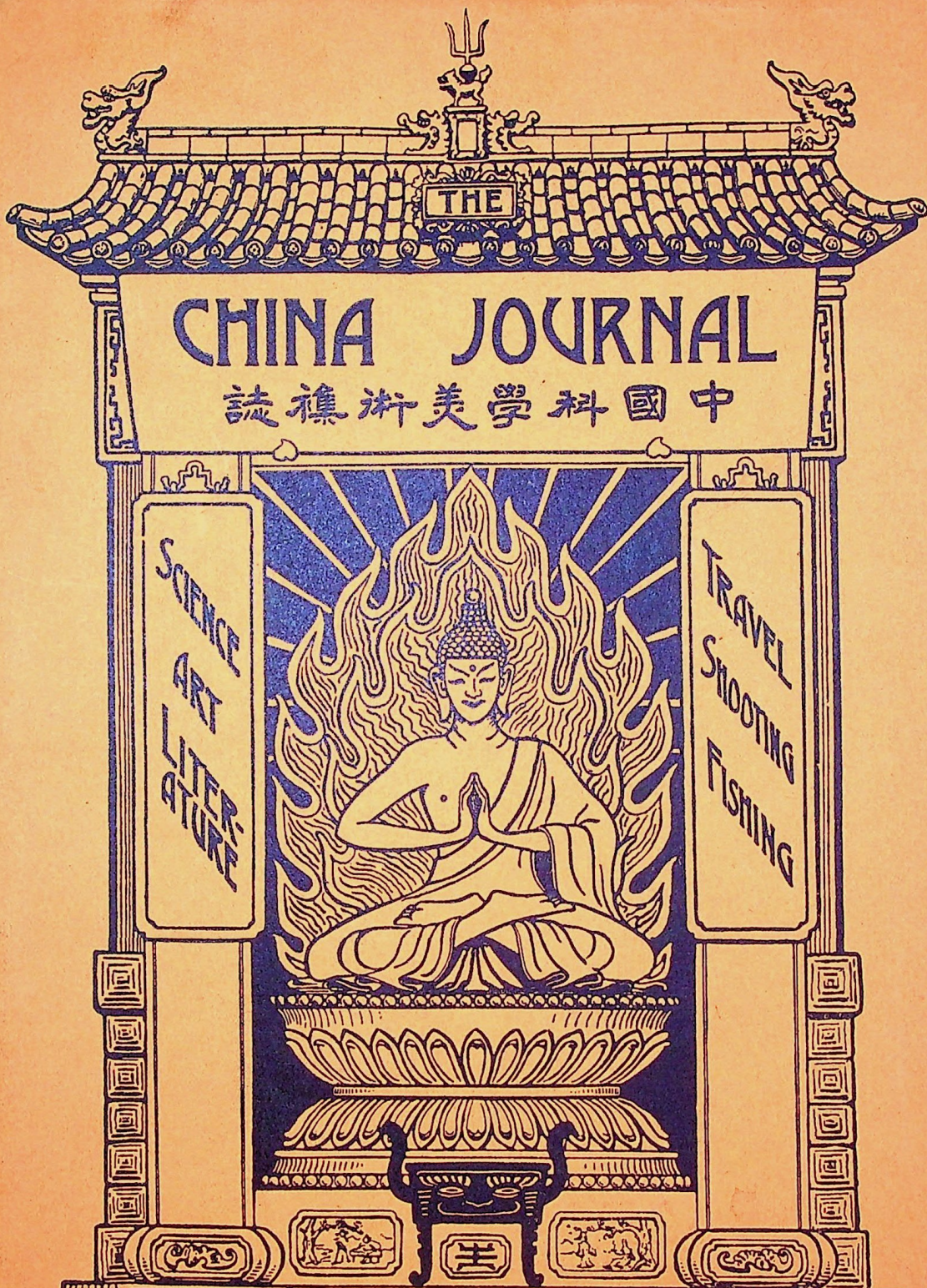




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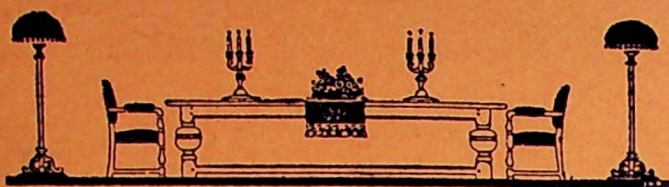
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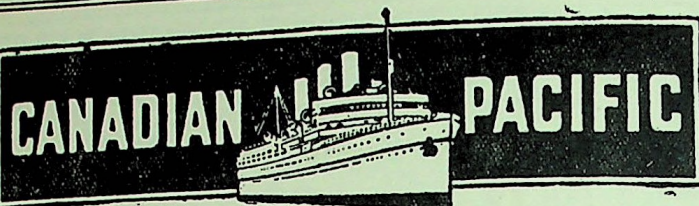
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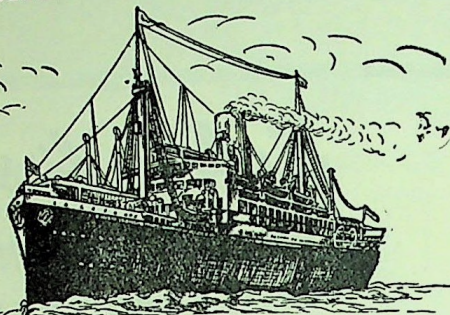
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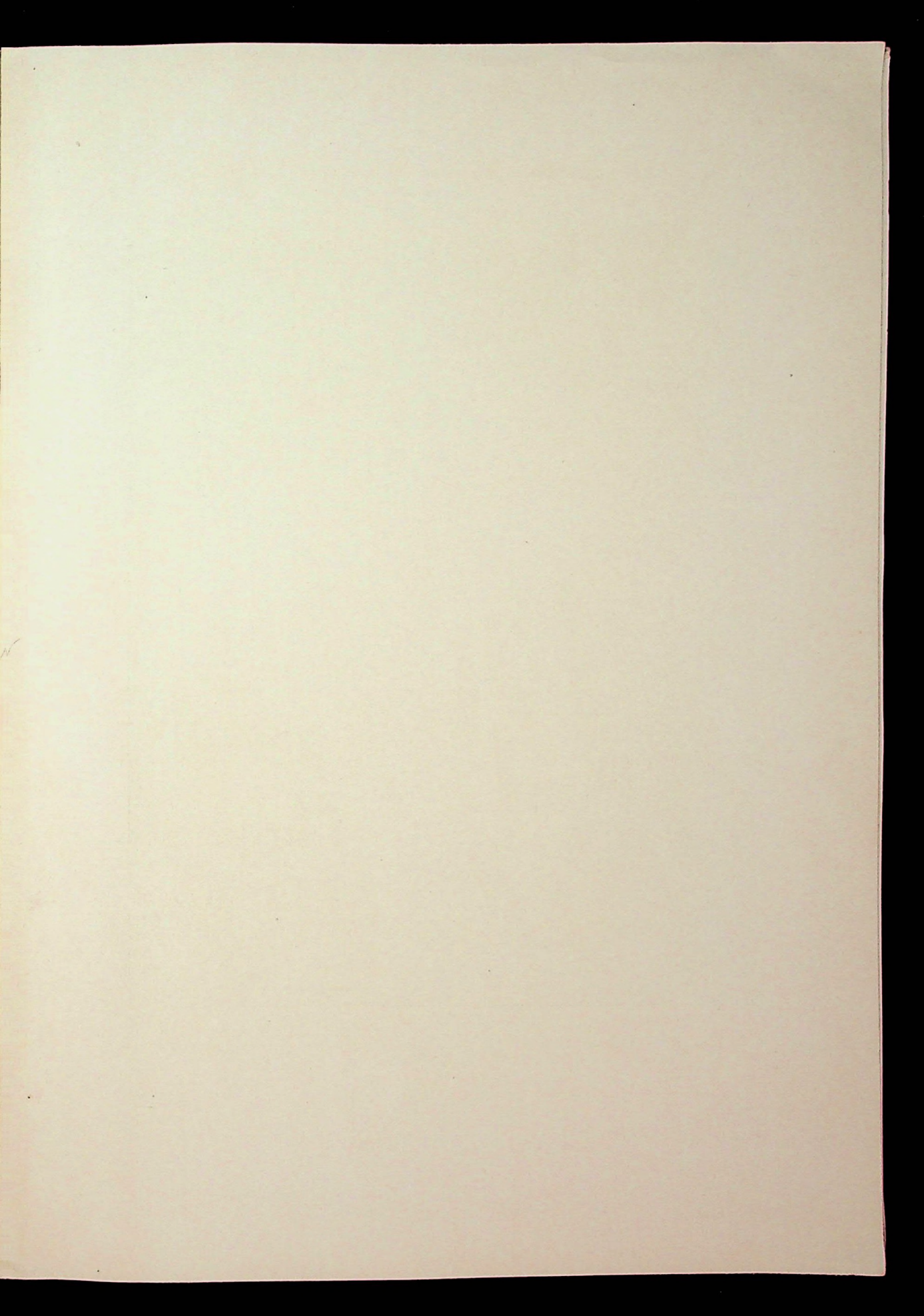
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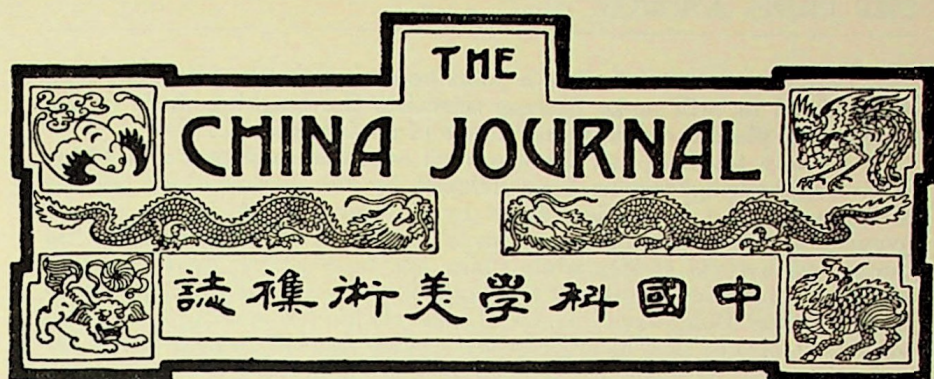
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The late Kang Yu-wei, Scholar and Reformer, who died at Tsingtao in his 70th year on March 31st, last. From the Portrait by A. Ketz
(See page 221)



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No. 5

SCIENCE KNOWS NO COUNTRY

BY

ARTHUR DE C. SOWERBY

That science knows no country and knowledge is international are facts which we would have thought had been universally accepted throughout the twentieth century world. That the people of any nation laying claim to culture could be so backward or behind the times as to think that they could maintain a corner in any branch of human knowledge or retain the sole right to prosecute any particular line of investigation is hard to believe. Yet from Peking comes the astounding news that certain scientific organizations there have formed an association to fight the efforts of various foreign scientific expeditions to search for remains of ancient man and other treasures of geological and archaeological interest in different parts of China. It is held that Chinese ancient relics and treasures should be explored only by the Chinese people themselves. Particular exception appears to have been taken to the recent expeditions of the American Museum of Natural History into Mongolia and the proposed Swedish expedition under Dr. Sven Hedin into North-western China and Turkestan. Some of the members of the association have even gone so far as to demand the return to China of the "one million year old dinosaur eggs" discovered by Dr. R. C. Andrews and party in Mongolia and taken to America.

In so far as this movement aims at retaining in China valuable archaeological relics and actual treasures of a bygone age, we feel a considerable amount of sympathy with it, but to attempt to forbid foreign scientists from carrying out geological and archaeological explorations on the ground that this should be left for Chinese to do is carrying the principle

of "China for the Chinese" to a point bordering on the ridiculous, and, if persisted in, will make Chinese scientists the laughing stock of the world, and place them outside the pale of modern science.

Already too long has the thorough scientific exploration of China and neighbouring regions been delayed by the backwardness of the Chinese and the difficulties placed by the government in the way of competent foreign explorers and investigators. The world at large has moved with rapid strides while China has been letting herself go into political convulsions, and now the world impatiently waits for the knowledge of what China contains, for the secrets hidden beneath her masses of yellow *loess* or that lie on the open surface awaiting the advent of the scientist with the seeing eye and understanding mind.

China has no right to bar the way of these scientists or to tell the world that it must wait for the knowledge it craves till such time as the Chinese themselves are ready to go and seek out that knowledge. That knowledge belongs to the world as a whole and not to China alone.

What, we would like to ask, would be the state of our knowledge of China's archaeology, geology, natural history, meteorology, topography and other kindred subjects, had the principle enunciated by this newly formed association been put into practice from the time that foreigners first came to China till now? For that matter, what would be the state of our knowledge of any part of the world to-day if such a principle were admissible and had been adhered to during the period of modern scientific development? It is safe to say that in either case it would have been almost nil. Left to the Chinese, the information and data that it is becoming increasingly imperative to have of China's geology, archaeology, palaeontology, ethnology, zoology and botany in order to fill in gaps in our general knowledge of these subjects and help solve the problems connected therewith, would inevitably be withheld indefinitely, for China is in no way ready to carry out such explorations as foreign scientists are only too willing to undertake. The financial state alone of the country would effectively prevent it.

We had hoped that Chinese scientists would have kept their heads during the present political upheaval that is threatening China with utter ruin, and even now we find it hard to believe that the responsible ones amongst them, such as have shown their ability to carry out original research work in the country, have identified themselves with this movement. Indeed we understand that the members of neither the Geological Survey nor the Geological Society of China have identified themselves with this movement. They, at least, appreciate the benefit accruing to China through the willingness of foreign scientists and scientific bodies to undertake such explorations as have been carried out in Chinese territories during the past few decades, and in which, in many cases, they themselves have co-operated.

In the interests of progress and in China's own best interests we call upon these men to exert all their influence against the introduction of politics and race antagonism into the sphere of scientific knowledge and research work, and to keep the Chinese body scientific from betraying a spirit of selfishness and jealousy that is little short of insane.

KANG YU-WEI, SCHOLAR AND REFORMER

On Thursday, March 31st, there passed away one of the great men of China. Kang Yu-wei, scholar and reformer, was one of that group of brilliant young men who surrounded the throne of the Emperor Kuang Hsu previous to the year 1898, and who, with the full approval of the Emperor, were pushing forward much needed reforms for China's good, when the Empress Dowager, alarmed at the rate at which these reforms were being put into force, brought off her famous *coup d'état*, beheading six of the reformers, imprisoning the Emperor, and successfully sowing the seed of the Boxer outbreak in 1900 and the Revolution of 1911.

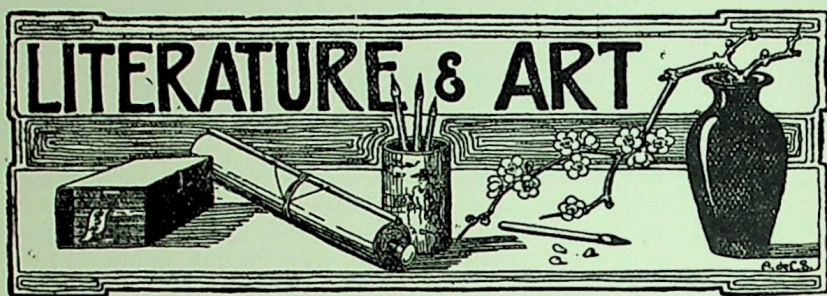
Kang Yu-wei has always been one of those men with a keen, well-balanced mind, capable of understanding the true state of affairs and assessing facts at their true value. There is little doubt that had he and the men he led been allowed to carry on the work to which they had set their hands, China would have been in a very different position from that in which she finds herself to-day, and instead of passing through the welter of bloodshed and the frightful chaos of the last fifteen years, she would have progressed in an orderly fashion from the system of absolute monarchy of the Manchus to some form of limited monarchy such as pertains in Great Britain, or a properly functioning republic such as exists in the United States of America.

But it was not to be. Kang Yu-wei was forced to flee the country and for sixteen years he lived the life of an exile, travelling about the world, and only able to help along the needed reforms in China through the agency of pamphlets which he sent to his colleagues from time to time.

Never an acknowledged republican, he advocated a limited monarchy as the best form of government for China, his party being known as the Pao Huang Tang, or the "Protection of the Emperor Society."

In 1912, after the outbreak of the revolution which swept the Manchus from the throne, Kang Yu-wei returned to China, but because of his pro-monarchical tendencies, never became associated with the new government. It is claimed that he was connected with Chang Hsun's attempt to restore the Manchus in 1917, but, if so, the anti-monarchical parties must have set little store by his actions, as he has been allowed to live out his life in peace on Chinese soil.

Kang Yu-wei was a native of Kuangtung and he first came into prominence on account of his brilliance as a scholar. Coming into contact with Western learning and ideals of government, he rapidly absorbed their essentials, subsequently establishing his claim to fame by publishing a series of brilliant treatises in Chinese. It was these that brought him to the notice of the Emperor, and paved the way to his becoming the leader of the ill-fated reform party. He was in his seventieth year when he died at his last residence in Tsingtao.



ARCHAEOLOGY IN THE SUNG DYNASTY*

BY PROF. WANG KUO-WEI (王國維)

(TSING HUA COLLEGE.)

TRANSLATED BY MR. C. H. LIU (劉崇鉉).

Sung scholarship is notable for the quality as well as the diversity of its achievement. In the field of philosophy, there were, in the early years of the dynasty, scholars like Liu Ch'ang (劉敞) and Ou-yang Hsiu (歐陽修), who, freeing themselves from the shackles of old Han and T'ang commentaries, applied new ideas to explain the classics. Later in time came the group of great thinkers, Chou Tun-i (周敦頤), Ch'êng Hao (程顥), Ch'êng I (程頤), Chang Tsai (張載), Shao Yung (邵雍), and Chu Hsi (朱熹), who made a distinctive era in philosophy. In the realm of science, men like Shên Kua (沈括), Li Chieh (李誠) and others contributed discoveries in astronomy, mathematics, physics and technology. History was represented by Ssü-ma Kuang (司馬光), Hung Mai (洪邁), Yüan Shu (袁樞), each with his monumental works. Painting was, since the time of Tung Yüan (董源), changed from the work of mere craftsmen to the artistic creation of scholars. In poetry there was a new emphasis on technique which distinguished it from the purely natural beauty of T'ang poetry. Similarly, archæological study, which the Sung originated, also reached a high level of excellence in this dynasty. Thus it may be said that the period in which the House of Chao reigned over China was not equalled in intellectual activity and in the variety of its manifestations by the dynasties of Han or T'ang which preceded it, nor by the dynasties of Yüan and Ming which followed it.

In many fields of modern scholarship, the Sung sowed the first seed. Archæology is one of the subjects the beginning of which we may

* A Paper Read Before The Peking Historical Association.

attribute to the Sung scholars. In pursuing this study, the scholars paid attention to all of its various aspects—collection (蒐集), descriptive records (著錄), identification (考訂) and application (應用)—and succeeded in making it, within the space of a hundred years, a distinctive branch of knowledge. The object of this paper is to discuss the achievements of the Sung archaeologists in these four different phases.

1. COLLECTION (蒐集).

There was originally a collection of antique objects in the Imperial Treasury at the beginning of the Sung Dynasty. In the third year of the Huang-yu era (皇佑三年), 1051 A.D., in the reign of Jên Tsung (仁宗), the Emperor decreed that the bells and tripods kept in the Pi Ko (秘閣) and T'ai Ch'ang Halls (太常) should be turned over to the Bureau of Music (太樂所) for the purpose of study, comparison, measurement and weighing. The objects thus turned over numbered eleven. But it was with the accession of Hui Tsung (徽宗) that collection on a large scale began. Ts'ai T'ao (蔡條) in his Reprints called T'ieh Wei Shan (鐵圍山叢談), Vol. IV, said:

"The ex-Emperor Hui Tsung, from the time he ascended the throne, took ancient models for his guidance. At the beginning of the Ta-Kuan era (大觀), 1107, following the example of Li Kung-lin's (李公麟) K'ao Ku T'u (考古圖), he ordered to be compiled 'Illustrations of the Ancient Objects in Hsüan-Ho Hall' (宣和殿博古圖). This collection, consisting of sacrificial objects, large and small, numbered over five hundred. However, it was only in the Chêng-Ho (政和) period of Hui Tsung's reign that the collection became exceedingly rich, totalling more than six thousand objects. The things that were treasured were those supposed to have come down from the three pre-Ch'in Dynasties. Objects that belong to the Ch'in (秦) and Han (漢) periods were not included unless they were of special value. Later during the Hsüan-Ho (宣和) period of Hui Tsung's reign, 1119-1125, when these were all brought together and recorded, it was found that they numbered more than ten thousand. All objects of renown, such as the stone drums of Hsüan Wang (宣王) found in Ch'i Yang (岐陽), and the paintings in the Sacrificial Hall of Wên Wêng (文翁禮殿) in Western Ssuchuan, wherever they were to be found, near at hand or far afield, were now gathered, irrespective of size, into the forbidden precincts of the emperors. Behind the Hsüan-Ho Tien (宣和殿) there was erected the Pao-Ho Tien (保和殿) and to the left and the right there were the cabinets (閣) named respectively Chi-Ku (稽古), Po-Ku (博古) and Shang-Ku (尚古). These were used for storing ancient jades, public and private seals, various kinds of tripods, famous examples of calligraphy and paintings."

This is the most detailed account we have of the famous collection of Hui Tsung. The account is not free, however, from exaggerations

and inaccuracies. For instance, it said that the book Hsüan-Ho Po Ku T'u (宣和博古圖)* derived its name "Hsüan-Ho" (宣和) from Hsüan-Ho Tien (宣和殿) and also it said that the book was completed by the beginning of the Ta-Kuan era (1107) rather than at the end of the Hsüan-Ho era (1125). That these points were not in accord with fact is clearly shown by the following records. According to Chai Ch'i-nien's (翟耆年) "Chou Shih" (續史), in the fall of the year kuei ssü (癸巳) of the Chêng-Ho era (1113) an ox-head shaped "Tui" (敦) was found in the city Ch'ang An (長安)†. This "Tui" was illustrated in the Po Ku T'u. Again, according to Chao Ming-ch'êng's (趙明誠) "Chin Shih Lu" (金石錄)‡, in the wu hsü (戊戌) year of the Ch'ung-Ho (重和)§ era (1118) a farmer of the Hsiao Kan District (孝感縣) in An Chou (安州), while ploughing, found three square tripods (鼎), two round tripods and one "Yen" or "Hsien" (簋). These were known as the six objects of An Chou (安州六器), ¶ five of which were pictured in the Po Ku T'u.** The same book records that in the fifth year of Hsüan-Ho (1123), an inhabitant of Ling Tzû District (臨淄) in Ch'ing Chou (青州), as he was ploughing on the site of an old city of Ch'i (齊), found a number of old articles, among which ten bells were considered the most remarkable.†† The Po Ku T'u had reproductions of five of these.‡‡ From the above instances, it is evident that the completion of the book must be dated after the fifth year of Hsüan-Ho (1123) and not about 1107 as Ts'ai T'ao maintained. Furthermore, as the T'u covers only a few more than five hundred objects, what Ts'ai T'ao said of the six thousand objects of Chêng-Ho and of the ten thousand objects of Hsüan-Ho cannot be quite trusted. It may be that Ts'ai T'ao included old jades, seals and stone inscriptions. Nevertheless even when limited to what was recorded in the Po Ku T'u, it was already a remarkably rich collection, for which one seeks in vain for a prototype.

One very remarkable fact is that when the Sung removed to Hang-chow and the collection of the Hsüan-Ho Tien had all been carted off to the north by the Chins (金), the imperial collection of Shao-Hsing (紹興) was not much inferior to the Hsüan-Ho Collection. About a tenth or a fifth of the objects that were pictured in the Po Ku T'u could be found in Chang Lun's (張綸) "Notes on the Imperial Collection of the Shao-

*See Ferguson's "Outlines of Chinese Art," p.36.

†Po Ku T'u Vol. XVII, p.5.

‡Vol. XIII, p.1-2.

§A.D. 1118.

¶Chin Shih Lu, Vol. XIII, p. 1-2. Also see Wang Fu-chai Chung Ting K'uan Shih p. 13.

**In Po Ku T'u I have only been able to find four. These are in Vol. II, p. 17, 18, 19, 26.

††Some of these bells are said to have had inscriptions of more than five hundred characters. See Chin Shih Lu, Vol. XIII, p. 2.

‡‡See Po Ku T'u, Vol. XXII, pp. 5-16.

—Ed., J.C.F.

Hsing Era" (紹興內府古器評). The reason was that while the Chins were not cultured enough to appreciate these things, the emperors and officials of Sung were willing to pay good prices for them and consequently objects that formerly belonged to the imperial collection or to old families would very frequently be found at the market (樵場) where the Sung and the Chins exchanged their goods. For example, the Chang Chung "Fu" (張仲簠)* which was formerly in Liu Ch'ang's (劉敞) collection was obtained by Liu Yen (劉炎) at the market. Pi Liang-shih (畢良史) also obtained fifteen kinds of antiques from the market of Hsü I (盱眙)†. He made rubbings of the inscriptions on them and sent these rubbings to Ch'in Po-yang (秦伯陽). Eight of these objects, it was found, were formerly of the Hsüan-Ho Collection.‡ In the "Chronicles since Chien-Yen" (建炎以來繫年要錄) it is recorded that in the fifteenth year of Shao Hsing, the emperor made Pi Liang-shih the governor of Hsü I, while San Ch'ao Pei Meng Hui Pien (三朝北盟會編) mentions that Pi Liang-shih became a favourite of the court because he was skilled in buying and selling examples of calligraphy, paintings and other antiques. We may thus infer that Pi was appointed to the post because Kao Tsung (高宗) wished him to look for old objects in the market. This is a good illustration of the emperor's enthusiasm for antiques. If the emperor Kao Tsung showed such enthusiasm for the collection of old things at a time when the Sung emperors were just establishing a new home in the south, and the country and the throne alike were as yet far from being secure, it is not surprising that the earlier Hsüan-Ho Collection made under more favourable circumstances should be so very rich and varied.

Remarkable as were the imperial collections, the fashion of collecting ancient objects, however, was created by private individuals. History records that Liu Ch'ang (劉敞), when governor of Yung Hsing (永興, present Hsianfu in Shensi), secured eleven objects of pre-Ch'in periods; and that Li Kung-lin (李公麟), having a wide acquaintance with objects of antiquity and being skilful in judging them, showed such enthusiasm that, whenever he heard of an object of value, he would not hesitate in the least to pay a price of a thousand taels. Books such as Lü Ta-lin's (呂大臨) K'ao Ku T'u (考古圖), Hsü K'ao Ku T'u (續考古圖) by an unknown author, Wang Fu-chai's (王復齋) Chung Ting K'uan Shih (鐘鼎款識), and the appendices (跋尾) of the Tsih Ku Lu (集古錄) and Chin Shih Lu (金石錄) very frequently record the names of the collectors underneath the description of the objects. The collectors thus recorded numbered no less than several score. Although the individual collectors did not have such rich collections as those of the present day, the number of collectors was far more numerous. And judging from what Chou Mi (周密) in his "Yün Yen Kuo Yen Lu" (雲烟過眼錄) wrote of the

*See Hsieh Shang-kung's Chung Ting K'uan Shih, Vol. XV. Also Wang Fu-chai's Chung Ting K'uan Shih, p. 19.

†See Wang Fu-chai's Chung Ting K'uan Shih, p. 25.

‡See Wang Fu-chai's Chung Ting K'uan Shih, pp. 25, 26 et seq.

—Ed., J.C.F.

treasures of southern collectors, we see that the fashion of collecting antiquities persisted to the very end of the Dynasty. The fact that Hui Tsung (徽宗), in decreeing the compilation of the Hsüan-Ho Po Ku T'u (宣和博古圖) made use of the arrangement and form of Liu Ch'ang's Hsien Ch'in Ku Ch'i T'u (先秦古器圖) and Li Kung-lin's K'ao Ku T'u (考古圖) shows us that the enthusiasm of Hui Tsung in making his great collection was influenced to a large measure by private collectors.

The Sung collected, in addition to bronzes, stone inscriptions. To mention a few famous examples, the Stone-drums of Ch'i Yang (岐陽石鼓) and the Tablet to Wu Hsien of the Ch'in Dynasty (秦告巫咸文) were both gathered by Hui Tsung into his Hsüan Ho Tien Collection; the Tablet to Ta Shên Chiu Ch'iu (秦告大沈九湫文) was in the possession of Ts'ai T'ing of the Southern Capital (南京蔡挺); the Tablet to Ya T'o (告亞駝文) was owned by Liu Shên of Loyang (洛陽劉沈); the Grave tablet of Hai-ling-wang by Hsieh T'ao of the Ch'i Dynasty (齊謝眺海陵王墓誌) was in the hands of Shên Kua (沈括). In the case of a few very valuable stone inscriptions even fragments were treasured. Take for instance the fragments of Stone Classics of the Han Dynasty (漢石經殘石). There were, according to Huang Po-ssü (黃伯思), ten pages (版) of them in the family of Chang Tao (張燾); five or six pages in the family of Chang's son-in-law; and small pieces in the family of Wang Chin-yü (王晉玉). Not many other kinds of tablets were collected, however. The vogue of collecting rubbings of inscriptions has been kept up since the time of Ou-yang Hsiu (歐陽修) and among the collectors we may mention Tsêng Kung (曾鞏), Chao Ming-ch'êng (趙明誠), Hung Kua (洪适) and Wang Hou-chih (王厚之), men who made such collecting a fashion of the time. Besides bronzes and stones, pottery (瓦甕) and wooden tablets (木簡) were also gathered into the net of the collectors. Thus in the field of collection, the Sung achieved a very notable result indeed.

2. RUBBINGS AND DESCRIPTIONS (傳拓及著錄).

The contributions of the Sung Dynasty to archæology did not, however, consist in the mere collecting of objects, its main service being the diffusion of knowledge on the subject. It accomplished that purpose by two means: rubbings and descriptions. The method of rubbing with ink, begun in the Six Dynasties, was first used to make copies of the Stone Classics of Han and Wei (漢魏石經); then it was used for making copies of Ch'in (秦) inscriptions; and in the T'ang Dynasty it was very widely used. At the beginning of the Sung Dynasty it was applied to making copies of the inscriptions on ancient objects. We have noted above that in the third year of Huang-Yu (皇佑三年) it was decreed to turn over the bells and tripods of the Three Dynasties kept in Pi Ko (秘閣) and the T'ai Ch'ang Halls (太常) to the Bureau of Music (太樂所) for study, comparison, measurement and weighing (叅校劑量), and it was again decreed that ink rubbings of the inscriptions on the objects be made for distribution among the chief ministers. This was the beginning of

the making of rubbings from old objects. Liu Ch'ang (劉敞) while in Ch'ang-an (長安), made rubbings of all the antiques he had secured and sent them to Ou-yang Hsiu. Even objects which were presented to the emperors, such as the ancient bell of T'ai P'ing Hu (太平湖), Wuchang, and the Six Objects of An Chou (安州六器), all had had ink rubbings made from them which were circulated throughout the country. This is sufficient evidence of how prevalent rubbings had become. But rubbings from originals only cannot have a very wide circulation and consequently there were adopted the methods of wood engraving (刊木) and stone engraving (刊石) for the purpose of wider reproduction. Some of these, like Wang Ch'iu's (王休) "Hsiao T'ang Chi Ku Lu" (曉堂集古錄), or Hsieh Shang-kung's (薛尚功) "Chung Ting I Ch'i K'uan Shih Fa T'ieh"* (鐘鼎彝器款識法帖), were only copies of the inscriptions. Others reproduced also the shapes and forms of objects. From "Huang-Yu San Kuan Ku Ch'i T'u" (皇佑三館古器圖) and Liu Ch'ang's "Hsien Ch'in Ku Ch'i T'u" (先秦古器圖) downward, more than ten works of this class were published. Of these, we have now extant only Lü T'alin's "K'ao Ku T'u" (呂大臨考古圖), "Hsüan-Ho Po Ku T'u" (宣和博古圖) and the "Hsü K'ao Ku T'u" (續考古圖) by an unknown author. These works, in addition to the reproduction of shapes and inscriptions, note also the dimensions, the weight, the place where the objects were unearthed and the collectors to whom these objects belonged. Thus we see that the method of describing and recording objects was highly developed. In the field of stone inscriptions, the two famous collectors, Ou-yang and Chao, were the first to compile a catalogue of the stone rubbings in their possession. Besides these, there were catalogues for particular localities, as T'ien K'ai's (田槩) "Ching Chao Chin Shih Lu" (京兆金石錄); and others for the whole country, as Ch'ên Ssü's (陳思) "Pao K'o Ch'ung Pien" (寶刻叢編). Hung Kua (洪适) in his "Li Shih" (隸釋) recorded, in addition, the characters of the inscriptions and pictured the forms of the objects, thus making his compilation different from ordinary catalogues. Old jades, old coins, old seals—each had a number of special treatises. At present there remains not quite a hundredth part of the objects that were formerly in Sung collections and only a tenth of the stone inscriptions, but we have the pictorial reproductions and catalogues of the Sung period which enable us to study and appreciate the original collections. Thus the Sung, in making archaeological knowledge current among their contemporaries and then transmitting it to posterity, were making an enduring achievement.

3. IDENTIFICATION AND APPLICATION (考訂及應用)

Liu Ch'ang (劉敞), in the introduction to his "Hsien Ch'in Ku Ch'i T'u" (先秦古器圖) discussing the method of archaeological research, said that it needed men versed in the rituals to know the usages (明其制度), men versed in philology to decipher the inscriptions (正其文字) and

*See Ferguson's "Outlines of Chinese Art," p. 36.—Ed. J.C.F.

men versed in genealogy to determine the sequence of historical names (次其世諡). Therefore, in examining the method of the Sung in identifying ancient objects, we may proceed along three lines; namely, the determination of the characters, of the forms and of the facts which they relate.

In the Sung Dynasty, the first scholar to explain the characters on the old objects was Yang Nan-chung (楊南仲). Yang deciphered the inscriptions on the objects of Huang-Yu San Kuan (皇佑三館) and also those on all of Liu Ch'ang's collection. His explanations, as we can judge from those scattered in the Tsih Ku Lu (集古錄) of Ou-yang Hsiu and the K'ao Ku T'u (考古圖) of Lü Ta-lin, are mostly well thought out and correct. Yang was followed by a succession of talented men—Lü Ta-lin (呂大臨), Huang Po-ssü (黃思伯), Wang Ch'iu (王惲) and Hsüeh Shang-kung (薛尚功). Although their work was not free from inaccuracies and errors, yet in comparison with that of modern scholars like Yüan Yüan* (阮元) and Wu Jung-kuang (吳榮光), it was not far inferior.

In the identification of forms the Sung scholars were especially skilful. The names that have come down to us of the old sacrificial vessels (禮器) were all determined by the Sung. Names like "Chung" (鍾), "Ting" (鼎), "Li" or "Ko" (鬲), "Yen" or "Hsien" (甗), "Tui" (敦), "Fu" (簋), "Kuei" (簠), "Hu" (壺), "Tsun" (尊), "Ho" (盃), "An" (盥), "P'an" (盤) and "I" (匜) were found inscribed on the vessels, and the Sung used them to designate these objects accordingly. Other names like "Yu" (卣), "Lei" (罍), "Tsih" (爵), "Ku" (觚), "Chih" (觶), "Chio" (角), "Chia" (斚) were not found in inscriptions. The Sung identified these according to the size and the shape of the objects, and, to this day, their identifications for the most part hold good. A few examples may be mentioned. Recently three objects of the old feudal state of Hsü (徐器) were unearthed in Kiangsi. According to their shape, they are what the Sung would call "Chih" (觶). Now we find the inscription on one of the vessels says "I-ts'u (義楚), Prince of Hsü (郟), has chosen good metal and made a sacrificial Chuan (祭觶) for himself." Another simply says, "I-ts'u made sacrificial Chuan" (觶). The words "觶" and "觥" are the same as the word "觥" or "觥" in Shuo Wen (說文) and are but a variation of the word "Chih" (觶).† Hence we find here a proof that the Sung were right in naming round wine vessels as "觶." Again what modern dealers would call "tiger-headed i" (虎頭彝) has been called "I" (匜) by practically all authors, early or modern, but in the Hsü K'ao Ku T'u (續考古圖), an unknown Sung author called it "Ssü Kuang" (兕觥)‡. Now this

*See Ferguson's "Outlines of Chinese Art," p. 37.

†The ancient pronunciation of the word "觶" approaches that of "Chuan" (尊), and that of the word "觥" resembles "Chih."

‡"兕" meaning an ox.

object is very large and its cover is shaped like the head of an ox, and its inscription says "Made as so-and-so's 'Pao Tsun I'" (寶尊彝). It is evident from this that this is a vessel for sacrifice and feasting, not for washing, and that the unknown author, alone in his opinion, was right after all. Again the short sword (拔) on top of the ancient weapons "Ko" (戈) and "Chi" (戟) was horizontally placed, not vertically. Among modern scholars Ch'êng Yao-t'ien (程瑤田) was the first one to discuss this point in detail in his T'ung I Lu (通藝錄). But Huang Po-ssü (黃思伯) of the Sung Dynasty had already written an essay called "T'ung Ko Pien" (銅戈辨)—"Discussion on Bronze Ko"—and made this point. These examples all lead to the conclusion that in the identification of ancient objects by their shapes and forms the ability of the Sung scholars was far superior to that of the moderns. In this, as in the making of pictorial reproductions, modern scholars are still outstripped by their predecessors of the Sung Dynasty.

But when the Sung scholars came to explain the names and facts found in the inscriptions on objects, they showed an inclination to jump at conclusions that are ridiculous. For instance, whenever they saw the word "Chia" (甲), they would conclude at once that it meant "K'ung Chia" (孔甲); whenever they saw the word "Ting" (丁), they would conclude that it meant "Tsu Ting" (祖丁). Their explanations were, therefore, often far-fetched and unreliable. This fault was not unnoticed by the Sung scholars themselves. The comments (跋) of Chao Ming-ch'êng's "Chin Shih Lu" said, in connection with "Chung Chieh 'I'" (中結匜), "The Chung Chieh 'I' inscription to the right and the two objects following were all in the possession of Li Po-shih (李伯時). When Po-shih got an ancient tripod of square shape he forthwith concluded that it was the very tripod given by the Marquis of Chin (晉侯) to Tzū Ch'an (子產). Later he found this 'I', and he made it out that this was the same 'I' which belonged to Pi-chieh (偃姑), the mother of Chin Hsiang Kung (晉襄公). Such conclusions are quite ridiculous. In fact all objects that have come down to the present from the remote past are all of value enough in themselves. Why then should it be necessary to strain the facts to connect them with some historical name in order to enhance their value? This is the fault of being over fond of antiquity." Later Hung Mai (洪邁) in his criticism of Po Ku T'u (博古圖), Ch'ên Ch'êng-sun (陳振孫) in his criticism of Liu Yüan-fu (劉原父), Lü Ta-lin (呂大臨) and Huang Po-ssü (黃伯思) made similar comments. Thus we see the Sung scholars were not unaware of their own faults and did not all stumble into such pitfalls. In the study of stone inscriptions, scholars like Ouyang, Chao, Huang, Hung were most careful and accurate, without showing in the least the shortcomings noted above. They used historical records to identify the inscriptions and then used the inscriptions to affirm or to correct the histories. Their achievement was such that no one can fail to recognize them.

Now to consider briefly their application of archaeological knowledge. At the beginning of the dynasty, the sacrificial vessels used were made

according to Nieh Ch'ung-i's (聶崇義) *San Li T'u* (三禮圖)*. Nieh's pictures were based upon old Han pictures. But even as early as Han there was no very accurate knowledge of the sacrificial vessels of the Three Dynasties. In this time of Sung, the great number of ancient vessels unearthed enabled Lu Nung-shih (陸農師) to compile a fifteen volume work, called "Li Hsiang" (禮象), to correct the mistakes of the *San Li T'u*. Its descriptions of objects—"尊," "爵," "彝," "舟"—were based upon those which were in the possession of officials or in the imperial treasury. They were very different from those pictured in Nieh's book. In the middle of the Chêng-Ho era of Hui Tsung (徽宗政和中), the altars to Heaven and Earth and the Imperial Ancestral Temples all had their sacrificial vessels made anew, and these new vessels were made according to the ancient vessels which had been found and studied. Later such vessels were occasionally cast and given to high officials. Some of these have come down to recent times. And since the time of Yüan and Ming, the vessels in Confucian Temples in the different provinces have all been patterned after these. During the Ching-Yu era (景佑) of Jên Tsung (仁宗) of the Sung Dynasty, Li Chao (李照) undertook to make certain musical instruments. The "Chung" (鐘) that he made was all of circular shape, rather different from ancient forms. Then it happened that a certain bell, Pao Ho Chung (寶酥鐘), was discovered in the official treasury, the mouth of this "Chung" being oval instead of round. With this as a model a new set of sixteen "Chung" was made. Kao Jo-no (高若訥), when he was ordered by the emperor to determine the proper size of new musical instrument, used the dimensions of Han coins to reconstruct fifteen kinds of foot-measures as described in the Book of Measures (律歷志) of Sui Shu (隋書). Thus we see the Sung scholars, in their study of archæology, did not confine themselves to mere researches and identifications, but sought application in practical fields.

CONCLUSION (後論)

From the above we note that the study of bronze and stone objects of antiquity, which originated in the Sung Dynasty, had, within a hundred years, reached already a high degree of perfection. What made it possible to make such rapid progress in so short a time? The explanation probably lies in the period of peace enjoyed by the Sung Dynasty from the reign of Jên Tsung (仁宗). Quiet prevailed over the whole country.† Scholars and officials had, in consequence, sufficient leisure to devote to the pursuit of knowledge. In this period, therefore, philosophy, science, history and art all showed considerable progress. Scholars of that epoch were for the most part endowed with a high level of culture. The zest of appreciation for study, and the zeal for the past and for new findings, were

*See Ferguson's "Outlines of Chinese Art," p. 35.

†This statement is difficult to reconcile with historical facts. It would be more nearly correct to state that peace prevailed in the Sung capital and its environs.

—Ed., J.O.F.

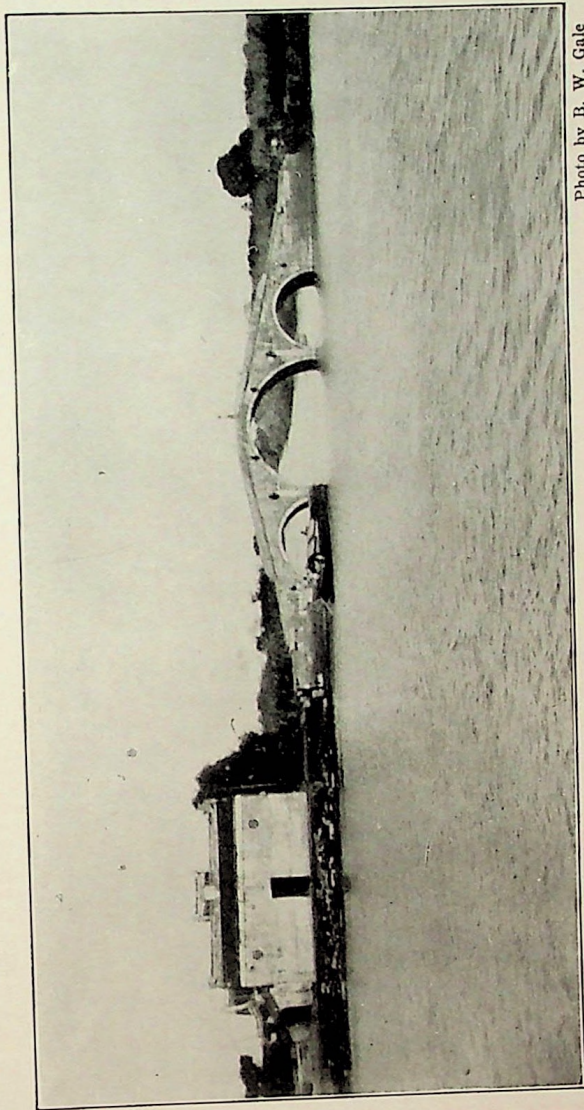


Photo by B. W. Gale

A Bridge on the Haiee-Kashing Creek where the Basali Creek joins it

ARCHAEOLOGY IN THE SUNG DYNASTY

warp and woof in the fabric of the spirit of the time. One meets this spirit constantly in any random perusal of the works of men of that age—Su Shih (蘇軾), Shên Kua (沈括), Huang T'ing-chien (黃庭堅) and Huang Po-ssü (黃思伯). Their interest in the stones and the bronzes of antiquity was like their interest in painting and calligraphy—on the one hand, appreciation; on the other, study. In other words, it was a broad interest, not an interest confined to one channel. Men of the earlier Han and T'ang, and the later Yüan and Ming Dynasties did not have the same interest as the Sung had in the objects of antiquity. Thus in the field of archaeology as well as in the realm of art the achievement of the Sung surpassed all other ages. Since the middle of the Ch'ing (清) Dynasty, the study of ancient stones and bronzes has been revived. But in description and in identification, the Ch'ings made use of the methods of the Sung. And in their catholicity of interest, they were not the peers of their predecessors. Therefore, to say that archaeology is a branch of study peculiarly the achievement of the Sung Dynasty is not far from the truth.

CORRESPONDENCE

Peking, March 12, 1927.

THE EDITOR

DEAR SIR:—

I note in the March number of the Journal a letter by Mrs. Ayscough entitled "Translation of Chinese Names" in which she mentions the "hsing" given by his friends to Mr. Borodin,—namely, Pao (鮑). She apparently takes exception to this name, based upon the definition given by her that the meaning is "dried oysters or putrid fish." I have never heard the term applied to oysters, but it is used with regard to fish and the Shuo Wen defines this character as "i yü" (饐魚),—rotten or decayed fish. However, this character is also the name of the well-known sea food *Haliotis gigantea*, called by the Japanese *awabi*: our abalone or sea-ear.

Mrs. Ayscough apparently overlooks the fact that "Pao" is a well-known Chinese surname, and will be found in the Po Chia Hsing. I would invite her attention to a few historical personages with this surname. How about:—

Pao Chao (鮑昭), the poet and author of the Wu Ch'êng Fu (蕪城賦).

Pao Ch'ao (鮑超), a general of the T'ai-p'ing wars.

Pao Shu-ya (鮑叔牙), whose name has given rise to the expression 你我鮑叔.

Pao Hsüan (鮑宣), the husband of Huan Shao-chün (桓少君), of the Han Dynasty?

Mrs. Ayscough herself in quoting Borodin's Chinese name has thus given confirmation of M. E. F.'s statement that—"Chinese names, like Western names, have had origins, many of them, of conscious association, but the association is no longer a conscious thought in the Chinese mind, and literal translation in such cases is therefore incorrect and carries with it a wrong impression of the Chinese intent."

To assume that the surname, or "hsing," Pao has anything to do with "stinking fish" would be on a par with stating that the English surname "Miller" was derived from a miller of grain, whereas it (and many other surnames having like derivation) is from the old Norse *melia*,—our present day *mill* and *maul*, and means a *fighter*. I could give other examples, but this single one is sufficient to convey my meaning, I believe.

To refer again to M. E. F.'s review in which the statement is made that the original of Shanghai (上海) is On-the-Sea, and not Above-the-Sea,—with this I certainly cannot agree, for if such be the case then “shang cho” (上植) would in like manner mean “on the table.” “Hai shang” (海上) is “on the sea,” and also sometimes means “at the seaside” or seashore.

Yours very truly,

I. V. GILLIS.

EDITORIAL COMMENTS

REPRINTS OF THE SCHOLARLY BOOKS OF THE CH'ING DYNASTY

Mr. K. C. Wong (黃季直), whose name is well-known to the readers of this Journal on account of frequent references to his collection of jade, has done further public service in collecting and reprinting various writings of some of the important scholars of the late Manchu Dynasty. The title of his books is “Reprints of the Scholarly Books of the Ch'ing Dynasty” (清代學術叢書). This edition, privately printed, is bound in a convenient form with folders and must be purchased through booksellers. In the preface Mr. Hu Yün-yü (胡繩玉) explains that this type of book is not easily obtainable. In order to put them into the hands of students of the present generation Mr. Wong decided to publish these reprints. Mr. Hu further states that among the Ch'ing Dynasty scholars Ku T'ing-lin (顧亭林) was easily at the head in classical studies, Huang Li-chou (黃梨洲) in historical studies, Yen Hsi-chai (顏習齋) in ethical studies and Wang Ch'uan-shan (王船山) in general criticism. Of these four branches of study the only one which enjoyed full liberty of thought under the Ch'ing Dynasty was that of classical studies, but, with the advent of the Republic, scholars are now free to discuss without handicap the questions involved also in the other three branches.

The first volume contains “Explanation of the Analects” (論語通釋) by Chiao Shun (焦循) and “Comments on Yen Yüan's Theory of Education” (顏氏學記) by Tai Wang (戴望). The latter of these two subjects, i.e., “Comments on Yen Yüan's Theory of Education” is dealt with in an article by Mansfield Freeman in Vol. LVII, 1926, of the *Journal of the North China Branch of the Royal Asiatic Society*. Subsequent volumes contain “Critical Studies of Kuan Tzū” (管子校正) also by Tai Wang. Kuan Tzū was one of the first of the legistic writers (法家) who are discussed by Liang Ch'i-ch'ao in a volume issued by the China Booksellers in 1926 entitled “Les Théories des Légistes à la velle des Ts'in” (先秦政治思想史). There is also a reprint of the miscellany of Cheng Chên (鄭珍) called Ts'ao Ching Ts'ao Wên Chi (臬經臬文集). Cheng was a noted writer of the Tao Kuang and T'ung Chih periods who specialized in studies connected with the Er Ya (爾雅) and Shuo Wên (說文).

The books selected by Mr. Wong connect the present day scholars of China through the writers of the Ch'ing dynasty with the earliest scholarship of their country. Mr. Wong deserves all praise for making these texts handy to the students of to-day.

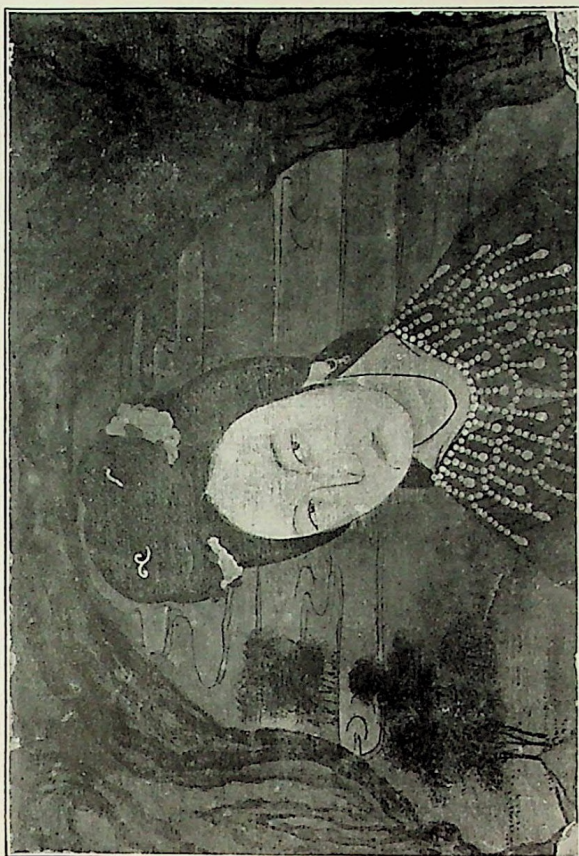
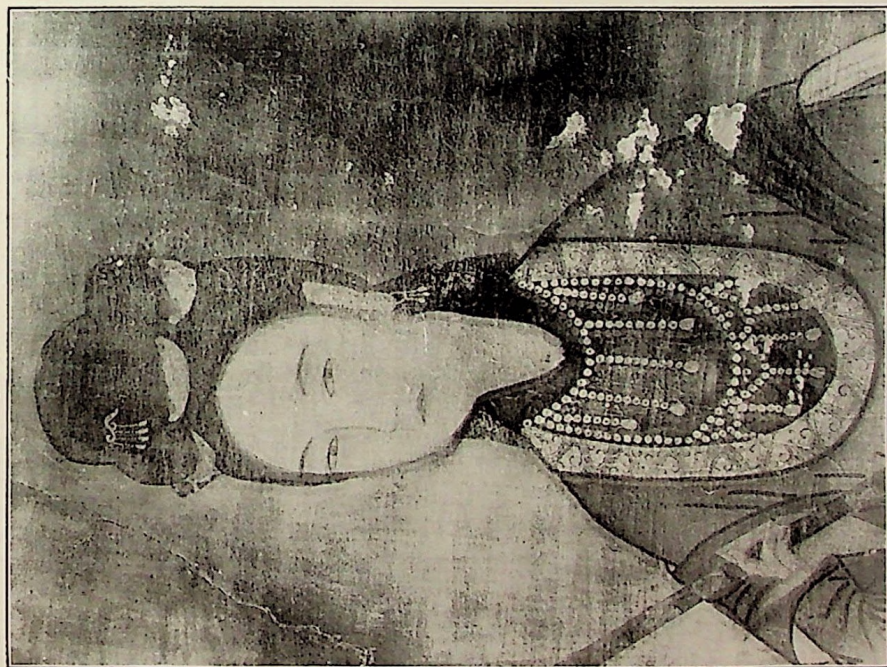
J. C. F.

CHINESE FRESCOES

A CORRECTION

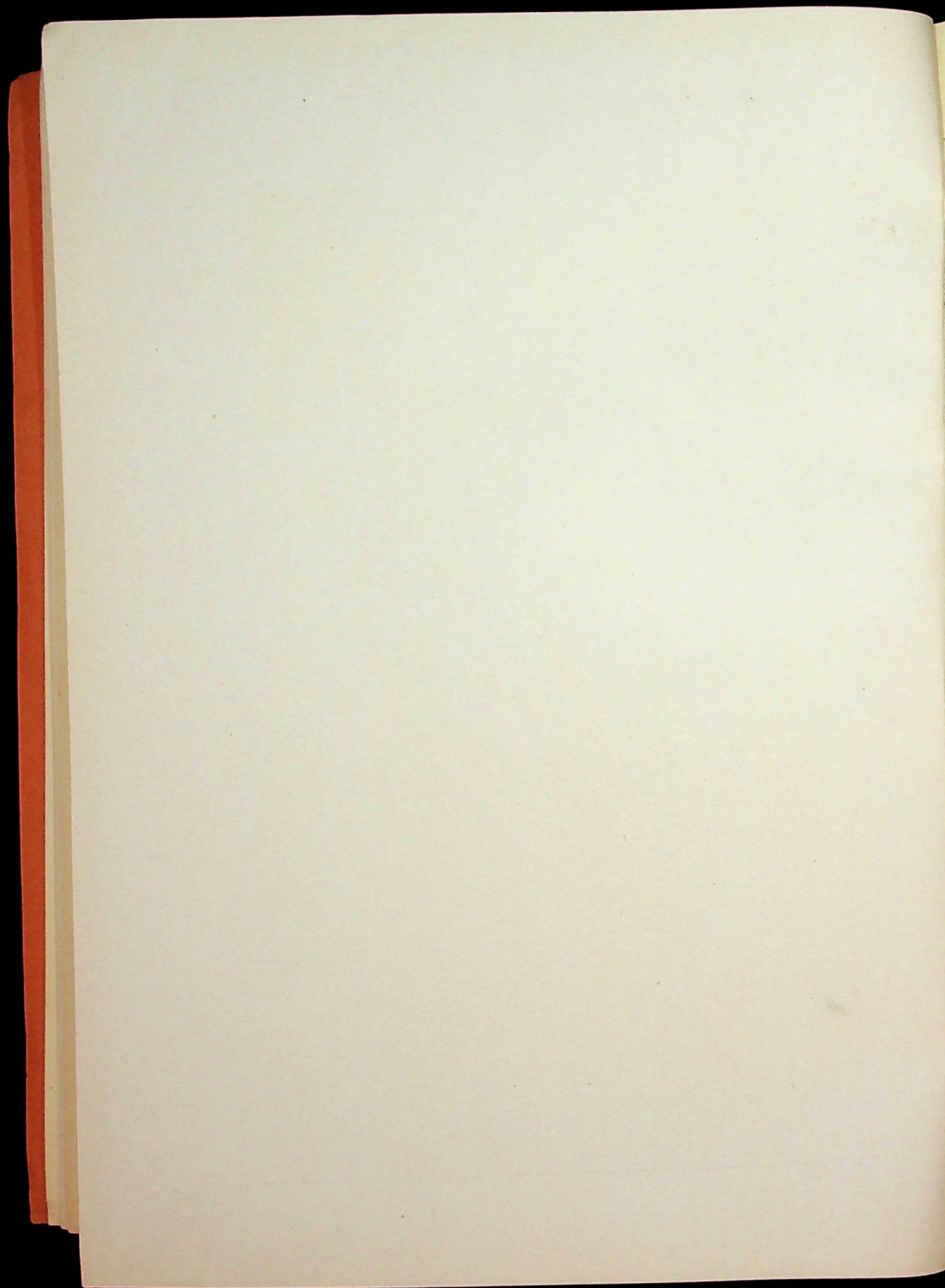
By an unfortunate mistake the two pictures of Chinese frescoes published in the last (April) issue of this journal were accredited to the wrong source. The frescoes reproduced are in the possession of Mr. L. Lion of Shanghai and not, as wrongly stated, in the Museum of l'Institut de Sinologie de l'Université de Pékin. We offer our apologies to Mr. Lion and to the Museum in question for this mistake.

—ED.



Photos by R. V. Dent

Two Chinese Frescoes in the Possession of Mr. L. Lion of Shanghai.
In the April issue of this Journal they were wrongly stated to be in
the Museum of l'Institut de Sinologie de l'Université de Pekin



REVIEWS

CHINA'S INTERNATIONAL RELATIONS AND OTHER ESSAYS, by Harley Farnsworth MacNair: The Commercial Press, Ltd., Shanghai, 1926. Price \$2.00 Mex.

We heartily commend to everyone interested in China's affairs—and who is not in this present day of turmoil and conflict—the collection of very readable essays under the above title. Dr. MacNair has made an exhaustive study of Chinese history and politics and his presentation of the many-sided problems which stand in the way of happier relations between East and West exhibits a fairmindedness and breadth of understanding that comes only from a wide knowledge of his subject. The author deplores the ignorance and lack of interest upon the part of Westerners as to China's civilization and history, and in the essay which gives the book its title he sketches briefly the historical and geographical background necessary for an understanding of China and her relations with other countries. The "unequal treaties" is an important topic discussed and he draws an interesting comparison between Japan's policy and that of China, pointing out that Japan during the last third of the nineteenth century, realizing the weakness of her international position, set about putting her house in order so as to free herself from the limitations put upon her by her treaties with foreign powers, while China has been demanding "full equality" and the abolition of unequal treaties but "has done little to prepare herself for the responsibilities which accompany complete sovereignty."

The book is written in a clear, straight forward style, not without humour, and is entertaining as well as highly informative. Some of the other subjects discussed are "Shanghai—As Others See It," "Thoughts on Racial Equality," "Combating Bolshevism in China," "Christianity in China," and "The Missionary and the Present Crisis."

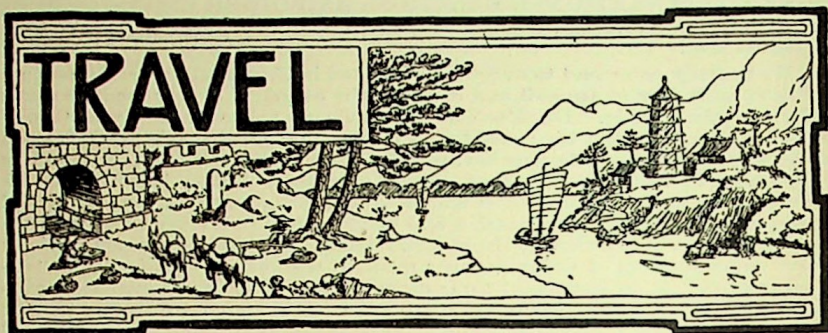
PRESENT DAY JAPAN, by Yusuke Tsurumi: Columbia University Press, New York; Osborn University Press, London. Price 9/- net.

In 1925 Mr. Yusuke Tsurumi lectured in America on Japanese-American Relations, and the present volume, comprising a series of six lectures which he delivered at Columbia University, New York, is very interesting and should have a wide appeal, especially at the present time when the attention of the world at large is turned toward the Orient. Mr. Tsurumi is one of Japan's best known publicists and speaks with authority. Moreover, he is a master of English, setting forth his ideas in a clear and vivid style. We quote from the introductory lecture. "The dikes of the unchanging East have burst, and the floods run under the bridge so swiftly that the old observers are breathless; and those who formed their judgments on the state of things yesterday must revise their opinions to-day. A new Asia confronts us. Only a few years ago the powers of the world treated China as an entity, a body politic, ruled by a sovereign authority with its centre at Peking; the hypothesis was always more or less tenuous, and the policies founded upon it never worked with precision. To-day, even this fiction is abandoned and all mankind waits on the conflict of social forces in China—a conflict that may last a thousand years as in the feudal Europe that followed the collapse of Rome, or that may be resolved before we are aware by some stroke of state foreseen only by the gods of fate."

The author summarizes Japan's readjustment to modern conditions from the time foreign pressure forced her to open her doors to Western nations, and outlines the rise of a new liberal movement in this country since the outbreak of the great war in Europe, and the economic changes that have grown out of the rise of the power of labour. In the chapters entitled "Intellectual Currents in Japan" and "Modern Literature" he shows the influence of Western learning and traces the gradual development in Japan of the modern novel, the drama and poetry. Mr. Tsurumi pays a graceful tribute to America's influence on Japan's development along many lines, particularly education, the advancement of humane and liberal movements, trade and foreign relations.

The final lecture takes up what Mr. Tsurumi characterizes the most delicate subject of his lectures, namely, the discriminatory features of America's recent immigration act, the attitude of the Japanese toward this legislative action on the part of the United States, and Japan's resultant policy of turning her attention to widening her sphere of influence in Asia in order to strengthen her position as a world power.

M. R.



THE CHINESE-TIBETAN BORDERLAND AND ITS PEOPLES

BY

PAUL HUSTON STEVENSON

(Continued from page 188)

Circumstances combined to prevent my making the trip I had hoped to make, namely, through the Chiarung country northwest of Kwanhsien and thence around through the Bati-Bawang country over a seldom travelled trail finally leading to Tachienlu. I was therefore forced to select the official Chinese road from Chengtu to Tachienlu, traversing thereby the southern section of the Ch'iang country. I was joined in this part of the trip by Dr. W. R. Morse and Mr. D. S. Dye of Chengtu, who were planning a mountain measuring expedition in the high mountain range region just beyond Tachienlu, and much of the pleasure and profit of the subsequent journey into the heart of the Chinese-Tibetan Alps was derived from association with these veteran West-China explorers.

This section of the journey really began at Yachow, four days overland to the west and south of Chengtu. Yachow is a place of considerable importance for many reasons. It is here that the most important Chinese official of the border has his residence. Permission as well as escort must be obtained from this "Warden of the Marches" before the trip over the passes of the Chinese-Tibetan Marches that lie just beyond can be undertaken. We spent three days in obtaining these, and in repacking our luggage for the eight days of severe climbing that separated us from Tachienlu, our next objective.

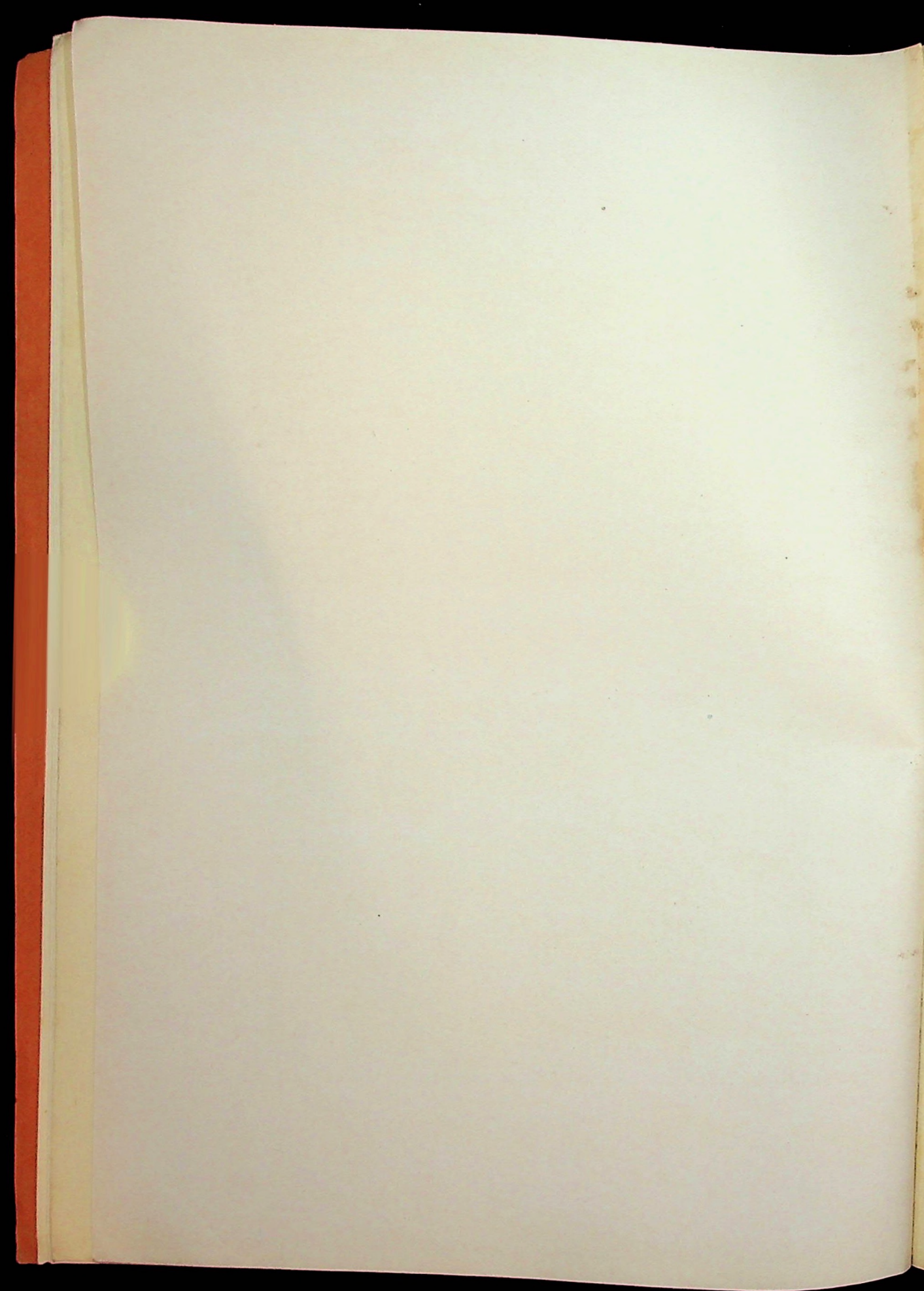
The road leading over the difficult country just ahead is one of the most celebrated roads of all Asia, and is reputed to be the highest elevated trade route in the world. It is known as the great "Junglam" or official highway from China to Lhasa. It is not only one of the very few routes



A Tea Carrier nearing the Tibetan
Border



A Glimpse of the Tibetan Snow-peaks
from the East



THE CHINESE-TIBETAN BORDERLAND AND ITS PEOPLES

connecting Lhasa with the outside world, but is that by which Tibet has been subdued by China on several occasions. While the gates of Tibet have been tightly closed against the entrance of outsiders from the west and the south, and the wild impassable steppes of the Cheng Tang have effectually barred communications from the north, there has been for many centuries a steady intercourse carried on with China on the east. Practically the whole of the enormous Tibetan tea trade has been carried over these Chinese-Tibetan marches by way of Yachow and the frontier town of Tachienlu. Between Tachienlu and Lhasa there is still a long thousand miles, leading over a series of tremendous passes only one of which falls below the altitude of 16,000 feet. Over this road since the days of Kublai Khan there have passed every three years, until the days of the republic, Chinese high commissioners or Ambans proceeding to Lhasa with their enormous train of officials and soldiers; each making the return trip three years later with the spoils gathered during his term of office. Now this trail has lost most of its official importance and splendour and carries only the less spectacular but more vital tea trade that still exists, though in diminishing amount, between China and Tibet.

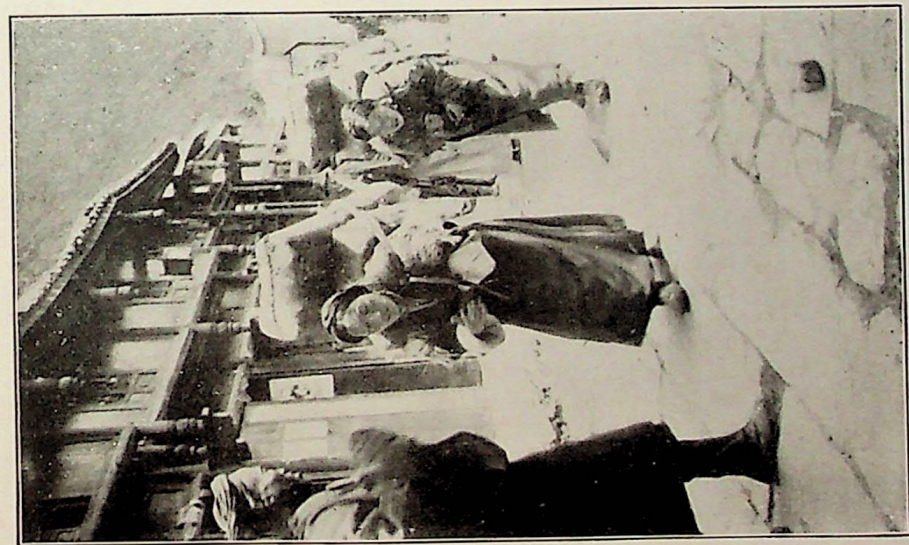
This famous road as it leaves Yachow strikes immediately into the high mountains, rising up to lofty passes and traversing a succession of deep valleys. The whole region presents wonderful opportunities for the study of physical as well as human geography. No better examples of the influence of mountain ranges on the distribution of moisture, for instance, could be asked for. Twice in the eight days that followed we climbed over passes more than nine thousand feet high. These passes represent the lowest notches in ridges that rise much higher and act as effective rain screens. On the windward side of these screens the mountain sides and valleys are drenched in the fine mists of the banked-up clouds. The dense semi-tropical growths of ferns, brackens, orchids and vine-festooned trees of the lower altitudes give way on the higher slopes to appropriate zones of deciduous and later coniferous forests, making the valleys on these moist sides of the ridges veritable botanists' paradises. On the other side of the ridges, however, except for a narrow zone of dwarf pines and shrubs clinging to the very top of the ridge where a few of the clouds are rolled up and over from the moist side, the country is dry and barren. Cactuses and lizards find few disputants of their claim to these sun-baked valleys.

The first part of the road makes a cross section through the southern edge of the tribes-country. To the north of the road are the Ch'iangs; to the south hidden away in a region known as "The Wilderness" are a few scattered Lolo tribes. The country actually passed through during the last five days of the trip was that of the northern Hsifans. Although the people along this road are mixed to a varying degree with the Chinese, whose inns and garrisons have brought about a certain amount of interbreeding between them and the non-Chinese natives of this region, yet almost every valley still shows its own particular physical type. In one valley, that of Yünching for instance, I found in most exquisite examples and in very large numbers the negroid type of facial features that I had been meeting in occasional individuals all the way from Chung-

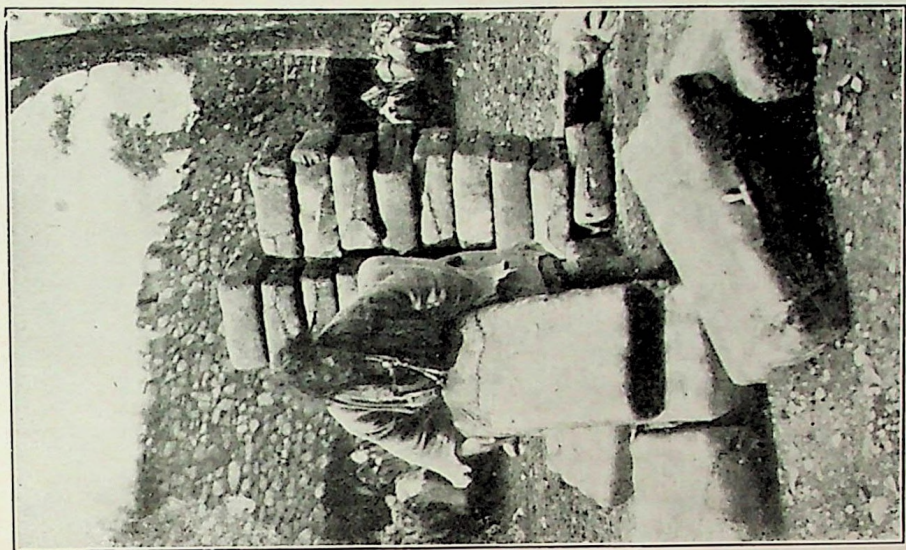
king. A low stature, broad body build, rather large head and short neck, eyes showing no trace of Mongolian characters, a bridgeless nose consisting merely of a flattened up-turned tip arising abruptly from the middle of the face, a marked shortening of the middle third of the face, and a maxillary prognathism with moderately thick lips—these constitute the distinctive physical characters of these negroid-like individuals. Although I was to see curly hair and even one case of kinky hair among some of the Tibetan tribes farther west yet I failed to note any among this negroid element of the population.

Further west, in the valley of the Tung River in the Hsifan country, is a valley of beautiful women. I realize that the term just used is capable of individual interpretation, but the clean white skin, the delicate features, straight and wide open eyes, thin noses, small mouths, quite occasionally dimpled cheeks, and graceful carriage of the women of this region, have earned for them this pleasant characterization. These peoples belong to a northern group of the Hsifans and were in this region quite Sinosized in both dress and speech. I was privileged later to pass through the mountainous districts of these Hsifans several days to the south where they had retained their own native customs and dress. A little further on at Wassukou we left the Tung River, not, however, without a long look up the valley into the Mup'ing country, the home of some of the wildest aboriginal Ch'iang tribes in all of West China. The Tung River as it comes down through this country is known as the Chin-Ch'uan or "Gold Stream," on account of the gold found in the stream-bed and throughout the region that it drains. The annals of Chien-lung record this region as the scene of some of the most difficult military expeditions of Chinese history. A day to the west brings us to Tachienlu.

The town of Tachienlu, as its Tibetan name "Darchendo" indicates, gets its name from the two streams, the Dar and the Chen, that come together there from the regions of eternal snows on the north and the west. After their juncture they undertake one of the wildest and most prolonged plunges I have ever seen, finally emptying their glacier fed waters into the "Gold River" at Wassukou eighteen miles to the east. All day long we travelled up the gorge of this wild Tachienlu stream—seemingly pitting our strength against the deafening roar as well as the force of the charging water. Nature seemed to be combining her forces in one last effort to keep us away from our goal—the Tibetan border just beyond. But each moment of the battle brought its own reward; each step seemed lightened with the exhilaration of accomplishment and fresh expectancy. Now and then the road would descend so near the rushing stream as to pass through the rainbow-tainted spray that dashed high above the roaring cascades below. Then again, as if to encourage the struggling traveller, the gorge-lined ribbon of sky would give a fleeting glimpse of the snow-peaks at whose feet lay Tachienlu and the promise of rest only a few hours away. The roar of the stream, the rainbows on the spray, the gradually nearing snow-peaks of Tibet made a fitting climax to the eight days of climbing that lay behind us—and this, the last of that stage of the journey, remains as one of the most to-be-remembered days of travel of my life.



Chiala Tibetan Women carrying Tea in
Tachienlu



Leather-wrapped Chinese Tea, awaiting a
Yak Caravan for the Interior of Tibet

THE CHINESE-TIBETAN BORDERLAND AND ITS PEOPLES

Tachienlu, the "Shanghai of Tibet," is the great eastern border town of Tibet. It constitutes the gateway into the best climated, best cultivated, richest in mineral wealth, and the most populous province of all Tibet—the eastern province of Kham. The town itself, in spite of its political and commercial importance, strikes a discordant note with its natural surroundings. Its filth and squalor are imposed at the foot of some of the most beautiful green-sloped, snow-crowned peaks in the world. There are only about ten thousand people, including a large floating population, in the city at any one time. These are divided between Tibetans and Chinese roughly in the ratio of two Tibetans to one Chinese.

A distinct border atmosphere pervades the streets of Tachienlu—a restlessness, and the lure of the great beyond. Almost daily during my two short visits to the town I went to one or the other of the gates to watch the large yak caravans arriving from or starting off on their long journeys to the "roof of the world." The caravans that take the western road begin almost at once their climb of the great Gi-la Pass, the first and lowest of many high passes along this great official highway through Batang and on to Lhasa. Those that choose the longer but easier road to the north first skirt the shoulder of Ta-pai-shan, seemingly only a stone's throw away but in reality two long days' journey, and then turn westward out of sight along the road that leads through Kanze and Chamdo and thence on to Lhasa through the great grass-lands of Derge. The pull of these caravans on my spirit was almost irresistible. May I be forgiven the chafing that I felt at the restraints that bound me.

Tachienlu is the former capital of the erstwhile Kingdom of Chiala, a semi-independent Tibetan state whose territory extends for several days journey in all directions from Tachienlu, but chiefly north, west and south. This petty kingdom first came under the influence of the Chinese during the Ming Dynasty in the early part of the fifteenth century, and has been maintained with varying degrees of autonomy as an administrative area under the subordinate rule of the King of Chiala until very recently. The history of the closing days of this illustrious family and the treatment accorded the last king of the Chialas by the Chinese is a tragic one. Opium, imprisonment, poison, exile and confiscations of property by local Chinese officials have operated to bring the royal family to an end within the short period of the last ten or fifteen years. To-day the king of Chiala is but a memory.

The Tibetans, even from a single area like that of the great eastern province of Kham, come far from presenting a picture of homogeneity in physical type. Although most standard works on the races of men describe the Tibetans as below the average in stature, and representatives from certain regions are indeed shorter than the average, yet my measurements of a random series of full-blooded Tibetans of this Kham region give an average stature (167.86 cm.) a little taller than the average height of mankind (165 cm.), making them but slightly shorter than the northern Chinese and considerably taller than the central and southern Chinese. As compared with the Chinese the Tibetans of the series measured also have longer and lower heads, much narrower noses, and comparatively longer and narrower faces. Aside from physical measurements, objective

observations indicate a distinct difference between the Tibetans and the usual xanthodermic type of man that with minor and regional variations forms the bulk of the population of most of Eastern Asia to-day. The Tibetans of short stature were usually from some of the regions farther west, the Na-hsi for instance. Among these latter I saw also fine wavy hair and was told by Dr. Hardy of Batang that wavy or even curly hair is a more or less constant feature among some of the Tibetan tribes peoples near Batang, so much so indeed that the people frequently employ "anti-kink" measures to straighten their hair to conform to the more commonly prevailing straight type of Tibetan hair.

The striking resemblance born by a considerable proportion of the Chiala-Tibetans seen in Tachienlu to the American Indian type is quite remarkable. Several years ago I had expected to note some such resemblance to the American Indian in the case of the Mongolians, but did not. I was quite unprepared to find this resemblance in the case of the Tibetans, but certainly found it. When this resemblance was first noted, in the case of several Tibetan women, I immediately dismissed the idea from my mind by attributing the impression to their swarthy complexions combined with a more or less American Indian method of dressing the hair. Day after day, however, as I had ample opportunity to study the people both of the town and from afar, I became more and more convinced of the presence of a fundamental type among them that was not only distinct from any other Asiatic type with which I was familiar, but which more closely resembled the American redskin in skin, hair, head and facial features, general body build and bearing than any other people I had ever seen. I was later much gratified and not surprised, therefore, at the coincidence of noting in one of the first papers that fell into my hands after nearly four months absence from the land of up-to-date news, that a similar impression had been recorded in the case of certain tribes-people of strong Tibetan mixture along the southern border of Tibet by one of the world's most experienced anthropologists, Professor Hrdlicka. He had been observing the Tibetan types along the southern border of Tibet at about the same time as I was studying them along the eastern margin. In the case of the individuals seen by me exhibiting most strongly the American Indian type, I noted that they seemed to be of the native and more or less fixed Chiala element of the population. A native language of this group, more primitive than the Tibetan that is now in common use among them, is reported to be still extant. In view of the purely hypothetical though very probable Asiatic origin of the American Indian, an intensive comparative study of these two groups from the standpoint of philology as well as of physical anthropology would certainly be of considerable interest and importance.

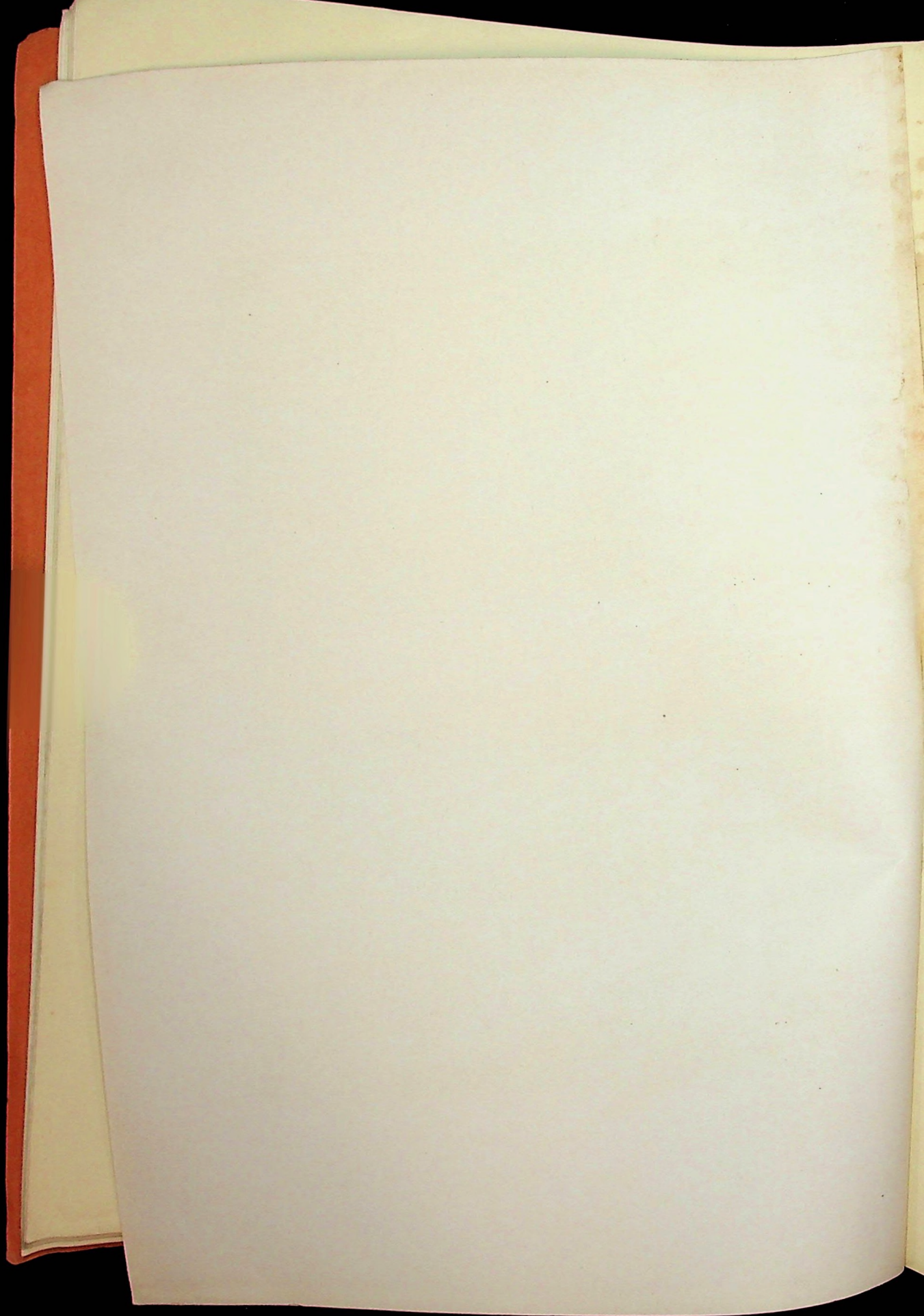
The position of the Tibetans in any of the classificatory systems of mankind has proved a stumbling block to almost every ethnologist who has attempted to define it. Observers early reported the presence of two prominent and distinct physical types among them. Turner's differentiation into a round-headed Mongolian or "priestly" type and a long headed "warrior" type, the latter drawn for the most part from the province of Kham, has gained general currency in the literature and has,



A Tibetan Pilgrim



A Tibetan Lama



THE CHINESE-TIBETAN BORDERLAND AND ITS PEOPLES

if not applied too rigidly, considerable basis in common observation. Morant's recent studies on a series of Tibetan crania confirm this general opinion of two distinct types. One of these, that from the southern provinces, seems to be closely allied to the Malayan, Burmese, and certain strains he speaks of as existing in the southern Chinese, and may provide a physical basis for the so-called Tibeto-Burman group which exists so far on only philological grounds. The other Tibetan type, the "Kham Tibetans" which I visited, shows, according to Morant's investigations by the method of the Coefficient of Racial Likeness, no definite affinity with any other race living at present on the Asiatic mainland. His results suggest that these Tibetans probably belong to a well differentiated and pure stock, perhaps of a fundamental primitive human type similar to certain isolated primitive types found on some of the islands of the Pacific, similar isolation in the case of these Tibetans being due to the inaccessibility of Eastern Tibet. In view of the resemblance born by these Kham Tibetans to the American Indian as mentioned above, a careful study of a larger series of Kham Tibetan skulls, and a comparison of these through the Coefficient of Racial Likeness with a similar series of early American Indian skulls, would seem to be indicated and may be expected in the not too far distant future.

Tibet, as the much coveted but not often attained goal of explorers, owes a large part of its challenge to the fact that aside from the arctic and antarctic regions of our globe this high mountain-walled plateau represents what is perhaps physically the most inaccessible region of the earth. Tachienlu, though the gateway to the most populous part of the country and well within the eastern ethnic boundary, is still on the outer slope of the great mountain rim that surrounds this "top of the world."

After days of grateful rest in the home of hospitable missionaries, we repacked in true Tibetan style the small part of our baggage that it was necessary to take with us, and arranged for animals and men to take us up over the edge of the rim and onto what is aptly called "High Asia." My two companions were interested chiefly in measuring the heights of two mountain peaks that have been repeatedly reported by travellers passing through the region as rivalling Mount Everest in height. I went along to see something of Tibetan life out in the open.

The first day of travel out of Tachienlu led us up through the gradually rising and fertile valleys formerly belonging to the ruling family of the Chialas, but now controlled by the representatives of the Roman Catholic Church. We camped that night at the foot of the great Che-to (Gi-la) Pass. The Tibetans have given the name Che-to (fire tongue) to this spot because of the hot springs that here issue from the ground at the base of the glacier-capped range. The second day saw us over the fifteen thousand foot pass—not, however, without our contributing an animal to the scores whose whitening skeletons lined the road. This unfortunately was the horse I was riding. Noticing signs of weakness in my beast the first thing in the morning, I began early in the day to favour him as much as possible by walking. I arrived late at the breakfast camp and found the rest of the party ready to start on. I insisted that they proceed, never dreaming that my horse, although perhaps a little

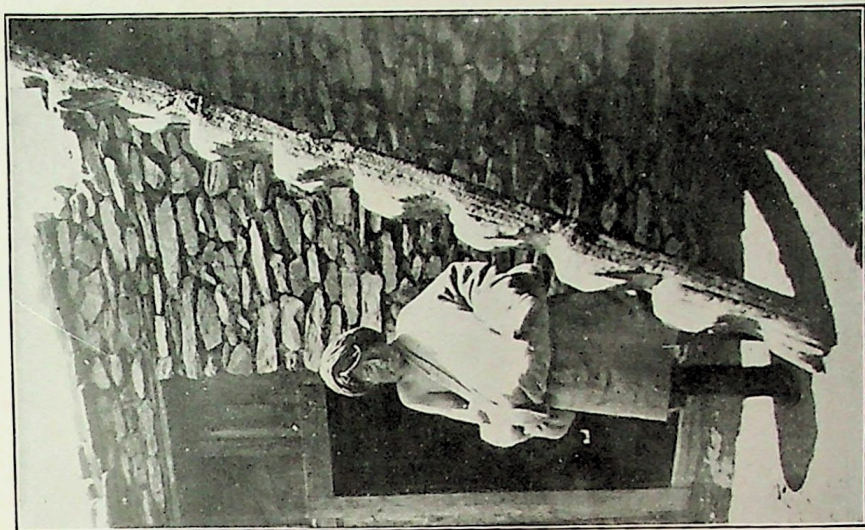
slow, would not be able to see me over the pass. Hardly were my colleagues out of sight, however, before I gave up hope of being helped over the pass by the poor beast I was now leading. Thinking that the animal could get over, however, and recuperate in the grasslands during our stay beyond, I tugged and pulled at his head while the two mafoos who had stayed with me beat and pushed from behind. After an hour of such work over the most execrable roads imaginable, and in the rarified atmosphere of twelve thousand feet, we were soon as exhausted as the horse. This latter member of the party finally was unable to take another step, and, in passing that way on our return some ten days later, we saw the freshly picked bones of the poor beast within a few feet of where we had abandoned him.

With the extra weight of the saddle, bridle and blankets divided among the three of us, we began the slow, hard climb. Now I regretted bitterly the efforts vainly wasted in urging on the dying horse, for every ounce of strength was going to be needed for the difficult climb that was in store. Through my field glasses during the frequent rests, I now and then caught glimpses of the rest of the party far up ahead—small moving figures whose progress I could follow more easily after they emerged from the zone of dark granite out onto the white background of the snow above. About noon I saw them disappear over the saddle of the pass at a spot that I reached some four hours later. Taking it slowly, and adopting the method of taking fifty slow paces and then stopping for five long deep breaths, and later decreasing the ratio of steps to breaths as the climb became steeper and the air rarer, I was in the end surprised at the ease with which I made the pass on foot. The descent, though only about half as long, was much more difficult than the ascent, and I was utterly exhausted when I arrived at the temporary camp of the party after another two hours of killing walking. My companions were much surprised that I had made the trip on foot, and were more than kind in alternating the loan of their animals for the remainder of the trip to our stopping place for the night. That night, too tired to eat any supper, and rolled in my sleeping bag on the dirt floor of a tumble-down Tibetan house, I would not have traded places with anyone else in the world. I was at last among the Tibetans in their own land.

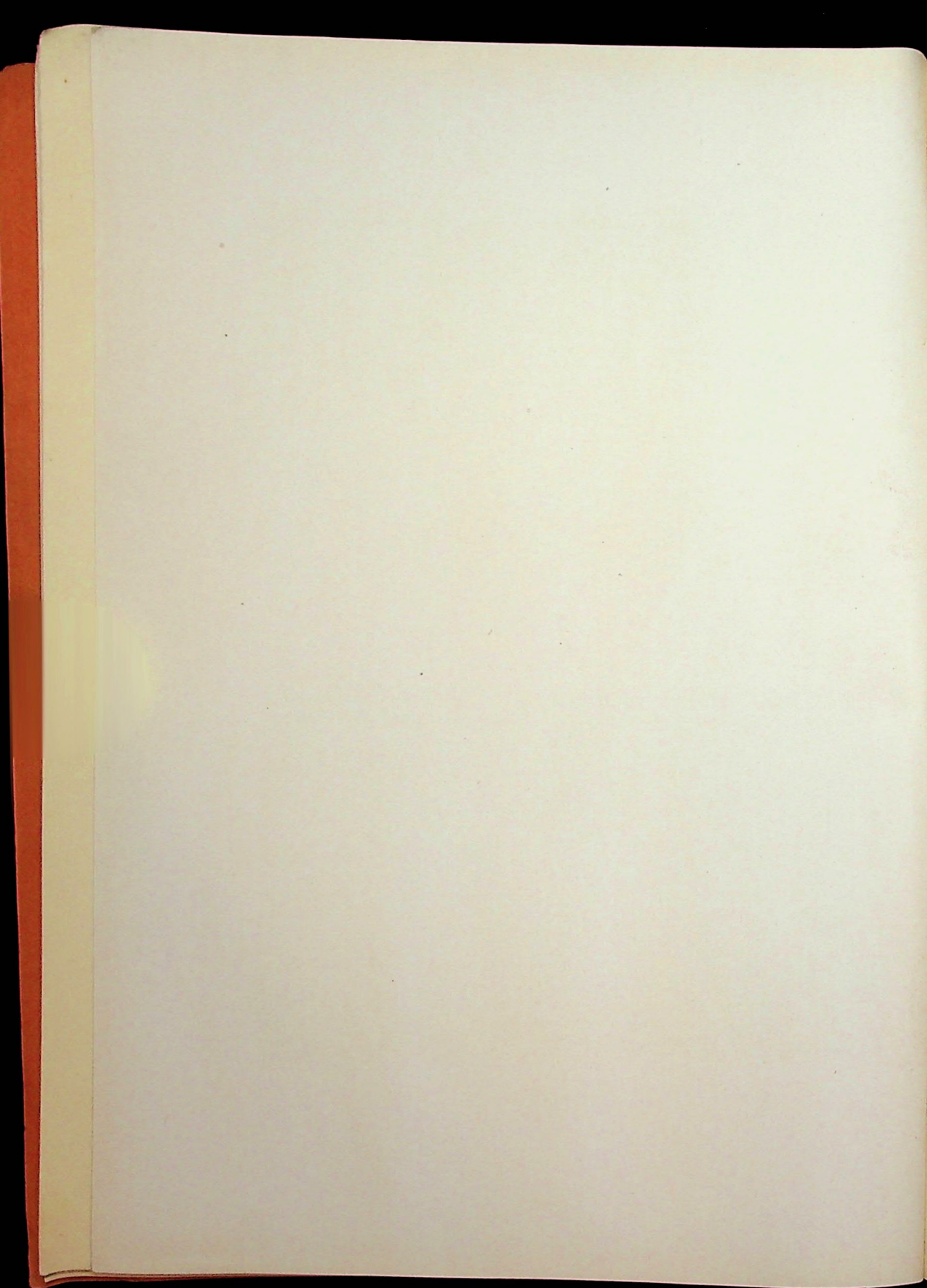
To one who becomes used to the Chinese manner—whatever that is—the alert frank style of the average Tibetan is most refreshing. On this point one has to differentiate sharply, of course, between the ordinary folk of the road and the Lamas. These latter are in mind and manner a law to themselves. The ordinary Tibetan met with on the road greets you with a genuine smile, a short curt bow, and both hands extended with palms open, this latter gesture supposedly to show that his hands hold no weapons. If seated at his camp fire the Tibetan will seldom or never arise at your approach, for tending the fire is at all times a matter of the first practical importance. But your welcome is none the less certain. With his free hand your host will either direct you to, or arrange for you, a seat among his leather bags and saddle trappings. As soon as the water over his small fire comes to a boil, tea is brewed, a little tsamba (parched barley flour) is then added, together with a little yak butter.



A Chinese-Tibetan Half-breed



Our Tibetan Host and his Stairway



THE CHINESE-TIBETAN BORDERLAND AND ITS PEOPLES

The latter two ingredients after the excess of tea has been drunk, are kneaded together into a ball which is then eaten from the hand. The whole provides a very nutritious and tasty meal. The Tibetans make liberal use of meat, chiefly mutton and beef, in their diet, and, in spite of a conspicuous lack of green vegetables, seem to have a fairly satisfactory dietary.

The next ten days were filled with experiences and observations of Tibetan life and customs that call for more comment than the present space allows. Their houses, clothing and food; their polyandrous marriage relations whereby one woman has several husbands; their method of disposal of the dead by cutting up and feeding the corpse to the eagles and vultures, or, if unable to afford the priestly ceremonies attending this practice, the slower method of complete dissolution brought about by the nibbling of the fishes and stream action; and the Tibetan "Wheel of Life," that complete cosmogony as well as philosophy of human existence—all these seem strange, but are, after all, more logical than anything any other civilization can at present offer in their place for adoption under the same circumstances of life.

The longest to be remembered scenes of this part of the expedition were those of the snow mountains—well named the "Alps of Chinese-Tibet." Friends of mine who have seen both are emphatic in their declarations that these of the Chinese-Tibetan borderland are many times more magnificent than the Alps of Switzerland. My first glimpse of these awe-inspiring mountains was obtained while on my way from Chengtu to Kwanhsien. Then, for a brief half hour, the western horizon had been swept clear of its mists—a rare occurrence for the summer season of constant cloudiness—and there, seemingly almost within reach, stood revealed this glittering range of pure white crystal peaks. Then the mist curtain formed again as quickly as it had been drawn aside, and the scene remained only a memory. I was conscious of having looked upon one of Nature's masterpieces.

Here on the Tibetan highland, however, I was privileged to enjoy many closer and longer views of this same snow range and of even grander peaks beyond. For a whole week we were camped on an observation point over 13,000 feet high with our theodolite trained on one or other of two towering peaks reported by some travellers to equal if not exceed Mount Everest in height. From our pinnacle we were completely encircled by 360 degrees of awe-inspiring panorama. Sweeping partially around us to the north and the south was the mighty snow range containing the two peaks that we had come to measure. To the west, as far as the eyes could see, extended a vista of lesser ranges—looking for all the world as if a tossing sea had suddenly become frozen. Here and there some of the snowy whitecaps stood out more prominently than others, while the troughs of the snow-crested waves showed varied shades of green. It is little wonder that these mountains have so impressed themselves upon the simple people who look up to them generation after generation from the valleys below. Standing sombre and silent throughout all time, controller of winds and watchful guardian of the passes, the first to catch the pink of each new-born day and the last to pale

when the evening glow fades—who can blame the simple nomad for peopling these magnificent mountain peaks with the spirits of the air. Here, if anywhere, are the homes of the gods.

Winding its way westward, in and around and up and over these mountain waves is the road to inner Tibet and to Lhasa. Forming a part of a Tibetan "Mani" (prayer) pile out on the main road to Lhasa, is a queerly shaped stone of white quartz that I placed there to mark the point of my "farthest west." It marks only a step, to be sure, into that great country of mysteries. But should good fortune ever take me back again for a longer and closer study of the people of that land, this stone shall be the starting point of my onward trek. Should my lot never again lead me thither, then those ten days will continue to hold a place all their own in my life's history. Crowded into that brief span of time—richly flavoured at times with yak butter (and hairs), enlivened at others by touching episodes with wild Tibetan horses and still wilder Tibetan dogs, wonderfully enriched at all times by many personal contacts with simple nomads and kindly Tibetan household hosts, and solemnized by the silent presence of some of the world's highest and grandest snow-clad peaks—these are experiences that I count among the greatest of my life. They come to but few men of my race.

(To be continued)

TRAVEL AND EXPLORATION NOTES

SWEDISH EXPEDITION TO NORTH-WESTERN CHINA: After considerable opposition from the federation of Chinese scientific organizations in Peking, who have expressed themselves as being opposed to any scientific expeditions in China that are not managed and led by Chinese, Dr. Sven Hedin and his party of eighteen foreigners left Peking by train late in March on the first stage of their journey to Chinese Turkestan and neighbouring South Mongolia, where they propose carrying out extensive investigations of an anthropometric and meteorological nature. Before leaving the capital the leader of the expedition is reported to have assured the Chinese government that its objects are purely scientific and that China will not be deprived of any treasures she possesses, through him or his party. It appears that an offer to take a Chinese archaeological expert on the expedition was refused.

AMERICAN MUSEUM OF NATURAL HISTORY'S THIRD ASIATIC EXPEDITION: Whether this expedition, which has done such good work during the past few years in exploring Mongolia from geological, palaeontological and zoological standpoints, is going to be able to carry on its program of work this summer appears doubtful. The leader, Dr. R. C. Andrews, returned to Peking about the middle of April. We understand he is trying to arrange for the start of the expedition, but it would seem highly doubtful whether, under present conditions, it will be possible to do anything in Mongolia this summer. Meanwhile we understand that the members of the expedition have already gathered in Peking. Dr. Granger and Mr. Nelson have returned from Yunnan where they carried out palaeontological work during the winter. Dr. Andrews paid a flying visit to Shanghai late in April.

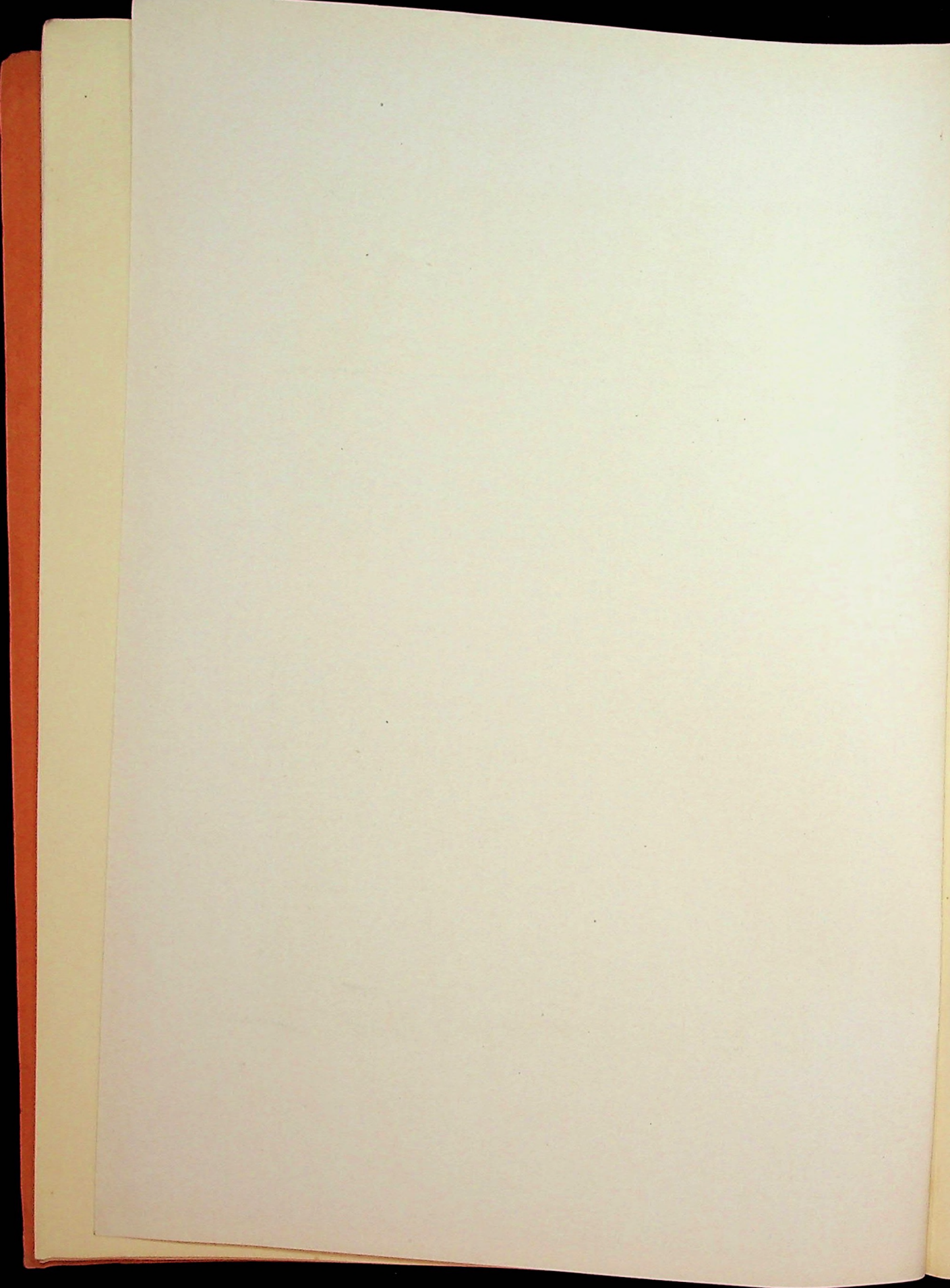
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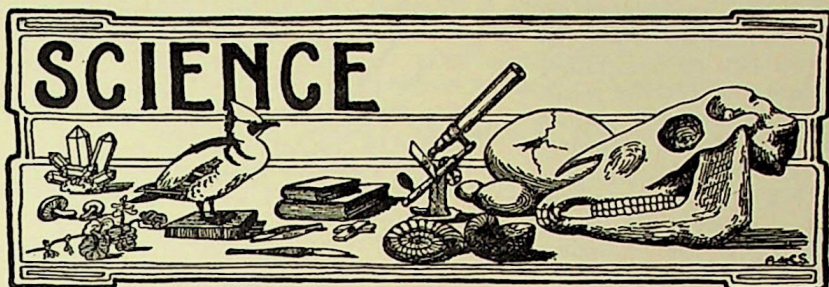


Tibetan Nomads camped for the Night



Tachienlu Snow-peaks from the West





THE MOSQUITO SCOURGE

BY

L. C. ARLINGTON

In the dry region of North China the common fly is a terrible nuisance from early morn till long after sunset, and in Formosa fleas, "jumping lice," are so abundant as to render certain regions of that island scarcely habitable even to the wild natives; but the mosquito is, on the whole, from his cosmopolitan character and nocturnal as well as diurnal visitations, more of a curse than fly and flea combined.

The female of this voracious insect (the, in this case, more worthy sex never stings) abound in Eastern Asia from equatorial jungles to arctic tundras. In the south where its life, like the summer, is brief, it makes up for its ephemeral existence by excessive virulence. Mosquitoes compensate, however, for the injury they inflict on man by helping him in the chase. They goad and drive wild animals from the forests to the pools in the tundras where they become an easy prey to hunters.

The Chinese for mosquito is *wen* 蚊, which is intended to imitate their buzzing noise. When a character came to be selected to represent this insect, the classifier for insect, *ch'ung*, 虫, was first taken, and to it was added a phonetic character, and of the various *wen* at hand, that which represents "literature," 文, was selected; so that mosquito signifies the "literary insect," evidently to foreshadow writers of a certain class. The Chinese claim to distinguish two distinct pitches of mosquito sounds; one, *m-e-n-g*, that is made by the insect while in quest of prey, an inquiring, impatient sound; the other is that which it gives as it flies away gorged—a slow satisfied sound, like *o-u-n-g*, expressive of thankfulness for the surfeit. It stands to reason that the sound they make in motion while thin and empty should differ from that which they make when full and heavy. Accustomed as the Chinese are to a nice discrimination of tones, it is not strange that they should have noticed this difference.

The vivacious chatting of a crowd of guests at a feast, contrasted with their subdued tone after having stuffed, is compared in one of their

books of amusement to the two different sounds given out by mosquitoes before and after a meal.

In the still waters about Soochow, mosquitoes abound in myriads. Three kinds are described, one, small and dark coloured, the "honest mosquito," so called because she injects no venom (*Culex cilliatu*s), another, the common striped kind (*C. pippiens*), and a third of a pale yellow colour. The venom which this bloodsucker injects is so irritating as to give rise to a tumour as large as a cherry. The last two are found in rank grass, and are the kind credited with killing the two girls whose sad end shall presently be described. When one is told of the numbers of these pests in certain parts of China, he is reminded of the uses which mosquitoes are put to in Africa, where, according to Livingston, they constitute an article of food. I have never heard of mosquitoes being put to such a use by the Chinese; but at Canton the excrement is collected and used as a medicine for certain diseases of the skin.

In Soochow there is a class of charmer who exercises power over rats, ants, mosquitoes and other pests. After certain incantations, rats will come out from hidden places and show themselves on a table, and walk around until the spell is removed. Ants are invited from holes and made to move as directed.



THE MOSQUITO SCOURGE

Mosquitoes are made to place themselves inside of a circle drawn on a piece of paper or on a fan, where they remain until released by the charmer, who declares that they would remain there until they died, unless he released them—an experiment that is never made, as the sorcerer would thereby lose his power.

It is related in the Kuang Yü Records (廣輿記) that in the department of Yangchow, and district of Kao, a young woman in company with her sister-in-law was benighted in a country place. They came to a farmer's hut where the sister-in-law determined to pass the night; but the young woman refused shelter from a sense of modesty. She therefore passed the night in a field of coarse grass, and in the morning was found dead, bitten to death by mosquitoes. She was covered with dew and her tendons were visible. A temple to her memory was erected, called the "Bedewed-tendon Temple." An example of filial piety occurs in the case of a Miss Lu Ching (盧涇), who is, in that part of the country at least, included among the Twenty-four Examples of Filial Piety. She ensconced herself within the mosquito curtain, and allowed the insects to gorge themselves from her body to enable her mother to lie down and sleep without being endangered by their attacks. The Lu family reside in a village in a district of Soochow, to which they gave the name Lu Creek (盧涇). According to their tradition, the same (or another member of the family—it is not clear which), immolated herself by fanning mosquitoes away from her mother; she herself being so bitten by them that she died. Certain it is that they have a temple erected to one of their family (*vide* the 太湖碑考) to whom they ascribe that act of devotion. A full-sized image of Miss Lu represents the phlebotomists at full work. The modeller had the good taste to represent her face, which is comely, without mosquitoes. In one hand she wields a fan, while with the other she beckons to the mosquitoes to turn from her mother to herself. A spider is represented descending, which, occurring at night, was an omen of her death. By day or early in the day, the descent of a spider from the ceiling is regarded as a good augury. Miss Lu is an object of worship, rather as a saint than as a goddess. She is invoked as a protectress, as, owing to her immolation, she is supposed to possess great spiritual influence and power. Another case of feeding mosquitoes—one of the Twenty-four Examples of Filial Piety—is that of the boy Wu Meng (吳猛), of the Tsin Dynasty,* when only eight years old. The family was so poor that they had no mosquito curtains to their beds. Every summer, at night, the mosquitoes were very numerous, piercing the soft flesh. Meng allowed them to feed without restraint on his blood till they were satisfied. A Chinese poet represents him to have discoursed as follows when he felt their proboscides: "I have no fear of you, nor have you any reason to fear me; although I have a fan, I will not use it, nor will I strike you with my hand. I will lie very quietly,

* Began 265 A.D. This would appear to show that mosquitoes were known to the Chinese from very early times; and that they were a scourge then as they are now.

and let you gorge to the full." History does not say, unfortunately, what effect his filial devotion had on the mosquitoes.

The mosquito has always been a very serious menace to the health of the Chinese; yet, they have never got beyond smoke to drive them away. Various means are resorted to to repel mosquito attacks, but the Chinese have never gone so far as to smear their bodies with grease and oils like the inhabitants of Siberia and Lapland. Stercoraceous matter is burnt by the poor, and sawdust rolled up in paper is burnt by those who can afford it. In some parts of China, *Artemisia* (艾) is extensively employed. Being obtained in abundance, and being somewhat fragrant, it is not so offensive to those who can endure smoke. Essential oils are obnoxious to those insects whose sense of smell is supposed to be placed in their antennae. It may be doubted if odours of any kind are offensive to these tiny creatures; it is believed to be the choking of the tracheae by means of which insects breathe that causes them annoyance and death. Bats are great enemies of mosquitoes. They prefer city residences because temples and large houses there abound. By night they flock into the country, where mosquitoes are particularly numerous. Just before dawn they return to the towns in vast numbers. So destructive are they to the *Culex* family that the Chinese believe a dead bat will keep mosquitoes from a bed. To the curtains of beds dried bats are sometimes stitched, and, I have known Chinese even keep a live bat in the room for destroying them. Of the one hundred and fifty species of the *Culex* family, none is so dangerous as the *Anopheles*, which is spreading rapidly all over China. The female is the bloodsucker. The multiplication of the *Anopheles* mosquito threatens to make malaria an ever-present and greatly to be feared danger. In China, these pests swarm in the out-houses and not only infect those who are bitten in various parts of the body, and who get covered with sores in consequence, but, in the larval stage, are carried away with the night-soil, and thus spread all over the vegetable and other fields. A vast area is thus constantly supplied; so that there is no wonder that mosquitoes are on the increase, despite all efforts to destroy them!

During many years spent in the Kowloon District near Hongkong, I observed hundreds, if not thousands, of times, large numbers of mosquitoes, amongst which were the *Anopheles*, flying out of the cargoes on board of the junks, such as dried fish and shrimps. Thus mosquitoes born and bred around Hongkong were provided with a free passage to various parts of the country, where they multiplied in larger numbers than ever. Such being the case, it is possible that they reach England and other countries on board of ships plying out of Chinese ports. If the mosquito is a carrier of disease in China, it stands to reason that the same applies to other places. Not only so, but infected persons are also capable of infecting the mosquitoes themselves! Consider the havoc thus wrought in a Chinese rural population. The loss of sleep, too, suffered through interference of these pests, reduces the vitality still more, so that the cumulative ill effect of the mosquito can readily be imagined. The only thorough way to kill them all off would appear to be the finding of a means to provide an army of bats. It is at any rate a

THE MOSQUITO SCOURGE

tentative measure worth trying. The money for such a project would not be wasted.

But as the mosquito season will soon be upon us our readers will probably be desirous of learning of an efficient mode of repelling these ceaseless enemies of comfort and repose. The most effective agent, to my knowledge at least, is oil of pennyroyal if it can be procured not impaired by adulterations. It is the distilled oil of *Hedeoma pulegioides*, or of the *Mentha pulegium*, and is called *Oleum Hedioma*. A drop or two of this essential oil when applied on the hands, feet or forehead, will infallibly keep off any number of these tormentors. But the best of all would be the organization of a Society or College of Pestology to start a campaign against mosquitoes in particular, and to have in mind the special rearing of bats for their total destruction.

BIRD SANCTUARIES OF NORTH CHINA

BY

GEORGE D. WILDER.

II

YÜ TAO HO, SHANSI

Yütaoho is a rather straight valley, some four hundred yards wide, cut in the loess drifts and alluvial fan by a small stream leading from the foot of the mountains on the western side of Shansi, eastward and down into the plain of the Fen River, about five miles north of Fen Hsien. The stream has been diverted into a great number of mill-races for about eighty mills. Poplar and willow trees are planted thickly along the banks and have grown to a great size, protected from the drying winds by the high loess cliffs on either side. These trees and streams form the sanctuary of which we treat.

There are certainly more birds and more kinds spending the summer season in Yütaoho than in any other place in North China that I know. Let me mention some of them so that readers may perhaps more easily learn their names and make friends with them.

BLACK BIRDS.

You may begin with the blackbirds. Of course you know the big black carrion crow, *Corvus coronoides hassi* Reichenow, who caws and

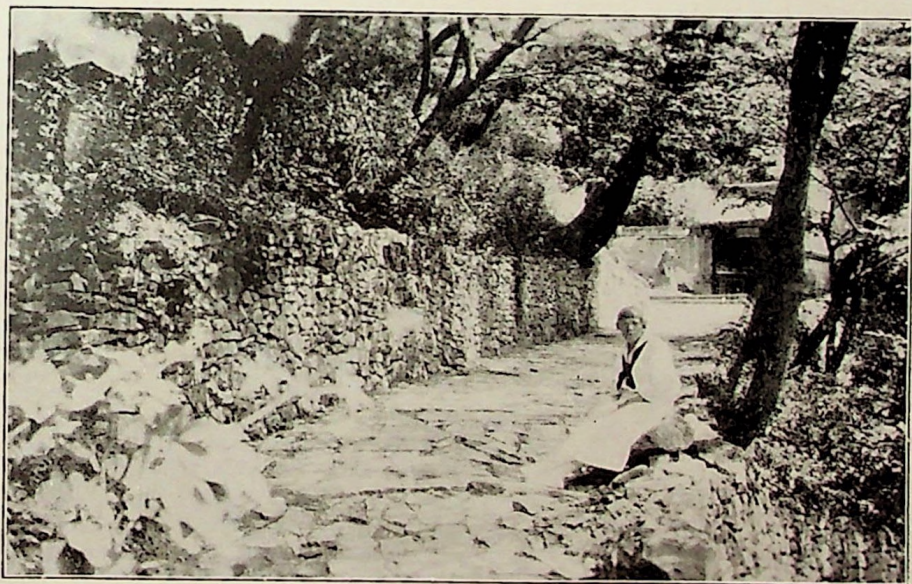
wakes you up in the morning. But you will have to be careful not to mistake him for the rook, which is almost as large. The rook, *Corvus frugilegus pastinator* Gould, has a sharp pointed beak while the crow has a beak curved in the upper and lower outlines and somewhat hooked. Then there is a black bird about half as large, that flies with a faster wing beat. You may see him once in a while, in flocks. It is the black jackdaw. Sometimes you will see another black bird, in size between the jackdaw and the rook, with a handsome slender curved red bill and red legs. This is the chough, and it will be seen on the loess cliffs where it may nest in holes, as it does in the crevices of the city wall at Fenchow. This is *Pyrrhocorax pyrrhocorax* of Linnaeus. It prefers the higher altitudes, not being found on the plain about Peking. Its loud clear call is easily distinguished from the calls of the other members of the crow family. The Shansi bird may belong to the subspecies *P.p. brachypus* Swinhoe. The smallest of the black birds is about the size of an American blackbird, or English thrush. It is very common, flying up and down among the trees, sometimes scooping up water from the surface of the pond while it flies, and making all kinds of rather pleasant calls at the same time. This is the black drongo, *Dicrurus ater cathoecus* (Swinhoe). Its tail in old age curls up at the sides toward the tip just as does that of the black-bird, or boat-tailed grackle in America.

BLACK AND WHITE BIRDS.

Then there are the black and white birds. The common magpie, *Pica pica sericea* Gould, that haunts our yards everywhere, needs no further introduction. The pied jackdaw, *Coloeus dauuricus* (Pallas), looks a good deal like it, as it is black with white underneath, but, unlike the magpie, it has a white collar clear around its neck behind, and no white on its wings and shoulders. Its tail is plain black, and short,—not long, with purple and green reflections like the magpie's. It is just the size of the black jackdaw, *Coloeus neglectus* (Schlegel), and flocks with that bird in the fall. In fact these two jackdaws are considered to be one and the same species in two forms. Specimens are found in which the white parts are all shades of grey to almost black. The Chinese pied woodpecker, *Dryobates major* (subspecies), is black above, with wings all spotted with white, and very dirty white or brown on the neck and lower parts. It has red under its tail and the male has red in its cap, too, as do the males of most woodpeckers. The hoopoe, *Upupa epops saturata* (Lönnerberg), looks black and white spotted when it flies, like the woodpecker, but it has a pretty fawn or tan coloured coat and a fine crest an inch and a half long, like a lead pencil sticking behind its ear when at rest and like a crown or halo when it is excited or interested. It is closely related to the woodpecker but does not creep up the sides of trees as the woodpecker does, and feeds on the ground. These two are about the size of the black drongo. If one looks carefully he will also see a smaller edition of the Chinese pied woodpecker, which is coloured like it, except that it has no red under the tail, it is white in the middle of the back instead of black, and the red on the head of the male

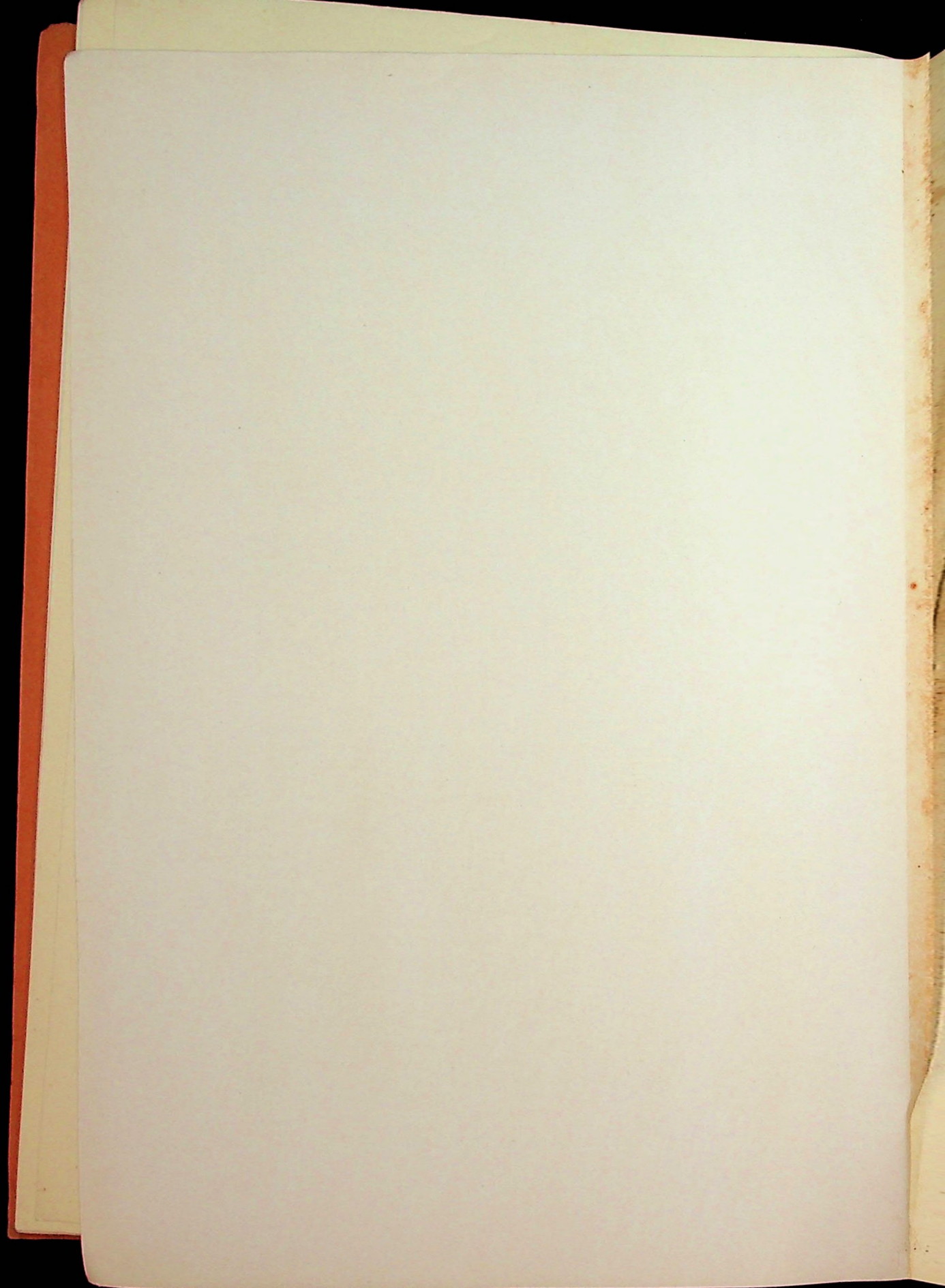


A leafy Walk at Yü Tao Ho, Shansi. Yü Tao Ho is a hilly wooded District which makes a natural Wild Bird Sanctuary



Photos by A. W. Hummell

In the Temple Grounds at Yü Tao Ho, Shansi



BIRD SANCTUARIES OF NORTH CHINA

is confined to two very small red tufts above its ears. These cannot be seen very well unless one has the bird in his hand, but they give it the name of spark-headed woodpecker. It is also called the pygmy woodpecker, *Yungipicus pygmaeus scintilliceps* (Swinhoe).

The grey starling, *Spodiopsar cineraceus* (T.) is about the same size as the hoopoe, and the old male has black head and neck streaked with white and white around his eyes like spectacles. The rest is brownish grey with a white spot on the rump that shows above its short rounded tail when the bird flies. These birds occur in small flocks, or families, all through the valley, and make a great clattering as they fly. They, like the woodpecker and the hoopoe, build their nests in the holes of trees made by the woodpecker or in rotten knot holes.

Another all black or brownish bird with a trace of white on the chin, is common flying around the city towers and is occasionally seen in the valley. It is the Peking swift, *Apus apus pekinensis*, (Swinhoe). It is still smaller than the drongo with very long slender wings and is always seen on the wing, as it only alights to enter its nest usually under the tiles of a roof. Another swift, slightly larger, looks like the Peking swift, but careful observation will show a snow white rump, when seen from above. It nests on rocky crags, but probably flies over the valley occasionally. This is the Siberian swift, *Apus pacificus* (Latham). These swifts look in flight like the swallow, but the common house swallow, *Hirundo rustica gutturalis* Scopoli, is cream white below, with a chestnut coloured throat and blue-black above. The yellow-rump swallow, *Hirundo daurica nipalensis*, ought to be seen here, too. It is the one that makes a nest of pellets of mud stuck together into the shape of a bottle, often stuck up on the walls or ceiling of a porch. It has a large yellowish spot over its tail, which shows when it flies, and its under parts are whitish, finely streaked with brown. It has no dark chestnut on its throat, and so can be distinguished from the house swallow whether you see it from above or below. In the rocky gorge or at the high peaks, you may see the crag martin, *Riparia rupestris* (Scopoli). It is even more brown than the swift, appearing all black in the distance. It has an oval spot of white on each tail feather, which is rarely to be seen in flight.

The pied wagtail, *Motacilla alba baicalensis* Swinhoe, is about the size of the last two birds, but it is usually seen running on the stones near the water. It has a long slender body and tail and keeps its tail wagging up and down. It is black above, white below and on the shoulders, with a black spot on its throat. One kind has a black streak through its eye. This one is the streak-eyed wagtail, *Motacilla alba ocularis* Swinhoe. Both wagtails turn from black to blue-grey in the autumn and stay so all winter, and the young birds are similarly coloured during the first year.

YELLOW AND GREEN BIRDS.

Akin to the starling is the Chinese oriole, *Oriolus chinensis indicus* Jerdon, a very handsome lemon-yellow and black bird almost as large as a dove. The male has a clear liquid note, but the female has a harsh

scream and is plain greenish mixed with black. The green woodpecker, the size of the oriole, is occasionally seen creeping up the trees or in its galloping flight. It appears green all over except for its grey head and yellow rump.

SLATE GREY AND BROWN BIRDS.

We might have placed the cuckoo-shrike, *Campephaga melanosticta melanoptera* (Rüppell) among the black and white birds as it appears so at a distance in the trees. The wings and tail are black with large white tips to the latter, and a white patch in some birds—the females—showing on the wings, when spread. The rest of the body is dark slate grey. These birds will be seen skulking in the leafy trees like cuckoos or orioles, and darting like flycatchers to seize insects on the wing. They are trim, slender birds smaller than the oriole but larger than the pied woodpecker.

Of the wild doves there is the rock pigeon, *Columba rupestris rupestris*, Pallas, which is slate blue with a white band across its tail, and a white rump above its tail. It looks like many of the tame doves, but the tame pigeons have no white on rump or tail. The commonest dove which is so tame that it stays on the road until you are quite close, is the collared turtledove, *Streptopelia decaocto decaocto* Frivaldszki. It is fawn coloured, with a black line around its neck, except in front, and white tips to its long tail feathers that show when it flies. The Barbary pigeon or Chinese turtledove, *Streptopelia orientalis orientalis* (Latham), looks much like it, but instead of the black line on the neck it has only some spots of blue on a black band on the sides of its neck; and instead of being plain fawn colour on the body it is darker brown, mottled with coppery gold on wings and back, while the tips of the tail feathers are drab. The spotted-neck turtledove, *Streptopelia chinensis chinensis* (Scopoli) is also seen and heard, as it nests in the trees and alights on the houses. Its body colour is more pinkish fawn, especially on sides and breast, brown without very noticeable mottling on shoulders and back, and it has a cape on the sides and back of the neck of black spotted with buff or white, the tips of the tail feathers being white also, not drab as in the Chinese turtledove.

There are two kinds of cuckoo that you hear constantly and when you see them you might mistake them for turtledoves. They are dark grey above, ashy blue on the head, neck and breast, and white below. They have a long tail and fly slowly among the trees, not lighting on the ground but keeping well hidden in the foliage. One, the Indian cuckoo, *Cuculus micropterus micropterus* Gould, says, "K'uai⁴ K'uai⁴ Chung¹ Kuo²," which means "Quickly sow your crops," or "Kuang¹ Kun⁴ Hao³ Kuo⁴," according to the Chinese "A bachelor easily gets a living." The other, the common cuckoo, *Cuculus canorus telephonus* Heine, plainly says, "Ku Ku." These birds lay their eggs in smaller birds nests, so compelling the small bird to work hard to feed the great cuckoo fledgling which crowds the young of the other bird out of the nest.

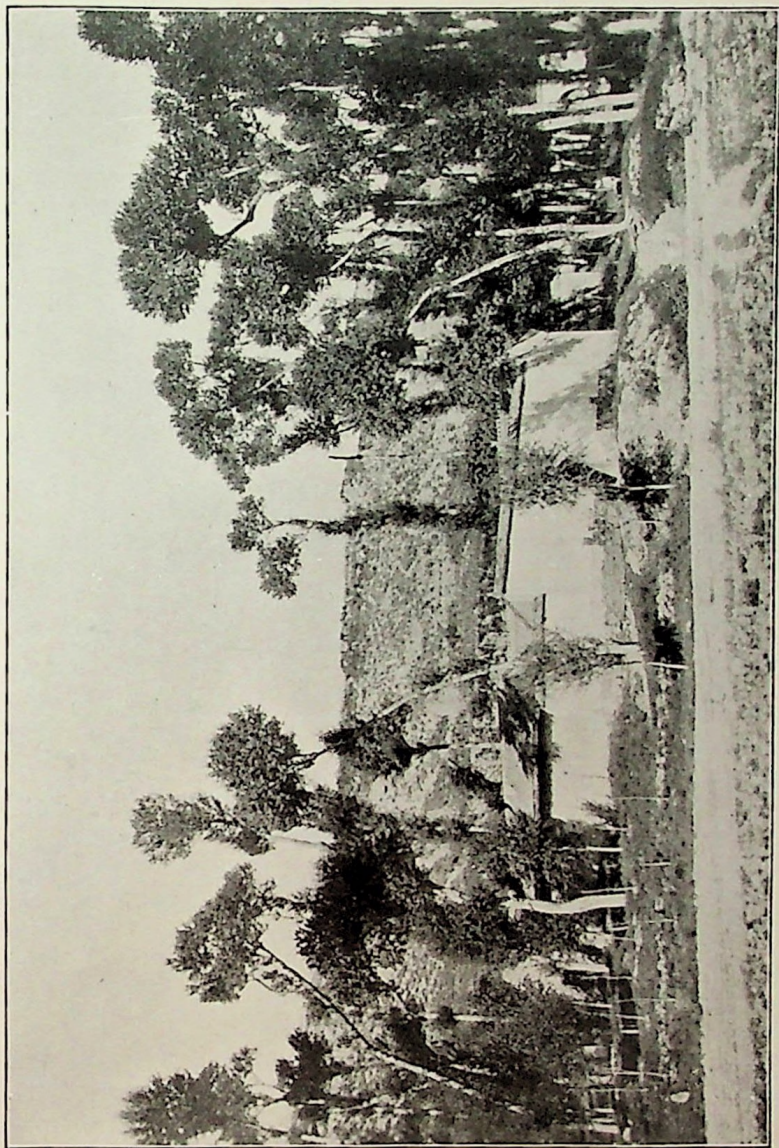
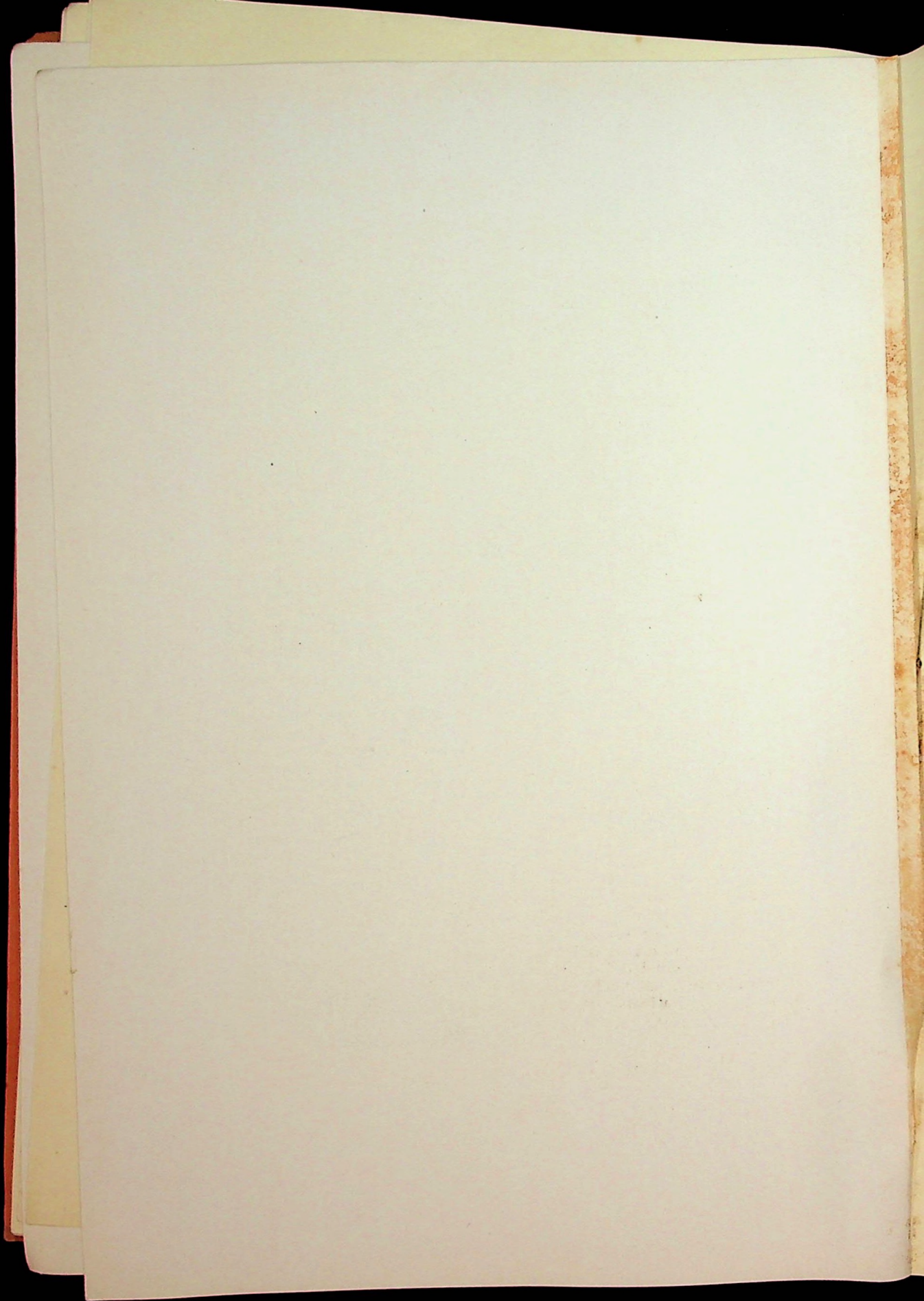


Photo by A. W. Hummell.

Magnificent Poplars at Yü Tao Ho such as are Characteristic of the Plains and Mountain
Valleys of North China, especially Shansi



BIRD SANCTUARIES OF NORTH CHINA

You will see the black-eared kite, *Milvus lineatus* (Gray), a great hawk, the largest bird you have there, except when the golden eagle may fly over the valley. You can tell the eagle by his rounded tail when he flies and spreads it. The kite has a tail square at the tip or even slightly forked. The young kite has a rounded tail, however, in the first year, like the eagle's. The only other bird of the hawk family you are likely to notice is the little red-legged falcon, *Falco vespertinus amurensis* Radde. When in flight you can see its rusty red legs, slate blue head and under parts, and dark, almost black wings with broad white rear edges as seen from below. It nests in the tops of the high trees and you often hear its chattering scream. It is about as large as the pigeon.

When you get away from the trees down on the plains you will see and hear the skylark, *Alauda arvensis*, a very plain dirt-coloured bird that alights only on the ground and sings as it soars. The crested skylark, *Galerida cristata leautungensis* (Swinhoe), is still more common in the summer, and is different from the field lark in having quite a pointed crest which it raises when on the ground, and looking intently for danger. You will see these in the bird cages sometimes but they are not nearly so common as the larger Mongolian lark, *Melano-corypha mongolica* (Pallas), with a brown band on its breast and white on its wings. These are kept in cages by the merchants a great deal, but are not natives, being all brought down from Mongolia when young, by tens of thousands, for sale in the cities of the plains. Their splendid singing does much to bring a little bit of the wild to the tired workmen in the shop.

These are about all of the birds that you will notice in the valley, before the migrants begin to arrive in August. Then the brown shrikes, the brown, red-breasted and Siberian flycatchers and little green willow warblers begin to be seen. But if you climb the mountains at the head of the valley the meadow bunting, *Emberiza cioides* (sub-species), the size of a house sparrow and resembling it, but found on the grassy and bushy hillsides, is pretty sure to be seen. You will also see the handsome red-bellied blue rock thrush, well described by his name. It is *Monticola solitaria philippensis*. Its song is well worth hearing, and you may find its nest in the crevices of the rocks. The same may be said, as regards the song, of the North China hill warbler, *Rhopophilus pekinensis* (Swinhoe), a long-tailed brown-streaked bird that skulks in the bushes, generally on the ground on the stony hillsides. It has a slightly down-curved bill and except for the longer tail is no larger than a sparrow. It is one of the most charming birds of North China. It builds a round compact nest in low bushes. It is usually found with David's scimitar-billed babbler, which reminds one of a catbird for size and colour, with a down-curved bill, but I did not happen to see any on my short visit. It builds a nest, not unlike a thrush's nest, in the thorn bushes that fill the ravine bottoms. Both birds have a great variety of calls and songs.

SHELLS OF PEITAIHO

BY

A. W. GRABAU AND SOHTSU G. KING.

(Continued from page 197)

CHAPTER II.

TYPES OF SHELLS AND SHELL-LIKE STRUCTURES FOUND AT PEITAIHO

The most common shells found upon the beaches of Peitaiho are those of the bivalve *Mullusca*, these being variously classed as *Lamelli-branchiata* (leaf-gilled) because of the leaf-like gills or breathing organs of the animal, or as *Pelecypoda* (hatchet-footed) because of the foot or anterior muscular projection of the body which often has the shape of a hatchet. The shells always consist of two parts, or valves, a right one and left one, but often in a given locality only one of the valves predominates, the other being rare or almost absent. This is due to the action of the currents which sweep away one valve, the one most favourably placed for this action, leaving the other behind. In the majority of the pelecypods the two valves are of equal size and convexity, but in a few inequality prevails. This is most pronounced in the oyster shells, especially the small boat-shaped oyster so common on these beaches. Here the upper smaller valve is generally carried away, leaving the lower boat-shaped one in vast numbers upon the beach. In one place on this shore about four hundred of these valves were obtained from the upper inch or two of one square foot of beach material. There are other shells with unequal valves which will be mentioned later, but, as a rule, the collector may consider that his species is incomplete unless he has two valves which fit together accurately. That does not mean that he should discard all single valves—single valves are for the most part quite sufficient to determine the species.

There are perhaps forty or fifty different species of pelecypod shells known from Peitaiho beaches, some of them very rare. Every collector may have the good fortune to add to this number by finding species not before found here or by finding larger and better preserved specimens of the rarer species of this coast.

Next in abundance are the univalve, or snail-like shells, which belong to the class of *Gastropoda* (stomach-footed). More than fifty-five species of these shells have been found, but the individuals are generally much less common than are the valves of the pelecypods. Some of the small thick-shelled species are frequent, and in the shell-sand a beautiful flat-spined shell (*Umbonium*) and a smooth rice-shaped and beautifully coloured shell (*Amycla*) are very common. The large shells are, however, generally broken and worn. The best collecting ground for the smaller gastropods is the shell-sand.

The third class of the *Mullusca*, that of the *Cephalopoda* (head-footed), is represented only by the internal shell of the cuttlefish (*Sepia*),

the so-called cuttlefish bone. The animal is caught in nets in the open water, as is also the shell-less *Octopus*. This internal sepia-shell has somewhat the shape of an elongated spoon without a handle, and with the bowl filled with a thick mass of white lime in thin superposed layers. The average specimens are not over four or five inches long and are generally somewhat broken. The student should look for specimens with a perfectly pointed lower end, for this little terminal cone, not over one-fourth of an inch long, is the real shell, the rest being an appendage.

One other type of shell is occasionally found on these beaches, namely, the *Lingula*. This is not a mollusk, but belongs to the class *Brachiopoda*, which is a rare class to-day but was very abundant in ancient times and forms one of the group of fossils found in the older rocks of China. The *Lingula* consists of two nearly equal valves, each symmetrical with reference to a line drawn down the middle. The shells are tongue-shaped (hence the name), brown or greenish-brown in colour and of a horny texture. The largest specimens are not much over an inch or an inch and a half in length, but when the animal is complete there is a fleshy stem or pedicel projecting from the pointed, or beak, end of the shell, having a length of several inches. By means of this pedicel, the animal anchors itself in the mud or sand of the deeper water. Only after a storm are these animals found upon the beach and they are among the rarities of the collector's trophies. Rarely, too, are single valves or complete shells of other brachiopods cast up on the beach. They can always be distinguished by the bilateral symmetry of the valve with reference to a line drawn through the apex, or beak.

There are many other calcareous structures found upon the beaches which do not belong to the class *Mollusca* and are not strictly classifiable as shells. Attached to true shells, to stones and to ledges of rock are the barnacles whose white shell-like structure consists of a ring of six or more calcareous plates, which form the corona. Within this ring of outer plates is an inner shell of four pieces, consisting of two scuta and two terga, which in the living animal, observable in the shallow rock pools at low tide, open and close rapidly during the process of feeding. These animals belong to the class *Crustacea*, to which also belong the various crabs, shrimps and other forms, the hard outer shell-like structures of which are often found in more or less broken condition among the shells upon the beach.

One of the most common limy or calcareous structures which is found upon the beach at certain times is a large colonial mass of a bryozoan. This seems to be most frequently found on the German beach after a September storm. The colonies look like sponge masses, but are hard and rigid though brittle. A crumpled newspaper or handkerchief might give some idea of the general form of these colonies; when examined closely the surfaces of the individual blades are covered with innumerable regular tiny apertures, each lodging a tiny polyp-like animal. The whole suggests a coral colony, but it does not belong to that class.

True corals are also found upon these beaches, but they are always small, usually single individuals not more than half an inch long and a quarter of an inch in diameter. They are readily recognized by the beaker-

or cup-like character of the specimen, the cup being filled by numerous vertical plates, or septa, arranged more or less radially from the centre to the wall of the cup.

The class *Echinodermata*, to which the star-fish belongs, also furnishes some shell-like structures to these beaches. These are the coronas or "tests" of the sea-urchins, compressed spheres flattened at the poles, half an inch to an inch or more in diameter and composed of numerous regularly arranged plates disposed in ten rows from pole to pole, and alternating in kind. When perfect, the entire test is covered with slender movable spines, each rounded knob of the plates bearing one of these spines. Small oval or compressed egg-shaped tests of a bilaterally geometrical form (*Echinocardium*) are more rarely found. They are more numerous and larger on the Weihaiwei beaches.

Calcareous tubes, sometimes minutely spiral (*Spirorbis*) but often very irregular in form (*Serpula*), are sometimes found attached to seaweeds, oyster shells or stones, and sometimes form independent masses which look like a number of intertwined petrified snakes or worms. These tubes were built and inhabited by sea worms. There are also sometimes fine straight, slender, tapering tubes formed of sand grains bound together by some transparent substance. These sand tubes were also built and inhabited by worms. They are more often found, however, in the material dredged from the bottom of the water some distance from shore.

Finally, there are the vertebræ and some other skeletal parts of fish which are left on the beach after the decay of the fish or after its flesh has been eaten by other animals. These skeletal parts are then shifted about and mingled with the shell sand.

Calcareous sea-weeds or nullipores, are not common upon these shores except the small rigidly branching *Corallina*. This is white when found upon the beach and looks as if made of small elongated beads strung upon a branching support. When alive in the water the colour of this sea-weed is pink.

Sometimes oyster shells and other large shells are found riddled by numerous small holes which cover the surface and are continued in canals within the shell. These holes were made by sponges which grew upon this shell for support and which during their growth pierced and riddled the shell to make the support a firm one. Often pelecypod shells are pierced by a single round hole near the apex or umbo of the valve. These holes were made by a carnivorous gastropod with the aim of sucking the contents, or paralyzing the animal in the shell. This accomplished, the muscles would relax, the shell gape and the animal would be exposed and become the prey of the carnivorous gastropods.

Rich and varied is the debris of ocean life cast by the waves upon the shores, and while the shells of mollusks are the most abundant of these remains, practically all types of animals and plants which have secreted structures capable of resisting destruction or decay, are mingled with these shells. Together they form a part of the deposits left by the sea and year by year these deposits increase in area and frequently in thickness as well. Perchance the day may come when the sea will have vanished from this region and only the sands with the shells and other

indestructible remains of marine animals will be left. Or a portion of the sea-bottom may be lifted and become a part of the dry land, as has happened in Japan, where, in the region around Tokyo, we may see these former sea-bottom sands now raised forty or fifty feet above sea-level. In them we find an abundant representation of the shells of the mollusks which lived upon that bottom, and which for the most part are of the same species that still inhabit the waters about Japan and also occur living on the China coast. It may happen that, in the course of ages, these ancient sea sands will become consolidated into a mass of rock layers, and will retain the shells as a record of the existence here of a former ocean. We know of many such vanished oceans or arms of the sea in various parts of China, as well as in other regions of the world, and these ancient seas have left behind their shells, which now form the fossils of these rocks. Often these rocks are broken and lifted up to form the mountains of to-day, but the fossil shells they carry speak eloquently of the day when they were the sands and muds of the ocean and when, as to-day, the shells and bones of the dead were buried in the sands of the shores and those which formed the bottoms of these long-since vanished seas.

(To be continued)

ON THE SKELETON OF FELIS TIGRIS

BY

CHI PING

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The following notes embody the results of my observations on the skeleton of a tiger shot in Amoy. The skeleton was not complete when it came to my hands, and the features that I have noted down are only those which seem to be different from the usual case of other *Carnivora*.

The skull is elongated owing to the prolonged occipital process (Fig. 1), which is somewhat parabolic in outline. On both sides of the process the lambdoidal ridges are very well developed, each extending into a slight curve cranioventrad, and along the middle dorsal line of the caudal part of the skull arises a high sagittal crest, measuring about 32 mm. high at the border between the parietal and interparietal, and extending from the caudal end of the skull to a point about 8 or 9 mm. anterior to the border between the frontal and parietal. These particular

features differentiate the specimen in question not only from the skull of the domestic cat and of the leopard, but even from that of the tiger of a different variety. The zygomatic arch has an unusual shape. In the case of the domestic cat it is in semi-oval curve; in the case of the leopard it forms with the skull a somewhat elongated opening, but in the case of the present specimen the caudal portion of the arch is almost perpendicular to the lateral wall of the cranium (Fig. 2), thus constituting the base of a somewhat right angled triangle on each side of the skull. The squamosal process, proportionally speaking, is shorter than that of the domestic cat, but seems to be slightly longer than that of the leopard. The sutures between the frontal and parietal, between the parietal and temporal, between the parietal and interparietal, between the sphenoid and occipital and between the maxillary and palatine are all obliterated. The cranial cavity measures 280 cc. (Fig. 3). The strong tentorium extends from each lateral wall of the caudal part of the cavity into the space between the cerebrum and the cerebellum. The length of the skull from the tip of the snout to the caudal margin of the occipital condyle is 311 mm. and its width across the zygomatic distance 247 mm.

The coronoid fossa of the mandible is large and deep for the attachment of a greater part of the extraordinarily strong masseter muscle (Fig. 4). Both dorsocranial and ventrocaudal of the fossa are strong crests and deep furrows. On the medial surface of the angular process is a well developed obliquely longitudinal ridge, on both sides of which are marked furrows. The length of the mandible from the symphysis to the tip of the condyloid process is 232 mm. and its width at the root of the molar tooth 42 mm.

The dorsal and caudal surfaces of the axis, especially the latter, have a large number of small foraminae. On the lamina of almost every cervical vertebra is a foramen of considerable size situated between the cranial and caudal articular facets, beside there are some small ones. The size of the foramen decreases toward the caudal region, and in most of the vertebral segments there are usually a pair of foraminae on the dorsal surface of the centrum inside the vertebral canal. In the case of the thoracic vertebrae small foraminae are irregularly distributed on the laminae, and one, or sometimes two, pair of distinct foraminae are found on the dorsal surface of the centrum in most cases. In practically all of the lumbar vertebrae the foraminae are more conspicuous and larger in size on the laminae and on the dorsal surfaces of the centra, but in the sacrum and in practically all of the caudal vertebrae they are absent, though a few of very small size occasionally are found. The total length of cervical, thoracic, lumbar and sacral vertebrae is 1226 mm.

The scapula is thin and light, except at the glenoid border and near both extremities of the spine where the bone is thickened (Fig. 5). Its shape is quite different from that of the scapula of either the cat or the leopard. The Glenovertebral angle is very much thickened, the portion of the vertebral border between this angle and the end of the spine on the border is slightly concave instead of being convex. The remaining part of the vertebral border, instead of continuing with the former portion into a smooth curve as in the case of other *Carnivora*, has an

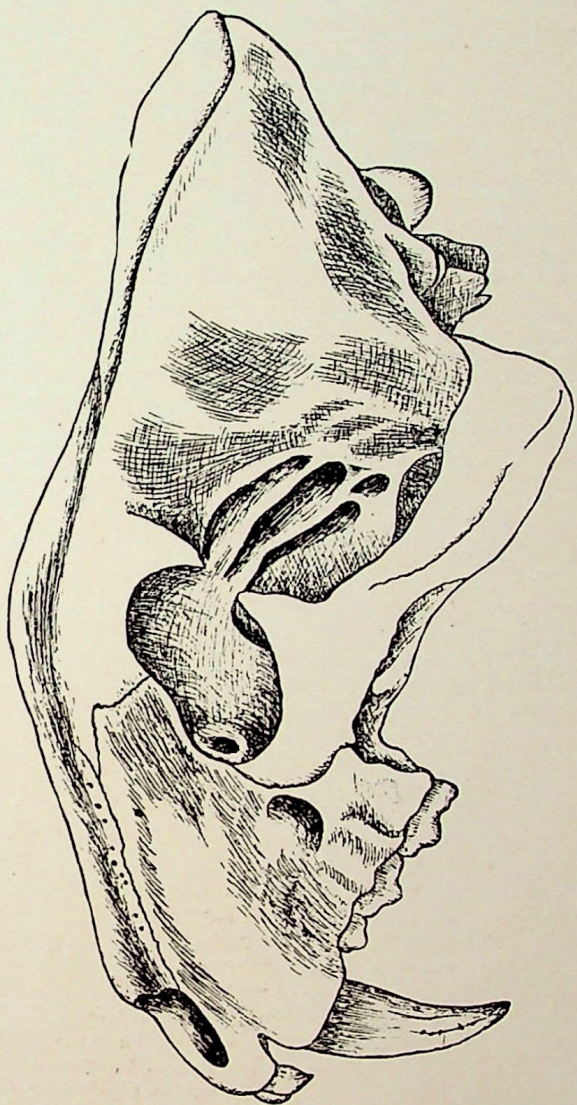
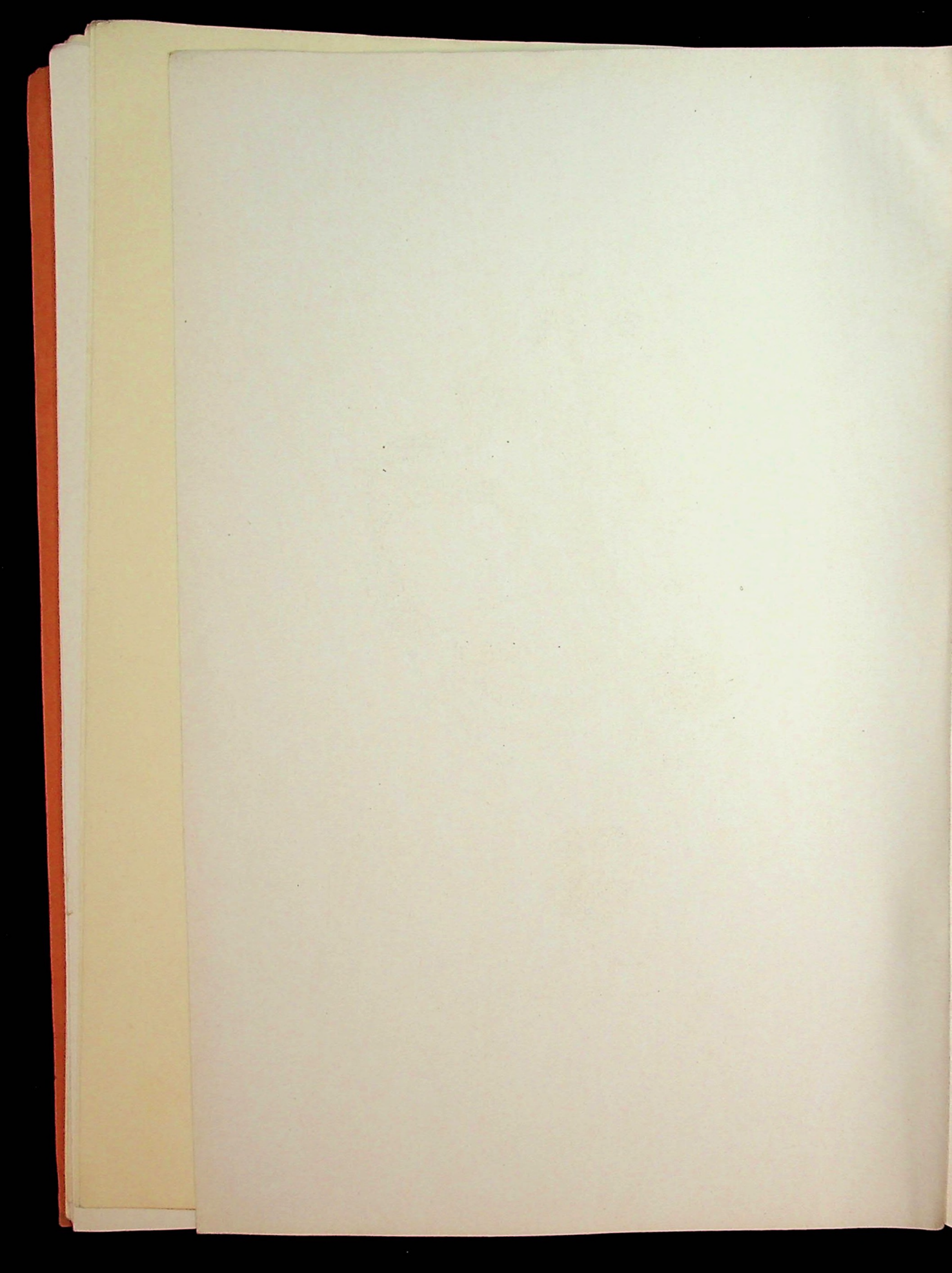


Fig. 1. Lateral view of the Skull of the Tiger



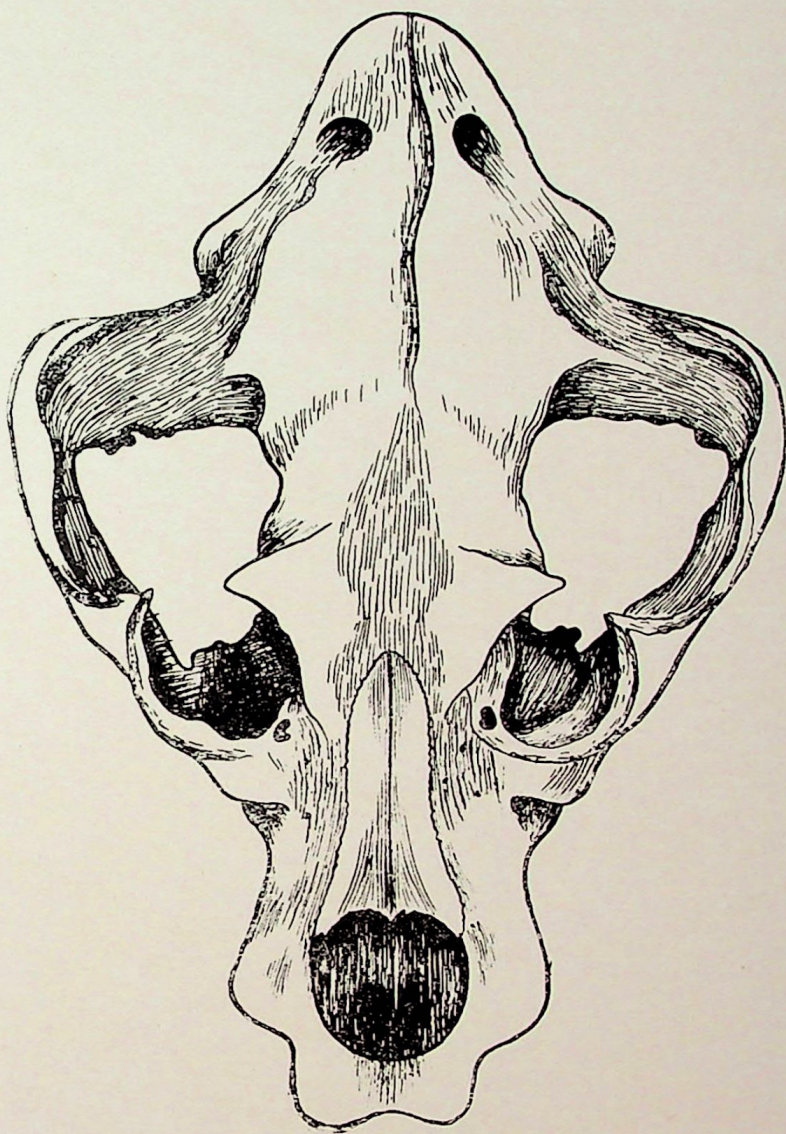
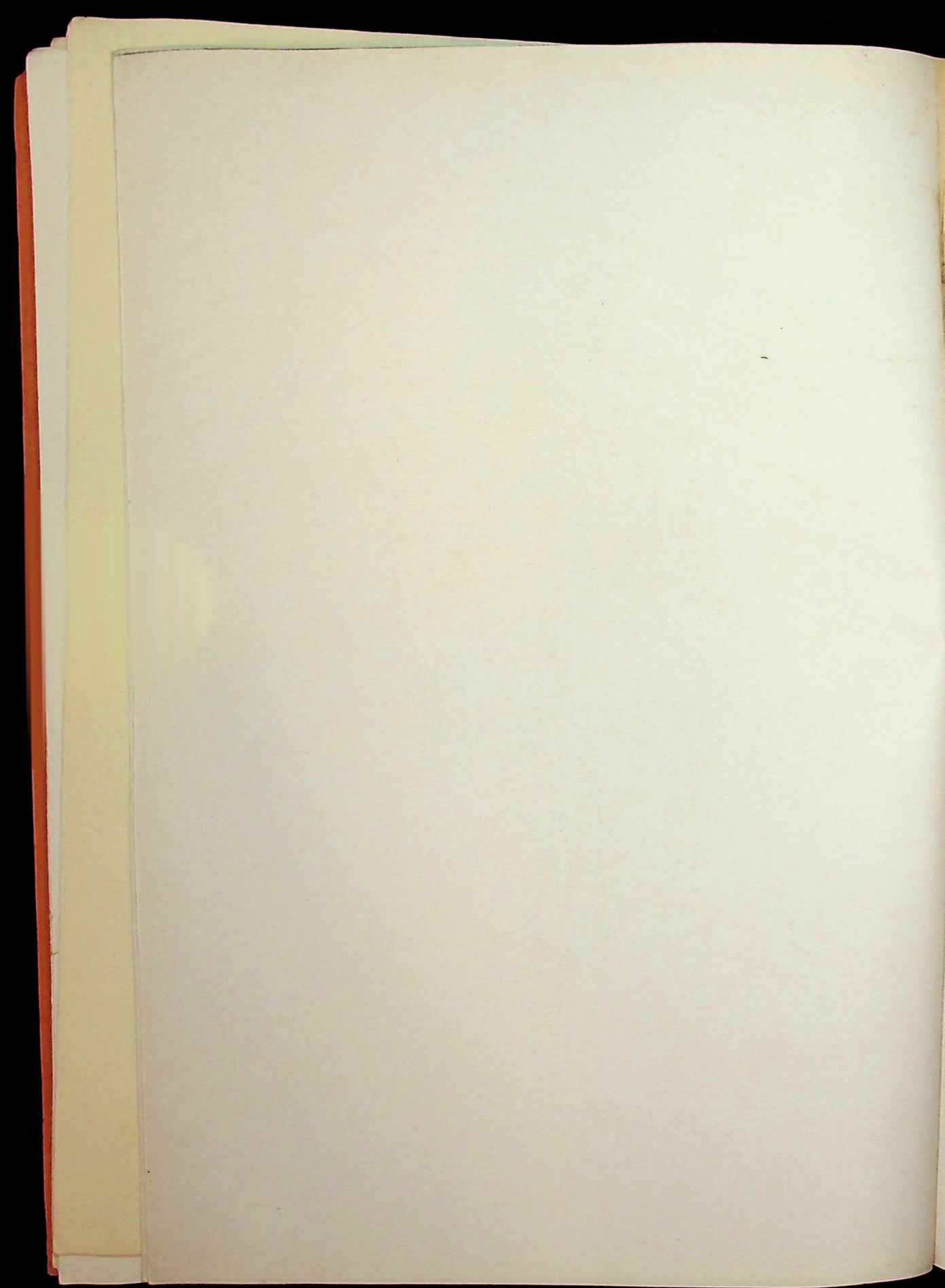


Fig. 2. Dorsal view of the Skull of the Tiger



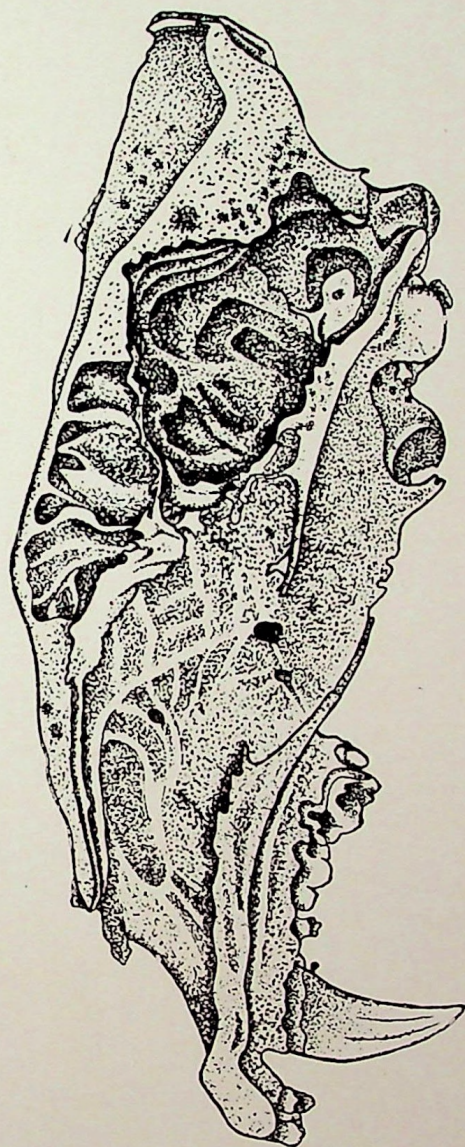


Fig. 3. Medial view (in section) of the Skull of the Tiger

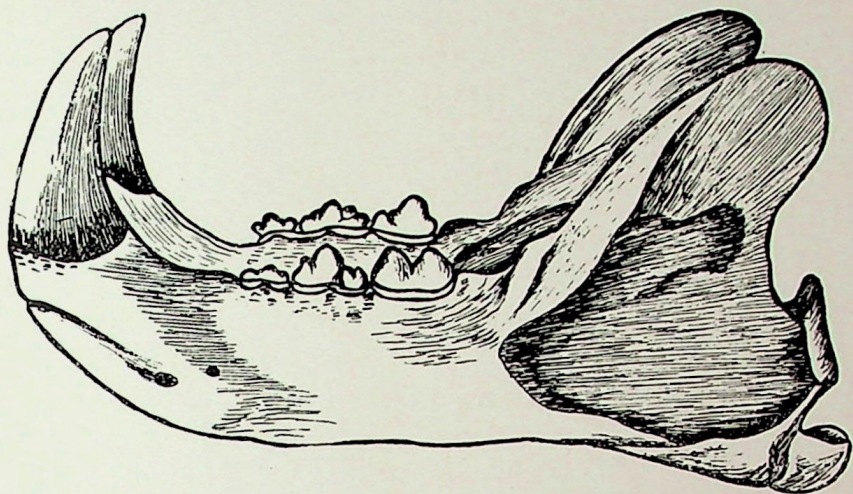


Fig. 4. Lateral view of the Lower Jaw of the Tiger

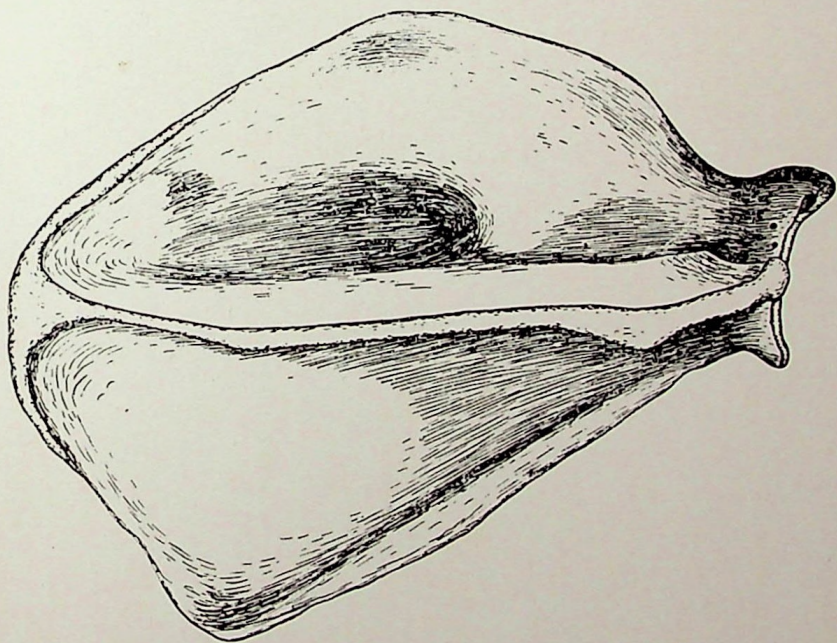


Fig. 5. Lateral view of the Scapula of the Tiger

ON THE SKELETON OF *FELIS TIGRIS*

abrupt turn toward the spine. The coracovertebral angle is inconspicuous, as the portion of the vertebral border between this angle and the end of the spine passes into the coracoid border gradually, forming almost a smooth curve. Both extremities of the spine are prominent, the one on the vertebral border is broad in comparison with the conditions in other *Felis*, and the portion between this end and the tuberosity of the spine which is inconspicuous, is uniform in thickness. Likewise is the portion between the tuberosity and the metacromium, the latter being not so prominent as in the case of other *Felis*, while the other extremity of the spine at the glenoid angle, different from the usual case, is a pronounced knob on the acromium. The fossae on the both surfaces of the scapula and the ridges on the medial surface are very distinct. The length of the scapula between the middle of the vertebral border and the supra-glenoid tubercle is 267 mm. and its width between the glenovertebral and the coracovertebral angle 210 mm.

Other bones in the skeleton do not show particular features in outline different from those of other *Felis*. The long bones and the bones of the feet are, however, very massive, strong, and solid in texture.

Owing to the obliteration of most of the sutures on the skull and the erosion on the roots of the teeth, a great deal of senescence of the animal is at once evident.

In the following table there are given the measurements of the body lengths taken from the tips of the snouts to the bases of the tails of six mammalian skeletons laid straight, including the one in question, and also their cranial cavities determined by filling in with coarse sand after having their foraminae plugged with cotton.

			Body Length	Cranial Cavities	Computed Values
Mammals			mm.	cc.	cc.
Cat	..	..	470	25	81.76
Dog	..	..	840	85	155.53
Leopard	..	..	960	165	264.17
Tiger	..	..	1,537	280	280.00
Monkey (Macacus)	..	..	355	85.5	370.18
Man	..	..	715	1,450	3,116.99

Taking the body length of the tiger as a basis, we obtain the computed value of the cranial cavity for each of the animals given in the table, i.e. by applying Rule of Three. The results of the computations are arranged in the fourth column of the table. Perusing the table we see at once the cranial cavity of the tiger falls in the third place, though its body length is the greatest of all. The cranial cavity of the tiger is larger than that of any other *Carnivore* used for comparison in this table, the cat, the dog, or the leopard, but it is 1.3 times smaller than, or 75 per cent. of, that of the monkey, and 11.13 times smaller than, or 8 per cent. of, that of man.

DESCRIPTIONS OF SOME FRESH WATER SPONGES FROM CHINA

BY

N. GIST GEE AND C. F. WU

(CHINA MEDICAL BOARD AND YENCHING UNIVERSITY, PEKING)

SPONGILLA (EUNAPIUS) CONIFERA. Annandale.

Habitat.—All of the specimens of this small sponge in our collection were found growing on the leaves of *Vallisneria spiralis*, or eel grass. Up to the present time we have not found it growing elsewhere. The larger number of specimens were taken from the lake, Waung Tien Daung, located east of the city of Soochow.

In the fall the farmers cut the grass in the lake for the purpose of fertilizing their fields, and bits of the grass covered with sponge were found floating on the surface of the water. Our specimens are all very thin, but at times covering both sides of the leaf of *Vallisneria* for a length of 10 centimeters. Sometimes the sponges bind two or three leaves of the grass together forming small masses. Some of my specimens are evidently larger than those taken by Dr. Annandale from the mouth of Moo Too Creek, Tai Hu, near Soochow.

General appearance.—Being found, as our specimens were, in the clear lake water they appear only very light brown against the dead grass leaf and are very nearly colourless when removed from their support. The mature gemmules are dark brown and when these are numerous they give a decided brownish appearance to the sponge. The surface of the sponge is, as a rule, smooth, but sometimes has small furrows in it leading to the minute orifices.

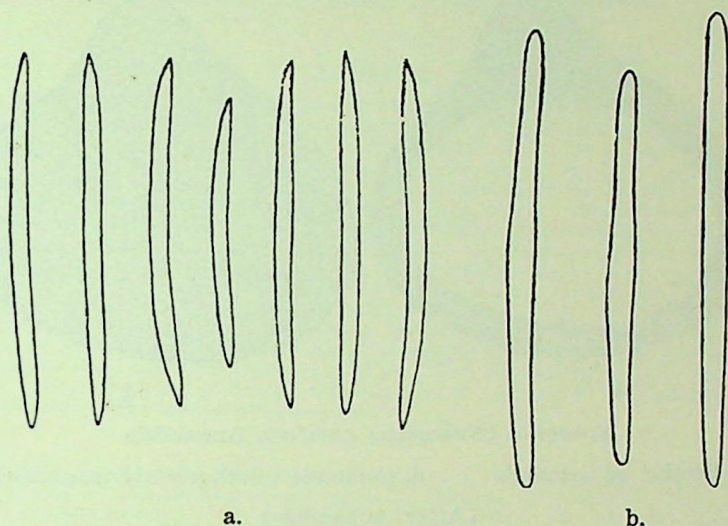
Structure.—The skeleton forms a close network of more or less regular hexagonal areas made up of strands which are composed for the most part of very few spicules. These areas, suggesting the bubble cells of the gemmules, are imposed one layer on top of another for the entire thickness of the sponge. While the amount of spongin is not large yet the skeleton is firmly bound together. When the sponge is detached from its support no horny base is observed.

Skeleton spicules.—The skeleton spicules are always smooth and generally somewhat spindle shaped, coming to a point somewhat abruptly without the gradual slope common in the spicules of so many of the other fresh water sponges. The spicules are slender and straight or only slightly curved. They vary greatly in size and in proportions and in general outline.

Length of spicules	..	..	240 to 300 microns
Diameter of spicules	..	..	9 „ 17 „

Flesh spicules.—"There are a few free flesh spicules. They are cylindrical, straight, blunt at the extremities and covered with spines.

DESCRIPTIONS OF SOME FRESH WATER SPONGES



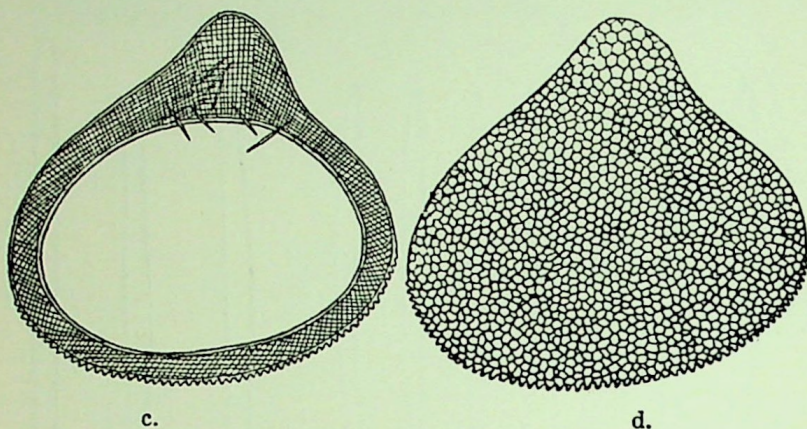
Spongilla (Eunapius) conifera, Annandale

- a. Skeleton spicules b. Gemmule spicules (Both greatly magnified).
(After Annandale)

Minute, smooth, rod-like spicules, sharp at both ends, also occur occasionally in the parenchyma; these are probably young flesh spicules. Other spicules, both of the pointed end and the rounded end types, occur; these are apparently adventitious." We have not been able to find these in our preparations.

Gemmules.—The following description of the gemmules is a modification of the one given by Annandale :

The gemmules lie free singly in the parenchyma. They have a conical form and a flattened or convex base and are still somewhat smaller than those of the other species (*S. micron*) found in the same lake. The base and sides of the gemmule are covered with a single layer of relatively large and regularly arranged air-chambers, which, seen in cross section, gives the toothed appearance shown in the drawings (c.) of the gemmules. On the upper surface there are several or many layers of similar chambers, among which, on this surface only, the few gemmule spicules are scattered. These gemmule spicules lie embedded among the several layers of air chambers and are rather closely arranged around the foraminal tubule. There is a single, relatively long and slender, straight foraminal tubule, which transverses the mass of air-cells on the upper surface in a vertical direction. Dr. Annandale found the



c.

d.

Spongilla (Eunapius) conifera, Annandale

c. Section of Gemmule

d. Gemmule (Both greatly magnified)

(After Annandale)

greatest transverse diameter of gemmule to be not more than 140 microns. We find the diameter of several of these cone-shaped gemmules to measure approximately the same across the base and from base to apex, and according to our measurements they vary from about 255 to 290 microns.

Gemmule spicules.—Dr. Annandale describes the gemmule spicules as sharp at both ends and spiny, and gives their length as 30 microns.

We are inclined to believe that the small, smooth, rod-like spicules with rounded ends which are often found in the preparations closely adhering to the tubule are the gemmule spicules. They are very few in number, but almost every slide shows two or three of them, and frequently when the coat surrounding the gemmules is transparent these may be clearly seen close around the tubule. They measure from 80 to 110 microns in length, are about 4 to 6 microns thick, and frequently a small enlargement is present at the middle of the spicule.

Type.—Indian Museum, Calcutta, India.

We have a minute co-type of this sponge (in alcohol) in our collection. We have also a number of other alcohol specimens collected in the lake to the east of the city of Soochow.

General remarks.—The most remarkable features of this sponge are the small size of all of its parts and the peculiar shape and structure of the gemmules; around the base of the gemmule there is often a circle of minute spinelets formed owing to an imperfect development of the pneumatic cells in this region.

SCIENTIFIC NOTES AND REVIEWS

BIOLOGY

NEW ASIATIC RATS: In the *American Museum Novitates*, No. 217, June 18, 1926, Dr. Glover M. Allen describes a number of new species and subspecies of rats (Genus *Rattus*) secured on the Asiatic Expeditions of the American Museum of Natural History, all from China. Altogether some twenty-one (21) distinct forms are listed and described and of these three are described as new subspecies. These are *Rattus rattus hainanicus* from Hainan Island, *Rattus humilatus celsus* from Yunnan (west bank of the Yangtze River at Taku Ferry) and *Rattus huang vulpicolor* from Nanting at the Burma border, Yunnan. Of these the first is a tawny representative of the common black rat, closely related to *R. r. sladeni* (Anderson) from Western Yunnan, from which it differs in having a longer tail, the dorsal colouring duller and the general appearance more olive. *R. humilatus celsus* is closely related to *R. humilatus* (Milne-Edwards) of South-eastern China, but differs in having longer hair, in lacking the bright buffy or cinnamon tone and in having the belly a buffy tint instead of white. *R. huang vulpicolor* is closely related to *R. huang* (Bonhote) of Fukien, but has a longer tail, slightly smaller skull and a much more vivid fulvous colouring above.

NEW SHELLS FROM LOOCHOO ISLANDS AND JAPAN: The following new species of mollusks have been described by William H. Dall in the *Proceedings of the Biological Society of Washington* (Vol. 39, pp. 63-66, July 30, 1926) from the Loochoo (Riu Kiu) Islands and Japan.

Dentalium luchuanum from Nago, Okinawa, Loochoo Islands
Mitra satsumae from Waki, Satsuma, Japan
Mitra nakama from Nakama Island, Okinawa, Loochoo Islands
Angiola periscelida (gen. et sp. nov.) from Waki Satsuma, Japan
Liotia langfordi from Waki, Satsuma, Japan
Emarginula imaizumi from Imäizumi, Kagoshima Bay, Japan
Emarginula (imaizumi var. ?) *imella* from Imäizumi, Kagoshima Bay, Japan
Ischnochiton thaunumi from Nago, Okinawa Island, Loochoo Islands
Ischnochiton melinus from Tokyo Bay, Japan, eight fathoms on dead shells.

CHINESE PROTOZOA: To students of microscopic organisms in China Mr. Chia Chi Wang's "Study of the Protozoa of Nanking, Part I," issued in the *Contributions from the Biological Laboratory of the Science Society of China*, Vol. I, No. 3, 1925, will come as a great benefit and material aid to their studies. Pointing out that the fresh-water protozoa of China have not been much studied, Mr. Chia proceeds to give in a preliminary survey the results of his investigations during three years' work in and about Nanking. The greater part of his specimens were taken in the Ho Hu, a lake lying outside the walls of Nanking city, but specimens were taken from other ponds and small lakes, as well as from the Ching Hwai River, which "seems to be a very rich source of simple organisms." A few preliminary remarks on the work of collecting and examining specimens are given, followed by a key to the sub-phyla, sub-classes and families of protozoa. The rest of the publication is devoted to detailed descriptions of the genera and species, with excellent illustrations. Species thought to be new are described without being named, an expedient made necessary by the lack of literature at hand. The author hopes to be able to determine and name these forms at a later date. The student of zoology will recognize many old friends in the illustrations, such as the *Amoeba*, *Euglena*, *Acanthocystis*, *Paramecium*, or slipper-animalcule, and *Vorticella*, or bell-animalcule, but these form only a very small proportion of the 152 species listed and described. The study of these micro-organisms is a fascinating one, and it should be doubly so in a place like China where there is always the chance of finding something entirely new to science.

MINERALOGY

CHINA'S COAL AND IRON: That China is destined to play an immensely important part in the spheres of international trade and politics is the belief of the author, Wilfred Smith, M.A., Tutor of Geography in the University of Liverpool, of a valuable little book entitled "A Geographical Study of Coal and Iron in China" published by Hodder & Stoughton, Ltd., for the University Press of Liverpool, Ltd. "That the economic development of China will be monstrous is taken for granted, but there is little more than conjecture as to the lines which it will follow and the precise factors which may be expected to affect it. This is perhaps particularly the case in the matter of Chinese mineral wealth and the circumstances affecting its utilization." Hence this book, the object of which 'is essentially to discuss the place of the coal and iron ore supply in the future economic geography of China.'

Chapter one is devoted to the structure of China in relation to the distribution of coal and iron; chapter two to the regional resources of China in these minerals; chapter three to the historical geography and factors affecting the future of the coal and iron industries of China; and chapter four to the regional functions of coal and iron in China. Under these headings a lot of valuable information is given; indeed, the book may be looked upon as a condensed summary of our knowledge of the coal and iron resources of this country. While there appears to be a very large reserve of coal in China, the iron ore resources are not very great, not nearly so great as was at one time believed. They amount to 950 million tons, and of this a large proportion, namely the coal measure ores, occur under conditions quite unsuited to modern mining methods. However, this does not mean that there is no great future in store for the coal mining and iron ore industries of China. There is, but that future inevitably depends largely upon the proper handling and financing of these industries. At present, Chinese capital available for such enterprise is inadequate, and "all recognize that foreign capital is necessary for mining development, but opinion is divided as to the terms on which it should be admitted." V. K. Ting "regards the real Chinese objection to the introduction of foreign capital to be the rights of extraterritoriality, which themselves witness to a distrust of Chinese law. He, therefore, maintains that whenever extraterritorial privileges are surrendered and the foreigner made subject to Chinese law, foreign capital can be freely admitted on equal terms with Chinese." This may sound reasonable, but it is certain that unless the judicial system of China is placed "on such a basis as to afford reasonable guarantees to foreign traders and residents in China" little foreign capital will be forthcoming for the development of China's coal and iron reserves.

MEDICINE

LEPROSY IN CHINA: It has been estimated that of the two million lepers in the world to-day one million are to be found in China. Considering that Christian missions have been operating in China for at least a century and that China herself now lays claim to being an enlightened nation fully qualified to take her place in the comity of nations and to enjoy the privileges of such a position, it is a remarkable thing that so little has been done by either missionary or government enterprise in combating this dread disease which has been allowed to go on unchecked in this country till half the world's lepers are located within its borders. All credit is due for such efforts as have been put forth to combat leprosy in China, but compared with the magnitude of the need these are pitifully small and inadequate.

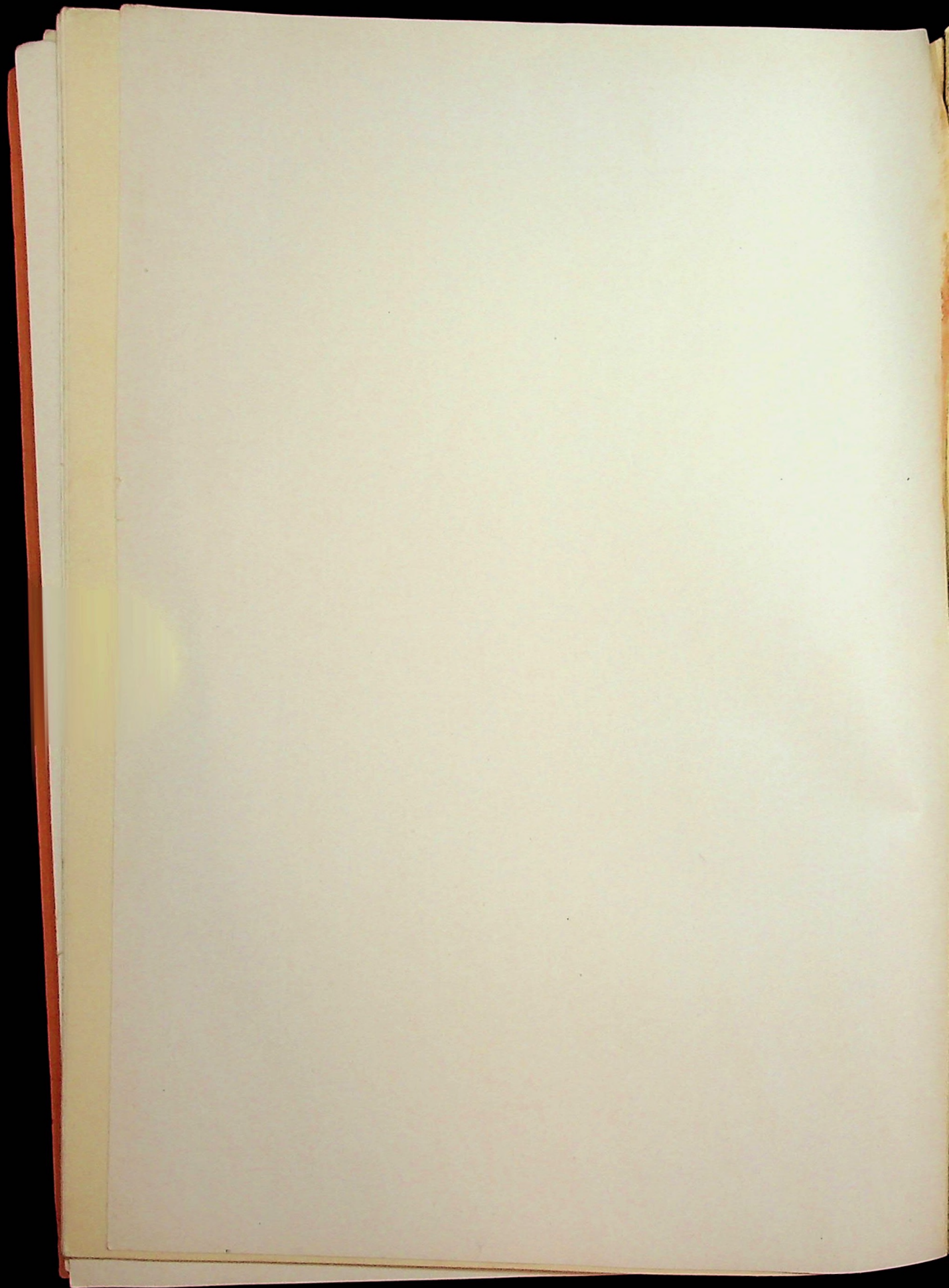
As quoted in *The Shanghai Sunday Times* of March 27 last, the Rev. R. C. Wu, who is the general secretary of the Chinese Mission to Lepers organized a year ago, says "Prior to the organization of the Chinese Mission to Lepers there was very little or nothing being done by the Chinese in the matter of eradication of leprosy and relief of lepers in this country. What had been done heretofore was done on a very small scale under the auspices of different missionary bodies. With the exception of the Canton Government which has been co-operating for some years with Christian missions in giving financial aids to maintain the work of Sheklung and Tungkun Lepers' Hospital, and of the Fokien provincial government which has been maintaining two leper villages in Foochow, the Chinese nation, as a whole, had practically



A Solitary Tsaine, or Banting, Bull shot on Messrs. H. Brain Bates' and W. E. Nops' last trip to Indo-China



Moï Trackers and Carriers. The Moïs are the Aboriginal Inhabitants of Indo-China, many of whom still do not acknowledge French Rule



SCIENTIFIC NOTES AND REVIEWS

done nothing to rid itself of leprosy." We are heartily glad to see that the Chinese themselves are awakening to a sense of the appalling state of affairs, and it is to be hoped that the Chinese Mission to Lepers will rapidly become a really effective weapon in the war upon leprosy. In March it was announced that arrangements were being made by the Mission to conduct a financial campaign aimed at raising \$20,000 for the furtherance of its work. The Rev. T. C. Wu is reported (*North-China Daily News*, March 18) to have said that most of the time since the mission was started has been spent in preparation work, and that, with the exception of an extended visit over South China by the general secretary and the treatment of individual cases by Dr. Tyau at St. Luke's Hospital, and the sending of a number of lepers to the Leper Asylum at Hangchow conducted by the Church Missionary Society, very little actual work had been done. This year it was proposed to distribute chaulmoogra oil, the great remedy for leprosy, to the different Chinese leper missions, free of charge. We presume he was referring to the above-mentioned institutions in Canton and Fukien. The formation of numerous new institutions of a similar nature scattered throughout the length and breadth of China, and supported by Chinese government funds as well as funds from individual Chinese should be the aim of the newly formed mission. We trust that the drive for funds will prove successful.

A. DE C. S.

SHOOTING AND FISHING NOTES

SHOOTING

SHOOTING IN INDO-CHINA: In the accompanying illustration is shown the head of a nice banting, or tsaine solitary bull, shot on Messrs. H. Brian Bates' and W. N. Nops' recent trip to Indo-China. These sportsmen, residents of Shanghai, put in the last few days of last year shooting in Annam where game is very plentiful. The trip was not altogether successful, for, as stated by one of the sportsmen, but for exceedingly bad luck four fine heads, two of seladang, or gaur, and two of banting, would have been secured. The above-mentioned head, however, was the only trophy brought back to Shanghai, and as they had previously secured better heads no measurements were taken. Besides this banting, several deer were shot and left in strategic spots in the jungle as bait for tigers. One deer was partly eaten but though the sportsmen sat over the remains, the tiger was not seen. Mr. Bates informs us that the most enjoyable part of the trip was the entire absence of mosquitoes, the fact that he and his companion were able to drink the beautiful clear water of the streams without danger, and the cool nights they experienced.

A. DE C. S.

SHOOTING IN MANCHURIA, MAY NOTES: The amateur big game hunter has still a chance to bag a bear whose pelt is yet in prime condition. But he must not forget that it is the bear's mating season and that great caution has to be exercised whilst hunting. To be caught single-handed on the trail by several bear gallants hot in pursuit of a bruin belle spells certain disaster. Bears will be found early in the morning along the higher open ridges, feeding on the tender sprouts of grass on the southern slopes, or turning over logs and rocks in search of worms and larvae.

But for the professional hunter the most strenuous time has arrived. High upon his forehead the wapiti stag now carries a pair of budding velvet antlers, the priceless *Lu-jung*—Elixir of Life of Chinese popular medicine. For a pair of these soft, half-formed antlers, filled with a bloody mass and covered with a thin velvety

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skin, pulsating with life at every heartbeat of the stag, the Chinese, thrifty as they are, will pay from \$200 to \$600. No wonder that numerous Mongolian, Korean and Russian hunters are now hurrying to the Manchurian forests and mountains for the spring hunt.

There certainly must be some exceptionally virile power in the blood of the stag at this period which enables him to grow in the short term of a few weeks a pair of beautiful, wide-spread antlers, weighing up to 20 lbs., and armed with which he will, in September, stand his ground and shatter the wilderness silence with his bugle-like calls in challenge of his rivals to a love duel.

But during May and June, a stag's life is not worth living. His sensitive antlers, painful at every contact, prevent him from seeking refuge in the dense brush; from morning to evening he is harassed by clouds of gnats and mosquitoes, replaced at night by swarms of other blood-sucking pests that cluster about his eyes, nostrils and antlers. But worst of all, every current of air carries along the hateful human scent. Mounted Mongols, once on his trail will chase him day after day for hundreds of miles and the solitary Russian or Korean hunter is constantly on the stalk or awaits him at night at salt-licks.

More precious than gold is *Lu-jung* in the Manchurian *Taiga*, and woe to the unwary, proud possessor of this trophy who too openly displays it on his way home. Only his bleaching bones will mark the spot where the speedy bullet of a prowling marauder or hunter reached him.

Blackcock and capercalsie *toks* will continue well into the middle of the month and this year some excellent *toks* are reported from Barim, Halasu Buchedu and Hingan stations.

Woodcock have arrived and although never plentiful here, from five to ten birds may be bagged in the course of an evening flight. Good locations for woodcock are Chalantun and Buchedu on the Western Line and Yablonia and Shitouhedze on the Eastern Line.

By the end of the month it will be time to try some tentative casts for salmon in deep, quiet pools, and a good day's work with a large fly may be rewarded by some speckled beauties.

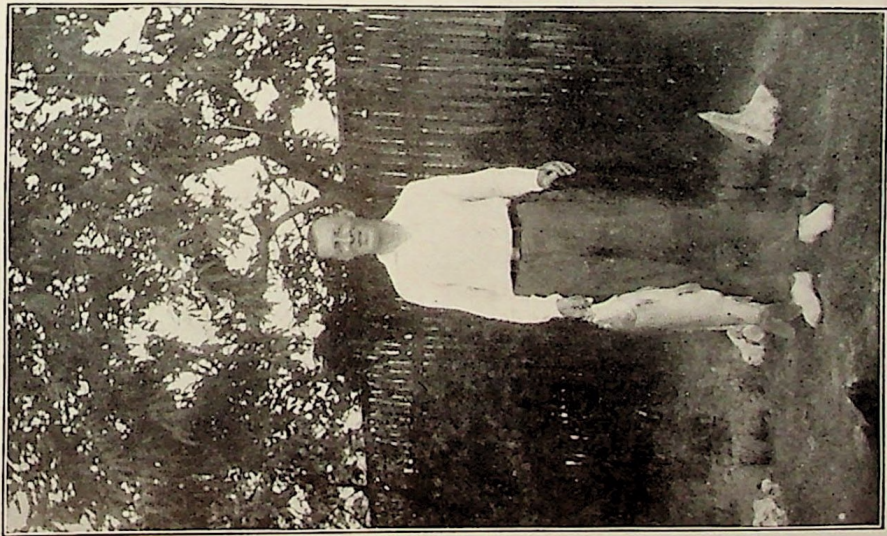
V. DE FRANCK.

SHOOTING IN THE SHANGHAI DISTRICT: Shooting in the environs of Shanghai and in territory easily accessible from this city has suffered an almost complete eclipse since January owing to the very disturbed state of the country. The fact that the whole country has been over-run with troops either "Nationalist" or Northern, none of whom may be expected to be in a very pleasant mood, has rendered it very unsafe to be found on Chinese soil with arms, and no one, not even the hardiest and most enthusiastic sportsman, has cared to venture afield. Recently, however, one or two have made short excursions with not unsatisfactory results. Mr. H. Brian Bates shot a couple of woodcock the other day close to the Settlement border, and later, April 19th, bagged two couple of snipe, one couple of which were winter and one spring birds. This is very early for spring snipe. Mr. Nops paid a visit to the snipe grounds near Kaochia Creek on the Whangpu early in the month and secured seven couple of winter snipe. Beyond this we have heard of no shooting being indulged in.

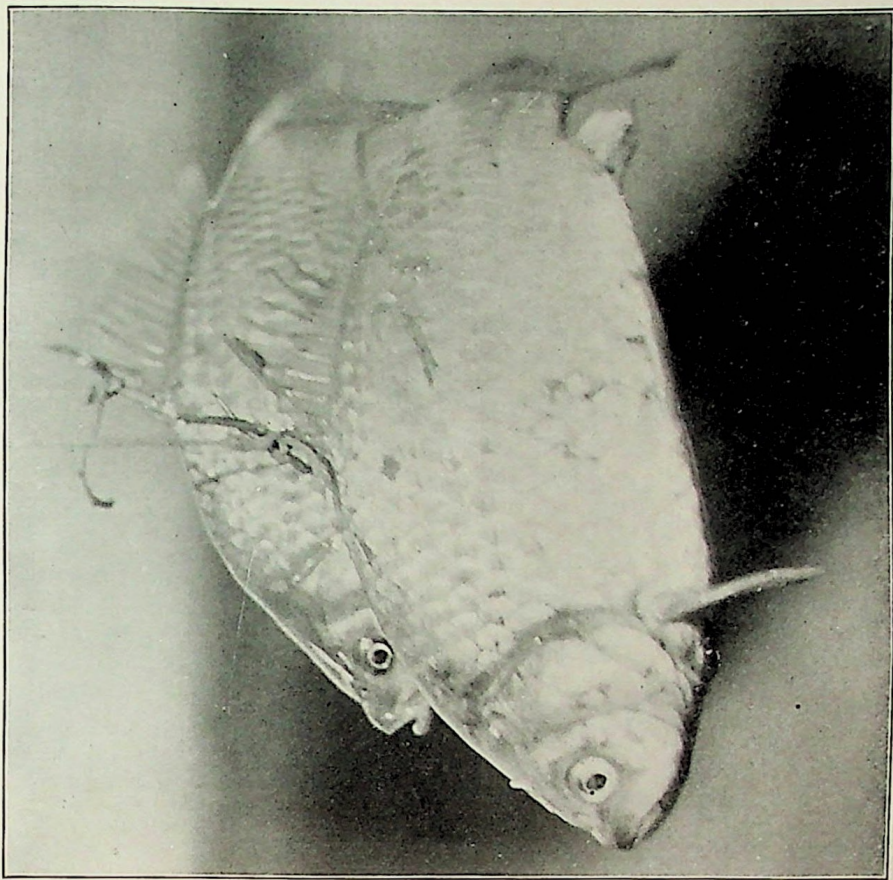
FISHING

LOCAL SPORT: The time is ripe in the Shanghai district to begin casting fly for knife-fish, while a trip to Hangchow will yield some good fly-fishing for culters and rainbow carp. As the warm weather comes on, ground fishing may be indulged in for large members of the carp family, such as the common carp itself and the Chinese ide, large specimens of both of which occur in even comparatively small ponds in and about Shanghai. The accompanying illustrations show locally taken fish; in one a large carp captured by Mr. H. Lane in a private pond in Shanghai last August, and reported in the October issue of this journal; in the other a couple of rather large specimens of the wild golden carp (*Carassius auratus*), which were caught in a creek bordering the Hungjao Golf Course by Mr. W. J. Hawkins.

A. DE C. S.



Mr. H. Lane and his 9-lb. Common Carp
caught in a private Pond in Shanghai,
August 7, 1926



Two fine Specimens of the Wild Golden Carp (*Carassius auratus*)
taken by Mr. W. J. Hawkins from a Creek near his House at
Hungjao Golf Course

THE KENNEL

ENGLAND BREEDS DOGS FOR THE WORLD: Says a correspondent in the *North-China Daily News*, "England supplies the world with dogs—sporting dogs, toy dogs, and Alsations. America buys more English dogs than any other country. In the days when collies were fashionable, a Manchester man sold one to America for £1,050. That collie was one of the pioneers in the dog business in the States, and since then there has been an increasing demand for English dogs. New York dog shows are strongly reminiscent of the Crystal Palace of the Agricultural Hall. Many of the exhibits have English blood in their veins. 'If people abroad want Pekinese dogs,' said the secretary of Crust's, 'they do not send to China for them but to England.' Whole families of Scottish sheep dogs have emigrated to South America, especially the Argentine, and those parts given to sheep rearing. Sporting dogs are sent out in great numbers to South Africa and India, and the fashionable dog in Italy just now is the Great Dane. The British bull dog, however, remains almost 100 per cent. British, the demand from foreigners being quite small."

This is very interesting, and we are glad to find that England maintains her supremacy in at least one field of activity. The correspondent might have added that practically all the foreign dogs in China have come from Great Britain or are descendants of dogs imported from that country. The Alsations in this country may prove an exception, though we note that these dogs are freely exported from England, where of late they have become very fashionable. We must suppose that the British being essentially a sporting people is mainly responsible for this, though the breeding of prize stock—animals and birds—of all sorts has always been a specialty of the country, and, from horses to chickens, the majority of the best breeds have originated there, or have been developed from original British stock.

DOG SHOW IN SHANGHAI: At the time of writing it has not been decided whether or not a dog show is going to be held this spring in Shanghai by the China Kennel Club. Our readers will remember that last spring and the two springs before very successful shows were held. It seems to us that since it has been decided to hold the spring race meeting there is no reason why a dog show should not be held, if for no other reason than to supply something of interest to the troops of the Defense Force now stationed in Shanghai. We feel sure that local dog owners and breeders have not lost their interest in this matter, and would do all in their power to make the holding of a show a success.

It has been suggested that the show should be postponed till the autumn. This might be a good idea, especially as business is so bad and everybody is suffering from a trade depression. A possible objection might be that the dogs will not be in as good condition after the trying months of summer as they are now.

A. DE C. S.

THE GARDEN

MAGNOLIA: In a previous issue of this journal* some of the best known evergreen species of magnolia flowering in summer were described. The deciduous species, on the other hand, for the most part flower in the spring, when they dominate the landscape. Like the evergreen kinds, a number of species are native to North America, and the others to East Asia. Of the American species *M. acuminata*, "the cucumber tree," *M. Fraseri*, *M. cordata*, *M. tripetala*, "umbrella tree," and *M. glauca*, "sweet swamp boy," are freely planted in parks. *M. acuminata*

*The China Journal of Science and Arts: Vol. V, No. 4, Oct. 1926, p.p. 209.

attains to a height of a hundred feet, whilst *M. glauca* is considered as a shrub. Prominent amongst the Asiatic species are *M. denudata* Desrous, *M. conspicua*, Salisb., *M. Yulan*, Desf. of the Chinese. "Yulan" was fittingly named by Salisbury *conspicua*, as it undoubtedly forms a most conspicuous tree when in flower during the end of March and the beginning of April. It is hardy and is found in most parks in both Europe and North America. It is reputed to attain to a height of fifty feet, bearing very freely handsome pure white flowers, about six inches across, before the leaves come out. There are various varieties, the best known being "*purpurascens*," bearing flowers which are rose red on the exterior and pale pink on the inner petals. It resembles *M. Soulangeana*, a reputed hybrid between *M. liliflora* and *M. denudata*, but is distinguished by having sepals and petals of equal length, whilst the sepals of *Soulangeana* are about half as long as the petals; further, *Soulangeana* is more of a dwarf tree.

M. Soulangeana.—This flowers contemporarily with the preceding. Of it there are a number of varieties differing in the colour of the flowers and the length of the sepals. One variety bears petals equally as dark as its sepals, four to five inches across, in June.

M. Nicholsoniana, Rehd and Wilson, native of West China,

M. Wilsonii, Rehd, native of West China,

M. Watsoni, Hook, native of Japan,

M. parviflora, Sieb. and Zucc., native of Japan,

M. salicifolia, Maxim, a slender growing tree found in Japan, which grows to a height of twenty feet, and bears before the leaves white flowers five inches across.

M. Campbellii, Hook and Thoms. On the Himalayas, where it is endemic, it is reputed to be a magnificent tree growing to eighty feet in height and bearing large crimson flowers, each about ten inches across. In cultivation, it is found to be rather tender and sparsely flowered.

TULIPS: Flamboyant and blatant as their detractors have named them, tulips, by their vivid colours, undoubtedly vie with the most brilliant of tropical plants. Hence to northern eyes used to the delicate primrose, blue and white of spring and Alpine flowers, tulips, likewise blooming in spring, may appear exotic, flamboyant, even, in some varieties, decidedly "jazzy." Exotic in a manner they are, for many of their progenitors hail from Persia, and they were garden favourites in Turkey long before the "tulipomania" period in Holland.

When originally introduced into Northern Europe about 1554, there were only two varieties, red and yellow. Whether these brilliant hues were considered unsuited for Puritanical countries, as being reminiscent of the gorgeous costumes worn in the harems of the heathen and unspeakable Turk, is not known, but it is certain that flowers of red and yellow shades were then classed as common and vulgar, and every endeavour was made to raise plants bearing flowers of less brilliant hue.

The popularity of tulips grew apace, and during 1634-1637, the "tulipomania" period in Holland, gambling in tulip bulbs became so reckless that laws were enforced to restrict it. Bulbs that never existed, or ever changed hands, were bought and sold for exorbitant prices many times a day. Prices ranged from £500 to over £1,000 a bulb. One variety "*semper augustus*" was sold for more than its weight in gold, 13,000 florins per bulb being a recorded price. In England the cultivation of this plant attained its zenith during 1840-1860. For a considerable period it was supplanted by "American" ligneous plants. It, however, was cultivated by cottagers, and, when within recent times tulips sprung into favour again, many of the forms now in vogue were obtained from cottage gardens, thus giving rise to the section now classed as "Cottage Tulips."

Cultivation.—Bulbs are usually imported from Holland in the autumn. Purchasers in China who order their supplies direct from the growers are advised to instruct that the bulbs be packed in perforated paper bags, without any packing material, and sent via Canada. Unless instructed otherwise, all bulbs sent from Holland are packed in husks to protect the outer skin. This material, however,

on a long journey may absorb moisture and cause heating, which will destroy the flower, the nucleus of which is in the centre of the bulb.

Bulbs sent via Suez, and consequently submitted to a high temperature, arrive, according to records, in a flowering condition about once in three years. Shipped in cool storage they arrive in flowering condition.

If there is any suspicion that the flower in the bulb may have perished in transit, cut the bulb through the centre—from base to apex—and the embryo flower will be found slightly tinted dark, showing that the flower is dead. Early in November, if possible, plant the bulbs three inches deep, placing a layer of sand around them. Bedding varieties may be planted six inches apart, and late flowering ones nine to twelve inches apart. The flowers of the bedding varieties often remain in condition for only about a week, and, as the sun perversely has a habit of exerting its strength locally during "Tulip Week," it is found best to plant the bulbs in rows, twelve inches between the rows, and six to nine inches between the bulbs. This allows of planting between the rows dwarf plants such as pansies, forget-me-nots and similar plants, which remain in flower during the period the bulbs are ripening. The foliage should not be removed until it is yellow. A dressing of bone meal and superphosphate at the rate of an ounce to a hundred square feet may be given to the soil, but the incorporating of natural manures in the soil is undesirable. A mulching of half decayed stable manure, leaf soil or decayed vegetable matter may be spread over the bed to keep the frost out of the soil. Bulbs planted too near the surface are liable to have their roots broken due to the expansion and contraction of the soil by frost.

Botanical.—This genus *Tulipa* is included in the Natural Order *Liliaceae*, its nearest affinities being *Erythronium* and *Fritillaria*, and it consists of about sixty species, the majority of which are endemic to Central Asia, Persia in particular, though species also occur in Europe, Siberia, China, and at least one species in Japan.

The species of the sub-genus *Orthya* are distinguished from *Tulipa* proper by the possession of a distinct style. The species found in Japan, *Tulipa odulis*, belongs to this section. It is not found possible to state positively from which species the garden varieties of the present period have originated, but it is generally accepted that they are derived from *T. Gesneriana* and *T. suaveolens*. *Gesneriana* is considered to be the parent of the late flowering varieties and *suaveolens* of the early flowering ones. The English name "tulip" is derived from the French *tulipan** which owes its origin to the Persian name *Thoulyban*.

Propagation.—The bulbs are annual in that they perish after producing leaves, flowers, and a new bulb which springs from the base of the parent one. Frequently, instead of one bulb being produced, the parent produces various small ones. This tendency is accelerated by slitting the base of the bulb. This method is termed asexual reproduction, and all plants obtained thus are identical with the parent one. New kinds are raised from seed, in which instance they produce self-coloured flowers. In the course of years—no exact period is defined—these self-coloured "breeders" break, that is to say become parti-coloured. Broken varieties are classified in accordance with their ground colour and markings :—

- (1) Flamed Bizarres, flowers with a yellow ground, flamed with red, very dark, nearly black and chestnut brown.
- (2) Feathered Bizarres, ground colour similar to preceding, but marked or pencilled on the margin with dark red and chestnut brown.
- (3) Flamed Bybloemens, white ground, marked with lilac and purple.
- (4) Feathered Bybloemens, white ground, feathered with lilac and purple colours.
- (5) Feathered Roses, white ground, feathered rose and scarlet colours.
- (6) Flamed Roses, white ground, flamed with rose and scarlet colours.

Varieties, which have proved satisfactory here over a period of years are :—

Early Flowering, "Duc Van Thol," in white, red, yellow, cochineal and rose ; dwarf, stem six to eight inches.

*According to Webster's Dictionary the word Tulip (French *tulipe*) is derived from the Turkish *tulbend*, *dubend*, literally, turban.—Ed.

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Cottage or second early flowering types :

White :—White Hawk and White Swan.

Rose :—Venus, Rose Lusiane, and Rose la Reine.

Pink :—Prosperity, Queen of the Pinks.

Scarlet :—Belle Alliance and Carmoisi Brillant.

Crimson :—Artus, Dussart and Crimson King.

Crimson and Gold :—Keizerskroon (one of the best) and Duchess de Parma.

Yellow :—Chrysolora and Rising Sun, these varieties flower early in April and are generally favoured for planting in flower beds. Height of flower, stem nine to fourteen inches.

May Flowering and Darwin :—Glow, crimson red ; King George, carmine purple ; Margaret, silvery lilac rose ; Paul Baudry, bronze ; After Glow, orange rose ; Bartigon, carmine red with white blotch ; Clara Butt, rose pink ; Feu Brillant, crimson scarlet ; Faust, dark violet ; La Tulipe Noire, or Black Tulip, reddish black, height eighteen inches to two and a half feet. These plants flower at the end of April or during May and are excellent for bedding and cutting. Many varieties have a purple white or yellow blotch at the base of the petals.

Breeder, Late Flowering :—Archeron, brown red ; Chestnut, brown gold ; James Watt, blackish purple with brown edge ; Jaune d'Oeuf, coppery yellow.

D. MacGREGOR.

SOCIETIES AND INSTITUTIONS

THE THIRD PAN-PACIFIC SCIENCE CONGRESS

Japan—October 18 to November 19, 1926

As reported by W. C. Lowdermilk, the delegate of the Society of American Foresters.

The Third Pan-Pacific Science Congress was held in Japan under the auspices of the National Research Council as guests of the Imperial Government of Japan. The delegates were guests of the Government from October 18 to November 19 during which time many excursions and social functions were arranged for their entertainment. The business sessions were held in Tokyo from October 30 to November 11, and included the opening session at the Imperial University and the succeeding deliberations in the Imperial Diet Buildings.

H. I. H. Prince Kotohito of Kan In, patron of the Congress, formally declared it opened in an address at the Imperial University on October 30, in which he affirmed that the co-operative work and spirit of scientific investigators constitute a solid foundation for the world's peace—a fact which shows the momentous importance of the responsibilities incumbent on the Congress. Addresses of welcome followed, by the Prime Minister Reijiro Wakatsuki, Honorary President of the Congress, and by Professor J. Sakurai, President of the National Research Council and of the third Pan-Pacific Science Congress. Responses to these addresses were made by leaders of the delegations from the nations represented. Dr. Victor Vaughan responded for the delegates of the United States, Col. Sir Lenox Conyngnam for those of the British Empire, Mr. La Croix for those of France, Dr. Went for those of Holland, and so on for the nations and their dependencies within the Pacific.

COMPOSITION OF THE CONGRESS: The delegation of the Congress numbered a total of 565 distributed among the various scientific units of the Pacific as follows :

OVER-SEAS MEMBERS OF THE CONGRESS

Australia	...	...	...	...	...	...	...	22
Canada	...	...	...	...	...	...	...	5
Chili	...	...	...	...	...	...	...	1
China	...	...	...	...	...	...	...	19
France	...	...	...	...	...	...	...	6
Great Britain	...	...	...	...	...	...	...	3
Hawaii	...	...	...	...	...	...	...	8

SOCIETIES AND INSTITUTIONS

Hongkong ...	...	...	...	...	...	...	1
Netherlands ...	...	...	...	...	...	...	3
Netherlands, East Indies...	...	...	...	...	...	...	9
New Zealand ...	...	...	...	...	...	...	5
Papua ...	...	...	...	...	...	...	1
Peru ...	...	...	...	...	...	...	1
Philippines ...	...	...	...	...	...	...	10
Portugal ...	...	...	...	...	...	...	1
Straits Settlements ...	...	...	...	...	...	...	3
Sweden ...	...	...	...	...	...	...	1
United States of America ...	...	...	...	...	...	...	44
U. S. S. Republics (Russia) ...	...	...	...	...	...	...	8
Total ...	...	...	...	...	...	...	151
OVER-SEAS MEMBERS CLASSIFIED ACCORDING TO THEIR SPECIALTIES							
Agriculture and Forestry ...	...	...	...	...	...	...	6
Botany ...	...	...	...	...	...	...	20
Chemistry ...	...	...	...	...	...	...	2
Entomology ...	...	...	...	...	...	...	1
Ethnology and Anthropology ...	...	...	...	...	...	...	10
Geodesy and Geophysics ...	...	...	...	...	...	...	13
Geography ...	...	...	...	...	...	...	5
Geology ...	...	...	...	...	...	...	30
Hygiene and Medical Science ...	...	...	...	...	...	...	9
Oceanography ...	...	...	...	...	...	...	5
Seismology and Volcanology ...	...	...	...	...	...	...	7
Veterinary Science ...	...	...	...	...	...	...	1
Zoology ...	...	...	...	...	...	...	13
Miscellaneous ...	...	...	...	...	...	...	29
Total ...	...	...	...	...	...	...	151
JAPANESE MEMBERS OF THE CONGRESS							
Architecture ...	...	...	...	...	...	...	5
Agriculture and Forestry ...	...	...	...	...	...	...	39
Astronomy and Geophysics ...	...	...	...	...	...	...	19
Botany ...	...	...	...	...	...	...	32
Chemistry ...	...	...	...	...	...	...	25
Engineering ...	...	...	...	...	...	...	26
Entomology ...	...	...	...	...	...	...	8
Ethnography and Anthropology ...	...	...	...	...	...	...	7
Fishery ...	...	...	...	...	...	...	7
Genetics ...	...	...	...	...	...	...	5
Geography ...	...	...	...	...	...	...	6
Geology ...	...	...	...	...	...	...	54
Mathematics ...	...	...	...	...	...	...	7
Medicine and Hygiene ...	...	...	...	...	...	...	63
Meteorology ...	...	...	...	...	...	...	8
Mineralogy ...	...	...	...	...	...	...	5
Oceanography ...	...	...	...	...	...	...	5
Physics ...	...	...	...	...	...	...	23
Seismology ...	...	...	...	...	...	...	6
Veterinary Science ...	...	...	...	...	...	...	12
Zoology ...	...	...	...	...	...	...	23
Miscellaneous ...	...	...	...	...	...	...	30
							414
Over-Seas Members ...	...	...	...	...	...	...	151
Total members ...	...	...	...	...	...	...	565

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ORGANIZATION: To attain the desired end of "solidarity of feeling and action" the executive council prepared the following general plan of organization. Different branches of science were grouped together to form two broad divisions, namely, physical and biological. Each division was again divided into sectional meetings to provide symposia for individual branches of science. Frequent divisional meetings served the rôle of joint sectional meetings. Thus a wide range of interests was covered by the discussions. And again joint divisional meetings were held from time to time in the course of the Congress whereby the solidarity of the congress was realized. Considering the difficulty of handling a congress with such wide interests as the sciences, this plan of organization worked admirably.

Such a congress might have been another Tower of Babel. Properly the language should have been Japanese, but the Executive Council in its wisdom and fine spirit decided to make English the official language of the Congress, which, as Col. Lenox Conyngham aptly said in his reply to the addresses of welcome, was on the part of the Japanese "a concession to our weakness." It was a generous gesture on the part of the Japanese delegates who handicapped their presentation and discussion of papers out of courtesy to groups of over seas delegates.

Fully four hundred papers were delivered in the sessions of the Congress. This large number required the restriction of the time of presentation to five, seven, ten, fifteen and at most twenty minutes. Chairmen had the unpleasant task of holding members to their allotted time. The net result was that the majority of the papers were presented in the form of their abstracts. More time was allowed in the sectional meetings, but discussion in every case had to be curtailed, since the task of considering four hundred scientific papers on all phases of scientific interest was a stupendous one. Future congresses may find it advisable to restrict the number of subjects considered, and, by clearing away much of the general material previous to the sessions of the Congress, leave outstanding problems only to be examined.

A paper entitled "Factors influencing the surface run-off of Rainfall" was delivered by Prof. W. C. Lowdermilk and illustrated with slides, in the section of Agriculture on Wednesday November 3. As an outcome of this paper a resolution was passed by the section of agriculture and later by the Congress recommending the restriction of cultivation to lands with gradients safe from erosion; systematic studies to determine the safe gradients for cultivation of sloping land; the terracing of lands to maintain safe gradients and to maintain all other lands in a cover of vegetation.

ACCOMPLISHMENTS: Space will not permit an account even of the more important papers. Oceanography, which was extended in scope as will be noted in the resolutions, Geophysics in its relation to earthquakes, Human Geography and Ethnology, Fisheries, Botanical studies, and Agricultural subjects occupied the chief places of interest in the Congress. Several general lectures by noted scientists were delivered. The proceedings will contain and make available all the papers read before the congress.

RESOLUTIONS: The following resolutions were passed by the Congress at the final joint sessions on November 11:—

GENERAL

I.—New Committee on Oceanography

It is recommended that the present committee be discharged and that it be succeeded by a committee on Oceanography which will be more broadly representative of the science.

II.—Founding of General Review

(1) That the Third Pan-Pacific Congress ask the co-operation of the National Academies or similar bodies of the countries bordering the Pacific in order to obtain the periodical publication in each country of abstracts in English of all scientific papers relating to subjects covered by the said Congress, as is done by the National Research Council of Australia.

(2) That the Third Pan-Pacific Congress propose to the said institutions to notify through the National Academies the scientific institutions of the countries

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bordering the Pacific when the publication of the said abstracts is started in order to obtain a general distribution by means of subscriptions to these periodicals.

III.—Hold-over Committee

That the Council appoint a chairman of a hold-over Committee for each section generally from the country in which the new congress is to be held.

IV.—Preservation of Natural Monuments in the Pacific Region

(1) That this Congress strongly recommend the preservation of natural monuments of the Pacific region.

(2) That this Congress suggest that the countries of the Pacific region be asked to take adequate steps for the preservation of:

(a) Original flora and fauna that are rare and at the same time of scientific interest, especially those containing endemic species.

(b) Those species of plants and animals that are especially interesting from the standpoint of geographical distribution.

(c) Remarkable geological and mineralogical structures and formations.

(3) That this Congress also strongly recommend that particular attention be given to the preservation of the flora and fauna of the islands of the Pacific Ocean, as very important problems regarding the origin and distribution of plants and animals in this region are still the subject of investigations.

(4) That this Congress should make the necessary representations to the Governments of the various countries concerned and to the appropriate scientific organizations in those countries. The Governments might be asked to arrange for the exchange of Acts, Regulations and Reports bearing on the subject in the various countries.

(To be continued)

THE CHINA SOCIETY OF SCIENCE AND ARTS

The lecture entitled "The Historical Development of Chinese Ceramics" which Dr. J. C. Ferguson was to have delivered on March 25th was indefinitely postponed owing to disturbed conditions which prevailed in Shanghai at that time.

ROYAL ASIATIC SOCIETY

For the same reason as stated above it was necessary to postpone indefinitely the lecture which the Royal Asiatic Society had announced would be given on March 24th by Dr. J. C. Ferguson on "Political Parties of the Sung Dynasty."

PEKING SOCIETY OF NATURAL HISTORY

The members of the Peking Society of Natural History and their friends met at a dinner on March 25th to celebrate the second birthday of the organization, after which the society received the reports of its officers upon the work of the past year. Officers elected for the year 1927-28 are:—President, Mr. Soitsu G. King; Vice-Presidents, Dr. C. F. Wu, and Mr. N. Gist Gee; Secretary and Treasurer, Mr. Bernard E. Read; councillors, Dr. R. K. S. Lim, Dr. Davidson Black, and Dr. Alice Boring.

A paper of great value entitled "Three Series of Anthropometrical Measurements" was presented before the society by Dr. Li Chi on April 8th. The three series were made up of Height, Head, and Face of groups of people of varied occupation in Shansi, Hsianfu, and Hupeh, and the work done by Dr. Li Chi represents a thorough scientific model for future studies in anthropometry.

PEKING INSTITUTE OF FINE ARTS

During the latter part of March a permanent exhibition of paintings by Peking artists was inaugurated at the Peking Institute of Fine Arts, with a view to bringing the artists, Chinese and foreign, into contact with the public. Artists who wish to learn the conditions of this exhibit may have them by applying to the office of the Institute, 18 Pao Fang Hutung.

It is interesting to note that at the second annual photograph exhibition, which was held at the Institute April 4-10, the majority of the exhibitors were Chinese. The display was marked for the variety of subjects and the quality of the work.

The Institute's program for March-April has included concerts as well as the regular Monday lectures. On March 14th Mr. Benjamin March spoke on "China

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of the Books" giving a helpful survey of what to read in English about China, the lecturer on March 21st was Mrs. T. C. Greene, her subject being "Prints and Their Makers—Etchers, Woodcutters, Engravers, Lithographers," while Dr. Paul Huston Stevenson was the speaker on March 27th. His paper "The Chinese-Tibetan Borderland and Its People" is now being reproduced in this journal.

THE B. W. A. ART EXHIBITION, SHANGHAI

The Art Section of the British Women's Association of Shanghai held a small but interesting exhibition of the works of local artists in the ball room of the Country Club on April 16th and 17th. Lack of space prevents us giving the detailed description of the exhibits that they deserve, but it may be stated that considerable interest was shown in the work of an artist new to Shanghai, namely Mr. G. C. Walter. The work of Mrs. R. J. Roberts, Mrs. R. C. Robertson, and Mrs. Pennant, members of the B. W. A. Art Section was well represented by pleasing studies in oils and water colours, while a rather striking picture of Lou Shan, Tsingtao, by Mrs. Mary F. Swan, attracted much notice. Miss Roberta B. Paterson showed some very attractive black and white decorative drawings for book illustrations, her work being not unlike that of the Russian artist Mstislav Stehirovsky, who had a number of interesting exhibits. Victor Podgoursky, another well-known Russian artist, had on exhibition a number of oil paintings as well as a set of delightful pencil studies of Chinese life. Mrs. E. O. Dunn's work was represented by some excellent portraits of children and studies of Chinese child life. Considerable prominence was given to numerous large portrait studies by Mrs. R. MacLeod, who, we understand, was mainly responsible for the exhibition. It was unfortunate that there was no catalogue, but in view of the facts that the exhibition had been postponed from a previous date, and that the facilities available were far from satisfactory, this could not be helped.

EDUCATIONAL NOTES AND INTELLIGENCE

PRESIDENT OF YALE IN CHINA RESIGNS

Dr. Edward Hume's resignation from the post of President of Yale in China, Changsha, Honan Province, was announced on March 18th, the reason given being that he believed the executive control of the school should be Chinese. Dr. Hume stated that other heads of Christian colleges in China have decided to act similarly. Yale in China is supported by the Yale Foreign Missionary Society, Inc., Yale University, New Haven, Connecticut.

PUBLICATIONS RECEIVED

BOOKS:

Beyond the Moon Gate, by Welthy Honsinger: Gay and Hancock, Ltd., London, 1925.

PERIODICALS:

Extrême Asie—Discovery—The Philippine Journal of Science—The Chinese Economic Bulletin—The New Zealand Journal of Science and Technology—Natural History—The China Weekly Review—Asia—The Asiatic Motor—The Bulletin of the Geological Society of China—The China Medical Journal—The American Journal of Science—Psyche—The New Orient—The Annals and Magazine of Natural History—Man—The Modern Review—Health—Chinese Students Monthly—Mid-Pacific Magazine—Far Eastern Review—The Chinese Recorder—The Bulletin of the Geological Survey of China—Bolletino del Laboratorio di Zoologia General Agrarie, Portici—Salmon and Trout Magazine—Game and Gun—Biological Bulletin of the Marine Biological Laboratory, Woods Hole, Mass.—The Geographical Review—The Chinese Social and Political Science Review—La Revue Economique d'Extrême-Orient—Science—Shipping and Engineering—The Modern World.



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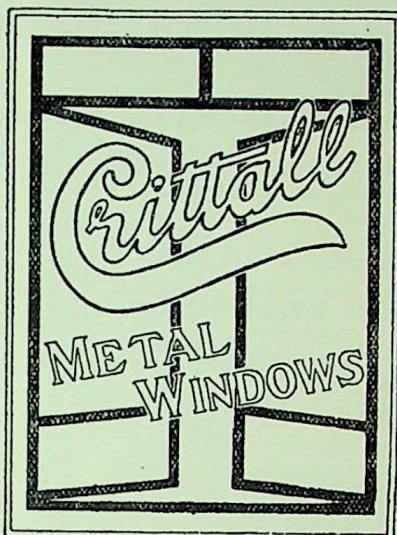
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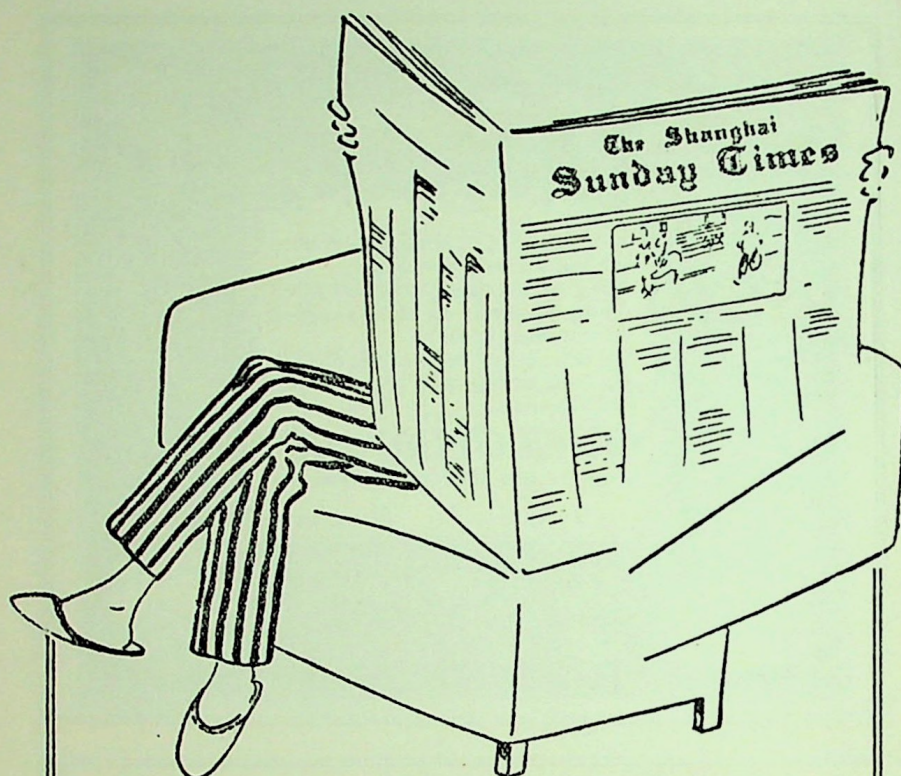
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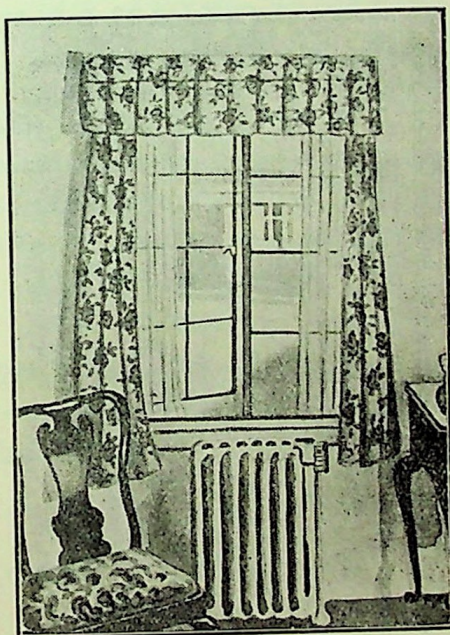
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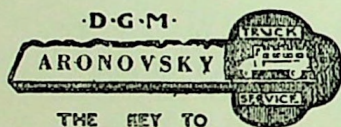
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