdorf and R. MacNeish under some provisions motivated by the lack of autopsy of the discussed specimens were inclined to see in the alleged imprints of the cob the impressions of basketry or coarse textile. Furthermore, the first of these specialists thought it probable that the alleged leaf imprints represent an impression of fingers. Dhawan, however, analyzing the character of the imprints denied completely any possibility of their maize provenance. As regards the date of the discussed specimen it appears to be also controversial. So, Vishnu-Mittre indicating that similar pottery dated to the VIIth and IXth century is known from Sirpur (Madhya Pradesh), for ca VIth—VIIth century from Nalanda (Bihar) and for ca 1435 from Kolhapur (Maharashtra) accepted the last date as *terminus ante quem* for the Kaundinyapur sherd⁷², admitting even elsewhere⁷³ that „it might be slightly earlier“. However, in a paper written jointly by Vishnu-Mittre and Gupta both authors were inclined⁷⁴ to assign that specimen to the period between the VIth and IXth century. Besides, despite all the sceptical voices they still considered⁷⁵ that the Kaundinyapur sherd tends to prove the pre-Columbian occurrence of that plant in India. Finally, taking into regard that finding, as well as an alleged evidence from Java⁷⁶, together with the well established American origin of maize, Vishnu-Mittre concluded⁷⁷ that all these facts suggest a pre-Columbian introduction of that crop into the Old World which could happen during the transpacific contacts between Asia and South America.

⁷² Vishnu-Mittre, *Kaundinyapur...*, p. 155.

⁷³ *Ibidem*, p. 152.

⁷⁴ Vishnu-Mittre & Gupta, *op. cit.*, p. 183.

⁷⁵ *Ibidem*, p. 183; comp.: Vishnu-Mittre, *op. cit.*, pp. 154, 155.

⁷⁶ That evidence is referred to by Sutô and Yoshida (*op. cit.*, p. 503), unfortunately, without any particulars.

⁷⁷ Vishnu-Mittre, *op. cit.*, p. 155.

A discovery of an unquestionable maize image in the art of one region or another of Asia and originating from before the XVIth century could constitute a proof of its pre-Columbian occurrence in the given area. However, only such images on which the cob of that plant, the main trait discerning it from other akin *Gramineae*, is distinctly shown, should be considered here. As concerns a representation of a stem with leaves alone, it should be remembered that among several cultivated forms of *Maydeae*, *Paniceae* and *Andropogoneae* like Job's tears (*Coix* sp.), millet (*Setaria* sp.), sorghum (*Sorghum* sp.), and sugar-cane (*Saccharum* sp.) they resemble these of maize in a general way. If we consider still a possible stylization, a correct botanical identification cannot take place. For that reason the opinion of Chang Jen-Hsia⁷⁸ after which a plant shown on a stone stele from Shansi, dated to the Han period, is to be identified with maize, appears to be without sufficient foundation. We find there namely a few identical and almost schematically outlined leafed stalks with a completely neglected ear and inflorescence, which are set in one range. In these, if we consider still the associated image of a ploughman, we can recognize nothing but a cultivated representative of *Gramineae*. According to the opinion of Heine-Geldern⁷⁹, it is possibly a kind of millet (then maybe *Setaria italica* Beauv. which attains considerable dimensions). It seems to be important here to note that for the Tang and Sung periods, a time of extensive trade-contacts with the adjacent countries and rapid development of the geographical knowledge in China, no alleged image of maize was reported up till now in Chinese art. Then, it is not to be found, as remarked by Merrill⁸⁰, in *Tang shen wei*, an illustrated herbal

⁷⁸ Chang Jen-Hsia, *Living History in Stone*, „China Reconstructs“, Vol. VI, No 1, January 1957, p. 41.

I am greatly indebted to Prof. Robert Heine-Geldern for attracting my attention to the above discussed identification of Chang Jen-Hsia.

⁷⁹ Communicated to the author in a letter of November 15, 1963.

⁸⁰ Elmer Drew Merrill, *The Botany of Cook's Voyages and Its Unexpected Significance in Relation to Anthropology, Biogeography and History*, „Chronica Botanica“, Vol. 14, No 5/6, 1954, p. 373.

compiled in the Xth century. According to the prevalent view⁸¹ the earliest known picture of that plant in the Chinese iconography occurs in *Pen Tshao Kang Mu*, a pharmacopoeia first printed at the end of the XVIth century, and cannot be considered as proof for pre-Columbian cultivation of that cereal in China, as admitted previously by Bonafous⁸². However, the attempts to determine a maize variety represented by that woodcut gave rise to some differences of opinions. Then Mangelsdorf and Reeves⁸³ admitted a possibility that we may deal here with a homozygotic form of a pop corn (var. *tunicata*) which could have been introduced to China from India where it was probably transplanted from South America by the Portuguese or Spaniards. Nevertheless Merrill⁸⁴, upon considering the description of maize found in *Pen Tshao Kang Mu*, stated that the form pictured in that work must be a kind of pop corn (var. *evarta*)⁸⁵, the only one which at that time was cultivated in China and which could be transferred from India after it had been introduced there from Brazil by the Portuguese. Besides, he remarked also that the manner in which that plant is represented in the earliest editions of *Pen Tshao Kang Mu* indicates that the artist must have never seen it in nature and reconstructed it only following somebody's relation. Finally Humlum suggested⁸⁶ even that the plant from the discussed image, though similar to maize, may represent another genus of *Gramineae*, so may be a kind of millet. If we consider however that on the woodcut of *Pen Tshao Kang Mu* we find an inscribed Chinese name of maize *yü shu shu*⁸⁷, that suggestion does not seem to be well grounded.

⁸¹ Wilhelm Wagner, *Die chinesische Landwirtschaft*, Berlin 1926, p. 307; Mangelsdorf & Oliver, *op. cit.*, p. 240; Weatherwax, *Indian Corn...* p. 196; Merrill, *op. cit.*, p. 373.

⁸² See: Weatherwax, *op. cit.*, p. 133.

⁸³ Mangelsdorf & Reeves, *op. cit.*, pp. 228, 240.

⁸⁴ Merrill, *op. cit.*, p. 373.

⁸⁵ Comp.: Wagner, *op. cit.*, p. 307.

⁸⁶ Johs Humlum, *Zur Geographie des Maisbaus*, „Handelsøjskolen i København Skriftraekke A. I.“, København 1942, p. 30.

⁸⁷ See: Weatherwax, *Indian Corn...*, p. 133.

It remains here to mention that Sedov⁸⁸ signalized generally that some representations of maize occur on Khmer reliefs of the XIIth century. Unfortunately, the lack of precise indication on which monuments they are to be seen and in which publications reproduced, does not permit us to undertake their detailed iconographical analysis.

WRITTEN SOURCES DATA

A mention about maize in an Asiatic written source preceding the XVIth or the last few years of the XVth century could be considered a sufficient proof for the pre-Columbian introduction of that plant into Asia. However, to consider such kind of testimony as credible, it should be necessary to have a complete certainty that the plant mentioned in that source under the name of maize cannot represent any other species than maize, and further, that the respective mention was not interpolated into the original text later on. Unfortunately serious difficulties not to say unsurmountable obstacles rise sometimes on the way to establish both these facts. Then, if an old record mentions only the name known to be used later for maize, without giving any description of the crop, it must be taken into consideration that at the time contemporary to that source the name in question could designate some other species. It might be either a plant resembling maize in its general habit or even a quite different one but playing a similar economic role to that of maize by which it has been later replaced and to which also its name has been shifted. A transfer of name from one plant to another is not anything exceptional and it is not difficult to prove that it occurred in diverse epochs and regions under the stimulus of such or other circumstances⁸⁹. But we should also take into consideration that in certain more isolated cultural centers the names of some useful plants during centuries could undergo only slight changes. Then, if such a stabilization in a plant terminology would be

⁸⁸ L. Sedov, *Angkorskaya Imperiya. Socialno-ekonomicheskii i gosudarstvennyi stroi Kambodji v IX—XIV v.*, Moskva 1967, p. 220.

⁸⁹ See: Marszewski, *op. cit.*, p. 286.

proved for some area, in a case when the name of a plant, maize for instance, is testified there only for the recent times, we could also admit as quite probable that a similar name mentioned by an old record from that area may designate the same species. Besides, even then, when a given source reports only the name of a plant and does not give its description, we should look for the whole context in which that mention occurs. Sometimes a careful examination of such a context may reveal some indications concerning the economic, religious or any other role of that plant, suggesting its more or less probable identification. Usually, when the description of a plant is indispensable for its identification, we can only rely on such a description which includes the main traits of that plant; so, for maize, its cob and kernels distinguishing it distinctly from other cultivated grasses. Another problem arises if we find an undoubted mention or allusion to maize, but simultaneously we have also some indications that the text does not or may not represent an original version. Thus, having no obvious evidence that this plant was already mentioned in that version we should admit the possibility that the respective passage could have been introduced during some later redaction of the text, then either by a copyist when we deal with a manuscript, or in one of the successive editions when it concerns an old print. In some cases the solution of such a problem may be practically almost or even quite impossible. The name of maize written between the lines in a laconical reference to some cultivated plants that occurs in a Phakial manuscript of *Li Kho Khon Tai Phwa*, may be an example of that⁹⁰.

At present we can state that the written sources, both the native and the foreign ones concerning the major part of Asia have not been studied in a systematic way from the ethnobotanical point of view, thus also in connection with our maize problem. In that situation the bulk of Asiatic literatures has not been yet included in that inquiry.

Chinese sources alone have been studied in that respect in a somewhat wider range, though not always with a sufficient scrutiny and criticism.

⁹⁰ *Ibidem*, pp. 276/277 and Table after the p. 294.

Starting our review with the pre-Columbian records we may recall here⁹¹ an attempt to see a maize symbol in one of the Shang ideograms from In-sü (Anyang) in Honan. As concerning the ancient Chinese literature *sensu stricto* Wagner emphasized⁹² already that maize is not included among the *wu-gu*, the „five grains“ which are reported there as the main crops.

For the medieval Chinese sources there have been yet advanced some suggestions or possibilities for a hypothetical recognition of maize under certain cereal names. Then in *Sung Shih*, a chronicle of the Sung dynasty compiled *ca* 1345⁹³ a passage is to be found which was translated by Pelliot⁹⁴ as follows: „Le Chö-p'o produit du riz, du chanvre, du millet (ou du maïs), des haricots; il n'y a pas de blé...“ It must be added here that in spite of an attempt of Schlegel⁹⁵ to localize *Shö-p'o* on the Malay Peninsula, Pelliot was inclined⁹⁶ to identify it with Java.

Next to be mentioned here is *Chu Fan Chih* of Chao Ju-kua, a work of the XIIIth century, which was already involved in the discussion on the maize ancientness in Asia. It was done by Jeffreys (1955)⁹⁷ who expressed some doubts whether the only cereal included by Chao Ju-kua⁹⁸ among the products of *Chan-ch'öng* (Central Vietnam) under the name *su* was correctly translated by Hirth and Rockhill as millet. According to him, considering the climatical conditions of that part of Vietnam as well as the fact, signalized by these two authors, that the same name is known to be applied in some later works to maize, it seems to be more plausible to

⁹¹ *Ibidem*, p. 294.

⁹² Wagner, *op. cit.*, p. 308.

⁹³ Joseph Needham with the research assistance of Wang Lin, *Science and Civilization in China*, Vol. I: *Introductory Orientations*, Cambridge 1954, p. 260.

⁹⁴ M. Paul Pelliot, *Deux itinéraires de Chine en Inde à la fin du VIII^e siècle*, BEFEO, T. IV, Hanoi 1904, p. 316.

⁹⁵ See: *ibidem*, pp. 279, 296, 307, 316—317.

⁹⁶ *Ibidem*, pp. 224, 225, 306, 317, 320.

⁹⁷ M. D. M. Jeffreys, *Pre-Columbian Maize in Asia*, „The Eastern Anthropologist“, Vol. IX, No 1, September—November 1955, pp. 21/22.

⁹⁸ See: Chao Ju-kua, *His Work on the Chinese and Arab Trade in the twelfth and thirteenth centuries*, entitled *Chu-fan-chi*. Translated from the Chinese and Annotated by Friedrich Hirth and W. W. Rockhill, St. Petersburg 1911, p. 48 and note 6 on the p. 50.

identify the term occurring in *Chu Fan Chih* also with that plant. Jeffreys then concluded:⁹⁹ „...if one accepts therefore that *su* stands for maize in this context then here is a written record of maize growing in Indo-China before 1250 A.D.¹⁰⁰ the date to which Hirth and Rockhill assign as the date of Chao Ju-kua's work“. One should recall here that already Maspero¹⁰¹ writing about the crops cultivated in the Champa kingdom mentioned among them also maize indicating that this cereal is reported for that country in *Chu Fan Chih*. Although the localization of that reference given by Maspero is incomplete, it seems however, that this author had in mind the same passage as that discussed by Jeffreys, since in no other place of *Chu Fan Chih* references to that part of Vietnam are to be found. As regards other regions of South-East Asia considered in *Chu Fan Chih*, for *Chön-la* (Cambodia) there is only a laconical mention that „... Rice and cereals are cheap“, while for *Hai-nan* (Hainan) „different kinds of grain“ are alluded, but neither for *P'ukan* (Pagan in Burma) nor *Ma-i* and *San-sü* (Philippines) are to be found references to cereals¹⁰². Finally, it is to be reported here that recently (1968) Chiba, a Japanese specialist, signalized¹⁰³ a Chinese literary evidence of maize cultivation in Yün-nan in the early XVth century.

As to the early Chinese post-Columbian sources, Bonafous (1836) was the first who paid attention to them in respect to the problem of the ancientness of maize cultivation in the Old World. He pointed¹⁰⁴ namely to an alleged image of that plant in one of the editions of *Pen Tshao Kang Mu* of Li Shih-chen, a cyclopedia published in 1596¹⁰⁵. He was followed by Mayers

⁹⁹ Jeffreys, *op. cit.*, p. 22.

¹⁰⁰ According to Needham (*op. cit.*, p. 253) it was composed in 1225.

¹⁰¹ George Maspero, *Le royaume de Champa*, „T'oung Pao“, Série II, Vol. XI, 1910, p. 167, and note 9: „Tehou Fan Tche 土10“ on the p. 167.

¹⁰² Chao Ju-kua, *op. cit.*, pp. 53, 58, 155, 159—162, 176.

¹⁰³ Tokuji Chiba, *The Dispersal of Maize in Continental China*, 21st International Geographical Congress India 1968, Abstracts of Papers, Calcutta 1968, pp. 293/294. I am greatly indebted to Prof. F. G. Carter for his kind information about that report.

¹⁰⁴ See: Weatherwax, *Indian Corn...*, p. 133 after Matthieu Bonafous, *Histoire naturelle, agricole et économique du maïs*, Paris 1836.

¹⁰⁵ Needham, *op. cit.*, p. 258 According to Mayers (see: *infra* note 106) *Pen Tshao Kang Mu* was compiled between 1552 and 1578.

who discussed (1867, 1870)¹⁰⁶ some references to that plant to be found in a few works of the XVIth and XVIIth centuries. The earliest reports were quoted by him from two cyclopedias: one from the above mentioned *Pen Tshao Kang Mu*, another — from *Ko Chih Ching Yüan* (published in 1735)¹⁰⁷. The respective passages dealing with the problem of maize introduction into China and its resemblance to other cereals were translated by Mayers as follows:¹⁰⁸

(1). „The seed of *Yü-shü-shü* came from the lands on the West, and it is cultivated by but few. Its stalk and leaf both resemble the *Shü-shü* (Barbadoes millet), but are more fleshy and shorter. They also resemble the *Coix lachryma*; the stalk grows to a height of 3 or 4 feet; it flowers in the sixth or seventh month, producing an ear like that of the *Pi-mé*“¹⁰⁹;

(2). „*Yü-mé*, or imperial wheat, originated in the Sifan territory (the lands beyond the western frontier of China Proper), and its ancient name was *Fan-mé*, or 'wheat of the foreign lands of the West'. Having been offered among tribute, it has received the name of imperial wheat. In its stem and leaf it is congener of the *Ts'i*, or paniced millet, and, in its flowers, of rice“.

Later on, Laufer amply discussed (1907)¹¹⁰ all alleged mentions of maize in the old Chinese literature considered by his predecessors. Thus he criticised¹¹¹ Mayers's translation and interpretation of the reference inserted in *Pen Tshao Kang Mu* and claimed to reveal in *Ko Chih Ching Yüan* two other mentions: one, evidently signalized already by Mayers, extracted from *Liu Ch'ing jü cha* of T'ien I-Heng, a work of the middle of

¹⁰⁶ W. F. Mayers, *Maize in China*, „Notes and Queries on China and Japan“, Hongkong, Vol. I, No 4, April 30, 1867, pp. 89—90; H. F. Hance & W. F. Mayers, *Introduction of Maize into China*, „The Pharmaceutical Journal and Transactions“, December 31, 1870, pp. 522—525.

¹⁰⁷ See: *infra*.

¹⁰⁸ Hance & Mayers, *op. cit.*, pp. 524/525.

¹⁰⁹ A kind of wheat — see: *ibidem*, p. 525.

¹¹⁰ Berthold Laufer, *The Introduction of Maize into Eastern Asia*, Congrès International des Américanistes, XV^e session tenue à Québec en 1906, Québec 1907, I, pp. 230—235, 248, 249.

¹¹¹ *Ibidem*, pp. 230, 232.

XVIth century, another from *Hsio pu tsa shu* of Wang Shih-mou, a work of the second half of that century. The respective passages in Laufer's translation are as follows^{111a}:

(1). „Maize (*yü mai*, 'imperial wheat') is produced in Tibet (*Hsi fan*). Its former name is 'Tibetan wheat' (*Fan mai*). Since it was formerly brought as tribute to the court, it received for this reason the name 'imperial wheat' (*Yü mai*). The stems and leaves are of the same kind as those of the paniced millet (*Panicum miliaceum*), the blossoms like the ears of the rice plant“;

(2). „The maize (*Hsi fan mai*, 'Tibetan wheat'), resembles in shape the paniced millet. Branches and leaves from extraordinarily large knots closely joined together“.

Several other specialists, among them sinologists, ethnologists and botanists, made also an attempt to interpret some or other of the above mentioned references, but very soon considerable discrepancies in opinions have appeared. So, while some of them, as Bonafous (1836), Mayers (1867)¹¹², Hance (1870)¹¹³, Collins (1909)¹¹⁴, Jeffreys (1955)¹¹⁵, and Heine-Geldern (1958)¹¹⁶ saw or were inclined to see in the testimonies of the discussed sources indices of the pre-Columbian occurrence of maize in China, some others, as Laufer (1907)¹¹⁷, Wagner (1926)¹¹⁸, Weatherwax (1954)¹¹⁹ and Merrill (1954)¹²⁰ considered that no one of these reports contradict its early post-Columbian introduction into that country. Further, some authors following the literal sense of some of these references thought that maize reached China over a land route from a territory lying in the West, then *via* Tibet, as accepted by Laufer and Heine-Geldern¹²¹ or by the main Central Asian silk

^{111a} *Ibidem*, pp. 232/233.

¹¹² Mayers, *op. cit.*, p. 89.

¹¹³ Hance & Mayers, *op. cit.*, pp. 523, 524.

¹¹⁴ Collins, *A New Type...* pp. 20—24, 25.

¹¹⁵ Jeffreys, *Pre-Columbian Maize in Asia*, pp. 21/22, 26.

¹¹⁶ Heine-Geldern, *Kulturpflanzengeographie...*, p. 371.

¹¹⁷ Laufer, *op. cit.*, pp. 224, 241, 250.

¹¹⁸ Wagner, *op. cit.*, pp. 307—308.

¹¹⁹ Weatherwax, *Indian Corn...*, pp. 133, 136.

¹²⁰ Merrill, *op. cit.*, p. 373.

¹²¹ Laufer, *op. cit.*, pp. 224, 232—236; Heine-Geldern, *op. cit.*, pp. 371, 392.

road, as supposed by Merrill and Jeffreys¹²². Again some others, in spite of the evidences of the Chinese sources persisted that it could have been done only from the sea during the early commercial activity of the Portuguese, as admitted for instance by Wagner¹²³.

It should be added here that recently Chiba announced (1968)¹²⁴ that while investigating several local Chinese gazetteers he detected names of ten places — half of them from NW Yün-nan — where maize used to be cultivated until the end of the XVIth century. According to Chiba it was testified as a variety characterized by a few small ears on a stalk and few irregular rows of grains: thus similar, he emphasized, to some forms cultivated in the mountains of Iran, Himalayas and Indonesia and unlike the „Caribbean race“.

Are there any Chinese sources antedating the advent of the Portuguese into China, unexplored from the ethnobotanical point of view, which merit to be studied in respect to our problem? The competent answer is to be expected only from the sinologists. Besides, we should not also forget how many geographical treatises and travel books, concerning the countries lying to the west and south of China which have been written or compiled between the IIIth and Xth century, a time of great development of the geographical knowledge in the Chinese empire, are lost and known to us only from their titles or preserved solely in fragments quoted in some later works¹²⁵. From the extant ones the most interesting for their geographical context are reports of some Chinese monks. The first to be mentioned here is *Fo Kuo Chi*, the relation of travel undertaken in 399—414 A.D. by Fa-Hsien who followed the southern edge of the Tarim Basin and *Tsung-ling* range (Karakorum), arrived to *U-chang* (Dardistan /?/) and after visiting various places in North India reached the mouth of the Ganges and

¹²² Jeffreys, *op. cit.*, pp. 26/27; Merrill, *op. cit.*, pp. 289, 366/367.

¹²³ Wagner, *op. cit.*, p. 307; comp.: p. 308.

¹²⁴ Chiba, *op. cit.*, p. 293.

¹²⁵ For the pre-Tang period see: M. P. Pelliot, *Fou-nan*, BEFEO, T. III, Hanoi 1903, pp. 275—280; M. E. Chavannes, *Voyage de Song Yun dans l'Udyāna et le Gandhāra* (518—522 p. C.), BEFEO, T. III, 1903, p. 440; For the Tang period see: M. P. Pelliot, *Deux itinéraires...*, p. 131; Edward H. Schafer, *The Golden Peaches of Samarkand. A Study of T'ang Exotics*, Berkeley and Los Angeles, 1963, pp. 272—273.

then through Ceylon and Java returned to China¹²⁶. Unfortunately, besides a mention concerning probably the mountain country south of Yarkend „... it produces no variety of grain; only wheat will ripen“¹²⁷, we do not meet in that account any other references to agriculture. The relation of Sung Yün who in 518—522 A.D. reached *U-chang* (= *Udyana*) and *Kan-t'o-lo* (= *Gandhara*) by the same way and then came back to China¹²⁸, does not contain much more information. Thus for the first of these coun trieshe reports only: „... cereals of every kind (lit. of a hundred sorts) flourish...“¹²⁹. *Ta Thang Hsi Yü Chi* of Hsüan-Chuang, who was travelling between 629—645 A. D. is somewhat more informative. Having reached India through the northern edge of the Tarim Basin and Afghanistan he visited many places in its northern part, so far as Lower Assam and returned to China through Pamir and Khotan¹³⁰. However, though his account abounds in brief references to the cultigens, they rarely concern the particular species. As regards regions which for our problem seem to be the most interesting, we find what follows. Thus for a region NW of the lake *Tsing* (Issyk Kul) we read: „The soil is favourable for red millet...“¹³¹ Further, for *Shang-mi* and *Shu-k'ini*, both regions most probably somewhere between the West Himalayas, East Hindukush and South Pamir¹³², we have respectively: „Much wheat and beans are grown, but little rice“ and „Every kind of grain is cultivated“¹³³ while for *Kia-pi-shi* (= *Kapisa*), a submontane area SE of the Hindukush „It produces cereals of all sorts“¹³⁴, for *Kia-shi-mi-lo* (Kashmir): „The soil

¹²⁶ *Buddhist Records of the Western World translated from the Chinese of Hiuen Tsiang* (A. D. 629) by Samuel Beal, London 1884, pp. XI—XV, XXIII.

¹²⁷ *Ibidem*, p. XXVIII.

¹²⁸ Chavannes, *op. cit.*, p. 381; *Buddhist Records...*, pp. XV—XVIII.

¹²⁹ *Buddhist Records...*, pp. XCIII, XCIV; Chavannes, *op. cit.*, p. 408.

¹³⁰ *Buddhist Records...*, pp. XVIII—XIX; Needham, *op. cit.*, pp. 126, 207, 214.

¹³¹ *Buddhist Records...*, Vol. I: pp. 25 (note 80), 26.

¹³² *Ibidem*, Vol. I: p. 41 (note 133); Vol. II: p. 296 (note 38).

¹³³ *Ibidem*, Vol. II: pp. 290, 295, 296.

¹³⁴ *Ibidem*, Vol. I: pp. 54, 119.

is fit for producing cereals...¹³⁵ and for *Po-lu-lo* (= *Bolor*), corresponding probably to Baltistan: „It produces wheat and pulse“¹³⁶. Finally for *Ni-po-lo* (Nepal) is reported only that: „It is adapted for the growth of cereals...“ while for *Kia-mo-lu-po* (= *Kamarupa*, Lower Assam), we do not find any mention of the plants¹³⁷. A wider geographical scope and a mine of ethnographical information for various areas of the Far East is to be found in *Wen Hsien Thung Khao*, compiled by Ma Tuan-lin ca 1254 A.D. and published in 1319 A.D.¹³⁸. However the majority of references to the plants cultivated by the particular peoples are quite laconical and often seem to be incomplete. As regards South-West and South China the following ones are the most interesting. Then for the *Y*, *Ti* and *Kiang* tribes inhabiting the mountainous country of *Jen-long*¹³⁹ on the NW confines of Szechuan we read only that they cultivate corn („blé“) ¹⁴⁰, for *Leao* from the mountains of South Szechuan — that they go to the market-places to buy the rice and corn¹⁴¹. Then, for the people of *Nan-Chao*, corresponding approximately to the present Yün-nan, only rice is mentioned¹⁴², while for the *Yao* of North Kwangsi we read in Saint Denys' translation: „Ils cultivent diverses sortes de céréales, du millet, du riz et plusieurs légumes...“¹⁴³. Outside China for *Kiao-chi*, the nucleus of which independently of the elasticity of its frontiers¹⁴⁴ lied in North Vietnam, only diverse varieties of rice are reported¹⁴⁵ while for *Chen-Ching*, identified with the Southernmost Vietnam — rice and millet¹⁴⁶. Further, for *Chin-la* (Chenla), which once stretched beyond Cambodia

¹³⁵ *Ibidem*, Vol. I: p. 148.

¹³⁶ *Ibidem*, Vol. I: p. 135.

¹³⁷ *Ibidem*, Vol. II: pp. 80, 195.

¹³⁸ Needham, *op. cit.*, p. 261.

¹³⁹ Toponyms are given here in English transcription.

¹⁴⁰ Ma-Touan-lin, *Ouen hien tong kao. Ethnographie des peuples étrangers à la Chine...*, transl. by le Marquis d'Hervé de Saint Denys, *Méridionaux*, Paris—London 1883, pp. 166—168.

¹⁴¹ *Ibidem*, pp. 116—118.

¹⁴² *Ibidem*, pp. 189, 192.

¹⁴³ *Ibidem*, pp. 36, 43 (note 261), 45 (note 265).

¹⁴⁴ See: *ibidem*, p. 309 (note 15).

¹⁴⁵ *Ibidem*, p. 256.

¹⁴⁶ *Ibidem*, pp. 434 (note 70), 540.

far inland embracing on the north, as mentioned by Ma Tuan-lin¹⁴⁷, the mountain areas, there is a passage which runs as follows: „On cultive dans ce royaume du riz, du seigle, un peu de mil et du gros millet“¹⁴⁸. Similarly for *Piao*, identified by Saint Denys¹⁴⁹ with Pegu we read: „Leur pays est propre à la culture des plantes potagères, du riz et du gros millet appelé *leang*; mais ne produit ni chanvre, ni blé“¹⁵⁰. Finally for a country which should be localized, it seems, on the Upper Burma—Yün-nan border we find: „Le pays des Ouei-po produit du millet et du riz“¹⁵¹. As concerning the islands lying in the vicinity of the Asiatic continent the mention about *She-po* (or *Tu-po*) in Java is the most informative: „Ce royaume est couvert de plaines fertiles, propres à la culture du riz, du sésame, du chanvre, du millet et des dolies; mais on'y récolte pas de froment“¹⁵². The following reference to the *Lieou-kieou*, which term after Saint Denys embraced also Formosa, seems to deserve attention too: „Les céréales cultivées sont le riz et différentes sortes du millet...“¹⁵³. As to the later works the most important one seems to be *Tao i chih lio* composed in 1349/1350 by Wang Ta Yüan who visited several countries of South-East Asia for trade purposes and recorded his own observations¹⁵⁴. Unfortunately, for *Chan-ch'eng* (Annam) and

Chên-la (Cambodia) he mentions only a kind of millet (小米)¹⁵⁵,

¹⁴⁷ See: *ibidem*, pp. 476 (note 1), 481.

At the beginning of the VIIIth century *Chenla* was divided into the „Maritime“ and „Upper“. This latter bordered even upon North Vietnam and Nan Chao (see: Lawrence Palmer Briggs, *The Ancient Khmer Empire*, „Transactions of the American Philosophical Society“, N. S., Vol. 41, par 1, February 1951, p. 37; comp.: pp. 54, 58—59, 91.

¹⁴⁸ Ma-Touan-lin, *op. cit.*, p. 481.

¹⁴⁹ *Ibidem*, p. 230 (note 19).

¹⁵⁰ *Ibidem*, p. 233.

¹⁵¹ *Ibidem*, pp. 298, 306 (note 12).

¹⁵² *Ibidem*, pp. 494 (note 1), 496.

¹⁵³ Ma-Touan-lin, *op. cit.*, *Orientaux*, Paris—London 1876, pp. 414 (note 1), 421.

¹⁵⁴ W. W. Rockhill, *Notes on the Relations and Trade of China with the Eastern Archipelago and the Coast of the Indian Ocean during the fourteenth century*, Part. II, „T'oung Pao“, Série II, Vol. 16, 1915, pp. 61, 62.

¹⁵⁵ According to G. A. Stuart (*Chinese Materia Medica. Vegetable Kingdom*, Shanghai 1928, p. 406) that variety (*hsiao mi*) represents *Setaria viridis* (*Germanica*).

for *Lohu* (Lopburi on Lower Menam), *San-fo-ch'i* and *Tan-yang* (Sumatra), *Chao-wa* and *Chung-ko-lo* (Java) *P'o-ni* (Borneo), *Wen-lao-ku* (Moluccas) rice while for *Su-lu* (Sulu archipelago) — millet and wheat¹⁵⁶. *Ying yai shang lan* and *Hsing ch'a sheng lan* elaborated between 1425 and 1436 by Ma Huan and Fei Hsin respectively, who accompanied Chêng Ho on his expeditions to the south of China¹⁵⁷, are still less informative. Then as to South-East Asia, for Central Vietnam (Annam), Siam, Sumatra and Java they report only rice, and for *Pang-ko-la* (Bengal) alone the first of these authors refers to the glutinous (黍) and red (秬) millets¹⁵⁸.

As regards the records of the non-Chinese peoples of China the numerous ritual manuscripts of the Na-khi (Mo-so) from Li-Chiang area in NW Yün-nan, several of them originating from the Wan-li period (1573—1640) or even much older¹⁵⁹, are the first which should be investigated for our ethnobotanical problem. At present the author can only indicate that in the brief accounts of the contents of particular manuscripts belonging to the Marburg collection, catalogued by Rock, besides the „black and white millet“, rice and wheat, no other cereals are reported, though in some manuscripts there are allusions to „... ten kinds of grains“¹⁶⁰.

Thai literature, though under that appellation are to be included here written records of many branches of the Thai peoples, may be named so, considering the fact that the bulk of them occupy or occupied once a more or less compact area and have much in common in myths and historical traditions¹⁶¹. However, we should

¹⁵⁶ Rockhill, *op. cit.*, pp. 86, 106, 110, 134, 143, 237, 252, 260, 265, 270.

¹⁵⁷ *Ibidem*, pp. 61, 69, 71—74.

¹⁵⁸ *Ibidem*, pp. 91, 92, 105, 144, 147, 150, 242, 253, 439.

¹⁵⁹ Joseph Francis Rock, *Na-khi Manuscripts*, ed. by Klaus

L. Janert, Part 1, Wiesbaden 1965, pp. XV, XVI.

¹⁶⁰ *Ibidem*, Part 1: pp. 65, 86, 102; Part 2: pp. 267, 270, 282.

¹⁶¹ J. George Scott assisted by J. P. Hardiman, *Gazetteer of Upper Burma and the Shan States*, Part I, Vol. I, Rangoon 1900, pp. 217, 255, 258, 259.

not forget that merely in some of the Thai centres in Assam, Burma, Siam and Laos a true historiography has evolved under the form of annals and inscriptions. Furthermore, from its extant specimens only some, like Siamese inscriptions¹⁶², have been recorded before the XVIth century, many others, like Ahom chronicles¹⁶³, being compiled somewhat later, or, like Shan chronicles¹⁶⁴, much later. As regards several less powerful groups of the Thai, their ancient myths, legends and traditions belong mostly up to the present day to the oral folk literature and only some of them, as among the Thai of Vietnam¹⁶⁵, have been recorded in recent times in the form of manuscripts. In any case the court literature as well as the folk one of the diverse Thai peoples has not been up till now explored in a systematic way for any ethnobotanical problem concerning cereals, maize among them.

As concerning the Western Thai records, the first attempt was made in 1960, when on the author's request two Ahom scholars from the Gauhati University undertook this kind of inquiry. As a result, one of them, C. Gohain found that in a Phakial manuscript of *Lik Kho Khon Thai Phwa*, containing a version of historical tradition, there occurs a laconical mention about some cultivated plants including also maize, which after being translated was published by the author in 1963¹⁶⁶. Simultaneously, further research carried out by the second scholar, B. Barua, and having as object some few Ahom historical manuscripts belonging to the collection of Gauhati University, did not reveal any similar references¹⁶⁷.

As for the Eastern Thai records, the author had a chance to go through some published Siamese Annals, namely these which were translated, annotated and published by Notton. However, as emphasized by Notton, only recent copies of these chronicles were available to him and in his opinion they possibly can have

¹⁶² See: Cornelius Beach Bradley, *The Oldest known Writing in Siamese: The Inscription of Phra Ram Khamhaeng of Sukhothai*, 1293 A. D., „Journal of the Siam Society“, Vol. VI, 1909, pp. 1—64.

¹⁶³ B. K. Barua, *Studies in Early Assamese Literature*, Nowgong (Assam), 1953, p. 69.

¹⁶⁴ See: Scott, *op. cit.*, pp. 190, 227.

¹⁶⁵ See: *infra*, p. 121.

¹⁶⁶ Marszewski, *op. cit.*, pp. 275—277.

¹⁶⁷ *Ibidem*, p. 277 (note 1).

several errors, lacunae and interpolations¹⁶⁸. In spite of all this as well as of the fact that these chronicles were compiled after the XVIth century, they may contain also some intact elements of an earlier tradition. In any case, considering their language and geographical context, they all seem to have emanated from the North Siam¹⁶⁹ cultural centres and some of them obviously incorporate the historical traditions of the Lawa¹⁷⁰ mountaineers who inhabited that country before the Thai migrations. As regards our problem the only important mention found so far by the author is the one in the chronicle of *Suvanna K'ôm Khăm* and that in a legend narrated before the relation about the fabulous apparition of Buddha P'ra Kassapa¹⁷¹. We read there namely (in Notton's translation) what follows: „Une fois près des bords du *Mě Khalanādi*, au sud-est, à la limite des frontières de *P'othisan Luang* et de *Suvanna K'ôm Khăm*, un pauvre garçon infortuné vint pour cultiver des rais. Il planta du riz, du millet, du maïs, des pastèques et des melons, le tout en grande quantité. Un îlot au sable fin, blanc, magnifique, formait cet emplacement“, while further a reference to maize is once more repeated¹⁷². It may be added here that in a corresponding passage of another variant of that legend quoted by Notton¹⁷³ from a publication of Prajā-kicakaracakra, we find an annotated remark of that Siamese expert according to which that place is to be localized at Luang Prabang. If we consider that localization as correct, then the river *Mě Khalanādi* should be identified with Mekong. As for other chronicles, in that of *Suvanna Khamdēng*¹⁷⁴ only millet and rice are reported; in these of *Mahāthera Fa Bōt* and of *Lamp'un*¹⁷⁵ rice and sugar cane; while in those of *Sinhānavati* and

¹⁶⁸ *Annales du Siam*, transl. by M. Camille Notton, Paris—Li-moges—Nancy, 1926, Vol. I: pp. VIII—XI.

¹⁶⁹ *Ibidem*, Vol. I: pp. VII, 1, 3, 18, 24, 38; Vol. II: pp. 13, 14; Vol. III: pp. 34, 41, 60, 61, 71, 88, 139.

¹⁷⁰ *Ibidem*, Vol. I: pp. 10, 11, 18, 22—26, 38—45, 135; Vol. II: p. 1.

¹⁷¹ *Ibidem*, Vol. I: p. 130.

¹⁷² *Ibidem*, Vol. I: pp. 121, 128.

¹⁷³ *Ibidem*, Vol. I: p. 121 (note 1); see also: p. VII.

¹⁷⁴ *Ibidem*, Vol. I: pp. 5, 8—13, 20, 26—32.

¹⁷⁵ *Ibidem*, Vol. I: pp. 35, 39—43, 46, 51, 57, 59, 63—68; Vol. II: pp. 5, 24, 28, 35, 40, 45—49, 55, 56.

of *Xieng Măi*¹⁷⁶ — rice alone. We should not forget, however, that numerous other Siamese as well as Laotian chronicles, most of them preserved in the form of manuscripts at Bangkok, Luang Prabang and Vientiane or in diverse temple collections in Thailand and Laos¹⁷⁷, still await a similar investigation. Besides, the fact that in the *Mandapakon*, the second book of the Laotian version of *Pañcatantra*, the juice of maize is mentioned in the fable about Uparat^{177a}, also deserves attention, though that version, being most probably heterogenetic, may contain some comparatively late interpolations and its redaction cannot be precisely dated^{177b}.

As regards the recorded specimens of folk literature, the author found that in two pieces quoted by Degeorge¹⁷⁸ from two manuscripts revealed in a Thai community from Thanh hoa region in North Vietnam, maize is mentioned several times. Thus in a legend about But B'ôi related in a manuscript from Chiêng Ha¹⁷⁹ village that plant is reported side by side with rice as a food crop. Then, in a myth about the flood from a manuscript of Ba ót chên there is a passage¹⁸⁰ about the time after that cataclysm, which in Degeorge's translation runs as follows: „Cette fois ayant du feu, ayant de l'eau, les hommes peuvent alors laver propre, manger cuit. Mais (ils) n'ont pas de grain de riz, ne savent comment faire, alors font monter le rat demander du riz à Pó Fâ, dire 'Les Tay de Mu'ong Lûm maintenant n'ont pas de riz, n'ont pas de maïs, ne savent que prendre pour faire une moisson, alors ils me font monter demander des semences de riz pour semer, demander du maïs pour semer, planter'. Pó Fâ donne des semences

¹⁷⁶ *Ibidem*, Vol. I: pp. 143, 149—177, 186, 190, 197; Vol. III: pp. 13, 19, 27, 34—37, 43, 50, 54, 58, 60, 71, 79, 90, 102, 110, 125, 131, 160, 167, 190, 207, 213, 220.

¹⁷⁷ See: *Ibidem*, Vol. I, p. XXVII; Pierre Bernard Lafont, *Bibliographie du Laos*, Publ. de l'EFEQ, Paris 1964, Vol. L, p. 229. Louis Finot, *Recherches sur la littérature Laotienne*, BEFEQ, T. XVII, 1917, No 5, pp. 149 f., 175—218.

^{177a} Finot, *op. cit.*, p. 100.

^{177b} *Ibidem*, p. 85 (note 3) and M. Johannes Hertel, *Le Mulla-Tantai et le Pañcatantra*, JA, Novembre—Décembre 1908, pp. 399, 405, 406.

¹⁷⁸ J. B. Degeorge, *Les légendes Tai*, „Anthropos“, Vol. XVI, 1921, pp. 110 f.

¹⁷⁹ *Ibidem*, pp. 112 (note 1), 115, 130.

¹⁸⁰ *Ibidem*, pp. 135 (note 1), 139/140.

de riz, des semences de maïs pour que le rat les descendent aux hommes. Les hommes qui ont des semences de riz, des semences de maïs grâce au rat, ne savent que prendre pour récompenser le rat..." (etc.).

Vietnamese literature which for the geographical context in which it was created could be very important for the study of our maize problem, has not yet been explored in that respect. The first probing of that literature, undertaken on the author's request in 1965 by R. Chmielewski — a Polish vietnamist, revealed that in *Văn đài loại ngũ*, a kind of cyclopedia elaborated in Chinese by Lê Qui Đôn (1726—1783) (recently published in Vietnamese)¹⁸¹ there occurs a mention about maize referring to the XVIIth century, the oldest one thus far reported in the native records. The respective passage translated by Chmielewski into Polish begins with a quotation from the work *Bản thảo* in which it is said that *ngọc thực thủ* is similar to *ý di*¹⁸² and has a case with white awns, inside which after its bursting appear white, compact grains which when parched are eatable and in which a white bubble arises during popping, as in the popped *thóc nếp* (a kind of sticky rice). In the succeeding comment Lê Qui Đôn explains that in the „land of the South“ the plant *ngọc thực thủ* is named *lúa ngô*. Then, he relates that at the beginning of the Khang-ki period (1662—1723) Tran The Vinh from the Tiên-phong district (present Sơn-tây region, W. of Hanoi) sent as legate to the court of Thanh (Chinese emperor), obtained the grain of *lúa ngô* and carried it into that region, where all people utilized it instead of rice.

¹⁸¹ Lê Qui-Đôn, *Văn đài loại ngũ* (part IX: *Phẩm Vật*, 156), Hanoi 1962, Vol. II, p. 172.

May I express here my gratitude to Mgr Ryszard Chmielewski for his kind efforts rewarded by finding the above mentioned reference and for translating it into Polish.

¹⁸² After the references which I am indebted for to Mgr R. Chmielewski the plant 意帝 (*ý di*) is identified either with Job's tears (see: *Dictionnaire Annamite-Français* par F. M. Génibrel, 2^{eme} édition, Saigon 1898) or with sorghum (see: Đào-Duy Anh, *Giản-yên Hán Việt từ điển* (A Short Chinese Vietnamese dictionary), Paris (Minh Tan) 1950). As regards the quotation made by Lê Qui Đôn, that latter identification seems to be more plausible.

Besides, as indicated by Lê Qui Đôn, the *ngô* cultivated in Nghê-an (region in the South of North Vietnam) belongs mostly to the white *lúa ngô* variety, while *ngô* cultivated in Lang-s'ôn (region adjacent to Kiangsi) is in five colours. In a further remark which seems to concern the latter one, he informs that it has pink, black, yellow or red kernels of a pepper seed size and that similarly to the variety *[ngọc] thực thủ* is as high as the plant *lau* (sugar cane). Finally, according to Lê Qui Đôn the same variety named *cao lương* occurs abundantly in Sơn-tây, while under the name *thực truật* — in the Thái-nguyên (N. of Hanoi) and Lang-s'ôn.

Another attempt initiated by the author and having as object a section of the monumental *Cu'o'ng mục*, a historical work compiled in the XIXth century, namely the chapter on the history of some parts of North Vietnam during the Han period (critically translated by Durand)¹⁸³, gave a negative result. Then, besides the few general mentions¹⁸⁴ about the grains purchased in *Kiao-chi* by the people of some adjacent regions, no other references to cereals are to be found there.

As to the prospects for further research, it must be stated here that the scientific exploitation of the bulk of Vietnamese historical literature will be not possible until, as pointed out by Gourou¹⁸⁵, all works are published and translated with a critical comment separating the credible from phantasy. We should also remember that we lack, with a few exceptions, first hand Vietnamese documents¹⁸⁶ and the extant works are mostly based on Chinese sources and do not fully reflect, as remarked by Pelliot¹⁸⁷, the economic life of the country. Nevertheless, it seems, that some of the known works compiled before the XVIth century, the earliest being

¹⁸³ *Cu'o'ng-mục* (Quyên II). Traduction et notes accompagnées du texte par Maurice Durand, BEFEO, T. XLVII, fasc. 2, Paris—Saigon 1955, pp. 374 f.

¹⁸⁴ *Ibidem*, p. 393 (fol. 8b 9a), p. 423 (fol. 25b).

¹⁸⁵ Pierre Gourou, *Les Paysans du Delta Tonkinois. Études de géographie humaine*, Paris 1965, pp. 111/112.

¹⁸⁶ *Cu'o'ng-mục* ... *op. cit.*, Introduction by M. Durand, p. 369.

¹⁸⁷ L. Cadière et Paul Pelliot, *Première étude sur les sources-annamites de l'histoire d'Annam*, BEFEO, T. IV, Hanoi 1904, Introduction by Pelliot, p. 618.

from the first half of the XIVth century¹⁸⁸, merit an ethnobotanical inquiry. Are there any chances of finding some new records? May be there is or was such a possibility in the official archives of Hue but also in private deposits in some provincial localities¹⁸⁹. In any case we should be aware that the bulk of the old Vietnamese literature remaining in the form of manuscripts has been destroyed by climate, insects and wars¹⁹⁰.

Cham sources would be no less important for our studies if we considered the geographical area occupied once by the *Champa* kingdom, as well as the time at which it existed, i.e. since the IInd up to the XVth century. However, the only known native records from that period are represented by some equally, Sanscrit and Cham, inscriptions¹⁹¹ which are still waiting for an examination as regards our problem. On the other hand, from the period of vassal principedom of Cham in South Vietnam, which lasted from 1654 up to 1822¹⁹², several manuscript works containing some elements of earlier traditions have been preserved. In one of such manuscripts, which is a version (C) of the *Pō Nagar Taha* chronicle, in a passage on the calendar oracles maize is mentioned in the first place among some important food crops¹⁹³. However, in the manuscript of *Ni çarakai padauñ* treatise, of cereals only rice is reported in a cosmogonic myth¹⁹⁴.

Malayan literature, if we use that term in a broad sense, embraces written records from Malay Peninsula, Indonesia as well as Philippines. Being unexplored as regards our problem they also deserve an inquiry. It concerns especially those which antedate the advent of Europeans into that part of Asia, and particularly, considering the enigmatic extension of maize cultivation at Cebu Island¹⁹⁵, the native chronicles from the Philippines.

Khmer records are sources of first rank to be studied for the

¹⁸⁸ *Ibidem*, pp. 623—638, 649; Gourou, *op. cit.*, p. 112 (note 3).

¹⁸⁹ See: Gourou, *op. cit.*, p. 114.

¹⁹⁰ See: Cadière & Pelliot, *op. cit.*, pp. 617, 620.

¹⁹¹ See: Briggs, *The Ancient Khmer...*, pp. 20, 237.

¹⁹² E. M. Durand, *Notes sur les Chams*, BEFEO, T. VII, 1907, pp. 353—355.

¹⁹³ *Ibidem*, pp. 321, 328, 332, 336.

¹⁹⁴ *Ibidem*, pp. 339—341.

¹⁹⁵ See: Marszewski, *op. cit.*, p. 265.

discussed problem. It seems to be sufficient to recall here the geographical area occupied once by the Angkor empire¹⁹⁶, as well as the general character of its civilization which was even defined by Groslier¹⁹⁷, as „civilisation agricole“. If we leave aside the few Sanscrit inscriptions from the Funan period¹⁹⁸, we have at our disposal a considerable amount of later inscriptions, both in Sanscrit and Khmer, sometimes fairly voluminous and detailed. However, though almost all of them were published, translated and critically commented, still in 1958 Groslier could object¹⁹⁹ that they had not been exploited from the social, juristical and economic point of view. Since then the first attempts have already been made, e.g. is a study on the Angkor Empire in the period IXth—XIIIth century published by Sedov (1967). The reconstruction of the role of agriculture, to be found in that study, is based mainly on the inscriptions from the respective period. Although among the cereals enumerated by Sedov²⁰⁰ maize is included alongside rice, millet and barley, we do not find in his publication any indication whether the alleged iconographical testimony of the occurrence of that plant within the limits of the Angkor empire is confirmed by any epigraphical one. It may be added here that the author having had a chance to go through the voluminous Coedès's²⁰¹ publication of Cambodian inscriptions, embracing the specimens dated since the VIIth up to the XIIth century, besides the very numerous references to rice and occasional ones to barley²⁰² and sugar cane²⁰³, could not

¹⁹⁶ Under Jayavarman VII (1181—1201) it extended on to the major part of the present Thailand and South Vietnam as well as some parts of Laos (see: A. Dauphin-Meunier, *Histoire du Cambodge*, „Que sais-je“, No 916, Paris 1961, map (fig. 2) on the p. 47 and p. 237.)

¹⁹⁷ Bernard Philippe Groslier avec la collaboration de C. R. Bo-xer, *Angkor et le Cambodge au XVI^e siècle d'après les sources portugaises et espagnoles*, Paris 1958, p. 108.

¹⁹⁸ See: Briggs, *op. cit.*, p. 15.

¹⁹⁹ Groslier, *op. cit.*, p. 108.

²⁰⁰ Sedov, *op. cit.*, p. 220.

²⁰¹ *Inscriptions du Cambodge*. Éditées et traduites par G. Coedès, Vol. I—II, Hanoi 1937—1942 Vol. III—VII, Paris 1951—1964.

²⁰² *Ibidem*, Vol. VII (1964), p. 31.

²⁰³ *Ibidem*, Vol. VII (1964), p. 16.

find among the identified plants any mentions of other *Gramineae*.

As regards the Cambodian annals which are the main native sources for the later period, they pretend to register the historical events since the middle of the XIVth century²⁰⁴. However, the extant chronicles are not the original ones, which disappeared during the wars of the XVIIIth century; they have been mostly reconstructed from the oral tradition early in the XIXth century and they have numerous errors and interpolations²⁰⁵. For that reason they almost completely lack documental value until they are critically reedited and translated, as postulated by Groslier²⁰⁶. Besides, as concerning for instance the chronicle published by Garnier²⁰⁷, we do not find in it any digression on the agricultural life of the country.

Mon records, very little known up till now, would be of great importance for our problem, if we considered that the Mon peoples belonged to the first civilized inhabitants of South-West Siam and Lower Burma. Unfortunately, as concerns their two earliest identified cultural centres: the kingdom of Dvāravatī, testified by the archaeological findings on the Meklong and Menam deltas since the VIth century and incorporated up to the XIIth century into the Khmer empire as well as the kingdom of Haripuñjaya founded in the Lampun region on the Upper Menam in the VIIIth century and destroyed at the end of the XIIIth century by the Thai, the native written sources are very scanty and represented only by inscriptions, some of them quite laconical, and some even partly undeciphered²⁰⁸. In any case they should not be omitted. As regards the cultural centres of Pegu and Thaton testified archaeologically since the IXth century, but developed from the earlier Mon communities at the mouths of Saluen, Sittang and Irrawaddy, the epigraphical sources are somewhat more abun-

²⁰⁴ Groslier, *op. cit.*, p. 7; comp. Briggs, *op. cit.*, p. 237.

²⁰⁵ Briggs, *op. cit.*, p. 40; Groslier, *op. cit.*, pp. 7/8.

²⁰⁶ Groslier, *op. cit.*, p. 8.

²⁰⁷ *Chronique Royale du Cambodge*, transl. by M. Francis Garnier, JA, Octobre—Décembre 1871, pp. 341 f.

²⁰⁸ Pierre Dupont, *L'archéologie Mon de Dvāravatī*, Publ. de l'EFEO, Vol. XL, Paris 1959, pp. 1, 2, 4, 12, 16, 17, 22, 23, 205, comp.: Briggs, *op. cit.*, pp. 24, 159, 169, 237, 238.

dant²⁰⁹. However the oldest known inscriptions, dated for the first half of the XIth century and preceding the Burmese conquest which took place in 1047, are only few and mostly inedited²¹⁰. Instead, for the time of the Burmese king Kyanzitthā (*ca* 1086—1112), the Mon inscriptions are more numerous. In some of them we even find mentions of certain cereals, as is the case with the one from the Schwegigôn Pagoda in Nyaung-U near Pagan referring to rice and maybe to millet or barley²¹¹. It must be added here yet that these inscriptions being inspired as remarked by Blagden²¹², by the headquarters of Pagan, reflect the Burmese rather than the Mon conditions. As for the period of temporary independence of the Mon states in Lower Burma (1287—1539) no historical records preceding the rule of Dhammaceti (1472—1492) were reported²¹³, while from the time of his reign we have some bilingual inscriptions from Kalyāṇisimā near Thaton, in which we find even references to rice²¹⁴. As regards the Mon chronicles, mostly compiled in the XVIIIth century²¹⁵ they are worse sources for the study of the old Mon culture, thought they should not be neglected.

Burmese literature which, considering an alleged role of some regions of Burma in the early diffusion of maize cultivation in South-East Asia, should be first investigated, remains unexploited in that respect. Then, if not much can be expected from the Arakanese, Pyu and *sensu stricto* Burmese inscriptions, our attention should be directed toward the numerous chronicles which, though the oldest existing specimen was compiled in the XVth cen-

²⁰⁹ Dupont, *op. cit.*, pp. 1, 12.

²¹⁰ *Ibidem*, pp. 5—8, 15/16.

²¹¹ C. O. Blagden, *Môn Inscriptions (Nos I—VIII)* in: *Epigrafia Birmanica*, ed. by Taw Sem Ko and Ch. Duroiselle, Archaeological Survey of Burma, Vol. I, Part I, Rangoon 1919, pp. 74, 89, 90, 117, 123.

²¹² *Ibidem*, pp. 72/73.

²¹³ Dupont, *op. cit.*, pp. 7, 8, 14, 15.

²¹⁴ C. O. Blagden, *Môn Inscriptions (No XII)* in: *Epigrafia Birmanica*, ed. by Ch. Duroiselle, Archaeological Survey of Burma, Vol. III, Part II, Rangoon 1928, pp. 81, 198, 259.

²¹⁵ Dupont, *op. cit.*, p. 5; comp., p. 7.

tury, are based on earlier records ²¹⁶. But first of all these of them should be investigated which, as *Tagaung* chronicle ²¹⁷, emanated from the cultural centres of Upper Burma, where in some regions maize is an important or even staple crop of the hill tribes. As to other literary forms, it seems that the prosaic compositions called *thamaing* which, according to Pe Maung Tin are „a mine of information on history“ and utilize some old materials, as well as some of historical ballads *egyin*, composed since the first half of the XIVth century ²¹⁸ — are equally worth to be studied.

Tibetan literature, considering an alleged introduction of maize into China from the territories lying beyond its western frontiers as well as the comparatively early testimonies of its cultivation in West and Central Himalayas ²¹⁹, has to be urgently investigated in that respect. Nevertheless no effort in that direction is known to the author. Being aware of the importance of such an inquiry he decided first to follow an indication given him in 1960 in Kalimpong by lama G. Rigzin Vang Po ²²⁰, according to which a variant of the legend about the descent of Tibetans including a mention about maize cultivation is to be found in the book *Rgyal Rabs Gsal Ba'i Me Long*. The date of the composition of that chronicle, being one of the main Tibetan historical texts, gave rise, however, to serious controversies among the tibetologists. Thus, Rockhill (1895) assigned ²²¹ to it a comparatively late origin, Bell (1941) considered ²²² it to be written after a compilation of *Debter-onbo* which took place in 1476—1478 ²²³, while Tucci (1950) suggested ²²⁴ the year 1508. But already Vostrikov

²¹⁶ *The Glass Palace Chronicle of the Kings of Burma*, Transl. by Pe Maung Tin and G. H. Luce, London 1923, Introduction by Pe Maung Tin, pp. IX, XIII, XVII.

²¹⁷ *Ibidem*, pp. XVII/XVIII; comp.: p. XX.

²¹⁸ *Ibidem*, pp. XXI—XXII.

²¹⁹ Heine-Geldern, *op. cit.*, pp. 370—373.

²²⁰ Marszewski, *op. cit.*, p. 274 (note 7).

²²¹ W. W. Rockhill, *Notes on the Ethnology of Tibet*, London 1895, p. 671.

²²² Charles Bell, *The Religion of Tibet*, Oxford 1931, p. 207.

²²³ A. I. Vostrikov, *Tibetskaya istoricheskaya literatura*, Moskva 1962, p. 61.

²²⁴ Giuseppe Tucci, *The Tombs of the Tibetan Kings*, Roma 1950, p. 79.

after his profound studies on the Tibetan historical literature concluded (1936) ²²⁵ that the discussed chronicle, first published in 1478, was presumably compiled in the middle of the XVth century by Legs-pa'i-ses-rab, one of the publishers of its Lhasa edition. According to Vostrikov it may be confirmed by the fact that *Rgyal Rabs Gsal Ba'i Me Long* contains references to the XIVth century and earlier sources, but none to the later ones, and the genealogies inserted in that book are carried only up to the end of the XIVth or early XVth century. Kuznetsov in his comments to the translation of a fragment (1961) and publication (1966) of the whole text of that chronicle, reexamined ²²⁶ all arguments advanced up till now. He expressed the opinion that Bsod-nams-rgyal-mtshan (1312—1375), an abbot of the monastery Bsamyas of the Sa-skya-pa school was the author of this chronicle which compilation he finalized „in the year 1368 or near this date“. That date is suggested according to Kuznetsov by the fact that Bsod-nams-rgyal-mtshan in his brief account on the Chinese history carried it only up to the fall of Yüan dynasty and revealed his ignorance of the posthumous name of the first Ming emperor. Besides, Kuznetsov, among several other arguments advanced in favour of the XIVth century origin of the chronicle, pointed out that the text of its Lhasa edition contains old words which did not exist in the XVth century any more. An insight into that chronicle had not been possible for the author until he received a copy of the above mentioned edition of the chronicle by Kuznetsov ²²⁷. Having verified that the legend about the descent of Tibetans is narrated in the seventh chapter ²²⁸

²²⁵ Vostrikov, *op. cit.*, pp. 8/9, 60/61.

²²⁶ *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, edidit J. W. de Joong, I, Leiden (E. J. Brill), 1966, pp. VII, VIII, X; comp.: *Tibetskaya Letopis* „Svetloye zercalo carskih rodoslovnih“, Foreword, translation and commentaries by B. I. Kuznetsov, Leningrad 1961, pp. 8, 9.

²²⁷ I should like to express my gratitude to Prof. Luciano Petech who was so kind to inform me about that edition (see: *supra* note ²²⁶).

²²⁸ See: *Rgyal Rabs...*, *op. cit.*, p. XI (conspectus of chapters) and pp. 42—45 (chapter seven); *Tibetskaya Letopis...*, *op. cit.*, p. 10.

the author detected a passage in which after a reference to buckwheat (*bra'a*) in three places the word *ma smos pa'i lo thog* (after Kuznetsov equivalent to: *ma rmos pa'i lo thog*)²²⁹ occurs. That word is almost exactly the same or very much similar to some vernacular names of maize reported in modern times for various regions of Tibet. Then, as indicated by Laufer²³⁰ the name *marmospeylothok* (which may be written: *ma rmos pey lo thok*) is testified by Ramsay for the Ladaki dialect while *mar me bai lo tog* (maybe correctly: *ma rme bai lo tog*) is given in *Yü chi sse t'i ch'ing wen chien* for the literary Tibetan. Moreover during his stay in Kalimpong the author noted two other variants of that name: one pronounced *ma mö pe lo to* — for Central Tibet²³¹, another as *mami lo to* — for Khampa²³². Finally, in a dictionary compiled by Kazi we find a term which according to Shastri²³³ has to be transliterated *bod-du-ma-rmos-lo-dog-zer* and pronounced *bö-du-ma-mö-lo-do-zer*.

What a vast field of research is presented by the native sources from various regions of Tibet may be learned for instance from a systematical review of its historical and quasi-historical literature presented by Vostrikov²³⁴. However, the early Tibetan records, the oldest known from the VIIIth century²³⁵, are mainly brief inscriptions, simple annals or dynastic genealogies²³⁶. Furthermore the sources of the XIth—XIIIth century, except few specimens, are lost or unrevealed, while many later works have not survived

²²⁹ *Rgyal Rabs...*, *op. cit.*, pp. 44, 45 and notes 80, 83, 87 on the pp. 44—45.

²³⁰ Laufer, *op. cit.*, p. 243 (note 1).

²³¹ Personal communication of Lama G. Rig Zin Wang Po, Kalimpong (Darjeeling District), November 11, 1960.

²³² Personal communication of Sonam Tshring Dzikumbe (native from Amdo), Algorah near Kalimpong, November 10, 1960.

²³³ *An English-Tibetan Dictionary* compiled by Lama Dawasamdub Kazi, Head Master, Sikkim State Bhutia Boarding School, Gangtok, Calcutta 1919, p. 458.

I am greatly indebted to Dr Bibhabasu Das Shastri who was so kind to give me the above mentioned references concerning the name of maize to be found in Kazi's dictionary.

²³⁴ Vostrikov, *op. cit.*, pp. 58—62.

²³⁵ See: H. E. Richardson, *Tibet and its History*, London 1962, p. 6.

²³⁶ Vostrikov, *op. cit.*, pp. 20—22, 51—52, 54.

either²³⁷. But there remains a considerable number of texts compiled before the XVIth century²³⁸. It seems that these which concern or emanated from the cultural centres of South-East Tibet, where in some regions the cultivation of crops had once been even more extensive²³⁹, should be first studied. Finally, we may expect that some uninventorized works, may be still extant in monastic or private collections in Tibet, as well as in Bhutan, Sikkim, Nepal and India.

Besides the literature in Tibetan *sensu stricto*, some ancient records in akin languages have also survived. They also merit examination from the ethnobotanical point of view. This may be well exemplified by one of the manuscripts discovered at Ch'ien-fo-tung near Tun-huang (Western Kansu) which had been deposited there most probably prior to the early XIth century²⁴⁰. According to Thomas²⁴¹ they all represent folk literature of the Chiang tribes of North-Eastern Tibet and, what regards the above mentioned text (IV), its original content seems to date from before 600 A.D. However, in spite of a comparatively large geographical horizon including the knowledge about several regions of South and South-Eastern Tibet²⁴², the only crops mentioned in that text are barley, wheat, and rice²⁴³.

Nepalese literature, the bulk of which remains unexploited deserves, it seems, also systematical investigation, the more so if we consider the role of maize in agriculture of the major part of Nepal²⁴⁴. While doing his research in India and Nepal in 1960 the author first paid attention to the Buddhist version of *Vamsāvali*,

²³⁷ *Ibidem*, pp. 19/20, 67.

²³⁸ *Ibidem*, pp. 28, 31, 35, 39, 41, 45, 54, 61, 63, 67—69, 78—80, 89, 91—93, 105.

²³⁹ See: Ernst Schäfer, *Geheimnis Tibet. Erster Bericht der Deutschen Tibet-Expedition Ernst Schäfer 1938/39*, München 1943, p. 184.

²⁴⁰ F. W. Thomas, *Ancient Folk-Literature from North-Eastern Tibet* (Introductions, Texts, Translations and Notes), Abhandlungen der Deutschen Akademie der Wissenschaften zu Berlin. Klasse für Sprache, Literatur und Kunst, Jahrgang 1952, Nr 3, Berlin 1957, p. VII.

²⁴¹ *Ibidem*, Preface p. IX, Introduction pp. 1, 9, 12, 16.

²⁴² *Ibidem*, Introduction pp. 9—13.

²⁴³ *Ibidem*, Texts, pp. 52, 81—85, 90, 95.

²⁴⁴ See: Marszewski, *op. cit.*, pp. 263/264.

a chronicle compiled in Parbatiya ca 1800, where a passage (V, 14) devoted to the rule of Jagat Jyotir Malla (ca 1617—1633), the king of Bhatgaon, reports that some grains of maize have been dragged to the Kathmandu Valley from the East ²⁴⁵. The credibility of that reference was confirmed to the author by two experts of Nepalese history and literature. Though the English translation of *Vaṃśāvali* was published already in 1877 and several specialists like Lévi (1905) ²⁴⁶, Landon (1928) ²⁴⁷ and Kawakita (1957) ²⁴⁸ indicated that mention in their references to the reign of Jagat Jyotir Malla, it has been completely neglected in the polemics on the ancientness of maize cultivation in Asia. For the first time it was included into that problem by the author (1963) ²⁴⁹. If we admit that the people of the Kathmandu Valley got indeed acquainted with maize early in the XVIIth century, we should not expect consequently any reference to its cultivation in that part of Nepal in the written sources prior to that time. Nevertheless, we should not exclude them from our investigations, if only for the reason that at least some of them may contain references to other regions of Nepal where maize could have been known earlier. Then, as regards the sources originating from the cultural centres of the Kathmandu Valley, numerous unpublished manuscripts, both in Sanscrit and Nevari,

²⁴⁵ *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; Marszewski, *op. cit.*, pp. 281/282.

²⁴⁶ Sylvain Lévi, *Le Népal — Étude historique d'un royaume hindou*, Vol. II, Paris 1905, p. 240.

²⁴⁷ Perceval Landon, *Nepal*, London 1928, Vol. I, p. 56.

²⁴⁸ Jiro Kawakita, *Ethno-Geographical Observations on the Nepal Himalaya* in: *SRJENH*, ed. by H. Kihara, Vol. III: *Peoples of Nepal Himalaya*, Kyoto 1957, p. 13.

It must be however remarked that Kawakita wrongly admitted that maize was introduced into Nepal in the XVth century and from the South. That view is derived from some mistakes he has committed. Jagat Jyotir Malla was not a son of Jaya Sthiti Malla and did not die in 1427, which was just the date of death of the latter; but he was a king of the local dynasty ruling at Bhatgaon up from the partition of the Malla kingdom which was said to take place ca 1480 (See: Landon, *op. cit.*, Vol. I, pp. 38/39; *History of Nepal...*, *op. cit.*, p. 189, 314.

²⁴⁹ Marszewski, *op. cit.*, p. 281 f.

which survived from the time of Malla dynasty (several of them written even before the XVIth century) ²⁵⁰ wait for such an inquiry. As for the other cultural centres of the country, our interest should go first to the region of Jumla, where maize cultivation is testified ²⁵¹ for the time preceding its spread in India, and which region was included from the XIth up to XIVth century into the vast kingdom embracing some western parts of Nepal and Tibet ²⁵². However, besides some stone inscriptions ²⁵³ containing genealogies of the kings and enumerating their conquests and donations, no other written sources emanating from that cultural centre have been signalized.

As regards North Indian literature, though Pogson, an expert on Indian agriculture wrote (1883) that „The cob of Indian corn called Bhotta in Hindee is repeatedly alluded to in the 'Maha-Bharut'...” ²⁵⁴ Gode, a professor of Indian literature could not find (1950) ²⁵⁵ in native sources any reference to that plant prior to 1540 A.D. The first opinion seems to be incompetent and unfounded as Pogson did not indicate the places where the alleged allusions to maize were to occur in the *Mahābhārata*. Contrariwise the statement of Gode should not stop a further ethnobotanical investigation in the North Indian sources, and especially in those of them which reflect the economic conditions of the mountain or submontane areas where maize cultivation acquired a prominent role in the agriculture of the aboriginal tribes.

²⁵⁰ See: *History of Nepal...*, *op. cit.*, pp. 316—324; Lévi, *op. cit.*, Vol. I, Paris 1905, pp. 198, 217; Luciano Petech, *Mediaeval History of Nepal (c. 750—1480)*, Roma 1958, p. 5.

²⁵¹ See: Marszewski, *op. cit.*, p. 248.

²⁵² Giuseppe Tucci, *Nepal. The Discovery of the Malla*, London 1962, pp. 60—62, 64, 68.

²⁵³ *Ibidem*, p. 57; comp.: pp. 59, 62, 65.

²⁵⁴ Frederick Pogson (Lieut.), *Manuel of Agriculture for India*, Calcutta 1883, p. 149.

²⁵⁵ See: Vishnu-Mittre, *op. cit.*, p. 155; Vishnu-Mittre & Gupta, *op. cit.*, p. 181 after: P. K. Gode, *The History of Maize in India between 1500 and 1900*, „Prof. D. V. Potdar Commemoration Volume”, Poona 1950. (Unfortunately that paper has not been available to the author).

Then, for the North-East India the Assamese literature is first to be studied. Thus, we have to consider the written sources of various cultural centres of Assam, which, though differentiated ethnically, had many mutual historical and cultural links and above all for a long period a common *lingua franca*, the Assami. The earliest records which up to the advent of the Ahoms²⁵⁶ in 1228 A.D. were written in the Sanscrit are represented by some copper-plate inscriptions²⁵⁷ being state documents. The fact that such kind of sources may also contain some information concerning the economic life may be proved by several references to hunting which are to be found in the oldest known specimen dating from the VIIth century as well as in some ones of the XIth and XIIth centuries²⁵⁸. Far more information about the economy of the country is furnished by *Yoginī Tantra*, a religious text composed probably in Assam²⁵⁹ and only approximately dated²⁶⁰, which enumerates for instance, as Barua remarked²⁶¹: „nearly twenty varieties of rice“. The early literature written in Assami, forms instead, as emphasized by the same author²⁶² „a veritable mine of information for the study of social and economic conditions of the land“, and though these texts were recorded after the XIIIth century, according to him „they preserve traditions of earlier times“. This literature seems to deserve an ethnobotanical inquiry as, according to the opinion of Barua²⁶³, it

²⁵⁶ Records written in Ahom, which was used as a literary language in a part of Assam up from the early XIIIth century to probably the XVIIth century (see: Suniti Kumar Chatterji, *The Place of Assam in the History and Civilization of India*, Gauhati 1955, p. 44), were considered in the passage concerning the Western Thai sources (see: *infra*, p. 117).

²⁵⁷ B. K. Barua, *A Cultural History of Assam (Early Period)*, Vol. I, Nowgong (Assam), 1951, pp. 18, 34, 36; idem, *Studies in Early Assamese Literature*, Nowgong (Assam), 1953, p. 79.

²⁵⁸ Barua, *A Cultural...*, p. 132.

²⁵⁹ Chatterji, *op. cit.*, p. 13.

²⁶⁰ Chatterji (*op. cit.*, p. 13) admits that it was written „after 1000 A. D. and probably still later“, while Barua (*op. cit.*, p. 13) assigns it even to ca 1600 A. D.

²⁶¹ Barua, *op. cit.*, p. 85 (after: *Yoginī Tantra*, II, 5; 289—291).

²⁶² Barua, *op. cit.*, p. VI.

²⁶³ *Ibidem* p. 85.

„abounds in descriptions of a hundred varieties of paddy“. From the oldest extant works, it seems that besides songs, poetry and dramas²⁶⁴ attention should be directed to versified treatises on particular subjects, as medicine for instance. As for the later works, some new items may be brought perhaps by: (1) the Ahom²⁶⁵, Jayntia and Cachari chronicles which are said to be compiled up from the late XVIth century²⁶⁶; (2) the *carita puthis*, biographies of the Vaishnavite saints written since the XVIIth century and reflecting the economic conditions of Assam; (3) some of the *peḍā-kākata*, as e. g. a survey of lands from the time of Śiva Siphā (1714—1744) which gives some statistical data concerning the present district of Kamrup²⁶⁷. Besides, we should remember that only a part of Assamese literature is available for scientific studies, and that many unpublished manuscripts are extant in various, mostly private collections²⁶⁸, while few works only have been translated into English.

As regards the countries belonging to Assam in historical sense, the Tipra chronicles from Tripura which are said to be composed in Bengali up from the end of the XVth century²⁶⁹, would merit investigation as well.

Finally, the written sources emanating from other centres of North India and referring to some regions of Assam (*Pragjyotiṣa*) and Himalayas also deserve attention.

One set of such sources is presented by some Sanscrit works, *Harṣacarita* of Bāna, a poet of the VIIth century, being an example. Unfortunately in the list of gifts, which Bhaskaravarman the king of *Pragjyotiṣa* was to offer to the king Harṣavardhana, included in that poem, some fruits and plant products are mentioned²⁷⁰, but no cereals.

²⁶⁴ *Ibidem*, pp. 2, 4, 11, 24, 34, 44, 52, 54, 60, 84, 138.

²⁶⁵ The later Ahom chronicles were written also in Assami.

²⁶⁶ Barua, *op. cit.*, p. 69.

²⁶⁷ *Ibidem*, pp. 72, 82, 84, 87.

²⁶⁸ See: *ibidem*, pp. VIII, 69; P. D. Chaudhury & M. C. Das, *Ancient Treasures of Assam. Through Assam State Museum Gauhati*, Shillong 1959, p. 26.

²⁶⁹ Chatterji, *op. cit.*, p. 44.

²⁷⁰ *The Harṣa-carita of Bāna*, transl. by E.B. Cowell & F.W. Thomas, London 1897, p. 213 f.; comp.: Chatterji, *op. cit.*, p. 28.

Another set is formed by a few works which may be designated as „Indo-Persian“. The first to be pointed out is *Ṭabakāt-i-Nāṣirī*, written by Abū ‘Umar Minhaj ad-Dīn who soujourned nearly two years (1242—1244) at Laknawti in Bengal and had a possibility, as remarked by Ferrand²⁷¹, to gather precise information about neighbouring countries. Thus, there are given some references to the language and physical appearance of mountain tribes living near the Tibetan frontier; further, in a passage about the campaign of Muḥammad Bakḥtiyār against Tibet in 1243 there is a mention about the prosperity of villages in some regions of West and North Assam which he was to cross with his army²⁷². Nevertheless nowhere any allusion to the cultivated plants is to be found. Then in *‘Ain-i-Akbarī*, an administrative report for the year 1590, written ca 1595 by Abul Fazl, a minister of Akbar, there are references²⁷³ to useful trees of Assam and domestic animals of Arakan, but none to the crops cultivated in these areas. Yet, it should be added, that though maize is not enlisted, as remarked by Watt²⁷⁴, among the food plants of India enumerated in that work, we read in the chapter about the flowers to be seen at the court of Akbar, that the leaves of *keurah* are like those of a plant which was recognized as maize²⁷⁵. According to Watt that identification seems to be quite credible, when considering that Abul Fazl gave a correct description of a pine-apple, being also of American origin. Finally, in *‘Alemgīr nāmeḥ*, a work of Mīrzā Muḥammad Kaẓim, finalized in 1663, there is a mention²⁷⁶ in a passage on the geography of Assam that the people *Nang* — most probably one of the tribes in the eastern part of that country — received grains and salt for aloes tree in barter trade with the people — as may be surmised from

²⁷¹ *Relations de voyages et textes géographiques arabes, persans et turks relatifs à l'Extrême-Orient du VIII au XVIII siècles*, traduits, revus et annotés par Gabriel Ferrand, T. II, Paris 1914, p. 353.

²⁷² *Ibidem*, T. II, pp. 353—355.

²⁷³ *The Ain-i-Akbari* by Abul Fazl Allami, translated from the original Persian by H. Blochmann, Vol. I, Calcutta 1873, pp. 117/118.

²⁷⁴ George Watt, *A Dictionary of the Economic Products of India*, London—Calcutta 1893, Vol. VI, Part IV, p. 334.

²⁷⁵ *The Ain-i-Akbari*..., p. 83.

²⁷⁶ *Relations de voyages*, op. cit., T. II, pp. 556—558.

the context — living in the Brahmaputra Valley. But unfortunately, no reference to the crops is encountered there.

For the North-West India it is the Kashmirian literature that should be investigated first. The amplest and most authentic native source for the geography of Kashmir, as remarked by Stein, is the *Rājataranginī* chronicle, compiled by Kalhana in 1148—1150²⁷⁷. Though it contains several references to some peoples inhabiting the mountains encircling the Kashmir Valley like *Darādas* (Dards), *Bhāttas* (Tibetans) in the North, and *Khaṣas* (Khakhas) in the West and South²⁷⁸, they mostly deal with political events and do not inform about culture. As for the Valley itself numerous mentions about rice and occasional ones about wheat, barley and millet are to be found²⁷⁹.

As concerning South Indian sources, it seems that our investigation should be concentrated on these of them which refer to the commercial and diplomatic contacts with one region or another of South-East Asia. Thus, Tamil sources are to be first examined, but the known and published specimens, which should be taken here into account concern mostly political events, like e.g. the naval expedition of king Rājendra Cola I to *Kādaram* (most probably Kedah on the west coast of the Malay Peninsula) or to the western peripheries of Śrīvijaya kingdom (then first of all Sumatra)²⁸⁰. Nevertheless, an early poem the *Paṭṭinappālai*, relates already, as reported by Ferrand²⁸¹, that ships brought some wares from the *Kalakan* (*Kādaram*(?)) country to a great port at the mouth of Kaveri (*Puhār*). Then, in a document recorded on

²⁷⁷ Kalhana's *Rājataranginī*, *A Chronicle of the Kings of Kāśmīr*, transl. with an introduction, commentary and appendices by M. A. Stein, Westminster 1900, Vol. I: pp. 6, 15, 42; Vol. II: p. 366.

²⁷⁸ *Ibidem*, Vol. I: pp. 91, 127—128; Vol. II: pp. 404, 430/431, 435.

²⁷⁹ *Ibidem*, Vol. I: pp. 38, 58, 75, 195, 201, 221, 276, 308, 364, 390; Vol. II: pp. 83, 117, 145, 191.

²⁸⁰ *Relations de voyages*..., op. cit., T. II, pp. 646/647; A. Nilakanta Sastri, *A History of South India from Prehistoric Times to the Fall of Vijayanagar*, Oxford 1958 (2 éd.), pp. 174—176; R. C. Majumdar, *The Overseas Expeditions of King Rājendra Cola*, „Artibus Asiae“, Vol. XXIV, 1961, No 3/4, pp. 338—342.

²⁸¹ *Relations de voyages*..., op. cit., T. II, p. 648 (note 1); comp.: Sastri op. cit., pp. 120, 128.

copper plates discovered in Puttur village and dated after Majumdar²⁸², for the 8th year of the reign of Rājendra Cola I (i.e. ca 1020 A.D.) a mention is to be found according to which that ruler received some gifts from the king of *Kambuja* (Cambodia). Majumdar remarked also that this event might have been preceded by some earlier diplomatic intercourses.

Iranian literature represents still a virgin soil for ethnobotanical investigations. From the extant works containing references to countries lying to the East of Iran, *Jamī'u-t-tavārikh*, a work written ca 1310 by Rašīd ad-Dīn²⁸³, a Persian historian born at Hamadan, is an example. But only a laconical passage about Indonesia and *Champa*, without any allusion to the plants cultivated in these areas, is to be found in that work. As regards Iran, according to the opinion expressed by Lacy in 1911²⁸⁴ in the Persian literature of the second half of the XVth century there is an alleged reference to maize. It namely concerns a brief mention about a plant called in Persian *rus* and identified by Herbelot with the „*blé de Turquie*“ which, as asserted by this author, is to be found in the fifth part of *Rauzat al-Ṣafā*, a historical work written by Mīrkhond (1435—1498). However, Bonafous, as emphasized by Lacy, did not confirm the plant *rus* to be mentioned in Mīrkhond's work, though he was inclined, we may add, to admit a pre-Columbian cultivation of maize in Asia. Besides, he suggested that Herbelot could have either confused his notes or quoted the discussed reference from another work. According to Lacy that reference could have been drawn, for instance, from *Kholāse-al-akhbār*, a work of similar content, written not long after that by Khondemīr (1475—1534), a grandson of Mīrkhond. That seemed to Lacy quite probable, as both these authors and their works have been often confounded. Lacy insisted therefore on investigating the work of Khondemīr in that respect. Such studies have not yet been carried out, as stated

²⁸² Majumdar, *op. cit.*, pp. 340, 341.

²⁸³ *Relations de voyages...*, *op. cit.*, T. II, pp. 361—362.

²⁸⁴ Mary G. Lacy, *Pre-Columbian References to Maize in Persian Literature*, „Science“, N. S., Vol. XXXIII, No 860, June 23, 1911, pp. 968—970.

by Mangelsdorf and Reeves²⁸⁵, and it seems that in any case they should be undertaken.

Arabian sources have not brought up till now any valuable elements for our problem, though we could expect them to at least in travel relations and geographical works from the IXth to the XIVth century, as they abound in references to various regions of South-East Asia. The bulk of these reports is based, however, on hearsays and second-hand information or quotations from earlier sources compiled by authors who had never seen the regions described in their papers. We shall review here only these which seem to be more important.

The relation of Sulaymān, who as a trader undertook several voyages to India and China and recorded his observations ca 851²⁸⁶, is the earliest which should be considered here. Unfortunately, though he reports about the *Lakṣmipura* kingdom, identified by Ferrand²⁸⁷ with the present Lakhimpur in NE Assam as well as about the countries of *Muja* and *Mabad*, which might be localized somewhere in the Himalayas, he did not give any references to plants cultivated in these areas²⁸⁸.

The relation of Abū Dulaf Mis'ar ben Muhalhil, a poet living at the court of the Samanids at Bukhāra, who ca 940 travelled across Central Asia to China and had to visit also some ports of India, Malay Peninsula and Indochina, is more informative²⁸⁹. In that account preserved only in some later geographical compilations²⁹⁰, several mentions are to be found about the cultivation of millet, barley and wheat among the Turkish tribes of Central Asia and that of wheat in Kashmir and Kalah on the Malay Peninsula, but no references to other cereals grown in these areas²⁹¹. As regards the relation of al-Mas'ūdī, written ca 943 we should not forget that North-West India was the easternmost country known to that poet from an autopsy²⁹². In that relation

²⁸⁵ Mangelsdorf & Reeves, *op. cit.*, pp. 37/38.

²⁸⁶ *Relations de voyages...*, *op. cit.*, T. I, Paris 1913, p. 35.

²⁸⁷ *Ibidem*, p. 45 (note 1).

²⁸⁸ *Ibidem*, p. 45.

²⁸⁹ *Ibidem*, pp. 1, 89.

²⁹⁰ As for instance in the work of Yakut compiled in 1224.

²⁹¹ *Relations de voyages...*, *op. cit.*, pp. 210, 213—216, 222, 224.

²⁹² *Ibidem*, p. 91.

some mentions ²⁹³ are found about certain products exported from the southern coasts of Burma and Vietnam as well as those from the Malay Peninsula and Indonesia but no cereals are included among them. A more detailed account could be expected, it seems, from the encyclopedic work of al-Birūnī, devoted to Indian culture and written *ca* 1030 ²⁹⁴. Though that scholar reached some parts of North India and gives, for instance, detailed information on the localization of some cultivated grounds in the Kashmir Valley as well as on the geographical position of Nepal, Bhutan and Assam ²⁹⁵, he does not refer to products of these countries. On the other hand in the geographical work of al-Idrisī compiled in 1154 ²⁹⁶ there are numerous references to plants cultivated in South Vietnam, the Malay Peninsula and Indonesia. They mostly concern rice or cereals in general, without specification of genus, though for *Jawaga*, which corresponds in a broad sense to the western part of Indonesia, there is also reported a kind of sorghum ²⁹⁷. In a similar work written by Abū'l-Fidā' (1273—1331) ²⁹⁸ we find some information referring, it seems, to various mountain or submontane regions of NE Assam, but nowhere mentions about cultigens of that area. The pharmacopoeias of al-Baytār and al-Samarqandī ²⁹⁹, both compiled in the first half of the XIIIth century, are also to be mentioned here. Nevertheless, though numerous plant products of Indian and Far Eastern origin, are reviewed in these works, no other cereal species than rice, panicked millet, sorghum, wheat and barley are reported. Finally the relation of Ibn Baṭṭūṭa has to be considered. Starting on his „Asiatic“ travel in 1332 he crossed Anatolia, Bukhara and Afghanistan, visited some regions of Punjab, Sind, Malabar, Coromandel,

²⁹³ *Ibidem*, pp. 97, 99, 106.

²⁹⁴ *Ibidem*, p. 162.

²⁹⁵ *Alberuni's India*. An English Edition, with Notes and Indices by Dr Edward C. Sachau, London 1910, Vol. I, pp. 201, 207.

²⁹⁶ *Relations de voyages...*, *op. cit.*, T. I, p. 172.

²⁹⁷ *Ibidem*, pp. 174, 186—188, 190, 192, 197.

²⁹⁸ *Relations de voyages...*, *op. cit.*, T. II, pp. 398, 400—401.

²⁹⁹ *Relations de voyages...*, *op. cit.*, T. I, pp. 234, 238; Martin Levey & Neury al-Khaledy, *The Medical Formulary of Al-Samarqandī...*, Philadelphia 1967 pp. 99, 104, 122, 126/127.

Dekhan, Bengal and Assam, then through Indonesia reached most probably China ³⁰⁰. However, the only cultivated grasses he mentions ³⁰¹, are: for Anatolia a kind of millet, for the Indus shores in Sind sorghum, for the neighbourhood of Delhi rice, wheat and sugar cane, for West India and Bengal rice and finally for China wheat and sugar cane. As to his trip into Assam, which would be the most interesting for us, its itinerary ran according to Gibb ³⁰² from Chittagong up to Sylhet and then through Habang on Meghma to the environs of the present Dacca. Unfortunately, in the respective passage of his relation we find only a laconical reference ³⁰³ to the mountains of *Kamaru* (= *Kamrūb*) extending up to *Thubbat* (Tibet) as well as to their inhabitants, but no crop from that area is reported, and a remark is even made that there are no cultivated lands.

As regards Turkish sources, considering the enigmatic forms of maize cultivated in the mountains of North-East Turkey („Asiatic“ or „Persian“ race) and those which are most common on the western shore of that country („Aegean“ race), it seems that an investigation of the early Ottoman records would be indispensable. Numerous registers of the XVth and XVIth century, preserved in the Turkish archives would be therefore the best source of information. They concern namely the lands and population in the great part of the Ottoman empire and, as emphasized by Barkan ³⁰⁴, contain precise data on the crops cultivated by particular villages.

³⁰⁰ *Ibn Battūta Travels in Asia and Africa* 1325—1354. Translated and selected by H. A. R. Gibb with an Introduction and Notes, New York, 1929, pp. 13/14; *The Travels of Ibn Baṭṭūṭa A. D. 1325—1354*. Translated with revisions and notes from the Arabic text edited by C. Defrémery and B. R. Sanguinetti by H. A. R. Gibb, Vol. I, Cambridge 1958, Foreword pp. XI—XIII.

³⁰¹ *Ibn Baṭṭūta Travels...*, *op. cit.*, pp. 143, 144, 185, 193, 196, 211, 228, 267, 282, 298; *The Travels...*, *op. cit.*, Vol. II, Cambridge 1962, p. 474.

³⁰² *Ibn Baṭṭūta Travels...*, *op. cit.*, map: face p. 184.

³⁰³ *Ibidem*, p. 268.

³⁰⁴ Ömer Lütfi Barkan, *Essai sur les données statistiques des cahiers de recensement dans l'Empire Ottoman au XV^e et XVI^e siècles* (Summary) in: „Proceedings of the Twenty-Second Congress of Orientalists, held in Istanbul, September 15th to 22nd 1951“, Vol. II: *Communications*, Leiden 1957, p. 372; comp.: p. 373.

Greek and Roman sources have been included into the problem of maize origin by some European writers of the XVIth and XVIIth century. Thus, John Parkinson in his *Theatre of Plantae* (1640) as well as some earlier herbalists³⁰⁵ considered that an alleged reference to maize occurs in *Peri fitōn istorias* of Theophrastus of Eresus on Lesbos (372/369—288/285 B.C.)³⁰⁶. The respective passage (VIII; IV, 4—6) in Hort's translation runs as follows³⁰⁷: „...not far from Bactra they say that in a certain place the corn is so vigorous that the grains grow as large as an olive-stone, while in the country called that of Pissatoi it is so strong that if a man eats too much of it, he bursts, which was actually the fate of many of the Macedonians“. However according to Sergeyenko³⁰⁸, another modern translator of that work, the discussed plant might be a kind of sorghum, though the localization of the region said to be inhabited by Pissatoi, is not possible for him. Further, Giovanni Battista Ramusio translated in his *Navigazioni et Viaggi* (published since 1550) from the *Bibliothēkē* of Diodōros Sikeliōtēs (written between ca 60 and 30 B.C.)³⁰⁹ a fragment describing an alleged voyage of Jambulus and claimed³¹⁰ to recognize maize in a cane mentioned there as cultivated on an equatorial island of the Indian Ocean. Besides he tried to identify that island with Sumatra. The discussed passages in Oldfather's translation are as follows³¹¹: „... a reed grows there in abundance, and bears a fruit in great plenty that is very similar to the white vetch“ (II, 57) and further „The reeds

³⁰⁵ See: Weatherwax, *Indian Corn...*, pp. 40/41; comp.: pp. 35, 39 and Finan, *op. cit.*, p. 157.

³⁰⁶ *The Oxford Classical Dictionary*, Oxford 1961, p. 896.

³⁰⁷ Theophrastus, *Enquiry into Plants*, transl. by Sir Arthur Hort, Cambridge — London 1949, Vol. II, p. 171.

³⁰⁸ Pheophrast, *Issledovanie o rasteniyah*, translation and commentaries by M. E. Sergeyenko, Isdatelstvo Akademii Nauk SSSR, 1951, p. 489 (notes 39 and 40).

³⁰⁹ *The Oxford Classical Dictionary...*, p. 284.

³¹⁰ Gio. Battista Ramusio, *Primo Volume & Seconda Edizione delle Navigazioni et Viaggi*, Venetia MDLIII (1554), fol. 190 r^o, v^o; fol. 192 r^o, v^o.

³¹¹ Diodorus of Sicily with an English Translation by C. H. Oldfather, London — Cambridge (Massachusetts) 1953, II, p. 73.

they say, from which the fruit for their nourishment is derived, being a span in thickness..." (II, 59). Yet according to Kroll (1914)³¹², while we cannot guess any definite island under that described by Diodorus, the reed with white fruit resembles rice³¹³ though its thickness may suggest sugar cane. Finally Gonzalo Fernandez de Oviedo y Valdes in his *Historia natural y general de las Indias* (published since 1535) thought³¹⁴ one of the plants mentioned by Gaius Plinius Secundus in *Historia Naturalis* (completed up to 79 A.D.)³¹⁵ to be maize. The respective passage (Book XVIII; X) runs as follows³¹⁶: „Miliū intra hoc decem annos ex India in Italiam invectum est, nigrum colore, amplum grano, arundineum culmo. Adoleſcit ad pedes altitudine ſeptem, praegrandibus culmis, lobas vocant: omnium frugum fertilissimum. Ex uno grano terni sextarii gignuntur. Sevi debet in humidis“. For Oviedo³¹⁷ the fact that the above mentioned grain was described as black, does not disagree with the possibility of its being a grain of maize, as it could be really dark purple like some forms from the New World and therefore appear black to Pliny. Such an identification was not excluded either much later by Littré (1883) who wrote³¹⁸: „Si l'holcus sorgho se trouvait déjà dans Théophraste, il faudrait renoncer à le voir dans ce mil indien dont Plin ne fait remonter l'importation en Italie qu'à une dizaine d'années. Le maïs a été, à la vérité, trouvé en Amérique; mais il n'est pas impossible que le maïs ait aussi pénétré dans l'occident par l'Asie; du moins les noms qu'il porte ἀραδοσίτι en grec modern (blé d'Arabie), blé de Turquie en Sicile, en France,

³¹² Kroll, *Jambulos*, in: Paulys Real-Encyclopädie der Classischen Altertumswissenschaft, Neue Bearbeitung begonnen von Georg Wissowa, Stuttgart 1914, Siebzehnter Halbband, col. 681—683.

³¹³ Such an identification is also suggested by Oldfather (*op. cit.*, p. 73 (note 1)).

³¹⁴ See: Laufer, *op. cit.*, p. 252 (note 2); Finan, *op. cit.*, pp. 150, 151, 153 after: Fernandez de Oviedo y Valdes, *Historia General y Natural de las Indias*, Madrid 1851 (Lib. VII, Cap. I), p. 268.

³¹⁵ *The Oxford Classical Dictionary...*, p. 704.

³¹⁶ *Histoire Naturelle de Plin avec la traduction en français* par M. E. Littré, T. I, Paris 1883, p. 661.

³¹⁷ See: *supra* note ³¹⁴.

³¹⁸ *Histoire Naturelle...*, *op. cit.*, p. 709 (note 11); comp.: p. 661.

sembleraient indiquer une telle origine". As pointed by Littré, Fraas also found it probable that the plant reported by Pliny was maize, while Fée identified it with sorghum. All these attempts to find allusions to maize in classical literature were negatively considered by modern specialists. In connection with it Weatherwax wrote ³¹⁹: „Obscure mention by Pliny or Theophrastus of peculiar grains or other seeds was easily distorted into reference to maize". Similarly according to Mangelsdorf and Reeves ³²⁰ none of the numerous Greek or Roman writers on agriculture, who discussed amply the Old World's plants, mentioned maize.

Unfortunately even such a kind of references, as mentioned above, is absent in the known records from the commercial centres of Roman Egypt; these sources being most interesting for their geographical horizons in respect to our problem. Thus, the *Geōgrafikē hyfēgēsis* of Claudius Ptolemaeus from Alexandria, compiled most likely in the middle of the IInd century A.D., though it contains a whole chapter on the geography of South-East Asia embracing vaguely vast territories of Indochina and several islands of Indonesia, it gives very scanty references to the culture of the aboriginal peoples. Then, in a few places we only find information ³²¹ that they go naked and live in caves, somewhere else ³²² that they are cannibals and a laconical reference to a riparian people called *ichtiofagos* whose name could indicate that their staple food was fish. If we consider, however, that all this information was based most probably on hearsays and inaccurate observations of travellers (one of them being Alexander, a Greek sailor who was to reach at least the coasts of South Vietnam) ³²³ the lack of references to the cultivated plants

³¹⁹ Weatherwax, *Indian Corn...*, p. 132.

³²⁰ Mangelsdorf & Reeves, *op. cit.*, p. 35.

³²¹ *Textes d'auteurs grecs et latins relatifs à l'Extrême-Orient depuis le IV^e siècle av. J.-C. jusqu'au XIV^e siècle*. Recueillis et traduits par George Coedès, pp. 58, 60 (*Geogr.* VII, 2; 18, 21, 26).

³²² *Ibidem*, pp. 52, 57, 60—63 (*Geogr.* VII, 2; 4, 16, 27, 28, 31; VII, 3; 1—3).

³²³ See: Tomasz Marszewski, *Remarques sur l'état des recherches concernant les contacts entre les peuples du Bassin de la Méditerranée et ceux de l'Asie du Sud-Est dans l'Antiquité*, „Folia Orientalia" T. VI (1964), Kraków 1965, p. 151; comp.: p. 173.

should not be surprising. Far more credible is the relation included in *Periplou tēs Erythras talássēs*, an anonymous guide over the ports of the Indian Ocean, the dating of which oscillates between the middle of the Ist and early IIIrd century A.D. ³²⁴ Nevertheless, though its author, probably a merchant from Alexandria or Berenice, undertook a voyage himself along the shores of South Asia, he could not be personally acquainted with them beyond the Malabar coast, or, at the farthest the Ganges delta ³²⁵. Therefore his fragmentary knowledge of Indochina and South China might derive from relations of some other voyagers ³²⁶. In any case he gave in his work the first approximately correct localization of certain elements of the geography of South-East Asia ³²⁷. But the only detailed report of an ethnographical character ³²⁸ to be found in that work and which concerns the *Besatai* (*Sesatai*), deserves special attention. It gives namely an amazingly vivid description of an annual peregrination up to *Thinai*, a metropolitean town of the *This* country, undertaken by that tribe, during which the fragrant leaves of some kinds of trees have been carried for barter trade. Judging from the whole context that people inhabited an inland mountain region adjacent to *This*. As regards the localization of these geographical elements, serious discrepancies in opinions have appeared. Then, whereas the alleged seats of the *Besatai* were looked for either in Sikkim or in Assam, or somewhere in Indochina, *Thinai* was identified with certain towns of South and Central China or even localized in the neighbourhood of Saigon ³²⁹. Unfortunately, though all these regions played most probably an important role in the early diffusion of several crops, none of them is mentioned in the discussed passage of *Periplou*. The same pertains to a far later Latin relation of Palladius (365—

³²⁴ *Ibidem*, p. 149; Jacqueline Pirenne, *Un problème-clé pour la chronologie de l'Orient: la date du Périples de la Mer Erythrée*, JA, T. 249, fasc. 4, 1961, pp. 450—457.

³²⁵ See: Marszewski, *op. cit.*, p. 149.

³²⁶ Richard Delbrueck, *Südasiatische Seefahrt im Altertum*, „Bonner Jahrbücher", Heft 155/156, 1955/1956, Zweiter Teil, p. 238.

³²⁷ See: Marszewski, *op. cit.*, p. 133.

³²⁸ *Textes d'auteurs...*, *op. cit.*, pp. 24—25 (*Peripl.* 65).

³²⁹ See: Marszewski, *op. cit.*, pp. 144 (Tabl. VI), 146 (Tabl. VIII), 147.

430) inserted in his treatise. *De Brahmanibus* preserved only in fragments in the work of the so called Pseudo-Kallistenes³³⁰. There is namely a mention about the people *Bisades*, in which, according to Coedès³³¹, we can recognize the *Beseidai* of the *Geōgrafikē* and *Besatai* of the *Periplou*. Whether that identification is correct or not, the above mentioned reference informs us only that *Bisades* inhabited the caves in a certain mountain region and that they collected pepper. Byzantine sources have been completely neglected in respect to our problem. Bearing yet in mind that they treat, among others³³², subjects like commercial geography, economic regulations and medical prescriptions, it seems that they should be also examined in search for possible references to cereals grown in Anatolia.

East European literature can be here represented only by Russian sources and among them first of all by the relation of Athanasius Nikitin of Twer who in the years 1467—1472 travelled across Persia and throughout Central India. Unfortunately his recorded observations on the agriculture of the visited countries are limited only to one mention concerning the cultivation of wheat and rice in Junir (Junnar) in the Bāhmāni kingdom³³³. In any case that reference merits an attention, as Nikitin had, as emphasized by Jakubovski and Willman-Grabowska³³⁴, an excellent memory and interest in all what seemed to be new, alien and characteristic. As regards his laconic and evidently second-hand information about Pegu he refers³³⁵ only to the trade in precious stones and does not report any plant product of that country.

West European literature, which since the XIIIth century has

³³⁰ *Textes d'auteurs...*, op. cit., pp. 98—100 (Pseudo-Kallistenes, III, 7—8).

³³¹ *Ibidem*, pp. XXVII, 57 (*Geogr.* VII, 2; 15).

³³² Karl Krumbacher, *Geschichte der Byzantinischen Litteratur von Justinian bis zum Ende des Oströmischen Reiches* (527—1453), München 1891, pp. 66—68, 155—159, 162—164.

³³³ *Chojenije za tri morya Afanasiya Nikitina 1466—1472*, (published by the USSR Academy of Science, second edition revised), Moskwa—Leningrad 1958, pp. 74, 79.

³³⁴ Atanazy Nikitin, *Wędrowki za trzy morza*, transl. by Helena Willman-Grabowska, Wrocław 1952, pp. CXI, CXIX.

³³⁵ *Chojenije za tri morya...*, p. 81

abounded in relations of travels undertaken to various countries of the Middle and the Far East, has not been either fully exploited for the problem of early diffusion of maize cultivation in Asia. The most important in that respect are of course the pre-Columbian records. However, for the coasts of South-East Asia where the first European settlements were established, the sources of the early XVIth century are also worth to be studied. For the more inaccessible, mountain or far inland regions, also the later ones, not excluding even those of the first half of the XVIIIth century, should not be neglected. The still later accounts, being mostly relations of scientific or diplomatic expeditions as well as reports of an administrative or economic character, belong already to the period during which the Europeans penetrated almost all the main centres and tracks of South-East Asia and their recorded observations of native cultures began to gain a more scientific shape. Therefore, they will be ranged together with purely scientific elaborations and discussed accordingly.

Italian records are the earliest among the known medieval pre-Columbian relations of travels into East Asia made by the European travellers. It was Heine-Geldern who in connection with the problem of maize ancientness in Asia alluded³³⁶ already to a certain passage of *Le Divisament dou Monde* of Marco Polo, whose journeys ran across several regions most interesting in that respect. Starting in 1271 he crossed namely some parts of Iran, Hindukush and Pamir, and through Kashgar, Yarkend and Chotan reached China in 1275. Further, during his 17 years long sojourn in that country he travelled throughout several of its provinces and undertook even some expeditions beyond its frontiers. The itinerary of his farthest trip led over the central and western parts of Yün-nan and then through the NE Burma up to the kingdom of Mien identified with Pagan, while the return route up to the capital of Yün-nan followed a somewhat more southerly course. Marco Polo may have participated also in an embassy to India and on the way spent some time in the kingdom of Champa. He left China in 1292 and navigated along the shores of Vietnam, the southern extremity of the Malay Peninsula, Sumatra, then Ceylon and the western coast of India, to reach home in

³³⁶ Heine-Geldern, *Kulturpflanzengeographie...*, p. 393.

1295³³⁷. Unfortunately the references to the cultivated plants and plant products to be found in his relation are, as emphasized by Heine-Geldern³³⁸, vague and full of gaps. Then, in the chapter about the *Chescemir* (Kashmir) it is reported (following the basic Franco-Italian version (F) completed by Moule and Pelliot³³⁹ after another version (V)) that the people of that province has for food „... rice & many other things“³⁴⁰. It may be added here that Heine-Geldern³⁴¹ who had recourse to a similar version remarked that such reference could well concern several cereals like wheat, barley, millet and maize too. Again in the chapter about *Ciamba* (*Champa*) in a Latin version from the *Codex of Toledo* (Z)³⁴² a following mention³⁴³, lacking in the version F, is to be found: „Much grain grows in the greater part of them“. Then for the countries *Gaindu* (SW Szechuan)³⁴⁴ and *Caragian* (Yün-nan) in all versions considered by Moule and Pelliot, there are only reference to rice and wheat³⁴⁵, for *Toloman* (S. Yün-nan, W. Kweichow[?]), *Caugigu* (NW part of North Vietnam[?]), *Çardandan* (on the Upper Saluen and Mekong), *Bangala* (Bengal) to rice alone³⁴⁶ while for *Mien* (Pagan) and *Tebet* (Tibet) no crops are reported³⁴⁷.

³³⁷ Marco Polo, *Opisanie Świata* (From the Old French Original with a consideration of the Old Italian and Latin Versions translated by Ludwika Czerny. Introduction and Notes by Marian Lewicki) Warszawa, 1954, Lewicki, pp. 10, 25—29, 694—696, 699, 740 and the map; Giotto Dainelli, *Marco Polo*, Torino 1941, pp. 130—133, 163—184 and the map.

³³⁸ Heine-Geldern, *op. cit.*, p. 393; comp.: Collins, *A New Type...*, p. 23.

³³⁹ Marco Polo, *The Description of the World*, A. C. Moule & Paul Pelliot, London 1938, Vol. I, p. 140.

³⁴⁰ However in a pure version F in a respective passage only rice is mentioned (see: *Opisanie Świata...*, *op. cit.*, p. 165).

³⁴¹ Heine-Geldern, *op. cit.*, p. 393.

³⁴² Marco Polo, *The Description...*, Moule & Pelliot, p. 41.

³⁴³ *Ibidem*, p. 366.

³⁴⁴ All localizations and identifications given here in brackets follow these accepted by Prof. M. Lewicki (see: Marco Polo, *Opisanie...*, pp. 692, 694, 696, 699, 700).

³⁴⁵ Marco Polo, *The Description...*, pp. 276, 277.

³⁴⁶ *Ibidem*, pp. 282, 295, 296, 298.

³⁴⁷ *Ibidem*, pp. 268—273, 293—295.

As for the post-Columbian sources, Jeffreys was the first who pointed out (1955)³⁴⁸ that some references interesting for the problem of maize ancientness in Asia are to be found in *Primo viaggio intorno al Mondo* of Pigafetta. It must be recalled here that this traveller participated in the contacts which took place in 1521 with the aboriginals of the Philippines and Moluccas, the first that they were to have with Europeans. Considering the fact that Pigafetta used the word *al miglio* for the crop named by some Indians of Brazil *mahiz*, being evidently maize, as well as for a species which the aboriginals of the eastern shore of Sama island (Philippines) called *humas*, Jeffreys concluded that this last name, must concern the same plant. He indicated too that in the translation of Pigafetta's relation given in 1789 by Richardson the name *humas* was also rendered as „maize“. Finally he quoted from Robertson's edition of 1909, several other extracts of Pigafetta's text where various crops cultivated on the Philippines, and Cebu island in particular, are enumerated. Having considered them he insisted that this traveller might have sufficient knowledge to discern maize and not to confuse it with some other cereals. A quite different point of view was expressed in that respect by Merrill³⁴⁹ according to whom nowhere in Robertson's edition of Pigafetta's relation references to maize are to be found and the name *humas* was applied in Negros to millet (*Panicum miliaceum* L.) at the time of the Magellan's arrival. It may be added here that while reading the discussed relation in Ramusio's edition of 1554 the author found that for the Bandan archipelago, lying not so far to the south from Moluccas, a following remark is given by Pigafetta³⁵⁰: „In q̃sta non si truova se no il pan che fanno di Sagu, & d'un certo grano detto Mahiz, risi, coche, fichi, & sono tutte uno apresso l'altra. Gli habitatori dō q̃ste sono Mori...“.

As to the published relations of other early Italian travellers they do not bring any valuable elements to our problem. From the extant ones these of the XIIIth and XIVth century were all

³⁴⁸ Jeffreys, *Pre-Columbian Maize in Asia*, *op. cit.*, pp. 22—24; see: Marszewski, *The Age of Maize...*, p. 285.

³⁴⁹ Merrill, *The Botany...*, p. 365.

³⁵⁰ Ramusio, *Primo Volume & Seconda Editione...*, fol. 406 v^o.

written by Franciscans who proceeded to the Far East as legates or missionaries, while those of the XVth and XVIth century mostly by merchants who penetrated the southern coasts of Asia. Then no references to cereals are encountered either in the relation of Giovanni da Pian del Carpine who in the middle of the XIIIth century travelled through Central Asia up to Mongolia, but referred also to *Burithabet* (most probably North Tibet), or in the letters of Giovanni da Montecorvino, who somewhat later lived for 36 years in China or those of Peregrinus de Castello, Andreas de Perusia and Giovanni de Marignolli, who in the first half of the XIVth century spent also some years in the eastern part of that country³⁵¹. No important ethnobotanical data are to be found even in the relation of Odorico da Pordenone who up from 1318 visited some regions in West Asia, South India, Sumatra, Java, maybe also Borneo and South-East Vietnam; then several ports on the coast of China from where after a 3 years-long sojourn he returned home through Shensi and Shansi and by an unknown route across Central Asia³⁵². Then in the fragments of that relation concerning South China and *Tibot* (Tibet) there are references to various kinds of food but no mention about cereals, while in the passage about *Zampa* (*Champa*) no plant products are reported³⁵³. The account of Nicolo di Conti, a trader from Venice, is of similar value. Having visited several places in South India he sailed from Ceylon to Tenasserim, afterwards to Bengal where he proceeded up the Ganges and returning to the coast took a ship for Arakan, whence across the mountains and along the Irrawaddy valley he arrived to Ava ca 1430³⁵⁴.

³⁵¹ *Sinica Franciscana*, Vol. I: *Itinera et Relationes Fratrum Minorum Saeculi XIII et XIV* collegit, ad fidem codicum redegit et adnotavit P. Anastasius van den Wyngaert O. F. M. Ad Claras Aquas (Quarachi — Firenze). Apud Collegium S. Bonaventurae, 1929: Carpini, pp. 60—61; Monte Corvino, p. 342; Castello, p. 367; Perusia, pp. 374—376; Marignolli, pp. 536, 543.

³⁵² *Ibidem*, Wyngaert, pp. 382—383; comp.: Berthold Laufer, *Was Odoric of Pordenone ever in Tibet?*, „T'oung Pao“, Série II, Vol. XV, 1914, pp. 415—418.

³⁵³ *Sinica Franciscana...* *op. cit.*, Portu Naonis, pp. 484—486.

³⁵⁴ Arthur P. Phayre (Lt-Gen. Sir), *History of Burma...*, London 1883, p. 262.

Maybe also, as suggested by the text of his narration³⁵⁵, he reached South China by land and from the port of *Zaiton* navigated to the western part of Indonesia. Unfortunately, in a report of Conti (recorded first in Latin by his secretary Poggio Bracciolini) either in the passages referring to *Ternassari* (Tenasserim) and *Racha* (Arakan) or in a description of Ava and the wealth of its inhabitants no mentions about the local cereals are found³⁵⁶. Only in the passage on *Mangi* (South China) and India there are references to rice³⁵⁷. The relation of Hieronimo di Santa Stefano, a merchant from Genoa, who arrived to Pegu in 1496 and noted there also hearsays about the kingdom of Ava³⁵⁸, is still less informative. Then, though for South India, Ceylon and Sumatra he reports pepper, ginger and various fragrant trees, in the passages concerning Pegu and Ava he does not mention any plant products³⁵⁹. The report of Ludovico di Varthema of Rome who visited Pegu and Tenasserim in 1503 or 1504, is quite laconical and unprecise. So, concerning cereals he noted only that in Pegu there is a great abundance of grain³⁶⁰. A separate attention should be drawn to *Il libro dei Conti* of Giacomo Badoer, a merchant from Venice, who stayed in Constantinople in the years 1436—1440. But the only cereal which seems to be reported in his accounts is *formento*³⁶¹, i.e. most probably wheat, though *formento de Turchia*³⁶² strangely coincides with the *Frumentum Turcicum*, a form of maize believed by early European herbalists to be introduced into Europe from Asia.

Finally, the relation of the Jesuit Ippolito Desideri who travelled and sojourned in Ladak in the years 1712—1727, may be also

³⁵⁵ Ramusio, *op. cit.*, fol. 376 r^o — 377 r^o; see also: fol. 374 r^o.

³⁵⁶ *Ibidem*, fol. 375 v^o — 376 r^o.

³⁵⁷ *Ibidem*, fol. 376 r^o, fol. 378 v^o.

³⁵⁸ *Ibidem*, fol. 382 r^o; Phayre, *op. cit.*, p. 263.

³⁵⁹ Ramusio, *op. cit.*, fol. 381 v^o, fol. 382 r^o.

³⁶⁰ *Ibidem*, fol. 181 r^o; Phayre, *op. cit.*, p. 263.

³⁶¹ *Il Nuovo Ramusio*, Volume terzo: *Il libro dei Conti di Giacomo Badoer* (Constantinopoli 1436—1440), testo a cura di Umberto Dorini e Tommaso Berteli, 1956, Introduction by Giuseppe Tucci, pp. IX—X; Text, pp. 108, 109, 131, 148/149, 240, 307, 308, 310, 422, 440, 441, 499, 604, 716.

³⁶² *Ibidem*, p. 441.

considered here. The only cereals, however, that he reports for West Tibet, are wheat and barley ³⁶³.

Portuguese sources demand a specially scrupulous investigation, considering the fact that „Lusitanians“ were the first among Europeans to establish permanent contacts ³⁶⁴ with the mainland as well as the islands of South-East Asia. Unfortunately this has not been done up till now in a systematic way and, as Merrill remarked ³⁶⁵, there have been no intensive studies of the „Portuguese plant transfers“ from America into Asia. The only Portuguese testimony which, as far as we know, was considered in connection with the problem of maize introduction into the Far East, is to be found in *Relazione della Grande Monarchia della Cina*, written ca 1633 (published in 1643) by the Jesuit Alvarez Semedo who spent some time in China in 1613 ³⁶⁶. The respective passages from that work were namely quoted and discussed by Laufer ³⁶⁷ who also concluded that at the beginning of the XVIIth century maize along with some other cereals was cultivated already throughout North China, and particularly in Shensi, Shansi and Chihli (Hopei).

The most important accounts would be those from the first contacts ³⁶⁸ of the Portuguese with the particular regions of Asia. Unfortunately, the state of documentation of the activity of the numerous traders and adventurers who up from the second decade of the XVIth century operated on the coasts ³⁶⁹ of Arakan,

³⁶³ *An Account of Tibet. The Travels of Ippolito Desideri de Pistoia S. J. 1712—1727*, ed. by Filippo de Filippi with an Introduction by C. Wessels S. J., Revised Edition, London 1937, pp. 75, 78, 121, 181, 190, 315.

³⁶⁴ See: Marszewski, *op. cit.*, map on the p. 292.

³⁶⁵ Merrill, *The Botany...*, p. 193.

³⁶⁶ Laufer, *The Introduction of Maize...*, p. 238.

³⁶⁷ *Ibidem*, pp. 238—239.

³⁶⁸ Then for instance the first contact of the Portuguese with Arakan was to take place in 1517; with Pegu and Siam — in 1511 (see: Phayre, *op. cit.*, pp. 172, 264).

³⁶⁹ Maurice Collis, *The Land of the Great Image. Being Experiences of Friar Manrique in Arakan*, London 1943, pp. 67, 78; Sudhitr Hiranplücks, *Die Entwicklungsgeschichte Thailands (Königreich Siam)*

Pegu, Siam, and Cambodia or penetrated farther inland up to Laos ³⁷⁰ and early in the XVIIth century even into Tibet ³⁷¹, is not very good. As regards the published sources one of the earliest is *Summa Oriental*, a compendium of the Portuguese knowledge about the countries of the Far East, compiled by Tomé Pirés most likely between 1512 and 1515 ³⁷². However, the only cereal which is reported there, and that as one of the main products of Arakan, Pegu, Cambodia and South Vietnam, is rice ³⁷³. Similarly in the relation of Duarte Barbosa who travelled across Indonesia in the years 1516—1519 ³⁷⁴ and collected also some information about various regions of Indochinese Peninsula, rice is mentioned as abundantly produced in Pegu and Siam, but no references to other crops are to be found there ³⁷⁵. The *Peregrinacão* of Fernam Mendez Pinto is somewhat more informative though not always reliable. In any case after leaving Malacca in 1540, that adventurer visited some regions in Lower and East Burma as well as in Siam and Indonesia, then touched the coasts of Cambodia and South Vietnam, but also travelled across East China and repeatedly up to Japan ³⁷⁶. Nevertheless, the only cereal reported by him for the countries of South-East Asia is rice, while among the crops he saw on his way from Nankin to Peking, wheat, rice, two kinds of millet, barley and rye, are included ³⁷⁷.

insbesondere die Geschichte der Beziehungen Siams zu den Europäischen Nationen in den Jahren 1600/1700, Dresden 1941, pp. 25, 48, 49; Groslier, *Angkor et le Cambodge...*, pp. 28, 34.

³⁷⁰ Groslier, *op. cit.*, p. 43.

³⁷¹ Francisco Maria Esteves Pereira, *O descobrimento do Tibet pelo P. António de Andrade da Companhia de Jesus em 1624 narrado em duas cartas de mesmo religioso*, Coimbra 1921, pp. 33/34.

³⁷² Groslier, *op. cit.*, pp. 142/143.

³⁷³ Ramusio, *op. cit.*, fol. 370 r^o, fol. 371 v^o, 372 r^o.

³⁷⁴ Groslier, *op. cit.*, p. 144.

³⁷⁵ Ramusio, *op. cit.*, fol. 350 v^o, fol. 351 v^o, fol. 353 r^o.

³⁷⁶ G. le Gentil, *Fernao Mendes Pinto, Un précurseur de l'exotisme au XVI^e siècle*, Paris 1947, pp. 11, 15, 17, 36, 54, 74, 95; Phayre, *op. cit.*, p. 265; Groslier, *op. cit.*, p. 145.

³⁷⁷ See: Samuel Purchas, *Hakluytus Posthumus or Purchas His Pilgrims*, Vol. XII, Glasgow 1906, pp. 71, 95.

More valuable reports for ethnobotanical studies, though somewhat later, are those of missionaries who since the middle of the XVIth century have proceeded into various countries of South-East Asia and the Himalayas and had closer and long lasting contacts with the aboriginals. The best known is the activity of Augustinians from Hughli, displayed in Dacca, Chittagong and Arakan as well as that of Jesuits from Goa — in West Tibet, both started early in the XVIIth century. The travel reports of Sebastiao Manrique, an Augustinian from Goa, are, for their geographical context, among the most important. One of his missions commenced in 1630³⁷⁸ at Dianga near Chittagong from where he sailed southwards up to Ramu (Panwa), then crossed the jungle on the Tha-lū-daung range, descended to Peroem (Pe-lun) and through Orietan (Urittaung), the mouth of Kaladan river and Poragri (Pharagrī) reached Mrauk-u, the capital of Arakan. However, the only cereal reported by Manrique for these regions as that of the aboriginal Magh tribe is rice, though describing his way to Poragri he noted³⁷⁹: „... we came into open country with rice fields, cotton crops and different kinds of cereals“. He undertook another trip in 1634³⁸⁰ from Mrauk-u to the mountains stretching nearby, most probably the Maum-awe range to the NE of the capital, where he visited the Portuguese prisoners exiled in a few hamlets inhabited by a wild tribe akin to Magh, which according to Collis³⁸¹ were probably the Mro or Chin. As regards their crops he wrote only „... we reached certain villages with fields of rice, vegetables and cotton“³⁸².

Another testimony which merits also to be considered here is the relation entitled *Da calidade da terra do Tibet e de sua gente* given by António de Andrade, a Jesuit from Goa, in a letter he wrote in 1626 from Chaparangue (Tsaparang), the main town

³⁷⁸ *Travels of Fray Sebastian Manrique 1629—1643*. A translation of the itinerario de la *Missiones Orientales* with Introduction and Notes by Lt.-Col. C. Eckford Luard, Oxford 1927, Vol. I, pp. XCVIII, LVII/LVIII, 94—163; Collis, *op. cit.*, pp. 95—122.

³⁷⁹ *Travels of Fray Sebastian Manrique...*, p. 124.

³⁸⁰ *Ibidem*, pp. 329—350; Collis, *op. cit.*, pp. 194—203.

³⁸¹ Collis, *op. cit.*, p. 199.

³⁸² *Travels of Fray Sebastian Manrique...*, p. 339.

of Guge district in the Ngari province in South-West Tibet, where he proceeded with a mission work from 1624 on³⁸³. But wheat and rice are the only crops reported in his account for that region of Tibet³⁸⁴.

As for other regions of Asia covered by the early missionary action, it seems that it would be indispensable to explore the respective archives, and especially those which concern the less known activity of the Dominicans from Malacca and Macao which embraced some parts of Cambodia as well as South and North Vietnam up from the second half of the XVIth century³⁸⁵.

Spanish sources are the next to be examined, as Spaniards followed the Portuguese in their attempts to colonize some regions of South-East Asia.

As regards the post-Columbian sources³⁸⁶ the report about the extension of maize cultivation in Fu-kien, inserted in *Historia de las cosas mas notables ritos y costumbres del gran Reine de la China* written by J. Gonzales de Mendoza, an Augustinian (published in 1585) is the only important one which has been considered as yet in the discussion on the time of introduction of that plant into the Far East. The first who in that connection examined that report was Laufer (1907)³⁸⁷. Later on it was discussed by several ethnologists (Jeffreys, Heine-Geldern, Marszewski)³⁸⁸ interested in that problem. It should be emphasized here that

³⁸³ Pereira, *op. cit.*, pp. 10—13, 21, 22, 39—41, 45, 69, 75.

³⁸⁴ *Ibidem*, p. 70.

³⁸⁵ Groslier, *op. cit.*, pp. 27, 29—30; R. P. Prisset, *Les Dominicains en Indochine*, „Indochine“, No 157, Jeudi, le 2 Septembre 1943, pp. 4—5.

³⁸⁶ Among the pre-Columbian Spanish sources the only one to be mentioned here is the relation of a Franciscan, Anonymus Hispanus, written in 1348. However, though he gives in it some information about the climate and geography of India and *Trimic* (Tibet (?)) as well as about some towns in the kingdom *Scim*, lying possibly in West Burma, he does not refer to the cultigens of these countries. (See: *Sinica Franciscana*, *op. cit.*, Wyngaert, p. 563; Anonymus Hispanus, pp. 572—574.

³⁸⁷ Laufer, *op. cit.*, pp. 235—236; 239—240.

³⁸⁸ Jeffreys, *Pre-Columbian Maize in Asia...*, p. 26; Heine-Geldern, *op. cit.*, pp. 369—371; Marszewski, *op. cit.*, pp. 283/284, 290/291, 293 and map on the p. 292.

this report was not a first-hand one but based on the account of Martin de Herrada, another monk of the same order who visited Fu-kien in 1577. Unfortunately, in other relations of that time concerning China, like those of Lucarelli de Pisauro, Tordesillas, Alfaro and Loyola, all Franciscans from Manila³⁸⁹ who penetrated in the years 1579—1585 also certain regions of the South-East of that country, there are no references either to maize or to any other cereals. As concerning the Spanish records from the Philippines, Merrill remarked³⁹⁰ that the earliest use of the word *mais* in these sources that he could detect, is to be found in a manuscript of 1578 written by Diego Lopez Povedano, the first „encomiendero“ of Negros. That word, however, is mentioned in a negative statement according to which maize is not to be seen on that island, the only cereals being rice, two kinds of millet and sorghum. Similarly in a relation from the year 1542 reported by Ramusio³⁹¹ as written by Ivan Gaetan, a sailor who was to reach Moluccas by the route of the Pacific Ocean, for two islands *Migindanao* (Mindanao[?]) and *Saguin*, the lack of maize is emphasized. Finally in a report for the year 1566 quoted by Purchas³⁹² as that of Miguel Lopez de Legazpi, the conqueror of Philippines, no maize is mentioned as cultivated there, but only rice and millet, though in his account for the year 1575 that concerns *Chautubo*, besides a reference to rice and wheat, an allusion to „other grains“ is encountered. But all these negative evidences should not stop a further investigation. That, should be concentrated, it seems, on the published and unpublished relations of missionaries, then above all these of Augustinians who appeared in the Philippines in 1565 and those of Jesuits who started there their work in 1581,

³⁸⁹ *Sinica Franciscana*, Vol. II: *Relationes et epistolas Fratrum Minorum saeculi XVI et XVII* collegit ad fidem codicum rededit et adnotavit P. Anastasius van den Wyngaert O.F.M. Ad Claras Aquas (Quarachi — Firenze), Apud Collegium S. Bonaventurae, 1933: Lucarelli de Pisauro, pp. 3 f; Tordesillas, pp. 93 f; Alfaro, pp. 163 f; Loyola, pp. 187 f.

³⁹⁰ Merrill, *op. cit.*, p. 365; see: Marszewski, *op. cit.*, p. 286.

³⁹¹ Ramusio, *op. cit.*, fol. 416 r^o, fol. 417 r^o.

³⁹² Purchas, *op. cit.*, Vol. XII, pp. 150, 214.

both orders having included the island Cebu into their early activity on that archipelago³⁹³.

French sources have not at all been considered in the studies of maize diffusion in South-East Asia. However, they merit also to be investigated, as travellers of that nationality reached some regions of Burma in the second half of the XVIth century, while missionaries, mainly Jesuits, proceeded into Cambodia³⁹⁴, Siam³⁹⁵ Vietnam, and China³⁹⁶ during the XVIIth century. As to the relation of I. B. Tavernier who travelled throughout India, we find in it references to the products of Bhutan, Assam and Tipra about which he was informed by some merchants he met at Patna and Dacca in the years 1665—1666. Unfortunately, only for the first of these countries cereals are mentioned, and among them merely rice and wheat („bled“) ³⁹⁷.

Dutch sources which could be of some importance for the discussed problem belong all to the post-Columbian period. The earliest known is *Navigatio et Itinerarium in Indiam Orientalem* of J. H. van Linschoten³⁹⁸, who wandered in India in 1583. But as emphasized by Watt³⁹⁹ though he was „one of the most painstaking Indian explorers of the sixteenth century“ he did not mention maize „as seen by him in the East“. Thus equally for the western and eastern coasts of India Linschoten reports only rice and corn, and for Goa alone he alludes also to other grains⁴⁰⁰ without yet specifying them. The documents connected with the

³⁹³ H. de la Costa, S. J., *The Jesuits in the Philippines*, 1581—1768, Harvard University Press, Cambridge (Massachusetts), 1961, pp. 5, 8, 9, 14, 143, 149, 620—624, 629; A. Antoine Cabaton, *Quelques documents espagnols et portugais sur l'Indochine aux XVI et XVII siècles*, JA, Septembre—Octobre 1908, pp. 271 (note 1), 272 (notes 1 and 2), 285.

³⁹⁴ Groslier, *op. cit.*, p. 125.

³⁹⁵ Hiranplücks, *op. cit.*, p. 59; Guy Tachard de la C. de J., *Voyage de Siam des Pères Jesuites*, Amsterdam (1689), pp. 149, 152, 272.

³⁹⁶ Prisset, *op. cit.*, p. 5; E. Bretschneider, *History of European Botanical Discoveries in China*, I, 1898, pp. 10/11.

³⁹⁷ *Les Six Voyages de Jean Baptiste Tavernier...*, Seconde Partie, Paris (1677), pp. 415 f., 419, 420, 424 f., 429 f.

³⁹⁸ Bretschneider, *op. cit.*, p. 21.

³⁹⁹ Watt, *op. cit.*, p. 334.

⁴⁰⁰ Purchas, *op. cit.*, Vol. X, Glasgow 1905, pp. 229, 249, 257 f., 275.

activity of the Dutch in South-East Asia are still later, as they appeared there no sooner than in the early XVIIth century. However, during their commercial enterprises they reached also mountain areas inhabited by primitive farmers so far inland as Laos, which having a difficult access and scanty population had not previously attracted, as Lévy remarked⁴⁰¹, the European traders. Nevertheless, neither in Purchas's extracts from the journal of Peter Williamson Floris, who stayed in the years 1608—1613 in some places of South Burma and adjacent countries, nor in a diary of Gerrit Wuysthoff, who led in the years 1641—1642 a fluvial expedition from the coast of Cambodia up to Vientiane, no other cereals are reported besides rice⁴⁰².

British sources which have to be considered here, all belong to the post-Columbian times. One of the earliest and most important is the relation of Ralph Fitch. Having landed at Goa in 1583 he travelled across Central India twice: to Masulipatam and back up to the court of Akbar near Agra. Then, proceeding once more eastwards he floated by the Ganges up to Hugli, made a trip to Cooch Behar, returned to Bengal and sailed to Chittagong from where through Bassein he reached Pegu in 1586. That place was also the starting point for his two further trips: one by land to Chiengmai, another along the shore to Malacca⁴⁰³. Though the real aim of Fitch, as Collis remarked⁴⁰⁴, was to gather information

⁴⁰¹ Paul Lévy, *Le Voyage de Wuysthoff au Laos (1641—1642) d'après son „Journal“ inédit en Français*, „Indochine“, No. 198, Jeudi 15, Juin 1944, p. 14.

⁴⁰² Purchas, *op. cit.*, Vol. III, Glasgow 1905, pp. 327, 329; *Voyage inconnu des Néerlandais du Royaume du Cambodge au Pays de Louven*, annoté par Francis Garnier, „Bulletin de la Société de Géographie“, Paris, Septembre—Octobre 1871, pp. 253, 255, 259, 264.

⁴⁰³ J. Horton Ryley, *Ralph Fitch — England's Pioneer to India and Burma. His Companions and Contemporaries with his Remarkable Narrative told in his own words*, London 1899, p. 153; Maurice Collis, *British Merchant Adventures*, London 1942, pp. 12, 15; Ram Chandra Prasad, *Early English Travellers in India. A Study in the Travel Literature of the Elizabethan and Jacobean Periods with Particular Reference to India*, Delhi—Patna—Varanasi, 1965, p. 31.

⁴⁰⁴ Collis, *op. cit.*, pp. 12, 15.

about the local trade and the main products of the visited countries, his account does not seem to be exhaustive and his references to the native crops are very scanty. Thus for India he does not report any other cereals than rice, wheat and barley, while for Pegu and Siam rice alone⁴⁰⁵. As regards other British pioneers in South Asia, most of them were attracted by India where from 1608 the East India Company with its first headquarters at Surat began to proceed⁴⁰⁶. However, the geographical limits of their activity were mostly confined to the western or north-western regions of that country and a few reports merely contain some references to its eastern peripheries⁴⁰⁷. Unfortunately even these accounts, which for their ethno-geographical context would be most interesting, do not give any valuable information for our problem. Then neither William Finch who visited Nagarkot (present-day Kangra) in 1611 nor Thomas Coryat who on his way through Punjab in 1615 came across the Jats and described their Tibetan like customs, report any cereals⁴⁰⁸. Only Richard Steel and John Crowther who crossed the regions of Multan and Lacca in 1615 refer to barley as abundantly cultivated there in the mountains⁴⁰⁹. Besides, it may be said in general that most of the early British travellers in India neglected the life of the common people in their reports⁴¹⁰. A Voyage to East India (published in 1655) of Edward Terry, who stayed at the Jahangir court in the years 1616—1619, appears to be the most informative⁴¹¹. In his description of the Moghul empire for the year 1616 we read: „...this land abounds in singular good Wheate, Rice, Barley and divers other kindes of Graine to make bread“⁴¹².

⁴⁰⁵ Purchas, *op. cit.*, Vol. X, Glasgow 1905, pp. 169, 173, 177, 182—184, 192, 194, 195.

⁴⁰⁶ Collis, *op. cit.*, p. 16.

⁴⁰⁷ Prasad, *op. cit.*, pp. 110, 179.

⁴⁰⁸ *Ibidem*, pp. 180, 190, 237; Purchas, *op. cit.*, Vol. III, Glasgow 1905, pp. 69, 472.

⁴⁰⁹ Purchas, *op. cit.*, Vol. IV, pp. 270, 271.

⁴¹⁰ Prasad, *op. cit.*, pp. 129, 130, 133, 190, 238.

⁴¹¹ *Ibidem*, pp. 277, 280/281, 312, 315.

⁴¹² Purchas, *op. cit.*, Vol. IX, Glasgow 1905, p. 17.

Comparative studies on the role and place of maize in economy, ceremonies, mythology and historical traditions of the primitive agricultural peoples of Asia may help in the detection: (1) of the oldest centre of cultivation of this plant in that part of the world, (2) of the routes of its early diffusion there and (3) of the relative chronology of its introduction to the particular areas in respect to that of other crops.

The first review of the position of maize in the economic life of some peoples of East Asia was given by Laufer (1907). He collected ⁴¹³ namely several data for different regions of China, like Jehol, Szechuan, Yün-nan, Kweichow, Formosa, Hainan, then Tibet, Kashmir, Sikkim (Lepcha), Bihar, Burma (Burmese, Kachin, Shan, Red Karen, Tingpan Yao) ^{413a} and Siam. Further, considering the data of written sources Laufer came ⁴¹⁴ to an assumption that maize being introduced to India early in post-Columbian times, most probably through Kashmir, Sikkim and Bhutan reached Tibet and then West China.

The first systematical field research concerning that problem was undertaken by Stonor and realized in some parts of Assam, mainly in Naga Hills. Its results were published in a paper written together with Anderson (1949) ⁴¹⁵. The data submitted by Stonor embraced such items as maize varieties, the technique of their cultivation, storage and utilization as well as the role of that plant in ceremonies and traditions concerning its origin or ancientness. However, if for certain tribes fairly abundant, for others they were incomplete or quite scanty. Besides for some of them ⁴¹⁶, (Angami, Lhota, Sema, Ao, Chang, Kacha, Nzemi, Konyak, Sangtam, Kuki, Khasi, Garo, Dafla, Padam, Minyong, Mishmi) they were collected during his longer stays or short trips into

⁴¹³ Laufer, *op. cit.*, pp. 241—247, 248, 249/250.

^{413a} Comp.: Collins, *Waxy Maize*... pp. 49/50.

⁴¹⁴ Laufer, *op. cit.*, pp. 224, 243, 250/251.

⁴¹⁵ Stonor & Anderson, *op. cit.*, pp. 355—379, 394; see: Marszewski, *op. cit.*, p. 251.

⁴¹⁶ Stonor & Anderson, *op. cit.*, pp. 359—363, 367—369, 372, 374, 378.

their villages, for some others ⁴¹⁷ (Yimchungr, Kalyo-Kengyu, Lushai, Mikir, Apa Tani, Aka, Monpa, Bhutani) from the relations of tribals themselves met outside their native areas; for still others ⁴¹⁸ (Rengma, Lakher, Chin, Kachin) from ethnographical literature. After juxtaposing all these data Stonor concluded ⁴¹⁹ that among some of these tribes, maize — after their own opinion cultivated by them since immemorial times — might have antedated introduction of rice into their agriculture while some varieties reached Assam most probably in pre-Columbian times.

Contrariwise Hutton in a review (1950) ⁴²⁰ of the above discussed paper, sceptically evaluated the traditions concerning maize current among the Assam mountaineers. He stated also that the ethnographical data are rather useless for the solution of the problem of origin and ancientness of maize cultivation in Asia.

Afterwards Oliver in a paper written jointly with Mangelsdorf (1951) ⁴²¹ strongly insisted on the hastiness of Stonor's conclusion. He expressed namely an opinion that neither the traditions of the Assam mountaineers concerning maize nor the differentiation of its vernacular names among these tribes, nor the manifold uses of that crop in their economic life and its position in their rituals have any significance for the problem of the time of its introduction into Asia.

In the same year another point of view was presented by Hatt ⁴²² who seriously considered not only the possibility of a pre-Columbian occurrence of maize in Asia but even its possible origin on that continent, though he expected the solution of that problem to come from archaeology. After his opinion ⁴²³ the pre-Columbian age of maize in Asia would make more comprehensible the

⁴¹⁷ *Ibidem*, pp. 362, 364, 367, 370—373.

⁴¹⁸ *Ibidem*, pp. 363, 365, 373.

⁴¹⁹ *Ibidem*, p. 355; comp., p. 394.

⁴²⁰ J. H. Hutton: Review of Stonor & Anderson, *op. cit.*, in: „Man“, Vol. L, November 1950, art. 250, p. 153; see: Marszewski, *op. cit.*, p. 252.

⁴²¹ Mangelsdorf & Oliver, *op. cit.*, pp. 280—286; comp.: pp. 288—289; see: Marszewski, *op. cit.*, p. 253.

⁴²² Hatt, *The Corn Mother*..., pp. 902—905; see: Marszewski, *op. cit.*, pp. 253/254.

⁴²³ Hatt, *op. cit.*, pp. 904—905; comp.: p. 908.

position of that plant in Indonesian myths, and the similarities between the agricultural folklore and rites of Indonesia and America, which he inclined to explain by a transpacific transfer of these cultural items together with some food plants.

Again new elements were brought by Brown and Anderson (1953) who investigated the Turkish pop corns and started in that connection „... a series of ethnological, linguistic and historical inquiries“⁴²⁴. Unfortunately they did not publish any details as regards the ethnographical data they had collected.

Then, an examination of the main, arguments so far advanced and some new ones, both *pro* and *contra* the Stonor-Anderson's hypothesis, was carried out by Heine-Geldern (1958). According to him⁴²⁵ the discussed problem cannot be solved with the help of ethnological methods and the traditions of the hill tribes about the ancientness of that plant in their economy are not reliable. Nevertheless the early XIXth century testimonies for maize cultivation in Kangra and Nepal, as well as the analogical problem with the grain amaranths of an American origin cultivated too in the Himalayas speak strongly, in his opinion⁴²⁶, in favour of his hypothesis.

An attempt to rehabilitate the traditions of mountain peoples of Assam was undertaken by Carter (1963, 1964). He indicated namely (1964)⁴²⁷ that rice was introduced to some regions of equatorial Asia very late, e. g. in Borneo where this took place ca 1000 A. D. Then, suggesting the transpacific pre-Columbian contacts between America and South-East Asia „at least as early as 2000 B. C.“, Carter remarked that maize could have been carried into the latter area and spread to Assam centuries before rice arrived there. Thus he concluded⁴²⁸ that „... the Assamese legends could be factual“. Carter pointed also (1963)⁴²⁹ to a possi-

⁴²⁴ Anderson & Brown, *op. cit.*, pp. 39, 41.

⁴²⁵ Heine-Geldern, *op. cit.*, pp. 367, 373, 391.

⁴²⁶ *Ibidem*, pp. 373, 374—376.

⁴²⁷ Carter, *Archaeological Maize in West Africa...*, p. 85; comp.: idem, *Maize to Africa*, „Anthropological Journal of Canada“, Vol. 1, No 2, 1963, p. 6.

⁴²⁸ Carter, *Archaeological Maize in West Africa...*, p. 85.

⁴²⁹ Carter, *Maize to Africa...*, p. 7.

bility that „rice spread to the hill tribes of Assam in the 17th and 18th century and that maize had, therefore, an opportunity to spread there during the 16th and 17th century“. Nevertheless he emphasized further that in the judgement of that case one should consider the primitive peoples' traditions, which among those of them to whom agriculture is important may be according to him reliable as far as 400 or some more years back, as well as the „use of plants in ritual as evidence of antiquity“.

A new field research was undertaken by the author in 1960 in North-East India. Its results confronted with the acquisitions of other specialists and comparative data for other countries of Asia were published in two papers (1963, 1964). His main investigation was carried in Lushai Hills district, for which area Stonor — having not been there himself — obtained only scanty personal information, completing them only by those extracted from publications. Although the author had opportunity to make inquiries in some few localities only in the northern subdivision of that district, due to a far advanced integration between particular groups of the Lushai and akin tribes on the main N—S tract, he met there tribals (Lushei, Ralte, Royte, Khiantse, Chongthu, Poonte, Fanai, Hmar, Poi) from almost all parts of that mountain area and received from them information for their native localities. Besides, during short stays in a few other regions of that part of India he got also supplementary information: then in the SE corner of Cachar district — for the Hmar, in Central Tripura — for the Tripuri, Chakma and Mok, on the southern peripheries of Khasia Hills—for the War, in Jaintia Hills—for the Pnar, in western part of Garo Hills — for the Abeng and in Darjeeling district — for the Lepcha and Bhutani. In conclusion the author stated⁴³⁰ that the results of his field research coincide with these of Stonor and that maize among such peoples like Lushai, Hmar and Lepcha is also considered to have been cultivated by their forefathers and sooner than rice. He indicated too that the traditions concerning the

⁴³⁰ Tomasz Marszewski, *Sprawozdanie z badań w Indiach Północno-Wschodniej w r. 1960 dotyczących problemu dawności uprawy kukurydzy w Azji*, „Etnografia Polska“, T. VIII, 1964, pp. 351—352; idem, *The Age of Maize...*, pp. 272, 274/275, 277—279.

ancientness and the introduction of maize are more vague and contradictory in the Garo-, Khasia-, and Jaintia Hills than in South-East Assam. Finally, he emphasized that while to the south of Brahmaputra in the diffusion of the particular maize forms the E → W and S → N directions prevailed, to the north of that river the E → W and N → S ones predominated.

Independently of the investigations especially devoted to the maize problem a certain progress in acquisition of new materials concerning the role of that plant in various regions of Asia has been realized due to some studies on the agriculture or even the whole culture of the particular tribes. Good examples of such kind of research are given by the papers of Kauffmann (1944, 1962) and Kawakita (1956, 1957)⁴³¹.

In the present paper the author will examine mainly the data supplementing those discussed in his paper of 1963 as they concern mostly the regions, peoples or items which were not considered there.

As for the place of maize in the religious life, examples will be given here equally for peoples among whom it is a staple or one of the main crops and for those among whom its role is only subsidiary or even quite negligible.

Then about the Maler from the northern part of the Rajmahal Hills in Bihar, Martin wrote (1838)⁴³² that the introduction of maize, being the greatest improvement of their economic conditions „has occasioned the addition of a new god to their worship“. It may be added here that for the same tribe Dalton

⁴³¹ Hans Eberhard Kauffmann, *Landwirtschaft bei den Bergvölkern von Assam und Nord Burma*, „Zeitschrift für Ethnologie“, 1934, Heft 1/3, pp. 21, 22, 30, 43, 45, 57, 62, 92, 106; idem, *Observations on the Agriculture of the Chittagong Hill Tribes*, „Occasional Studies of the Asiatic Society of Pakistan“, 1, Dacca 1962, (Unfortunately the latter paper was not available to the author); Jiro Kawakita, *Crop Zone*, SRJENH ed. by H. Kihara, Vol. II: *Lands and Crops of Nepal Himalaya*, Kyoto 1956, pp. 69, 71, 72, 75, 83, 85—91; idem, *Ethno-Geographical Observations...*, pp. 16, 17, 20, 232, 306, 310 (see: *supra* note ²⁴⁸).

⁴³² Robert Montgomery Martin, *The History, Antiquities, Topography and Statistics of Eastern India...*, London 1838, Vol. II, p. 125.

reported (1873)⁴³³ a rite of scattering rice grains to the evil spirits during „buffalo offerings“. Then, for the Khasi from Central Assam Becker related (1909)⁴³⁴ that in the neighbourhood of Shillong they used to offer cakes baked from rice or maize to the god *u Blei Shillong*; Stegmiller reported (1922)⁴³⁵ only rice offerings, while Roy described (1963)⁴³⁶ the use of maize and Job's tears grains in some, and that of rice grains in other phases of their complicated funeral ceremonies. As regards the Dafla from North Assam, for whom maize is an important subsidiary crop, Stonor remarked (1957)⁴³⁷ that „the agricultural rites do not seem to be of great importance“. He also thought it noteworthy that in one of these rites, performed for the first rice to be harvested, the ceremonial paste is made only from that cereal, though „maize, millet and Job's tears are likely to be of at least the same antiquity“. For the Chiang from West Szechuan, among whom „maize is the main crop up to 8000 feet“ Graham noted (1958)⁴³⁸ the use of barley, rice, wheat and buckwheat in certain ceremonies aiming either to pay the vows to the „five great gods“ or call a deity, or cure sick people. For the Ch'uan Miao from Szechuan — Yün-nan border, for whom maize provides the main food, the same author reported (1964)⁴³⁹ that this cereal alongside rice is

⁴³³ E. T. Dalton (Col.), *Beschreibende Ethnologie Bengalens, aus officiellen Dokumenten*, Deutsch von Missionar Oscar Flex in Ranchi, „Zeitschrift für Ethnologie“, Bd. V, 1873, p. 357.

⁴³⁴ C. Becker, *Die Nongkrem-Puja in den Khasi-Bergen (Assam)*, „Anthropos“, Bd. IV, 1909, pp. 893, 896, 898.

⁴³⁵ F. Stegmiller, *Aus dem religiösen Leben der Khasi*, „Anthropos“, Bd. XVI—XVII, 1921—1922, pp. 423, 428—430, 433, 436, 438.

⁴³⁶ David Roy, *The Megalithic Culture of the Khasis*, „Anthropos“, Bd. LVIII, 1963, pp. 522, 523, 531, 533, 536, 542, 551.

⁴³⁷ C. R. Stonor, *Notes on Religion and Ritual among the Dafla Tribes of the Assam Himalayas*, „Anthropos“, Bd. LII, 1957, pp. 14, 15, 19—20.

⁴³⁸ D. C. Graham, *The Customs and Religion of the Ch'iang*, „Smithsonian Miscellaneous Collections“, Vol. 135, Number 1, December 8, 1958, pp. 60/61, 86, 89.

⁴³⁹ D. C. Graham, *Songs and Stories of the Ch'uan Miao*, „Smithsonian Miscellaneous Collections“, Vol. 123, Number 1, April 8, 1954, pp. 6, 37, 39, 46—48, 55, 71, 74, 76, 77, 80, 82.

used in offerings and other ceremonies performed for the deceased, then mustard or maize seeds are thrown in a rite of reviving faint people and the souls of various cereals, maize among them, are addressed in their incantations. About the Lutzus from the Menkong region in Yunnan Ward wrote (1912)⁴⁴⁰ „... in common with the Lissu, Moso and other tribes they hang up corn cobs in their houses, which are, I think offerings to the penates; this practice is not observed by the Tibetans at all“. Contrariwise for the Lamet from the western peripheries of Luang Prabang province in North Laos and the Lawa from Chiangmai and Mae Hongson provinces in North Siam, among whom rice cultivation dominates the whole life, Izikovitz (1951) and Kunstadter (1965) noted⁴⁴¹, respectively, a developed conception of the soul of rice and found that this cereal plays also a preponderant role in their agricultural and other ceremonies. Similarly for the Akha and P'u-noi from the Phongsaly region in North Laos as well as for the Tsa Khmu from the adjacent region in North Vietnam — all having maize as a subsidiary crop — rice is the only cereal reported by Roux (1925, 1928, 1954)⁴⁴² in their agricultural and funeral rites, shamanistic expulsion of evil spirits etc. Furthermore even among the Man-lan-ten from the Vietnam — Yün-nan border, for whom maize is a basic food, the defunct, as testified by Abadie (1924)⁴⁴³, was placed

⁴⁴⁰ F. Kingdon Ward, *Through the Lutzus Country to Menkong*, „The Geographical Journal“, Vol. XXXIX, No 6, June 1912, p. 587.

⁴⁴¹ Karl Gustav Izikovitz, *Lamet. Hill Peasants in French Indochina*, „Etnologiska Studier“, 17, Göteborg 1951, pp. 15, 17, 160, 165, 166, 219, 226—227, 237, 239, 240, 243/244, 248, 330, 335/336, 342, 343; Peter Kunstadter, *The Lawa (Lawa) of Northern Thailand. Aspects of Social Structure, Agriculture and Religion*, Princeton University, „Research Monographs“, No 21, November 30, 1965, pp. 1, 18—23, 25, 32, 39—42.

⁴⁴² Henri Roux, *Deux tribus de la région de Phongsaly (Laos septentrional)*, BEFEO, T. XXIV, Hanoi 1925, pp. 391, 392, 420, 424—426, 470, 475, 476, 480—481; idem (en collaboration avec M. Trần-Văn-Chu), *Les Tsa Khmu*, BEFEO, T. XXVII, Hanoi 1928, pp. 191, 192, 196, 198, 209; idem, *Quelques minorités ethniques du Nord Indochine*, „France-Asie“, Numéro spécial, 92—93, Janvier—Février 1954, pp. 171, 191, 201, 209—212, 263, 271, 272, 275—277, 311—313, 330, 343.

⁴⁴³ Maurice Abadie, *Les races du Haut-Tonkin de Phong-Tho à Lang-Son*, Paris 1924, pp. 114, 121.

in grave with a bit of rice. Among the White Meo from the western confines of North Vietnam Moréchand (1955)⁴⁴⁴ found instead an equally evolved conception of the rice and maize soul as well as some rites connected with them, and observed that maize grains and meals are used in their shamanistic practices to cure diseases, while rice plays a prominent role in their foundation and funeral rites. As for the Meo from North Siam, for whom maize was to be formerly the main food, Bernatzik found (1947)⁴⁴⁵ that they still use the grains of that cereal together with these of rice in their shamanistic rites performed on behalf of sick people. However, among the Muong from Thanh hoá, Hoá binh and Quang binh provinces of Central Vietnam rice is not only their main food but, as testified by Cuisinier (1948)⁴⁴⁶, plays a principal role in prayers, cults and funeral rites. Besides, considered to be a celestial gift, it is vested with mystical value, while the „soul of rice“ is venerated by special ceremonies and offerings. Further to the south among the Jarai from Pleiku, southern Kontum and northern peripheries of Darlac in South Vietnam as well as Voeune Say in Cambodia the agrarian ceremonies, as observed by Lafont (1963)⁴⁴⁷, are performed only for rice which is their main cereal. However, maize „soul“ side by side with that of rice is called and spirits governing maize, rice and millet are invoked in their prayers for good harvest and even for the deceased. Merely among the Jarai from Cheo Reo region he found some propitiating and other agricultural rites to be performed also in connection with maize cultivation. For the Bahnar from Kontum instead, as related by Guillemi-

⁴⁴⁴ Guy Moréchand, *Principaux traits du chamanisme Méo Blanc en Indochine*, BEFEO, T. XLVII, Paris—Saigon 1955, pp. 529, 533, 535, 539—542.

⁴⁴⁵ Adolf Bernatzik, *Akha und Meau. Probleme der angewandten Völkerkunde in Hinterindien*, Innsbruck 1947, Bd. I, pp. 180—181, 185—188; Bd. II, p. 527.

⁴⁴⁶ Jeanne Cuisinier, *Les Mu'ong. Géographie humaine et sociologie*, Paris 1948, pp. 24, 46, 99, 111, 145, 187, 206, 514, 461, 526—533, 537—541, 545—549, 555—561.

⁴⁴⁷ P. B. Lafont, *Prières Jarai*, „Collection de Textes et Documents sur l'Indochine“, VIII, EFEO, Paris 1963, pp. III, X, XVIII, 163, 165, 212, 218, 219, 225, 230, 240, 242, 245, 251—256, 259, 265—268, 321, 388—390.

net (1952)⁴⁴⁸ rice is not only a staple crop but also a „sacred plant“, though millet also plays a part in their offerings. Maize which is their subsidiary crop is not at all reported by him as used in their religious rites. Finally, among the Sre from Djiring, the cultivation of rice which is their basic crop, determines, as emphasized by Doornes (1954)⁴⁴⁹, all great seasonal feasts and that cereal is the only one signalized by him among their offerings.

It remains to state that it would be also important to supplement that review with corresponding data for several other peoples—like Koo from Arakan, Lahu, Wa and Lisu from East Burma and adjacent regions of Yün-nan, Lolo from Laos and Vietnam as well as Ulu-lama, Nakhi and Sifan from NW Yün-nan—among whom in general or in some regions only maize is a staple or one of the main crops⁴⁵⁰.

As regards oral literature, mythology and tradition, it seems that the following motives, all emanating from the peoples inhabiting the eastern part of South-East Asia, deserve special attention. Then for the Meo from Siam Bernatzik reported⁴⁵¹ a song narrating about the „Golden Age“ during which the weeds did not grow in the fields while leaves of maize were eaten as well as about an event after which maize began to grow together with grasses and its leaves became eatable only for buffaloes. Among the Thai of Laos a tale was noted⁴⁵² relating that in the remote times there lived a poor one-eyed man who fed monkeys with pumpkins and large kernels of maize, both plants being the

⁴⁴⁸ Paul Guilleminet, *La Tribu Bahnar du Kontum (Plateaux de l'Indochine Centrale). Contribution à l'étude de la Société Montagnarde du Sud Indochinois*, BEFEO, T. XLV, Paris—Hanoi, pp. 408, 410, 423, 442.

⁴⁴⁹ R. P. Jacques Doornes, *Fêtes saisonnières des Srè*, BEFEO, T. XLVI, Paris—Saigon 1954, pp. 600, 603—605.

⁴⁵⁰ See: Kaufmann, *Landwirtschaft...*, p. 21 and Kartogramm Nr 1; Abadie, *op. cit.*, pp. 175, 178; J. F. Rock, *The Ancient Na-khi Kingdom of Southwest China*, Cambridge (Massachusetts) 1947, Vol. I: pp. 236, 242, 244, 255; Vol. II: pp. 277, 298, 301, 304, 313; Y. I. Juvrilev, *Tibetskie narodnosti i etnograficheskie gruppy Tibetsev Kitajskoj Narodnoy Respubliki*, „Sovetskaya Etnografiya“, 1959, No 5, p. 75.

⁴⁵¹ Bernatzik, *op. cit.*, p. 225.

⁴⁵² G. Stratanovich, *Serebraniy Kluch — Tayskie Skazki*, Moskva 1963, p. 94.

only ones he cultivated. Further, among the Ch'uan Miao Graham found⁴⁵³ two myths referring to maize. In one of them relating about the cats sent by Ntzi, the Supreme Being, there is an allusion to a maize meal. In another one, explaining how it happened that the „five grains“—which previously were to be alike—became different after Nizi's envoy tried to take them away, maize is mentioned in the first place and then millet, rice, wheat and buckwheat. However, in two other mythologized traditions⁴⁵⁴ of Ch'uan Miao, both of them concerning the time when their forefathers were to live in mountain forests, no maize is reported. Then, in one of them it is mentioned that they got the seeds of rice and tare from Ntzi's granary for planting; in another—that they burnt the trees to clear the land and cultivate small kind of rice and a plant called *mao bai* (?). For the Chiang instead, Graham noted⁴⁵⁵ a tradition after which their forefathers migrating to West China had sheep and goats and grew wheat but had no maize. Finally, as reported by Mayers (1867, 1870)⁴⁵⁶, in Kweichow a tradition was current following which maize was introduced there from *Cochin-china* (in that context North Vietnam) by the general Ma Fu-po (Ma Yüan), then after 41 A. D. It is also to be emphasized here that among several peoples like Tho⁴⁵⁷ and Tsa Khmu⁴⁵⁸ from North Vietnam and Kha-hoc⁴⁵⁹ from Central Vietnam, rice is the only cereal mentioned in their flood myths, as utilized by the rescued human beings.

⁴⁵³ Graham, *Songs and Stories...*, pp. 16, 220.

⁴⁵⁴ *Ibidem*, pp. 19/20, 27.

⁴⁵⁵ Graham, *The Customs and Religion...*, pp. 7, 22—23.

⁴⁵⁶ Hance & Mayers, *op. cit.*, p. 524. Mayers quoted here the respective passage from the memorandum of Mei K'i-chao, an „Intendant of the Grain Revenue for the Province of Kwang-tung“, as being the source of that information (see: *op. cit.*, p. 523). However, taking into consideration the testimony of the Chinese sources of the XVIth century according to which maize was introduced into China from the Si-fan country, Mayers was inclined to admit that it could happen as a result of the Ma Yüan's expedition against the Si-fan tribes that took place in A. D. 36. Comp.: Mayers, *Maize in China...*, p. 90.

⁴⁵⁷ Abadie, *op. cit.*, p. 58.

⁴⁵⁸ Roux, *Les Tsa Khmu...*, *op. cit.*, pp. 177—178.

⁴⁵⁹ Georges Marie Kerneis, *La tour du partage (conte Kha-hoc de premiers âges)*, „Indochine“, No 172, Jeudi 16, Décembre 1943, p. 23.

The linguistic data in a limited range and to a certain degree can also throw some light on the particular questions of our problem.

The sole fact that several peoples in the remotest regions of Asia possess their own names for maize seems to be quite natural and therefore has no special bearing on our problem. Nevertheless, the occurrence of such vernacular names among the mountain tribes of Upper Burma and Assam was considered by Collins (1920) and Stonor (1949)⁴⁶⁰ respectively as indices of an old age of maize cultivation in these regions. A sceptical opinion in that respect was expressed, however, by Oliver (1951)⁴⁶¹ and Heine-Geldern (1958)⁴⁶² though each of these authors defended a different view as regards the question of maize ancientness in Asia.

The case when the peoples growing numerous maize varieties have a separate and different name for each of them as well as a developed nomenclature connected with particular stages of growth or cultivation of that crop, is somewhat more significant. Such a phenomenon was signalized by Laufer (1907)⁴⁶³ for the Lepcha and considered by him as a proof of a relatively old cultivation of maize among that tribe. This opinion was supported by Anderson (1949)⁴⁶⁴ and then by the author (1963)⁴⁶⁵ who verified that fact during his stay at Kalimpong.

The etymological affinities and geographical distribution of the vernacular names of maize, if studied on a vast area and with consideration of a great amount of items, may help in detecting the oldest centre of maize cultivation on that area and the ways of its diffusion. Such method was applied already by Birket-Smith⁴⁶⁶ to the vernacular names of maize in South America.

⁴⁶⁰ Collins, *Waxy Maize...*, pp. 49, 51; Stonor & Anderson, *op. cit.*, pp. 374, 394.

⁴⁶¹ Mangelsdorf & Oliver, *op. cit.*, p. 281.

⁴⁶² Heine-Geldern, *op. cit.*, pp. 391/392.

⁴⁶³ Laufer, *op. cit.*, pp. 242/243.

⁴⁶⁴ Stonor & Anderson, *op. cit.*, p. 388.

⁴⁶⁵ Marszewski, *The Age of Maize...*, pp. 274, 290; idem, *Sprawozdanie...*, p. 350.

⁴⁶⁶ Kaj Birket-Smith, *The Origin of Maize Cultivation*, København 1943, pp. 12—14, 20—32.

Some tentative and preliminary comparisons of selected maize names from certain regions of South-East Asia (mainly Assam and East Himalayas) and some hypothetical inferences drawn from the geographical distribution of these names were presented by the author (1963)⁴⁶⁷. One should remark here, however, that if the first stage of such an investigation i. e. the classification of names in respect to their etymological affinity falls under the competence of specialized comparative linguistic, the next one, i. e. the application of a geographical method to the classified material, does not exceed the ethnological methodology.

The semantic and etymological analysis of maize names may sometimes give indications as to: (1) the value of that cereal in the eyes of the aboriginals; (2) its origin or direction of its diffusion; (3) the relative chronology of its introduction into the given area in relation to that of other crops. The first two aspects were studied by Laufer (1907)⁴⁶⁸ in respect to several names from various regions of China⁴⁶⁹ as well as to a few from Japan, Burma and Iran; later on by Stonor (1949) and the author (1963)⁴⁷⁰ in respect to some tribal names from Assam. It may be added here that a similar method was applied by Willett (1962)⁴⁷¹ to the names of maize from West Africa and by Jeffreys (1963)⁴⁷² to the names of that cereal current in various regions of Africa as well as, comparatively, to some ones from India, Iran and Europe. An analysis of maize names under the third of the above mentioned aspects was preliminary attempted by the author (1963)⁴⁷³ and that

⁴⁶⁷ Marszewski, *The Age of Maize...*, pp. 272—274, 288—289.

⁴⁶⁸ Laufer, *op. cit.*, pp. 232—234, 241, 243, 246, 247, 249, 250.

⁴⁶⁹ Some Chinese names of maize were discussed also by Mayers (1870) (Hance & Mayers, *op. cit.*, pp. 523—525) and Jeffreys (1955) (*op. cit.*, pp. 26—27).

⁴⁷⁰ Stonor & Anderson, *op. cit.*, pp. 359—365, 367, 374; Marszewski, *The Age of Maize...*, pp. 270—272, 291, 293.

⁴⁷¹ F. Willett, *The Introduction of Maize into West Africa: An Assessment of recent Evidence*, „Africa“, Vol. XXXII, No 1, January 1962, p. 7.

⁴⁷² M. D. W. Jeffreys, *How Ancient is West African Maize?*, „Africa“, Vol. XXXIII, No 2, April 1963, pp. 115, 119—120, 123—127, 129.

⁴⁷³ Marszewski, *The Age of Maize...*, p. 289.

in relation to some items from Assam, Burma, Laos, China and Tibet.

In the present paper the author will submit first a tentative analysis and then, a few hypothetical explanations of two composite Thai names of maize. One of these names was testified for Siam in the form transcribed as *khao phot* (Bastian)⁴⁷⁴ or *kao pot* (Laufer)⁴⁷⁵ and for Laos as *khăo phôt* (Vidal)⁴⁷⁶; the other one for Laos in the form transcribed as *khaui sali* (Roux)⁴⁷⁷ for maize in general and as *khăo 'sali* (Vidal)⁴⁷⁸ for its purple and violet grained variety. Besides, we may add that according to Bastian⁴⁷⁹ *khao sali* is also a fabulous crop from which after a Siamese myth the first human couple was to be born while *khao phot sali* is a Siamese name for wheat. The first segments of the discussed names, i. e. *khao* or *khaui*, are names of rice widespread equally among the Western and Eastern⁴⁸⁰ Thai peoples. However their second segments, i. e. *phôt*, *phot*, *pot*, or *saly*, *sali*, resemble or even quite correspond to the maize names of certain Austro-Asiatic peoples. Then *pôt* is reported as the maize name of the Khmer (Cabaton)⁴⁸¹ while *pho* and *phô* as these of Sedang (Cabaton)⁴⁸² and Rongao (Guilleminet)⁴⁸³ from South Vietnam respectively. Then, *saly* is noted as a maize name of the Tsa Khmu (Roux)⁴⁸⁴

⁴⁷⁴ Adolf Bastian, *Die Voelker des Oestlichen Asien. Studien und Reisen*. Dritter Band: *Reisen in Siam im Jahre 1863*, Jena 1867, p. 214.

⁴⁷⁵ Laufer, *op. cit.*, p. 246.

⁴⁷⁶ Jules Vidal, *Noms vernaculaires de plantes (Lao, Méo, Kha) en usage au Laos*, BEFEO, T. XLIX, 1959, pp. 477, 607.

⁴⁷⁷ Roux, *Les Tsa Khmu...*, p. 216 (note 2).

⁴⁷⁸ Vidal, *op. cit.*, p. 477.

⁴⁷⁹ Bastian, *op. cit.*, p. 214.

⁴⁸⁰ Marszewski, *The Age of Maize...*, p. 276; Antoine Cabaton, *Dix dialectes indochinois recueillis par Prosper Odend'hal administrateur des services civils de l'Indochine*, JA, T. V, No 2, Mars—Avril 1905, p. 327; Vidal, *op. cit.*, pp. 477, 607; H. Warrington Smyth, *Five years in Siam from 1891 to 1896*, London 1898, Vol. II, p. 319.

⁴⁸¹ Cabaton, *op. cit.*, p. 315.

⁴⁸² *Ibidem*, p. 315.

⁴⁸³ Paul Guilleminet, *Dictionnaire Bahnar — Français*, Tome, Deuxième, Première Partie, L—U', Paris 1963, pp. 219, 627.

⁴⁸⁴ Roux, *Les Tsa Khmu...*, p. 216.

from North Vietnam and *cali* as that of the Sue (Cabaton)⁴⁸⁵ from South Vietnam. The names of that cereal, maybe also linked etymologically with the above mentioned ones, were testified for several other akin tribes from that part of Vietnam, then *hali* for the Halang (= Selang) and Boloven (Cabaton)⁴⁸⁶, *hilui* for the Sedang (Cabaton)⁴⁸⁷ as well as *hōli* and *hōlai* for the Alakong (Guilleminet)⁴⁸⁸. But the whole picture is far more complicated. Thus, *sali* as a word of Pali origin applied for maize, was noted by Bastian⁴⁸⁹ for the Lao Nioh from Phanom in Siam. Furthermore, *cāli* (in Dufrené's transcription)⁴⁹⁰ and *sālu* (in Jäschke's transcription)⁴⁹¹ is one of the Sanscrit names of rice. But the latter form was reported too for Tibet as a name of rice (Jäschke), sorghum (Laufer)⁴⁹² and even as a possible name of maize („Indian corn“) (Schmidt)⁴⁹³, while *syāl* for East Nepal, as maize name of the Khaling (Hodgson)⁴⁹⁴. Another puzzle is presented by *goronri*, the maize name testified by Martin (1938)⁴⁹⁵ for the Mal, a mountain tribe from the southern part of Rajmahal Hills (E. of Bhagulpur) in Bihar. That term has namely its only signalized counterpart in the name of that crop, likely to be transcribed as *ghoreri*, noted by the author in 1960 in a Bhutani hamlet in Paiyung (E. of Algorah) in Darjeeling district⁴⁹⁶. The name *ghoga* which after Hodgson (1857)⁴⁹⁷ was

⁴⁸⁵ Cabaton, *op. cit.*, p. 315.

⁴⁸⁶ *Ibidem*, p. 315.

⁴⁸⁷ *Ibidem*, p. 315.

⁴⁸⁸ Guilleminet, *op. cit.*, pp. 299, 300.

⁴⁸⁹ Bastian, *op. cit.*, Vierter Band: *Reise durch Kamboja nach Cochinchina*, Jena 1868, p. 300.

⁴⁹⁰ Hector Dufrené, *La Flore sancrite. Essai d'explication des noms sanscrits servant à désigner les principales plantes de l'Inde d'après leur étymologie*, Paris 1887, p. 48; comp. Laufer, *op. cit.*, p. 230.

⁴⁹¹ H. A. Jäschke, *A Tibetan — English Dictionary with special reference to the prevailing dialects*, London 1949, p. 570.

⁴⁹² Laufer, *op. cit.*, p. 230.

⁴⁹³ Jäschke, *op. cit.*, pp. 570, XXII (after: J. Schmidt, *Tibetisch — Deutsches Wörterbuch*).

⁴⁹⁴ Brian Houghton Hodgson, *Miscellaneous Essays relating to Indian Subjects*, Vol. I, London 1880, p. 199; see: Marszewski, *The Age of Maize...*, p. 273.

⁴⁹⁵ Martin, *op. cit.*, Vol. II, p. 246.

⁴⁹⁶ Marszewski, *Sprawozdanie...*, p. 350.

⁴⁹⁷ Hodgson, *op. cit.*, pp. 171, 172.

applied to that cereal by the Pakhya, one of the so-called „broken tribes“ of Nepal, present a further similitude, while in the whole North India quite different names of maize spread, among which the forms *makkai* and *bhutta* or their variants prevailed⁴⁹⁸.

Finally, it is to be answered by sinologists whether the name of maize transcribed as *yü-mé* (Wagner) or *yü-mai* (Laufer), testified by a Chinese source of the XVIth century⁴⁹⁹, is related to the following names applied to that crop in modern times: one reported by Madrolle (1908)⁵⁰⁰ for the Minkia from NW Yün-nan and transcribed by him *yi mé*, another noted by Wolfenden (1936)⁵⁰¹ for Jyarung state in East Tibet and transcribed by him *ö-yü-mé*.

CONCLUSIONS

Before proceeding to final conclusions the author will first present the main inferences which according to his opinion may be drawn from the particular categories of data.

As regards the taxonomical and the phytogeographical data the fact that they are more or less abundant for such countries as Turkey, Transcaucasia, Iran, Afghanistan, Central Nepal, Assam, North Burma, Philippines, Japan, China, East Siberia and Central Asia, permit, it seems, to reconstruct a hypothetical succession of appearance of the particular types of maize in Asia, as it was done by Sutô and Yoshida. However, considering the lack of similar or sufficient data for East Himalayas, West and East Burma, Siam, Laos, Vietnam and Yün-nan, where in some regions maize is or was a staple or one of the main crops of the aboriginal peoples, the approximate limits of distribution of the „Persian“ and „Aegean“ types drawn by Sutô and Yoshida perhaps will have to undergo serious corrections. Furthermore, the enigmatic forms of maize from Assam signalized by Dhawan call for further extensive and comparative studies on a wider area.

⁴⁹⁸ Watt, *A Dictionary...*, Vol. VI, Part IV, p. 327.

⁴⁹⁹ See: *supra* pp. 112, 113.

⁵⁰⁰ Cl. Madrolle, *Quelques peuplades Lo-lo*, „T'oung Pao“, Série II, Vol. IX, 1908, p. 564.

⁵⁰¹ Stuart N. Wolfenden, *Notes on the Jyarung dialect of Eastern Tibet*, „T'oung Pao“, Série II, Vol. XXXII, 1936, p. 184.

As concerning the cytogenetical data, the elucidation of the origin and variability of number and position of the chromosome knobs of maize appears to be most important in respect to our problem. But as long as there is no unanimity among the specialists on that particular question, no interpretation of these elements observed also among the most primitive Asiatic forms of that cereal will be possible.

The palaeobotanical data represented up till now only by the alleged subfossil maize pollen from the northern slopes of Pir Panjal Range and Haigam Lake in Kashmir, though possibly pre-Columbian, cannot be conclusively considered as such until more accurate and, if possible, several combined methods will confirm the suggested age of these specimens or layers in which they were found. Besides, even if such an ancientness of maize growing in Kashmir were proved, we would not be authorized to regard it as being in favour of the hypothesis admitting the South-East Asiatic origin of maize. In the light of the findings⁵⁰² of an alleged maize pollen from Mexico City dated for *ca* 80000 years ago, belonging therefore to the wild species, as well as of the numerous maize cobs from Tehuacan Valley in Central Mexico, the oldest of them dated for *ca* 5000 B. C. and maybe also representing the wild form, the American cradle of that cereal seems to be the most plausible. On the other hand, even if the Kashmir findings were early post-Columbian, it would not deprive them of their great importance for our problem as the occurrence of maize in the Himalayas in the time immediately following the first European colonization of the southern and eastern coasts of Asia, would be still in favour of the pre-Columbian introduction of this plant into that continent.

The alleged archaeobotanical data, represented only by a very much controversial finding from Kaundinyapur in Madhya Pradesh, are completely useless for our research until they are confirmed by other findings.

As regards the iconographical data, first of all those which were signalized as alleged pre-Columbian representations of maize,

⁵⁰² Paul C. Mangelsdorf, Richard S. MacNeish, Walton C. Galinat, *Domestication of Corn*, „Science“, Vol. 143, Number 3606, February 7, 1964, pp. 539, 541/542; Richard S. MacNeish, *The Origins of American Agriculture*, „Antiquity“, Vol. XXXIX, No 154, June 1965, pp. 88, 92.

the author had only a chance to form his own idea about the Chinese Han relief mentioned by Chang Jen Hsia and considered its identification with that cereal as unfounded. Unfortunately he had no such opportunity in respect to the Khmer medieval relief referred to by Sedov⁵⁰³.

A far greater range of assumptions may be drawn yet from the written sources data.

As regards China, if we refer first to the alleged Shang maize ideogram, it will not be out of place to recall how many difficulties sometimes arise in attempts to determine an exact meaning of some ancient Chinese characters designating plants. Besides, even if we admit the pre-Columbian occurrence of maize in South-East Asia, taking into consideration the geographical and chronological context of Shang inscriptions, the above mentioned identification seems to be doubtful, though, it merits to be reexamined. At present we can state that besides the alleged testimony of maize growing in Yün-nan in the early XVth century, as signalized by Chiba, in any other Chinese or foreign sources explored up till now and prior to the middle of the XVIth century no unquestionable mention about the cultivation of that cereal in China has been reported. Maize is not included either in the lists of imports, gifts or tributes which up from the Western Han dynasty and particularly under the Tang dynasty⁵⁰⁴, reached China from various countries of South and Central Asia. One cannot, however, exclude that it could be known in certain regions on the southern peripheries of China among the numerous hill tribes, whose culture, though frequently referred to in medieval Chinese sources, was not always recorded in details. We ignore, for instance, which were the particular species comprised under the general term of „cereals“ reported by Ma Tuan-lin⁵⁰⁵ for the Yao of North Kwangsi.

For Vietnam the oldest, thus far signalized, dated and unquestionable mention about maize is reported by Lê Qui Đôn and refers to the end of the XVIIth century. That reference, however,

⁵⁰³ See: *supra* p. 108.

⁵⁰⁴ Schafer, *The Golden Peaches...*, pp. 118—213; F. Hirth, *China and the Roman Orient*, Shanghai & Hongkong 1885, pp. 179, 274—275.

⁵⁰⁵ See: *supra* p. 116.

does not make clear: (1) whether the grain of maize *lúa ngô*, said to be brought at that time from China to So'n-tây region, was the first import of that cereal into Vietnam or only that of its peculiar form; (2) whether the varieties with yellow, pink, red and black grains reported under various names for S'on-tây, Lang-s'on and Thai-nguyên regions as well as that with white grains for Nghê-an province, derived from the above mentioned transfer or some of them at least had been cultivated earlier. As to the pre-Columbian records the argumentation of Jeffreys, who for some climatical reasons was inclined to recognize maize in one of the crops reported by Chao Ju-Kua for Annam under the term *su*, being a common name of millet⁵⁰⁶, seems to be unfounded. First of all it must be pointed out here that in spite of Jeffreys's objections the cultivation of millets is testified for various peoples of South-East Asia and even in South Vietnam (Jarai) and Laos (Lamet)⁵⁰⁷. So, at present we may only point to an unreliable tradition recorded in a Thai manuscript from Thanh-hoa, according to which maize along with rice was given by the Supreme God to the human beings after the flood cataclysm. The reference to maize in *Pô Nagar Taha*, a Cham chronicle from South Vietnam, though possibly based on an earlier tradition, is also not reliable.

As regards Cambodia, though the known native records do not report maize, we must remember that epigraphical sources concern mostly donations to temples and priesthood, and may not reflect a full set of crops, especially those less important, cultivated in that country, particularly those among the semi-independent mountain tribes from the remote regions of a once vast Khmer empire. As to the Chinese sources, maybe, a detailed enquiry undertaken by sinologists could show, for instance, whether the cereals mentioned by Ma Tuan-lin in his description of *Chenla* and translated by Saint Denys as „mil“ and „gros millet“ really represent the species that are suggested by the respective charac-

⁵⁰⁶ According to Stuart (*Chinese Materia Medica...*, p. 406) the term *su* 粟 once was applied to all millets in general.

⁵⁰⁷ Lafont, *Prières Jarai*, pp. X, 212; Izikovitz, *op. cit.*, pp. 240, 302.

ters from the Chinese text — or, taking into consideration a possible shifting of names from one plant to another, they previously designated other species maybe resembling millets in some traits.

For Laos and Siam we may point here to a legend narrated in *Suvanna K'ôm Kkām* chronicle in which maize is reported alongside with rice and millet. Though the cultural context of that story seems to be localized somewhere in the northern part of Siam and adjacent part of Laos, and its nucleus belongs probably to the old Thai tradition, we have no point of reference which would suggest an approximate age of the above discussed variant of that legend. The laconic mention about maize juice, to be found in the Laotian version of *Pañcatantra*, may be also considered here.

For Burma we may only indicate at present, under some provision, a version of the myth, widespread among the Thai peoples, that occurs in *Li Kho Khon Thai Phwa* chronicle and relates that maize together with some other crops was recommended to Hkunlung and Khunlai, the semi-fabulous princes, for cultivation. Considering that each section of the Thai peoples, as noticed by Scott⁵⁰⁸, located the scene of that myth in their own region, we may suspect that the discussed version emanated from the Shan States area from where the Ahom as well as the Phake and other akin tribes successively migrated into NE Assam. How can we date that variant is a puzzle hardly to be solved. For Lower Burma, on the other hand, even such vague references to maize are lacking. As to the „gros millet appelé *leang*“ reported by Ma Tuan-lin for the country which may be identified with Pegu, without a special study on the possible meanings of the respective ideogram from the Chinese text, we can only speculate which plant is concerned. By now we may remark that

the sign: 粱, pronounced *liang* was applied to the spiked millet (*Setaria italica* Beauv.) or as a component of some names of sorghum (*Sorghum vulgare* Pers.)⁵⁰⁹. Finally, for Arakan we may point only to Manrique's relation about his journey of 1630,

⁵⁰⁸ Scott, *op. cit.*, p. 258; comp.: R. Boileau Pemberton (Capt.), *Report on the Eastern Frontier of British India...*, Calcutta 1835, p. 110.

⁵⁰⁹ Stuart, *op. cit.*, p. 405, 416.

referring to rice cultivation but also alluding to „other cereals“ cultivated by the aboriginal Magh. However, neither in his relation about a trip he undertook in 1634 to a tribe identified with the Chin or Mro, nor in the account of Latter⁵¹⁰ (1846), concerning the tribe Kyounngthas, nor in the letter by Hay from the year 1889⁵¹¹, relating about the peoples of Arakan in general, any other cereals are reported except rice. So, the author cannot indicate any record prior to the modern scientific reports which would testify an isolated and extensive maize cultivation observed among the Koo from the northern part of the Arakan mountains.

As regards Assam, the oldest testimony of maize cultivation known to the author, as mentioned already in his paper of 1963, occurs in the account of Robinson (1841)⁵¹². One should remark, however, that in a somewhat earlier study of Martin (1838)⁵¹³, besides rice, only wheat, barley and millet are mentioned as the cereals cultivated in the Brahmaputra Valley, while for Garo Hills, rice and millet alone are reported. Similarly for the adjacent district of Rongpoor (western part of Lower Assam and North Bengal) only rice, millet and wheat are testified among the cereals. Also for Tripura the author does not know any reference to maize prior to modern times. Thus in a report of Rawlins (1790)⁵¹⁴ concerning one of the Kuki tribes (considering the name of its Supreme Being most probably the Lushai or akin tribe) rice is mentioned as the only cereal used in their offerings.

As regards, the Indian Peninsula, Gode signalized that the oldest known to him reference to maize in native sources concerns the year 1540. Nevertheless, as indicated by Heine-Geldern⁵¹⁵, still

⁵¹⁰ T. Latter (Lieut.), *A Note on some Hill Tribes on the Kuladyne River — Arracan*, „Journal of the Asiatic Society of Bengal“, Vol. XV, 1846, p. 65.

⁵¹¹ John Ogilvy Hay, *Arakan. Past — Present — Future*, Edinburgh and London, 1892, pp. 96, 169.

⁵¹² See: Marszewski, *The Age of Maize...*, p. 291.

⁵¹³ Martin, *op. cit.*, Vol. II: pp. 815, 827; Vol. III: pp. 351, 356, 358, 670, 694.

⁵¹⁴ John Rawlins, *On the Manners, Religion and Laws of the Cúcis or Mountaineers of Tipra*, „Asiatick Researches“, 2, 1790, pp. 187, 188, 192.

⁵¹⁵ Heine-Geldern, *op. cit.*, p. 372.

Roxburgh wrote (ca 1800) that he did not learn about that plant to be extensively cultivated somewhere in India while Lassen stated (1847) that it was not very much common in that country. We may point here yet to the above mentioned publication of Martin (1838) in which abundant information about the role of maize in the economy of some north-eastern districts of India, are given. Thus for Puraniya (NE Bihar and adjacent part of Bengal) he noted that „a good deal of maize, Indian Corn (*Zea Mays*), called here Makkai, is used. The people like it, but they imagine that it occasions fluxes“ and he remarked that it is more grown than sorghum ⁵¹⁶. Similarly for Bhagulpoor (East Bihar) he reported an extensive cultivation of maize, supplanting even that of sorghum, among the mountaineers of Rajmahal Hills, and emphasized that the Maler have even „no tradition concerning the introduction of maize which is now their principal food“ ⁵¹⁷. Finally, for Behar, Patna and Shahabad districts (West and Central Bihar) Martin wrote that maize cultivation, confined mainly to the banks of Ganges, was supplanting rapidly that of sorghum ⁵¹⁸.

As regards Nepal, the oldest up till now signalized reference to maize, which occurs in *Vaṃśāvali*, relates about the first appearance of its grain in the Kathmandu Valley during the reign of Jagat Jyotir Malla, i.e. ca 1617—1633. Considering, however, that this grain was to be introduced from the East, we may presume that in the eastern part of Nepal that plant might have been cultivated earlier. For the Palpa region in the central part of southern Nepal as well as for Jumla region in the north-western part of that country the earliest known report on maize cultivation is that of Hamilton (1819) ⁵¹⁹.

As concerning Tibet, if the word *ma rmos pa'i lo thog*, occurring repeatedly in *Rgyal Rabs Gsal Ba'i Me Long*, signified really maize, as suggested by the author, but which must be verified

⁵¹⁶ Martin, *op. cit.*, Vol. III: pp. 109, 218, 219; comp.: pp. 700, 701.

⁵¹⁷ *Ibidem*, Vol. II: pp. 125, 127, 128, 203, 205, 246, 247; comp.: pp. 5, 7.

⁵¹⁸ *Ibidem*, Vol. I: pp. 6, 279—280; comp.: pp. 26, 41, 48, 49.

⁵¹⁹ Francis Hamilton, *An Account of the Kingdom of Nepal...*, Edinburgh 1819, pp. 178, 284; see: Watt, *op. cit.*, p. 335.

by tibetologists, then we would have here one of the earliest reference to that plant signalized as yet for that part of Asia. Furthermore, whether we admit that *Rgyal Rabs Gsal Ba'i Me Long* was composed in the XIVth century, as accepted by Kuznetsov, or in the XVth century, as suggested by Vostrikov, that reference could be considered, under the above mentioned provision, as a recorded testimony for a pre-Columbian occurrence of that plant in Tibet. The same conclusion could be reached if we considered even the date 1508, assigned to that work by Tucci, as correct. We cannot thus imagine how maize could be transferred immediately after the first Spanish and Portuguese voyages to America, to the coasts of Asia — where the first European settlements were founded early in the XVIth century — and spread rapidly far inland up to Tibet. It would have had to be done early enough to permit maize to acquire in Tibet a position which caused that an allusion to that plant was interpolated in an old lamaistic myth about the descent of Tibetans inserted in *Rgyal Rabs Gsal Ba'i Me Long*. A comparatively early maize cultivation in Tibet is also suggested by two Chinese references: one from the middle, another from the second half of the XVIth century, both quoted in *Ko Chin Ching Yüan*. We should recall that maize was designated in these references by the names *fan-mai* and *hsi-fan-mai*, which after Laufer are to signify „Tibetan wheat“, and supposed to have come to China from beyond its western frontiers. The view according to which the terms *hsi fan* or *fan* suggest in that context Tibet rather than Inner Mongolia, as previously admitted by Mayers ⁵²⁰, seems to find support in the fact that the tribe called by Chinese *Sifan*, speaking a language akin to Tibetan and known as cultivating maize, live still scattered in NW Yün-nan and SW Szechuan ⁵²¹. Besides, as remarked by Juravlev ⁵²², that tribe was to migrate to these areas from some territories lying further to the North already in the XIIIth century. We may add here also that at least up from the Tang dynasty the Chinese name of Tibetans was *Tu-fan* (after Pelliot:

⁵²⁰ Hance & Mayers, *op. cit.*, p. 523 (note).

⁵²¹ Juravlev, *op. cit.*, pp. 71, 72 (map), 87.

⁵²² *Ibidem*, p. 87.

Thu-p^wan)⁵²³. In any case the view-points on the etymology of the discussed names of maize are to be agreed upon by sinologists.

For West Himalayas we may only indicate at present a report of Hamilton (1819)⁵²⁴ according to whom maize formed the staple diet of the poor people in Kangra. However, that testimony was considered by Heine-Geldern⁵²⁵ as comparatively early and therefore meaningful. As to Kashmir no reference or allusion to a plant which could be suspected to represent maize was detected in the sources prior to the modern times. Such references are not only lacking in the more or less laconic and generalizing reports of Chinese pilgrims as well as those of Arabian and European travellers but even in the most informative of all these sources, i.e. *Rājataranginī*, a work of the XIIth century. We must emphasize, however, once more that this work reports only about the plants cultivated in the Kashmir Valley and does not inform about those that might have been grown on the slopes of the surrounding mountains, thus Pir Panjal Range too, where the alleged pre-Columbian pollen of maize was discovered.

For some mountain and submontane regions lying to the south, south-east and east of Hindukush merely unprecise mentions are to be found in the relation of Hsüan Chuang, reporting about the „various“ or „every“ kind of „grains“ or „cereals“, which opens only a vast field for speculation. However for an unprecisely localized region of ancient Bactria, lying most probably somewhere to the north of Hindukush, a peculiar cereal with big grains is reported, as mentioned above, in *Periplus historiarum* of Theophrastus. As regards the two proposed identifications of that plant: one with maize — by early European herbalists; another with sorghum — by some modern specialists — it seems that both are too hasty and not sufficiently authorized by the character of the discussed reference, deriving most probably from an information given by somebody taking

⁵²³ Paul Pelliot, *Quelques transcriptions chinoises de noms tibétains*, „T'oung Pao“, Série II, Vol. XVI, 1915, p. 18; comp.: W. Eberhard, *Kultur und Siedlung der Randvölker Chinas*, Leiden 1942, p. 92.

⁵²⁴ Hamilton, *op. cit.*, p. 312.

⁵²⁵ Heine-Geldern, *op. cit.*, p. 373.

part in the campaign of Alexander the Great. However, it would also be uncautious to exclude the possibility that one of these identifications may be correct.

As regards Iran the plant *rus* suspected to represent maize, the reference to which was reported to occur in an unidentified as yet Persian historical work of the XVth century, cannot be an object of a responsible study until this reference is correctly localized.

For Asia Minor the mention about *formento de Turchia* in the accounts of Badoer from the years 1436—1440, is the only one known to the author which seems to deserve verification. Thus, one should recall that in several countries of Europe, mainly the mediterranean ones, maize was designated by analogical names (e.g. *blé de Turquie*, *Frumentum Turcicum* etc.).

It remains to review shortly the oldest reports of maize cultivation on the islands adjacent to the Asiatic continent.

Thus for Japan Sutô and Yoshida indicated the year 1573 as the alleged date of introduction of the „Carribean“ type of maize into that country, without giving yet the source from which they drew that information. However, one should consider here also the data given by Engelbert Kaempfer, a Dutch commercial agent of German nationality, in his work *Amoenitates Exoticae* (1712), containing numerous observations on the Japanese flora made during his stay in Japan in the years 1690—1692. Maize is namely included there among the plants which he thought to have been introduced from China. Besides, as remarked by Laufer⁵²⁶, though one of the maize names noted by Kaempfer i.e. *to morokoshi* alludes to its Chinese provenience, another one *nan ban kiwi* may point to the Portuguese or Dutch as being possibly responsible for the introduction of that plant into Japan.

As to Formosa, the earliest reported thus far unquestionable testimony of maize cultivation on that island, is a mention about that plant to be found, as indicated by Laufer⁵²⁷, in *Tai wan fu chi*, first published in 1694. According to Laufer, though Mayers⁵²⁸ considered it probable that maize was introduced into Formosa

⁵²⁶ Laufer, *op. cit.*, pp. 250—251; comp.: Bretschneider, *op. cit.*, p. 28.

⁵²⁷ Laufer, *op. cit.*, p. 249.

⁵²⁸ Mayers, *Maize in China...*, p. 90.

by Dutch or Spanish settlers during the XVIIth century, its local name *fan mai* reported in that chronicle, suggests that it could have been done still earlier by the Chinese from Fu-kien. Among the older sources the work of Ma Tuan-lin is one of the most informative, but it alludes only to „different kinds of millet“. Also for Hainan a similar reference of Chao Ju-kua relating about the cultivation of „different kinds of grain“, is to be mentioned here.

As regards Philippines, the problem of an alleged allusion to maize in the relation of Pigafetta remains controversial. However, as seen from the Ramusio's edition of that relation, besides the word *al miglio* applied for instance to a cereal from Cebu and under which name Jeffreys tried to recognize maize, Pigafetta used the word *mahiz* to designate a plant which was obviously maize grown, as it will be mentioned below, on another island of the Indian Ocean. Besides, in some later relations, as that of Gaetan from the year 1542 concerning Mindanao and Saguin islands and that of Povedano from the year 1578, which seems to concern mainly Negros island, the lack of maize cultivation is announced. It does not, however, preclude that this cereal could have been known earlier or even cultivated on some other islands of that archipelago.

For the Bandan archipelago maize is evidently reported under the name *mahiz* in the Ramusio's version of the account of Pigafetta for the year 1521, and that as cultivated by the aborigines of Zorobua island.

Finally, for Indonesia we may point here only to a passage from *Sung shih*, compiled as mentioned above in the middle of the XIVth century, in which for a country that is to be localized most probably on Java, a cereal is reported which according to Pelliot may be identified either with millet or with maize. Which of these identifications is correct, is to be answered, if at all, by sinologists, after a special comparative study of several Chinese ideograms.

Taking into consideration the above discussed data of written sources we may come to the following conclusions:

I. All alleged pre-Columbian references to maize cultivation, i.e. those which concern China, Vietnam, Java, Tibet and Iran should be reexamined by sinologists, tibetologists and iranists.

II. Lack of further references of such kind for these and other regions of Asia cannot prove that this plant was not cultivated or, at least, known there. This assumption is based on the following facts:

1. The bulk of written sources from various regions of Asia, most of them remaining in the form of manuscripts, was not explored in that respect, as emphasized by Carter⁵²⁹, or even not at all investigated, while many specimens are lost for ever.

2. Some written sources allude to „cereals“ or „grains“ without specification of their genus, so under such a general designation maize could be comprised too. Similarly the „different species of millet“ reported for some regions may also include maize whose primitive form could be well considered by incompetent observers as one of these species.

3. Many written sources, either reports of travellers, as remarked already by Heine-Geldern⁵³⁰, or geographical compilations based on second-hand information, or local records do not contain references to native crops and relate only about the political, religious and juristical affairs or even commercial ones but concerning luxury wares to be purchased or sold in particular regions. If, however, the food crops are mentioned, then only the main ones; so those less important, thus, maybe also primitive, „relatively unattractive“, as suggested by Carter⁵³¹, and we may add not very much productive forms of maize, could easily escape notice of the travellers.

4. The itineraries of many Chinese, Arabian and European travellers, though crossing various mountain areas of Asia, do not always run through or nearby the regions inhabited by peoples for whom maize was in modern times a staple or subsidiary crop and maybe could have been also cultivated, following their traditions, by their forefathers.

⁵²⁹ George F. Carter, *Plants Across the Pacific*, „Memoirs of the Society for American Archaeology“, Number 9: 1953, p. 68.

⁵³⁰ Heine — Geldern., *op. cit.*, p. 393; comp.: Collins, *A New Type...*, p. 23.

⁵³¹ George F. Carter, *Plant Evidence for Early Contacts with America*, „Southwestern Journal of Anthropology“, Vol. 6, Number 2, 1950, p. 175.

5. Several cultural centres and ports of South and East Asia, e.g. some in Burma, Siam, Cambodia and China were quite distant from the above mentioned regions which for their ecological conditions and culture of the aboriginal tribes were well adjusted to the cultivation of the „primitive“ forms of maize. Thus, written sources emanating from these centres or accounts of foreign traders could well not have report about the crops grown by primitive mountain tribes. Contrariwise, in SE Tibet for instance, where maize fields might have stretched in the vicinity of cultural centres, that plant could have been easily referred to in native records.

As regards the ethnographical data, it appears that those which were examined thus far in connection with the discussed problem, are insufficient to solve definitely the question which peoples of South-East Asia were the first to have maize and which were the directions of its early spread in that part of the world. However, all these data after being compared, permit, it seems, to draw some inferences. They are as follows:

1. Among some peoples only (Bhutani, Monpa, Northern Khasi, Chang Naga, Hmar, Lushai, Lakher, Lisu, Lutzu, Lolo, Nakhi, Ch'uan Miao, White Meo)⁵³² the great importance of maize in their economy coincides with the role that it plays in their rituals or festivals and beliefs or traditions. All these peoples live either in the East Himalayas or in mountains on the Assam — Burma, Burma — Siam, Burma — Yün-nan, Yün-nan — Szechuan and Laos — Vietnam borders. Most of them belong to the Tibeto-Burman and Miao-Yao groups of peoples which at different times migrated to their present seats.

2. Among certain peoples (Dafla, Tangsa, Rengma, Angami, Kachin, Chiang, Punoi, Akha, Jarai, Bahnar, Toradja, Mangarais, Riung)⁵³³ for whom maize is one of the main subsidiary crops, its economic role is either not at all reflected in their religious ceremonies or in some ones only, while in their bulk a dominant role is played by rice. However, among some tribes (Kachin, Toradja, Mangarais) myths concerning their main crops, maize among them, were noted. All these peoples live scattered in North and

⁵³² See: Marszewski, *The Age of Maize...*, pp. 267/268 and *supra* pp. 165—167, 169.

⁵³³ See: Marszewski, *op. cit.*, pp. 269, 280 and *supra* pp. 166—168.

East Assam, Upper Burma, North Laos, South Vietnam, Indonesia). They represent various ethnical groups and waves of migration.

3. Among several peoples (Western Thai, Lawa, Lamet, Tsa Khmu, Eastern Thai, Muong)⁵³⁴, for whom maize is only a not very much important subsidiary crop and rice the staple one, that latter dominates the whole religious life. Nevertheless, among some of them (Thai) maize appears in their myths, legends and fables. All these peoples live in the northern part of Indochinese Peninsula and mostly belong to the Austro-Asiatic and Thai groups, the first one forming in many regions an ethnical substratum which the peoples of the second group infiltrated in successive waves.

Reassuming all what has been said above, it may be concluded, it seems, that the actual importance of maize either in the economic or religious life or in both these domains of culture of the discussed peoples, depends not so much on their belonging to this or that wave of migration, but most probably on different factors, then above all on ecological conditions as well as on intertribal and trade contacts. So, to assign maize cultivation, as suggested by Stratanovich⁵³⁵, to the Mon-Khmer peoples from South Burma, Siam and Cambodia for the time preceding the second wave of migration of the Thai peoples, which was to take place according to him in IInd—Ist century B.C., seems to be premature.

However, some linguistic data tend to support the view of Stratanovich. These are the composite Thai names of maize analyzed above, whose second segments are names applied to that plant by the Khmer and some other Austro-Asiatic tribes of South and North Vietnam.

Some other linguistic items, discussed here and in the first part of that study, and especially those analyzed from the semantic point of view, permit only to suggest directions of diffusion of some maize varieties from one tribe to another, neighbouring or at least not very distant one. So, the respective inferences, already exposed, will not be repeated here.

⁵³⁴ See: Marszewski, *op. cit.*, pp. 266/267, 276 and *supra* pp. 166, 167.

⁵³⁵ Stratanovich, *op. cit.*, p. 224.

Having considered all categories of data juxtaposed in that study, the following conclusions may be drawn:

I. The greatest concentration of indices, thus far detected and signalized for the possible pre-Columbian cultivation of maize in Asia, is testified for Himalayas and some of their southern and eastern ramifications or submontane regions. So:

1. The areas of distribution of the two most primitive forms of Asiatic maize, i.e. the „Persian“ and „Aegean“ types overlap in Himalayas and adjacent mountains up to *ca* 20° of N. lat. and *ca* 100° of E. long., while to the south and east of these geographical coordinates they diverge⁵³⁶.

2. The alleged subfossil pollen of maize was discovered in the Pir Panjal Range and in deposits of Haigam Lake in Kashmir.

3. A plausible reference to maize occurs in *Rgyal Rabs Gsal Ba'i Me Long*, which most tibetologists consider at present to be composed before the XVIth century or at least in its first decade. Besides, some Chinese sources from the second half of the XVIth century report that maize reached China from a country beyond its western frontiers, most probably Tibet, where its cultivation was to acquire importance. Then, *Vaṃśāvali* referring to the introduction of maize into Kathmandu Valley from the East in the first half of the XVIIth century suggests an earlier cultivation of that cereal in East Himalayas. Finally, a report of Hamilton provides the testimony of maize being a staple food of a part of the population of Kangra in West Himalayas early in the XIXth century, so at a time preceding, as emphasized already by Heine-Geldern⁵³⁷, its great spread throughout India.

4. The association of the importance of maize in agriculture with its distinct role in religious life is to be observed mainly among the peoples of East Himalayas from Sikkim up to the confines of West Yün-nan.

II. Far more questionable are the alleged indices which in the present stage of research may be presented, under some provision,

⁵³⁶ Sasuke Nakao, *Transmittance of Cultivated Plants through the Sino-Himalayan Route*, *SRJENH*, ed. by H. Kihara, Vol. III: *Peoples of Nepal Himalaya*, Kyoto 1957, map on the p. 408 (fig. 6); comp.: Sütö & Yoshida, *op. cit.*, map on the p. 497 (fig. 69).

⁵³⁷ Heine — Geldern, *op. cit.*, p. 373.

in favour of the particular hypothetical routes by which maize could have reached the above mentioned remote mountain areas, possibly even in the pre-Columbian times. If one admits, not excluding other possibilities, that maize was introduced first into one point or another of the continental coast of South-East Asia, its further spread far inland along the mountain ranges or valleys, which for some of its primitive types assured best ecological conditions, seems to be quite plausible. Then:

1. In favour of the „West Burma“ route we may indicate only the fact that maize is testified as a staple crop among the Koo in the North of the Arakan Range and as an important one among the Lakher, Lushai and Poi from the Lushai and Chin Hills, where it acquired even a certain role in the religious ceremonies of these peoples⁵³⁸.

Against that possibility the following facts may be suggested:

(a) no civilized or semi-civilized peoples inhabiting the southwestern coasts of Burma, thus the Magh from Arakan and the Mon from Irrawaddy delta, are known thus far to display a maritime activity which could be responsible for maize introduction, though one must not exclude their role in the transmittance of that cultigen due to some trade contacts;

(b) no maize cultivation is reported either in pre- or early post-Columbian sources, known to the author, for the mountaineers of the South of the Arakan Range, where these mountains approach the sea shore;

(c) between the Lushai Hills and East Himalayas only among the Northern Khasi and Chang Naga maize is known to play an important role simultaneously in the economic and religious life.

2. In favour of the „West Siam“ or „East Burma“ route we may point out to the compact area of a more or less extensive cultivation of maize, grown by the Red Karen, Lahu, Wa, Lisu, Ulu Lama and Lutzü, that stretches from *ca* 19° N. lat.⁵³⁹ along and on either side of the Saluen Valley up to the easternmost confines of the Himalayas, where that crop plays even a prominent role in some religious practices of several tribes. However, the res-

⁵³⁸ Kauffmann, *Landwirtschaft...*, p. 21; Marszewski, *op. cit.*, pp. 264, 268.

⁵³⁹ Comp.: Kauffmann, *op. cit.*, Kartogramm No 1.

pective sectors of the coast of Lower Burma and Siam for centuries, or even millenia, were under the control of Mon communities from the mouths of Sittang, Saluen, Meklong and Menam about whose maritime and trade contacts we know at present very little.

3. In favour of the „Vietnam — Laos“ route the following facts can be taken in to account:

(a) isolated centres of a more extensive maize cultivation, as⁵⁴⁰ among the Mnong Cil to the Ne from Dalat, Jarai from Cheo Reo, Nguon from Quang binh, Meo and some Yao tribes from the NW corner of North Vietnam and neighbour parts of Laos as well as the Lolo and Nakhi from SW Yünnan, are scattered along the Annamite, Sipsong Chotai, Ailao-shan mountains and adjacent uplands, but surrounded by areas where rice is preferred as a staple crop;

(b) two civilized peoples living on the shores of North and Central Vietnam, i.e. the Viet and Cham respectively, displayed a vivid maritime activity, as it was already suggested by Heine-Geldern⁵⁴¹ in connection with the discussed problem for the representants of the Dongson culture.

Against that possibility the fact is to be considered that among the bulk of Austro-Asiatic and Austronesian peoples of Vietnam maize does not play a particularly important role either in their economic or religious life.

The author is inclined to admit as very much probable that the first introduction of some „primitive“ types of maize into Asia could have happened in the pre-Columbian era. However, he considers as premature, in the present stage of research, the final solution which was exactly the route or routes by which it was done, though the second and the third of the above mentioned hypothetical directions of maize diffusion look plausible⁵⁴².

⁵⁴⁰ André Leroi — Gourhan & Jean Poirier, *Ethnologie de l'Union Française (Territoire extérieurs)*, Paris 1953, T. 2, p. 659; Lafont, *Prières Jarai...*, p. 163; Cuisinier, *Les Mu'o'ng...*, p. 145; comp.: p. 24; Abadie, *Les races...*, pp. 114, 159; Kauffmann, *op. cit.*, p. 21 and Kartogramm No 1.

⁵⁴¹ Heine — Geldern, *op. cit.*, pp. 367, 392; see: Marszewski, *op. cit.*, p. 293.

⁵⁴² See: the map. *supra* p. 192.

But the author does not exclude also the possibility that maize was first introduced by some Austronesian sailors on one island or another of the Indian Ocean and then transplanted onto the Asiatic mainland.

ABBREVIATIONS

- AMBG — Annals of the Missouri Botanical Garden.
 BABGPB — Bulletin of Applied Botany, of Genetics and Plant Breeding (Trudy Prikladnoy Botanike, Genetike i Selektzii).
 BEFEO — Bulletin de l'École Française d'Extrême-Orient.
 EFEO — École Française d'Extrême-Orient.
 JA — Journal Asiatique.
 SRJENH — *Scientific Results of the Japanese Expeditions to Nepal Himalaya 1952—1953.*

ALICJA MAŁECKA

STRUCTURE OF A SIMPLE SENTENCE IN THE SWAHILI LANGUAGE WITHIN THE RANGE OF THE VERBAL GROUP AND CONGRUENCY

The present article is a continuation of the article published in the IX Vol. of „Folia Orientalia“ under the title: *Structure of a Simple Sentence in the Swahili Language within the Range of a Nominal Predicate and Nominal Group*.

As to symbols and abbreviations concerning patterns and bibliography, some were already used previously in the above mentioned work, others — new ones — have been introduced into the present paper.

LIST OF SYMBOLS

(fragments which occur in the present paper)

The nomenclature applied in this paper refers both to the general and detailed symbolics. The first one serves to characterize basic, general phenomena and to denotate sentence members which are not the problem under discussion in a particular sentence. A precise analysis by means of detailed symbols, on the other hand, was carried out with reference to the discussed problem or member of a sentence.

Note. The same system has been shown in my previous article about the nominal predicate and nominal group in Swahili (IX Vol. of „Folia Orientalia“).

Verbal Group

Verbal Predicate

P = *Praedicatum* = verbal predicate in general symbolics;

