

mountain mass called by the Tibetans gNyan-po-gyu-rtses-rdza-ra (Nyen-po-gyu-tse-dza-ra) reaching a height of 20,000 feet. It is in the territory of the Khang-sar and Khang-gen Go-log tribes whose sa-bdag or mountain god it represents.

Unlike the Am-nye Ma-chhen, Nan Shan, Gyü-par, and Sha-ri-yang-ra ranges which are composed of schists, sandstone, conglomerate, soft phyllite, marble and quartz, this previously unrecorded range is composed entirely of limestone. The mountain has seven glaciers which radiate like the spokes of a wheel from below the main summit. The streams issuing from four of these glaciers form beautiful lakes around the northern base of the mountain which enhance its beauty. This mountain was discovered by William E. Simpson an intrepid young American missionary intensely interested in geography. He was later murdered by Moslem bandits.

The Yellow River receives two more tributaries of note, both having their sources southeast in Ssu-ch'uan 四川, one northwest, and the other west of the Kung-ka-la 貢嘎拉 of the Ssu-ch'uan Min Shan 岷山; the first which is the larger one is called sMe Chhu (Me Chhu) by the Tibetans, and Hei Ho 黑河 or Black River by the Chinese. It enters the Yellow River at the northern end of the knee where it flows west towards its source; the second, the shorter one, is called the dGah Chhu (Gâ Chhu) by the Tibetans, and Pai Ho 白河 or White River by the Chinese. This tributary enters the Yellow River at the southern end of the bend, below the lamasery Sog-tshang dgon-pa (Sog-tshang Gom-pa). In the valley of the northern tributary dwell the mDzo-dge hBum-tshang Tibetans, that is in the plain flanking the river on its right or northern bank, while on its southern bank the Gur-sde Tibetans have their encampments. The confluence of the Me Chhu and Yellow River near which is a ferry, is called Mar-me hdren-mtshams (Mar-me dren-tsham).

A range to the north of the Me Chhu extending from east to west, is the Yellow and T'ao River watershed; a trail leads from sTag-tshang Lha-mo in Ssu-ch'uan across the foothills of the above mentioned grass-covered divide, where, at the southwestern foot of it, and west of an affluent called the hBrong Khog (Drong Khog) are many fresh water springs. Here a trail leads north from the Yellow River; a lower pass over the divide is 11,118 feet, and a second pass over the main watershed, the hBrong Khi (Drong Khi), is 12,824 feet above sea level. This trail leads north to the Shi-tshang dgar-gsar (monastery) on the T'ao River.

Chinese maps mark the northern end of the wedge which Ssu-ch'uan pushes between Kan-su on one hand, and Ch'ing-hai on the other, far too much south, it extends to north of the bend of the Yellow River and not south of it.

The Am-nye rMa-chhen Range

The Name of the Range

On all the maps published in the west, the name of this range is still given as Amne Machin which is incorrect, various alternatives also occur. The first explorers to

approach the range were Russians, viz. Przewalski, Roborowski, Kozlov³⁰ to name the most important. To the Chinese the range was known from the immemorial; it occurs on their maps as Ch'ing-shih Shan 碇石山 but in their books more correctly as the Chi-shih Shan 積石山.

In Tibetan classics, its Tibetan name, always without the prefix Am-nye, is rMa-chhen spom-ra, or rMa-rgyal-chhen-po spom-ra or the Great Ma-spom-ra and the Great One King Ma-spom-ra, respectively. The word rMa, pronounced ma, is also the Tibetan name of the Yellow River viz. rMa Chhu; chhen or stand for great or the great one, respectively, and spom-ra is the second part of the name pronounced pom-ra.

Am-nye also written A-mye, meaning ancestor, grandfather, is an honorific and only used in the spoken language, never in texts. As the mountain is, or represents, the mountain god of the Tanguts and Gologs who dwell in its environs, when speaking of the mountain will always prefix the name with the honorific Am-nye, similar as westerners would prefix the name of one canonized with «saint». Thus has the term Am-nye, which has nothing to do with the actual name of the mountain or mountain god, come into geographical nomenclature.

In Chinese works the Tibetan name, plus the honorific, has been transcribed commonly as A-mu-ni Ma-ch'an mu-sun 阿木你麻繡母孫 to which is added Tshüeh-shan 大雪山 or Great Snow-Mountain. The Chinese name is merely a phonetic transcription of the Tibetan name and has no meaning. During my stay in the Lamastery of Cho-ni I obtained a copy of the classic pertaining to this mountain god, which classic is chanted when the god is worshipped and offerings made to him by the lamas. In this Tibetan classic which has been translated by Dr. J. Schubert³¹, a full description of the mountain god is given, also the Tibetan names mentioned previously. This translation will be published with the Historical Geography I am writing of the entire region.³² It is needless therefore to further discuss why the name Machin or Amnyi Machin, as occurring on western maps, cannot be retained. The name of the mountain must be given as Ma-chhen pom-ra.

In the geography entitled hDzam-gling rgyas-bshad³³ written by the famous Gong-

³⁰ Petr Kužmič Kozlov, 1863-1935, Russian explorer of Central Asia, best known for his research on Karakhoto. See *Russkie voennye vostokovedy. Biobibliografičeskij slovar'*. Moskva 2005, 114-116; he started his career by accompanying Prževal'skij on two trips.

³¹ Johannes Schubert, 1896-1976, librarian, then professor of Tibetan and Mongolian at Leipzig University. See *Asienwissenschaftliche Beiträge. Johannes Schubert in memoriam*. Herausgegeben von Eberhardt Richter und Manfred Taube. Berlin: Akademie-Verlag 1978. 201 pp., 28 ill. (Veröffentlichungen des Museums für Völkerkunde zu Leipzig 32.); Eberhardt Richter: Johannes Schubert (1896-1976). *Namhafte Hochschullehrer der Karl-Marx-Universität Leipzig* 5.1984, 66-74, portrait; H. Walravens: Briefwechsel Johannes Schuberts mit Ernst Schäfer und Bruno Beger. *Nachrichten der Gesellschaft für Natur- und Völkerkunde Ostasiens* 175-176.2004, 165-224. – The mentioned translation of the text was not published as the editor, Giuseppe Tucci, considered it not up to standard.

³² *The Amnye Ma-chhen Range and adjacent regions*. A monographic study. By J. F. Rock, Honorary Research Associate, Far Eastern and Russian Institute, University of Washington. With 82 plates and 5 maps in color. Roma: Is.M.E.O. 1956. IX, 194 pp. (Serie orientale Roma 12.) – The structure and contents is very similar to the one of the present book but more focused on the historical geography.

³³ Turrell Wylie, 1927-1984: *The geography of Tibet according to the 'Dzam-gling-rgyas-bshad: text and English translation* / Btsan-po. Roma: Istituto Italiano per il Medio ed Estremo Oriente 1962.

mai-lung-gis bla-ma btsan-po of sMin-grol-gling, the name of the mountain also appears as rMa-chhen-spom-ra. The work is famous and was written in 1820.³⁴

In a work composed at the order of Ch'ien-lung 乾隆 (1736-1796) called Ch'in-ting Hsi-yü t'ung-wen-chih³⁵ 欽定西域同文志 chapt. 15, fol. 18a, Gazetteer of the Western Region giving the names of mountains and places, etc. in six languages, the name of Am-nye Ma-chhen is given in Chinese as A-mi-yeh-ma-le-chin mu-sun o-la 阿彌耶瑪勒津木孫鄂拉 which is a transcription of the Mongol name, the first six syllables represent the name, and the last four a transcription of Mu-sun-u-la the Mongolian for Ice Mountain. And so is the Tibetan name occurring in the same work a transcription of the Mongol name, viz., A-mye-mal-chin-mu-sun-u-la and not the actual Tibetan name. Under the Mongol name is the explanation that Ma-le-chin means «old man's head, and mu-sun ice, i.e., it resembles the bald head of an old man; the top of the mountain is shining and pure».

Location of the Range on Existing Maps

The Am-nye Ma-chhen Range is actually an isolated mountain mass, not within the knee of the Yellow River, but as shown on Roborowski's map accompanying his work³⁶ Vol. I, part III, which my findings also corroborate. The range is northwest of Ra-rgya Gom-pa and directly opposite a pass east of the Yellow River and north of Ra-rgya where I first saw it. The pass is called Mo-khur Nye-ra and is 12,800 feet in height; from a peak to the northwest of the pass, at an elevation of 13,220 feet, I was directly east of the Am-nye Ma-chhen and approximately at 35° latitude.

On all existing maps the Am-nye Ma-chhen range is shown to extend into the knee of the Yellow River, which it decidedly does not; it extends from northwest to southeast, and as seen from Mo-khur Nye-ra falls within 268.5° to 277.5° of the compass. The first pyramid is at 270°, the actual peak Am-nye Ma-chhen from which the range derives its name at 272° and the huge dome, the northernmost at 275° of the compass. This is the real Am-nye Ma-chhen or rMa-chhen spom-ra, to give it its proper name.

Other maps in Roborowski's work are not correlated with the map showing that range, and were made by someone else who apparently thought he knew better, and changed the name of the range which Roborowski definitely called the Amnye Machin, and made the range to the west of it the Amnye Ma-chhen. Sven Hedin copied the error and published it in *Petermanns Mitteilungen*.

XXXVII, 286 pp. (Serie Orientale Roma 25.) – Wylie: *A Tibetan religious geography of Nepal / Btsan-po*. Roma: Istituto Italiano per il Medio ed Estremo Oriente 1970. XVIII, 66 pp. (Serie Orientale Roma 42.)

³⁴ An earlier translation was by Vasil'ev: *Geografija Tibeta*. Perevod iz Tibetskago sočinenija Miščul-chutukty. V. Vasil'eva. Določeno v zasėdanii Istoriko-filologičeskago otdėlenija 2 maja 1889 g. S. Peterburg: Akad. nauk; I. Glasunov, Eggers & Co.; K. L. Rikker; Riga: N. Kimmel in Komm. 1895. [4], 95 pp. 8°

³⁵ A Japanese facsimile edition, with index, was published Tōkyō: Tōyō Bunko 1961-1964. 4 vols.

³⁶ Trudy Ėkspedicii Imperatorskago Russkago Geografičeskago Obščestva po Central'noj Azii soveršennoj v 1893-1895 / pod načal'stvom V. I. Roborovskago. Izdanie Imp. Russkago Geogr. Obščestva. Č. 3: Naučnye rezul'taty ėkspedicii V. I. Roborovskago: s kartoju i 19 planami. S.-Peterburg : M. M. Stasjulevič 1899.

From high peaks both east and west of the Yellow River no other higher mountain range is visible beyond the Am-nye Ma-chhen, had any range higher than the latter been immediately west of it, it would certainly have been seen.

The Am-nye Ma-chhen range must however be of considerable width, and spurs of notable length must extend west; it is probably these spurs rather than the actual mountain which certain travelers approached, like Clark and Hao. The latter says in his botanical paper that he spent three days at the Am-nye Ma-chhen and marks an area covered on his map as being his travel route; this does not only encircle the mountain, and also crosses it in the center where there is no pass, but extends far within the knee of the Yellow River; such a journey would take at least twenty days. To circumambulate the range starting from its eastern foot takes a week without stopping to do botanical work. He gives no rivers, except the name of one, which he obtained from a French map of 1902.

All early and even recent maps, both Chinese and foreign of this region are notoriously wrong. It seems further strange that Hao should have to copy the name of the range from a French map of 1902, which name does certainly not apply to the Am-nye Ma-chhen. The whole western region and a great part of the eastern side of the range are still unexplored, and for a Chinese who claims to have climbed it only to an elevation of 5,200 m, or about 16,200 feet, to have to fall back on a French atlas fifty years old, seems certainly strange. His photograph shows a valley purporting to be in the Am-nye Ma-chhen with a snow-covered spur, which may be anywhere. He does not give us a photo of the range nor of the actual mountain mass Am-nye Ma-chhen. Had he actually covered the area or gone around it, as marked on his map, he would have been able to add considerably to our geographic knowledge, but this cannot be done in three days, especially when one collects plants and climbs around on the higher slopes. I leave it to any one who is familiar with travel in the Tibetan highlands, to judge for himself, and try to reconcile his statement of having spent three days at the Am-nye Ma-chhen with the area he marks on his map as having been covered by him; the map is drawn at the scale of 1: 5,000,000. Nothing more need be said.

We observed the Am-nye Ma-chhen also from the highest peak of the brGyud-par, pronounced Gyü-par or Jü-par range, from an elevation of 14,546 feet, but saw no range to the west of it. From the highest peak of the Jü-par Range, brGyud-par mtshar-rGAN = Jü-par Tshar-gen, the Am-nye Ma-chhen Range came within 219° and 231° of the compass. The compass indicated 228° for the centre of the dome, the northernmost and highest peak of the range. It forms a semi arc, and is undoubtedly connected with the range which extends southeastwards into the knee of the Yellow River, but that range, although snow covered, and below the perpetual snow line, is known as Sha-ri yang-ra according to my lama guide, but the name does not occur on any map. In this range are two peaks which stand out above the others of the range, the Sa-ri to the east, at about 101°15' longitude, situated between two valleys, the western one called the Chhu-har Khog whose stream flows north and enters the Yellow River opposite Thar-lung dgon-pa, and the one to the west, the Dwang-ri, pronounced Dang-ri, with the large valley carrying the Dwang-chhen Chhu (River) to the west, and the smaller Dwang-chhung Chhu to the east. Futterer in his work *Durch Asien*, vol. I, opposite page 364 gives a long folded plate depicting this mountain range within the knee of the Yellow River.

This range he calls Sarü-Dangerö Gebirge; apparently when asking a Tibetan the name of the range, the Tibetan knowing only the two peaks, which are sacred and represent mountain gods, replied Sa-ri (and) Dang(Dwang)-ri, this Futterer took for the name of the range. Both peaks are in Ngu-ra Tibetan territory.

This range was known as the Ch'ang-shih-t'ou Shan 長石頭山 or Long Rocky Range to the Chinese and so appeared on Chinese maps. For some reason or other, the name Chi-shih Shan 積石山 has been substituted, which is the actual name of the Am-nye Ma-chhen.

The two ranges are distinct, although connected by lower mountains. General Pereira in his diary which he kept on his journey from Peking to Lhasa wrote under May 26th: «crossed Churi or Chida pass through the Chulung Range 14,500 feet. The going was stony and boggy, descended through gloomy valleys to the sandy Luan-ch'uan plain, here saw Amne Machin peaks possibly 70 miles away to the southeast from an altitude of 13,000 feet.»

May 28th: «Crossed the Tungri pass 13,867 feet (this pass is over the range which separates the To-so Nor from the Chu-ngön River) from the top of the pass obtained view of To-so Nor. (This range Roborowski calls the Ghirun-tun, *italics* author's).»

May 29th: «Passed through gap in the Ch'ang-shih-t'ou range which appears to connect up with the range in which the Am-ne Machin is situated.»

June 2nd: «Crossed west Malayi pass 14,500 feet and later forded the Yellow River, 30 yards wide, 2-2 ½ feet deep.»

Pereira believed the range to be higher than Everest, but after careful calculation I have come to the conclusion that it does not reach 21,000 feet. The perpetual snow line commences at 17,000 feet; the range being much glaciated thanks to its height.

Description of the Range

The Am-nye Ma-chhen is a huge mountain mass extending over nine degrees of the compass, and the highest peak is the huge dome to the north, it is little sculptured, but forms a huge massive dome and is called dGra-hdul-rlung-shog pronounced Dra-dül-lung-shog or Enemy Subduing-Air (Wind) Wing, but the last syllable may be written gshog, meaning to pierce. The next highest peak is to the south and forms a rounded pyramid, it is named after the god of mercy of which the Dalai Lama is an incarnation, namely Chen-re-zig, written sPyan-ras-gzigs. The actual peak from which the entire mountain mass derives its name is a lower one, between the southernmost and northernmost mentioned above, and is Am-nye rMa-chhen or rMa-chhen spom-ra, pronounced Machhen Pom-ra, the second «h» in the second syllable indicates that the «ch» is pronounced aspirated.

Ma-chhen pom-ra is a sa-bdag or earth owner and therefore a mountain spirit, or god of the land or ground. He is supposed to be an angry, jealous being of terrifying appearance, to whom sacrifices are offered in the shape of a fire of green juniper boughs, the god delighting in the fragrant smoke of the juniper.

In the west the mountain drops steeply to the plain, but in the east, its preliminary ranges which gradually decline towards the Yellow River gorges, are cut up by many valleys, one coming from the northern slopes is called the Ye Khog or Right Valley, written gYas-khog, and the southern one, the Left Valley or Yön Khog, written gYon-

khog. These two valleys unite in front, about centre of the eastern slopes of the Ma-chhen pom-ra and united they flow as the Tshab Chhu east into the Yellow River. It is one of the largest tributaries of the Yellow River in this region, except the Chhu-ngön, written Chhu-sngon or Blue River, Tafel's Tschürnen. The latter has its source to the west of the Am-nye Ma-chhen Range, makes a large bend to the north, and flows around the northern end and finally debouches into the Yellow River almost opposite the Bâ River. The Chhu-sngon also pronounced Chhu-ngön is called Churmyn by the Russian travelers and is so marked on their maps. The correct name is Chhu-ngön. The Chinese write the name phonetically Chu-erh-men-ch'u Ho which, as can be seen from the transcription, was taken from foreign maps and not from the Tibetan name. Another affluent of the Tshab Chhu is the hDom Khog, or the Valley of Assembly. It is in this valley that the Tibetan nomads hold their gatherings and discuss their differences. Another notable tributary is the Gu Chhu or Gur-zhung, see journey west of Yellow River.

These are the main valleys east of the Am-nye Ma-chhen Range. Between the Tshab Chhu and the Chhu-ngön River is the Drong-de-nang or Drong-de Valley which sends a small stream into the Yellow River, the name is written hBrong-sde-nang, hbrong meaning wild yak, sde a part of, as the nang or valley, apparently part of a valley where wild yak roam.

North of the Chhu-ngön is the Ta-ho-pa 大河坝 which the Tibetans call the Hang Chhu, and to the south of it is the Nga-thang written rNga-thang or Camel Plain.

The Pilgrims Trail Around the Am-nye Ma-chhen

The greatest number of pilgrims circumambulating the Am-nye Ma-chhen is in a horse year, when more than 10,000 Tibetans visit the mountain or walk around it. It has been known that Tibetan women have measured the distance around the mountain with their bodies in penance or religious zeal, taking two months to do it. Otherwise the circuit can be accomplished in seven days. No one rides, not even the high incarnations, but all walk. There are many places arranged for the burning of incense around the mountain and the pilgrims, while circumambulating either chant or pray. The trail encircling the mountain commences at the mouth of the Yön Khog, a valley which extends to a pass on the southern point of the range, called rTa-mchhog-gong-ma or the excellent superior horse, but it is also said to be written bDe-mchhog-gong-ma meaning the superior bDe-mchhog, the latter is a Yi-dam or protective tutelary deity of the lama church. Beyond the pass one descends to the southern foot of the range to a large plain called Ngang-gi-shog-hdebs or the spread-out wings of the wild goose. On this plain roam many wild yak and wild asses, the Tibetan *rkyang*, pronounced Chiang. From this plain a place is reached called Bye-ma-hbri-sde, pronounced Je-ma-dri-de, where there are many yellow sand dunes which stand like offerings to the god; they are conical in shape and their bases are grass-covered, but their apices are bare. The place derives its name from these sand dunes, ja-ma (bya-ma), meaning sand. We are now on the west side of the mountain and reach a place called Gos-sku-chhen-mo (Gö-ku chhen-mo) or the great painting. The name is derived from the varicolored rock-cliff of which the steep slopes of the Am-nye Ma-chhen are there composed; the rocks are of all colors giving the mountainside the aspect of a great painting. Near the cliff are two conical hills, one is

called Mo-pa, in Amdo pronounced Mo-wa = the diviner, and the other the gtor-ba, or tor-wa, he is the one who throws tor-ma or tsamba offerings to the gods into the fire, or merely throws them out; tor-ba means to strew, to scatter. The place or hill is so called because around the hill are many rocks representing the offerings which the tor-wa has thrown out.

Beyond the trail leads up a pass called the rGal-thung la (Ge-thung La) or the Short Crossing Pass. Near the pass is a rock with the imprint of a lama's hand; there is also a projecting rock, about which legend relates Seng-chhen rgyal-po (Seng-chhen Ge-po) or the Great Lion King tied his horse to, while resting on the pass. He is none other than the mighty Ke-sar, of whom Tibetan bards recite innumerable epics of his many heroic deeds.

From the Ge-thung La one descends into the rGal-thung nang or Ge-thung valley which merges into another valley, at the mouth of which is a huge boulder with an Obo or cairn on the top. This white boulder is called Nu-bo dGra-hdul rlung shog (Nu-wo Dra-dü lung shog) and represents the younger brother of Am-nye Ma-chhen pom-ra. Nu-bo meaning younger brother, dgra = enemy, hdul = conquer, subdue, rlung = wind, shog = wing; it may however be written gshog, also pronounced shog, meaning to pierce, to split, and this may be the more correct rendering having reference to his conquering his enemy like a piercing wind. This place is to the northwest of the Am-nye Ma-chhen. From here the trail arrives at the bank of the Chhu-ngön or Blue River which debouches into the Yellow River opposite the hBâ River q.v. without crossing the Chhu-ngön one ascends a valley whose stream empties into the former river, the valley is called the Brag-stod (Drag-tö) or the upper rock. At the head of this valley is a level place called Ri-gur-stong-shong literally meaning mountain tents one thousand elevated plain, having reference to the flat head of the valley where a thousand tents can be pitched. A shallow pass leads over the ridge separating Drag-tö valley from the long valley called the Ye Khog or Right Valley down which the trail leads (in contradistinction to the Yön Khog or Left Valley), to a place full of junipers (*Juniperus tibetica*). The Ye Khog valley narrows to a veritable gorge and is here joined by two other valleys with constricted exits; these three gorges are called collectively mDzo-mo rгод-tshang (Dzo-mo gö-tshang) or the lair of the wild halfbreed yak cow. The three valleys being designated, one as the gong-ma or upper, the middle one as ü-ma written dbus-ma or middle one, and the gzhug-ma read zhu-ma or the lower.

The Ye Khog and Yön Khog united beyond Dzo-ma go-tshang, and from their confluence the river is known as the Tshab Chhu to where it debouches into the Yellow River. That part of the valley is densely forested with junipers (*Juniperus Przewalskii* Kom.), and spruces (*Picea asperata* Mast.). Near the mouth of the Yön Khog are three thrones built of river stones and rocks, they are simply known as bZhugs-khri (Zhu-thri) or the thrones. One is for the La-brang (bLa-brang) incarnation, i.e., for the highest incarnation of that largest of all lamaseries in China, just within the borders of Kan-su, hJam-dbyangs-bzhad-pa (Jam-byang zha-pa) or the Laughing Jam-byang; one of the highest incarnations of Ra-rgya dgon-pa (Ra-gya Gom-pa), situated on the Yellow River, q.v., Shing-bzah Pandita (Shing-za Pandita), and one for the highest incarnation of the Rong-wo (Rong-bo) lamasery. When any one of the three incarnations

circumambulates the mountain he will mount his particular throne, to meditate and pray, and to accept homage from the pilgrims.

Journey to the Am-nye Ma-chhen from Cho-ni 桌尼 via bLa-brang (Hsia-ho hsien 夏河縣) and Ra-rgya dgon-pa (T'ung-te hsien 同德縣)

The region between Cho-ni and La-brang or Hsia-ho Hsien

The region between Cho-ni and Hei-ts'o 黑錯 is a high grassy plateau of an average elevation of 10,500 feet, intersected by shallow, grassy valleys with grass-covered passes. Out of the loess in places project limestone crags or individual mountains of the same rock formation as Pai-shih-yai Shan, to the north of T'ao-chou Old City. Still farther north rises the higher Ta-mei Shan which separates the Rong-war plateau from the Hsia-ho valley. In this valley we find rock outcroppings but these are shale and schist, indicating that the mountain has been forced up through beds of schist and shale similar to the Min Shan. Forest is only found in the vicinity of Hei-ts'o and in the valleys to both sides of Ta-mei Shan, as at La-brang proper where *Picea asperata* occurs in company with *Picea purpurea*, the latter's northern limit.

The main stream which waters this region is the Ta-hsia Ho 大夏河 or the Great Summer River and its affluents. It has its source to the west of Hsia-ho hsien or La-brang, and southwest in the grassy high plateau of which the pass called Tshâ-a-mi-kha, elevation 12,020 feet, is the divide; it is part of the system which forms the Yellow River – T'ao River watershed and separates the Hsia-ho territory from that of the Amchhog tribal lands. The passes vary from 11,400 feet in the east, to 10,140 and 12,020 feet in the west. The Amchhog country is watered by the rDog Chhu which flows from west to east for a considerable distance when, after having passed the lamasery called hBo-ra dgon-pa, it flows south-southeast into the T'ao Ho 洮河. It receives several affluents from the north which have their sources in the Tshang-dkar and rTse-ü passes, east of the hJog-khyi pass. These affluents surge through valleys which cut the grassy range at certain places, that otherwise forms the rDog Chhu-Hsia Ho divide. The whole region is a maze of valleys with interjacent spurs over which passes lead from one valley into the other; all are of loess formation and grass-covered, some of the valley floors being swamps with protruding grassy hummocks. Further east towards Lin-t'an the valleys become drier. All the spurs are intricately connected and their highest crests indicate the ancient level of the plateau.

The vegetation in this area is very poor in species, and with the exception of the forests indicated, is treeless.

T'ao-chou Old City is the first town encountered after leaving Cho-ni. In the temple compounds of T'ao-chou *Viburnum fragrans* a shrub 15 feet tall, with pale pink, fragrant flowers is cultivated as an ornamental while on fields and waste places *Aconitum gymnantrum* Max., with dark bluish-purple flowers, flourishes like a weed. Everything else had not yet awakened from the winter's sleep. The surrounding hills are loess and grass-covered; the town itself is gray, dreary and spells desolation. The roads leading north of T'ao-chou are lined with poplars, and the hills of red clay are terraced and cultivated to near their summits.

Here in the grassland we shot a golden *Aquila chrysaetos daphanea* Menzl., and *Circaetus gallicus* (Gm.) a rather rare bird for West China.

The highest pass between T'ao-chou and Hei-ts'o is 11,400 feet, the grassy plateau embodies shallow depressions and short valleys, making travelling comparatively easy. The soil varies from grey to red loess and black loam. Although nomads are encamped everywhere, there is still an odd Tibetan village here and there, also a lone monastery called rJe-tshang dgon-pa or She-tsung ssu 舍宗寺 on the hillside, at an elevation of 10,500 feet.

From a rocky pass where a lone hermit had built a stone dwelling, depending on travelers for his food, a high, snow-covered range, which I judged to be between 15,000 and 16,000 feet in height is visible; it is in a northeasterly direction from Hei-ts'o and is called Am-nye gnyan-chhen. To the Chinese it is known as the T'ai-tzu Shan 太子山 or the Mountain of the Heir-Apparent. This range is the evil counterpart of Am-nye Ma-chhen. While the latter is a protector of the lamas and is considered a beneficent sabdag or earth-lord, Am-nye Nyen-chhen, as the name is pronounced, is a malevolent spirit and considered the protector of thieves and robbers. It is therefore spoken of as the Nag-phyogs-pa pronounced Nag-chho-pa or the Black Side, while Am-nye Ma-chhen is known as the dKar-phyogs-pa (Kar-chho-wa), or the White Side. Anyone possessed by a demon is considered to be of the Nag-chho-wa or Black Side. Nyen-chhen is an epithet denoting the great cruel one, or fierce one, while the former means the well disposed one.

Large groves of conifer forest extend to almost the summit of the range which stretches from west-northwest to south-southwest. It is a formidable range, and branches or affluents of the Ta-hsia Ho 大夏河 have their source on the northern slopes of it. United they discharge north into the Yellow River at Yung-ching 永靖, the former Lien-hua Ch'eng 蓮花城 or Lotus City. The range is apparently of limestone and seems to be a northern extension of the Hsi-ch'ing Shan 西傾山. Southwest of it and north-northeast of the monastery of K'a-chia ssu 卡家寺 is another high mountain called Liao-chia Shan 廖家山.

Hei-ts'o ssu 黑錯寺 or Hei-ts'o Monastery called in Tibetan Tse-ü Gom-pa, written rTse-dbus dgon-pa or the Central Peak lamasery, is situated on a grassy hillside in a shallow valley at an elevation of 9,205 feet, and belongs to the Yellow Sect. It contains about 200 compounds or houses, possesses a nine storey building called dGu-thog or «nine storeys» a description of which will appear in the Historical Geography of the region to be published. It had 350 residing monks, but before the Moslem-Tibetan war in 1925, it had 993 monks. It was partly destroyed and entirely looted by Mohammedan soldiers who also put more than twenty lamas to the sword.

Opposite the lamasery is a small forest of the ubiquitous *Picea asperata* Mast., associated with *Betula* sp? *Berberis*, *Spiraea* etc.

The lamasery was destroyed over 100 years ago by the Chinese and then again rebuilt. The monks and lama officials are the most haughty and unfriendly of the entire region. Teichman who came to Hei-ts'o several years before me was not received and had to put up elsewhere.

Not far from Hei-ts'o, in another valley is situated the yellow sect lamasery called in Tibetan Kha-rgya-sgar-rnying and K'a-chia ssu 卡加寺 in Chinese, while near a

stream, in another valley is the little monastery bKra-shis dgon-pa, pronounced Tra-shi Gom-pa, or Monastery of Happiness, which the Chinese transcribe Cha-shih ssu 扎什寺. From this lamasery a trail leads west over a rocky spur and into a narrow valley up the stream, northwest. This valley is or was wooded, the trees were again *Picea asperata* and *Betula*; all the large trees had been cut and thousands of saplings were piled up along the streambed. This is not done by the Tibetans but by the Chinese Moslems who, like the Lolos of Yün-nan, and the Chinese in general, are the arch enemies of the forests.

On our return journey the ground had come to life and there was a profusion of rich green grass studded with *Pedicularis decorissima* Diels, a new species with remarkable flowers, the bright blue *Delphinium Henryi* Franch., *Pedicularis semitorata* Max., the new *Leontopodium haplophyloides* Hand.-Mazt., *Ligularia virgaurea* (Max.) Mattf., the globose bluish-white *Delphinium albo-coeruleum* Max., the campanulaceous *Adenophora Potanini* Korsh., with blue bells, and its congener *A. Smithii* Nannf., an herb with dark blue flowers.

Three miles or ten li beyond is another monastery called Rong-war written Rong-bar dgon-pa at an elevation of 9,500 feet with a village of the same name one li distant. It is larger than Hei-ts'o and controls the latter. On the loess banks at Rong-war flowered *Eurotia ceratoides* C. A. Mey., a shrub 3-5 feet in height with blooms of a grayish-pink. At the head of the valley is a snow-covered range, the lower slopes of which appeared black, indicating forests. This is the Ta-mei Shan 大煤山 or the Great Coal Mountain.

The northern slopes of a valley descending from the above mountain support lovely forests of *Picea asperata* Mast., here associated with the tall and stately *Picea purpurea* Mast.; the slopes facing south are covered with *Juniperus glaucescens* Florin; not a single juniper could be detected among the spruces nor a spruce among the junipers, they kept strictly apart, each to its favorite exposure, the spruces clinging to the northern slopes where the snows melt late, and the dampness favors the growth of Mnium moss, whereas the junipers love dry feet, and no undergrowth whatsoever, not even grass.

The streambed is lined with willows, both shrubs and trees, among which grows the Kan-su gooseberry *Ribes stenocarpum* Max., the latter is often planted by farmers as hedges among their fields. Berberis are also plentiful.

Higher up on the valley slopes the spruces cease and a shrubby juniper takes their place, while the latter gives way to *Potentilla fruticosa* L., this in turn relinquished the ground to grass.

The pass over the Ta-mei Shan is called in Tibetan Dam-mai-la-rgan which the Chinese phoneticised Ta-mei-la 大煤拉, to which they add the syllables shan-k'ou 山口 or mountain pass. It is the steepest pass in this region, is 11,675 feet above sea level, and extends from south-southeast to north-northwest. When returning over this pass early in August we found various plants in bloom such as *Delphinium tatsienense* Franch., which, with its deep sky blue flowers occupied the grassy slopes at 10,500 feet elevation, and *Aconitum laeve* Royle, a plant 5-6 feet tall, displaying pale pinkish-lavender flowers. A little lower occurred *Dianthus superbus* L., and at 9,000 feet *Thymus serpyllum* L. var. *mongolicus* Ronn.

The valley which leads down from the pass is called the Dam-lung and extends from south to north, its floor is at 9,500 feet above sealevel and its stream debouches into the

Hsia Ho 夏河 or Summer River, on the north bank of which the great La-brang monastery is situated. Flowing northeast by Ho-chou 河州, now called Lin-hsia 臨夏 it enters the Yellow River at Yung-ching 永靖 after crossing a deeply eroded, loess-covered plateau called Pei-yüan 北塬, the name being applied particularly to that part which extends west of the river. Following the Hsia Ho west up stream, the trail leads over rocky cliffs and grassy banks till La-brang is reached at an elevation of 9,585 feet above sea level.

Hsia-ho hsien or La-pu-leng ssu 拉卜楞寺

Hsia-ho hsien was established in the 17th year of the Chinese Republic (1928), and was so named on account of its situation on the Hsia Ho or Summer River. Its local name is La-pu-lang or La-brang (bLa-brang). It is next in importance to Kumbum or T'a-erh ssu in Ch'ing-hai province, while Hsia-ho Hsien is in Kan-su. It controls in all 108 lamaseries in its neighborhood, and a monk population of more than 300,000 lamas.

La-brang monastery is known as bLa-brang bKra-shis-hkyil, transcribed in Chinese La-pu-leng Cha-shih-ch'i 拉卜楞扎什溪. Since our visit in 1928, the monastery, the largest in China, harbouring usually between 4000-5000 monks, has been created a hsien or district as stated above. It is a regular city with many large stone buildings. A cavalry barack was across the stream from it where a Moslem general ruled with a cruel hand. He was later replaced by the so-called Christian, and later Red, general Feng Yü-hsiang, and the district incorporated into Kan-su province. A complete description of this monastery will appear in the Historical Geography of the region.

The Region Between La-brang and Ra-rgya dgon-pa or Ra-gya Lamasery

The region between La-brang and the Yellow River is one vast swampy plateau, with valleys and high passes, and long plains. Most of the region is an actual morass with stagnant water and hummock-forming grasses; it is only near the great gorges of the Yellow River and the mouths of its tributaries that basic red sandstone cliffs are revealed which give way to shale, mica-schist and a purple conglomerate in the valley of the Yellow River proper.

The valley of the Hsia Ho, called the Sang-khog (bSang-khog) in Tibetan, in which La-brang is situated on the left or north bank of the stream, is rocky, and covered mostly with *Caragana tibetica* bushes on its slopes facing south. The hills facing north are covered with conifer forest of two species of spruces *Picea asperata* and *Picea purpurea*. In the winter and spring fierce west winds blow carrying clouds of dust with them, enshrouding the entire valley and making life disagreeable.

The monastery controls most of the Tibetan clans who have their encampments west of La-brang and near to the Yellow River, but not the monastery of Ra-rgya on the Yellow River.

The flora of the region is poor in species and only when we approach the valleys which join the Yellow River from the east do we find a more interesting type of vegetation. Of conifers *Picea asperata* is the only representative besides *Juniperus*

which genus is represented by several endemic species. We encounter a meadow flora restricted to the narrower parts of the valleys, near where they debouch into the Yellow River, and in the gorges of the latter. The alpine flora is confined to the high passes which lead over the high intersecting spurs from one valley to another.

R. C. Ching in his account of the itinerary during his botanical exploration in Kan-su says about the La-brang Ho as he terms the Hsia Ho: «The clearness of the water suggests the existence of immense forests at its source, far up in the Tibetan country.»

That no forests of any kind exist at or near its source we ascertained, for we followed the Hsia Ho its whole length to its source, northeast of the 12,020 foot pass Tshâ-a-mi-kha, nor are there any forests beyond, but vast swampy grassland till, as already remarked, we approach the gorges of the Yellow River. The Hsia Ho has many affluents on both sides, all the northern ones of which we crossed (the trail leading at right angles to the affluents), on our journey west to the Yellow River and Ra-rgya dgon-pa.

The Journey to Ra-rgya

West of La-brang the Hsia Ho stream emerges from a narrow valley known as the bSang Khog (Sang-khog). Beyond the defile the stream divides and flows in a broad valley which resembled more a plain than a valley. Here took place the last fight between the Moslem army and the Tibetan nomads of the entire region, and from even west of the Yellow River.

A long valley leads from northwest into the Sang Khog, it is called mDâ-nag Khog. Its source is northeast of a mountain called dBang-chhen-shar-snying (Wang-chhen shar-nying) and partly also in a mountain to the north of the latter called Am-nye gnyan-ri. It describes a long curve from southwest to east-northeast flowing practically parallel to the Sang Chhu, but separated from it, and its smaller affluents by a long grassy spur; in this spur is a prominence which rises to about 12,000 feet called the Chhong-rtse in which the second, right lateral valley, the Chhong-rtse nang has its source. The valley of the Dâ-nag Chhu (mDah-nag Chhu) is the camping ground of the Tibetan clan hJorong-og, while north of the divide is the encampment of the mDo-ba (Mdo-wa) clan of the Tibetans. The Sang Chhu valley is flat and broad and rises almost imperceptibly. In the triangle between the two streams (v. s.) grow many willow shrubs, also *Hippophaë rhamnoides* L., and *Potentilla fruticosa* L., the latter scattered throughout the valley. The hills are loess, bare and eroded, while those flanking the Dâ-nag Khog are of red sandstone. The spurs flanking the main valley are terraced, the remains of ancient cultivation. Owing to the wild A-mchhog Tibetans who dwell to the south, and whose main occupation is robbing, no settlers can exist here.

The elevation of the valley floor is here 9,550 feet. Opposite the Dâ-nag Khog a short valley opens out called the Ngor-chhen, here a trail leads across a spur separating the latter from the next valley the hJog nang in which it continues southeast over the hJog Khyi (pass) to A-mchhog. The scenery is wild in the extreme, herds of yak and horses graze peacefully, searching for grass beneath the snow.

Not far beyond is another affluent also from the south, it is the dGu-dgu Chhu (Gu-gu Chhu); across from the pass whence the Gu-gu stream has its source, another valley of the same name extends southeast. The Tibetans have the practice of calling two

valleys which have their sources in the same mountain or pass, but on opposite sides, by the same name, therefore when speaking or writing of a valley one must be careful to indicate which one is meant.

The trail follows at the foot of the spur flanking the Sang Chhu on the south (left), below the trail are a number of springs called Chhu-ngo bkra-mdog (Chhu-ngo tra-dog) the last two words meaning many-colored (variegated). The broad valley of the Sang Chhu is now abruptly narrowed by two projecting ranges. South is a valley called dBenchhen drag-las (Wen-chhen drag-le); the spur or hill flanking it to the right is named dBen-dkar (Wen-kar) and that to the left hJab-gyâ-nag (Jab-yâ-nag). The valley is thus narrowed by these two prominent hills beyond which it again widens, the ground is soggy and black and is really a marsh.

Our camps were always arranged in a circle with loads and horses in the center; the latter had to be hobbled and padlocked on account of possible marauding Tibetans, it has even been known that robbers file the chains and thus make off with horses which are highly prized. Even when only resting for lunch horses have to be hobbled with yak-hair ropes, one front leg to a hind leg, so that they cannot stray too far, and to prevent mounted bandits to charge and drive them off. For the securing of yaks for the night a long rope is staked into the ground, and each yak is tied to it with another rope which is fastened to the nose ring, they are thus attached at regular intervals, often, when the caravan is a large one, in several parallel rows.

Our Arig nomads used argols for fuel which they fanned into red heat by means of a sheepskin bellow to which a crude iron tube is attached at one end, it is quite a knack to manipulate these bellows as they are open all round only the neck of the sheepskin being tied to the iron tube. Pheasants were calling and hares jumped about in the *Potentilla* bushes. Several Tibetan mastiffs were watching our camp and during the night Tibetans took turns to be on the alert for bandits. The nomads, as soon as their tea had boiled, take a ladle full, place a little butter in it and throw it out of their tent while yelling a prayer to the mountain gods, This they perform several times, but only from the chief's tent. Along the stream were many willows, also *Myricaria dahurica* (Willd.) Ehrbg.

The vegetation in the valleys is mainly grass and *Potentilla fruticosa* said to be the yellow-flowered variety. The ground is water-logged, the water clear, but brownish.

At 10,790 feet a valley opens with a rather steep incline called Rang-chhog gzhug-ma (Rang-chhog zhu-ma), up which a trail leads to the Ngu-ra encampment, six to seven days journey distant by Yak caravan, and four days by horse. The yak caravan advanced slowly up the rocky, boggy valley, and had to keep close to the rock cliff to avoid the marshy ground. Here the hills flanking the Sang Khog decrease in height and the trail emerges again into a broad valley to the right, in a west-northwesterly direction is the source of the Sang Chhu which at La-brang becomes the Ta-hsia Ho 大夏河 and empties into the Yellow River. There are two valleys on the south side of the Sang nang, the Rang-chhog dbus-ma (Rang-chhog ü-ma or the middle Rang-chhog), and the Rang-chhog gong-ma (Rang-chhog gong-ma or upper Rang-chhog), the valley is here one great bog and one of the affluents contains quicksand. Water stands in pools above the grass and the horses sink deeply into the black mud.

At the head of the valley is the gravelly pass Tshâ-a-mi-kha, elevation 12,020 feet above sea-level. the valley beyond discharges into a larger one called Chhu-nag nang or the Black Stream valley, which receives here another branch named dBang-ra-ran (Wang-ra-gen). The latter has its source in an isolated grassy mountain dBang-chhen shar-snying (Wang-chhen-shar-snying) whose height is probably near 15,000 feet.

Beyond is a seven mile long plain called the hDar-tshogs-thang (Dar-tshog-thang). It is on this plain where the Sang-khog Tibetan clan, which inhabits the valley of the Sang Chhu in the summer, holds its annual horse races on scrawny, grass-fed horses. It is one of the most forsaken and dreary-looking places imaginable.

The long and wide, snow-covered plain, framed by bare low hills produced a picture of desolation and utter loneliness. We made our way across this weird plain like a row of ants up a pass over the low ridge flanking it. We thought we were alone, but somewhere Tibetans were hidden, they had followed us and had been watching for an opportunity to rob us.

This opportunity soon presented itself. One of my men, not used to horseback riding, was thrown from his horse which had been frightened by a hare, the horse galloped off with saddle flying, and before we had realized what had happened, a group of horsemen appeared, and drove the frightened horse which we never saw again. This taught us to be on our guard. As we did not have extra horses the poor chap had to walk till it was possible to procure another horse from a nomad camp. Although Mr. Simpson and a number of armed Tibetans of our entourage followed, and searched for the rest of the day, the horse and marauders were gone.

The pass is called the Dar-tshog nye-ra and leads down into another plain, the Wog-chha-thang, which extends toward the east. Crossing another pass south-southwest, the trail descends into a still broader valley known as the Gan-dmar gzhung (Gen-mar-zhung). The whole landscape has an indescribable stamp of desolation. The entire region as far as traversed is one vast morass or marsh. At a sandstone cliff our Tibetans gathered in groups around yak dung fires and were boiling their everlasting tea. To me it was appalling to be buried in these weird marshes, crossing ridge after ridge and swamp after swamp with nothing except yellow-brown grass, no sign of a shrub or tree. Wherever one looked one beheld bare hills and water-soaked plains with a temperature which certainly did not suggest the month of May. The valley is at an elevation of 11,350 feet. We crossed the trail to the mouth of a valley opposite, the rNam-nang (Nam-nang), but instead of ascending it we continue up a valley to the left, the two valleys being separated by a low spur; this valley is called the mKhas-chags (Khe-chhag) and is nothing more than a continuation of the morass, it leads to a pass of the same name. Before its termination into the pass Khe-chhag Nye-ra it receives three small valleys each one called hBor lung or Bor Valley, they are termed the (first nearest to the pass) gong-ma or upper, the second ü-ma or middle, and the last the zhu-ma or lower. The broad head of the upper valley is at an altitude of 12,132 feet boiling point. As the yak were tired from crossing the swampy plains we did not think it wise to cross the Khe-chhag Nye-ra (pass) more than a thousand feet higher than our camp. Here in this valley we found *Rhododendron capitatum* Max., *Rhododendron Przewalskii* Max., and *Rh. thymifolium* Max., all shrubs 2-3 feet tall, only the first and last were in flower. Near the top of the pass a dwarf form of *Primula fasciculata* Balf. f. et Ward, formerly

known as *Primula reginella* Balf. f., was already flowering in the surrounding swampy meadows of this bleak, cold region, the little pink flowers with their yellow eyes brightening the drab, yellow grass, covered with patches of snow here and there. There were leaf-rosettes of *Meconopsis punicea* Max., but no sign of inflorescences as yet, while of *Meconopsis integrifolia* (Max.) Franch. and other herbaceous plants only the dead flowering stalks of the year before remained. Undoubtedly in the height of summer this would prove an interesting region botanically. The growing season is however very short in this part of the world.

The rawness and inclemency of the weather was well matched by the hostility and churlishness of our nomad yak drivers, they were as unfriendly as the landscape was bleak, and I could not help but think that it was due to the environment which had fostered such an inimical character, and never one produced a smile or a friendly word. There was an old man, but could not have been more than fifty, people age quickly here being continuously exposed to the elements, who was antagonism personified, he was the very image of a churlish beast, he had participated in many a fracas for his face was cut in all directions, and so were his lips which had the aspect of multiple harelips. Even his nose³⁷

were nearly blown off our horses by the 50 mile gale, at a temperature of 15°F., this on the 8th of May. The descent was much worse than the ascent, the trail was regular chute, the gravel frozen hard, while the snow whirled around us as we descended, slid down is the better word, into the teeth of a gale. Arrived at the foot of the pass we gasped for breath, and I felt my cheeks freezing, also the skin around the eyes where my spectacles touched it. The valley beyond is also called Khe-chhag-nang and as lonely and desolate as its other half on the other side of the pass.

Here we found abandoned encampments, the mud stoves of the nomads on which they boil their tea, burning sheep manure; also square blocks of yak dung piled up to three feet in height with a mud frame, these served as altars on which the nomads burn juniper twigs as offerings to the mountain gods. Of nomads there was no sign. The gale did not abate, but if anything increased in fury. We halted here for some of our yaks had given out and could hardly move, even without a load. We allowed them to graze and gather strength, although yaks like the nomads seem to be immune to hardships.

Rather than wait in the icy wind we decided to go ahead leaving a few Tibetans with the played-out yak. The trail leads from east-northeast to west-southwest, till we came to a plain known as Khe-chhag thang. The sky was clear and the west wind this time brought no clouds in its wake. While crossing another plain called the sTeg-sgam thang (Teg-gam thang) with a fair sized stream in its center, we shot some snipes and ducks, in the vicinity of a nomad encampment whose fierce dogs attacked us. Climbing out of this amphitheatrical depression we descended into a long valley, the Ma-mo gzhung (ma-mo zhung), the winter encampment of the Sog-wo A-rig tribe to which our Tibetan yak drivers belonged.

³⁷ Page 290 is missing in the typescript. It is not clear whether it is a recent loss – now also p. 289 is absent from the files of the Royal Botanical Gardens Edinburgh but, fortunately, preserved in the xerox copy.

The wind or gale continued in all its fury but glad to have arrived at this encampment we pitched our tents at an elevation of 11,449 feet, just far enough away from the tents of the nomads so as to be out of reach of their dogs (see Plate 43).

We rested a day at the Sog-wo Arig camp and also arranged for a change of yak to replace those which were nearly all played out. Winter time or early spring is a bad time to travel with a yak caravan as the grass is poor and young grass not yet sprouted, the hardships are too great from cold, snow and gales. There are actually only two seasons in this part of the world, summer and winter, and the former is very short, as one can expect snow storms even in July and August. It may be remarked that there is not a single frost free night throughout the year in these bleak uplands.

Near the camp of the Sog-wo Arig we shot several ducks and the blacknecked crane *Megalornis nigricollis* (Przew.), a male, for it had a bright red cap on its head.

The boys also amused themselves catching the large marmots *Marmota himalayana* so common in this region. They tied them to stakes on a long rope, and whenever one approached they raced around in a circle, but more often raised themselves on their hindlegs and bared their long teeth. We made arrangement with the nomads to take us from here to Ra-gya, but this they refused, although they had promised to do so in La-brang; furthermore they announced that before they would move they would have to be paid in full in advance in lump silver. As there was nothing to be done, we had to acquiesce in their demands, but they agreed to take us only as far as the lamasery of gTsang-sgar (Tsang-gar), two days east of Ra-gya. There we would have to make other arrangements to be taken to the Ra-gya monastery, but this did not prove difficult, in fact we were glad to get rid of these rude, and churlish Mongolized Tibetans, with their lamb-skin caps and long red tassels. However the Sog-wo Arig chief's son, the chief lay dying of paralysis in his tent, became more civil on acquaintance, and the men did not mind to have their picture taken, but refused to have their womenfolk photographed, saying that the women would not like it. Although they spoke no Mongol, and were indistinguishable from Tibetans, they all lived in Mongol yurts, much more comfortable than the black, yak-hair Tibetan tents which leak for years when new, and only become waterproof when the soot of years has filled the coarse meshes of the cloth which resembles burlap than any other weave.

We had a peaceful windstill Sunday at this camp and entertained many of the nomads who wanted to see the wonders of an Urussu camp, Urussu meaning Russian, the nomads knowing no other nationality, and every foreigner (white man) is called Urussu. Some of the nomads especially the son of the chief had distinctly negroid features, as large projecting jaw, huge thick lips and a negroid cranium. They are an independent, absolutely fearless lot, and always go fully armed with sword and rifle even at their own encampments. They are of a swarthy brown complexion, age early, on account of their primitive existence, forever exposed to the unfriendly raw elements.

The only money in use here is lump silver which has to be chopped with chisel and hammer and then weighed, that everyone has his own scale which dips to his advantage need not to be wondered at. For minor purchase such as milk, cheese or argols, one barter, using needles and foreign thread which are much in demand, also cotton drilling of either blue or brilliant red color; the fixed rate is usually one square of this cloth for the hire of an animal or man as guide. These they patch together to make trousers, or

give their women folk for jackets. We carried two yak loads of goods for barter, and presents for chiefs and incarnations and their stewards, for the chiefs we had pieces of black sateen, and violet purple brocade with gold thread designs for the stewards, the bright red or yellow brocade was reserved for the higher incarnations, as were watches, while needles, thread, tea and salt served in lieu of small change.

The 10th of May found us on the way at 6 a.m. after a cold brilliant starlit night, without a breath of wind. It was a glorious morning, and what under the circumstances one would here call «balmy» atmosphere. From our camp the trail led us to the slopes of the ridge on which the nomads were encamped, northwest, then directly north to the valley in which the Tshe Chhu flows, one of the larger tributaries of the Yellow River. This river has one of its sources, the southern branch, in the Tshe-sde-ra (Tshe-de-ra) pass, and the northern in a grassy spur of the plain called Ma-mo-ren-chhung-ba (Ma-mo-ren-chhung-wa), which is also the name of an isolated grassy hill around which a southern and northern branch flow. It makes a right angle around a mountain called the Seng-ge khang-chhags and flows directly south to where it receives the Ma-mo-zhung at the Sog-wo Arig encampment. Here it makes another right angle and flows west-south-west between hills, two on its northern bank and one on the southern one. In the triangle formed by the confluence of the Ma-mo-zhung and the Tshe Chhu is a conical hill with a cairn or Obo on top, this is the southern hill, the Ma-mo-shar-snying. On the opposite bank of the stream is a single house, the embryo of a lamasery which the nomads had been trying to build with great difficulty owing to the entire absence of timber. The mountain against which the would be lamasery nestles is called Yur-rgan-ri, the lamasery-to-be was already known as mGur-sgar (Gur-gar). Owing to the swamps the trail which keeps to the left flank of the valley, leads to the ford of the Tshe Chhu at an elevation of 11,250 feet. Here at the river bank were many ducks and white terns, of the latter we collected specimens, it proved to be a variety of the common tern of both coasts of the Atlantic *Sterna hirundo tibetana* Saund.

West-south-west rises a mountain range, quite conspicuous in the landscape, it has five peaks of which two, the central ones are prominent and about 15,500 feet in height. This range is called A-rig dzo-rgon-ma (Arig dzo-gön-ma); almost at right angles to the range is a less high, about 14,500 feet, whose name I could not learn; the Tshe Chhu flows in a deep gorge between these two ranges and debouches into the Yellow River beyond them. No one has yet been at the confluence of these rivers. The trail continues west-north-west, crosses the affluent O-man-hde (Wo-men-de), and arrives at another encampment of the Sog-wo A-rig in the valley of the second affluent from the north, called the Chhu-nag Chhu or the Black Water River which has its source on the southern slopes of a mountain called Sa-ri mkhar-sgo (Sa-ri khar-go) in the north, and within the bend of the Tshe Chhu. At the banks of the Chhu-nag we decided to pitch our camp at an elevation of 11,450 feet. Here we found the encampment of an incarnation over 80 years old who was traveling, like we ourselves, to the lamasery of Tsang-gar to which he belonged. His name was Lags-kha-gtsang and later in the day we made his acquaintance.

We considered that day's temperature sultry and hot although the thermometer registered 52°F. at noon. At 6 p.m. the sky became overcast, a wind began to howl and rain rattled on our tents. We were in the middle of the vast grassy plain where the wind

had full sway. During the afternoon we went to the nomad encampment and called on the old incarnation who received us well. He camped in a comfortable yurt or Mongol felt tent which we entered on the left, that is turned left after entering, as custom describes, while a Tibetan tent is entered going right. He sat on cushions surrounded by reliquary shrines and silver charm boxes, a prayer wheel and a few painted scrolls, the latter hanging from the roof of the yurt. I presented him with the usual silk scarf, pictures of the Dalai and Pan-chen Lamas which he raised to his brow in blessing. After that we repaired to the tent of the local tribal chief where we were «entertained» to tea. A fire roared in the mudstove in the middle of the large tent which was crowded with nomads, men, women and children. They were all husky and well built, but dirt begrimed. An old woman tended the fire and tea kettle. Producing from a pile of sheep manure wooden tea bowls, she dipped them into the ground up sheep dung and with her dirty black hands began to wipe them, after which she proceeded to wipe them again with a black filthy rag. They were now «clean» and ready to be filled with tea. It is true everyone should carry his own wooden tea bowl, among many other things, in his voluminous garment, but as I did not live or dress Tibetan style, they furnished me with a bowl of their own, «cleaned» it in the way described above. A small wooden box was then set before us with three equally large compartments, the first contained ground roasted barley flour, the middle one butter in which yak hair bristled and covered with a layer of dust from powdered sheep manure; like a mold it exhibited the imprints of five fingers with which the last nomad helped himself to the butter. The last compartment contained salt. So as not to offend these simple, friendly people I took a sip, but just a tiny sip. Thus ended the tea party in the chief's tent and we returned to our camp.

Next day the caravan went in three relays of twenty yak each over the same monotonous, grassy, rolling plain between low hills, the same kind of landscape we had seen since leaving La-brang. The grass flora is made up of the following genera and species: *Stipa mongolica* Turcz., *Poa attenuata* Trin., *Poa flexuosa* Wahl., *Poa* aff. *arctica* R. Br., *Deschampsia cespitosa* (L.) Beauv., *Elymus sibiricus* L., *Trisetum* sp.? *Festuca ovina* L., *Koeleria argentea* Griseb., the new species *Koeleria enodis* Keng, and the new variety *Elymus sibiricus* var. *brachystachys* Keng, to mention the most important.

In the summertime many herbaceous plants grow among these grasses which lend color to the otherwise drab landscape.

It was difficult to know whether one followed a plain or a large valley so vast is the landscape; as it was we had followed the Sha-bo (Sha-wo) valley west-northwest over a gradual incline at an elevation of 11,500 feet. Sha-wo nang has its source in a hill or mountain to the north called hDam rdzab-ri (Dam-dzab-ri) which rises high above the surrounding grassland. A trail leads across the intervening spur, only 250 feet above the level of the valley, into another valley known as Gan-dmar khog (Gen-mar Khog) on account of its red clay wall which flanks it on the northeast. Antelopes, the Chinese Huang-yang 黃羊 are common here and so are wolves of which we met many. Of the former we bagged one for the pot for they are fat and most excellent eating. The Gen-mar stream is of considerable length and flows in a southeasterly direction into the Tshe Chhu. The Gen-mar valley was dotted with black tents of the nomads and thousands of yak and sheep grazed over the broad landscape, the floor of the valley being only 90

feet below the pass. Gen-mar khog has three upper branches which unite to form the Gen-mar stream, the shorter ones from the northwest are the sPhyi-sgar (Chhi-gar), and the Lar-sgol (Lar-göl), while the third flowing from west to east, the longer one, is called the Rag-chhung nang. Here the grass was very poor not even an inch high having been overgrazed by the herds of yak and sheep of the nomads who belonged to the Tso-khar tribe. On and on we went, when all at once the pleasant balmy atmosphere changed in to a chilly wind, and we were bombarded with snow pellets for a considerable time; changes in temperature follow each other in great rapidity. After traveling for about sixteen miles we decided to call a halt and finding the grass better on the northern bank of the stream pitched our tents near the encampment of another Tibetan clan called the Rong-po (Rong-wo) subject to the Rong-wo lamasery situated on the road to Kuei-te 貴德. The Rong-wo people are easily distinguished by their felt head gear which resembles the cover of a chafing dish. Our camping place was designated by the name Ru-nag or the Black Horn. Here in the shallow Gen-mar stream at 12,100 feet we discovered fish, my men catching 48 by diverting the stream into a dry depression five feet deep. The nomads were astounded and asked what we were going to do with these worms. When told that we would eat them they looked disgusted, for no Tibetan of this region would ever touch fowl, fish or eggs.

A clear sky and a glorious morning found us next day ascending the first, lower part of the Nyin-zer La, elevation 12,520 feet; from this first pass there is a slight depression and a gradual incline to the main pass 12,650 feet. From the summit there is visible a black range, then partly snow-covered of approximately 15,000 feet in height, it extends from southwest to northeast, the Yellow River flowing back of it. In front of it, and separated by a valley called the gSer-chhen Nang or the Great Golden Valley, is a parallel range but much lower and grass-covered, whose name we could not learn. From here the descent is gradual over a somewhat rocky trail, the hill-side to the left was covered with bare bushes that could not be identified. A very short ravine leads from the pass into a long, narrow valley which stretches south-southwest to the Yellow River, it is known as the rDo-rgan Nang (Dorgen Nang) and is 12,220 feet above the sea.

Crossing its stream diagonally the trail leads between the grassy hills over a small pass known as sKyod-dmar (Kyö-mar) elevation 12,420 feet, and descends into a broad valley bordered by low hills; this is the sGo-shub Nang (Go-shub Nang) composed of much tilted slate and shale, in which Tsan-gar (lamasery) is situated.

On the rocky slopes we shot quite a number of beautifully marked partridges *Alectoris graeca magna* (Przew.) who, with rabbits or hares and marmots, were most common. Not far above Tsang-gar (monastery) there is a phantastic red sandstone cliff, pitted with holes caused by the action of the water. On this cliff grew beautiful, rich green, junipers (*Juniperus glaucescens* Florin), the elevation at the foot of the cliff being 11,200 feet. A few more bends down the narrowing valley and we reached Tsang-gar (monastery). We were well received and shown an old red house and court where we could stay as long as we wanted. In the court yak manure was spread out a food thick, to dry, and into this our unruly nomads, on arrival dumped our loads most unceremoniously. There was not one who came to say good bye, they had been paid in advance and there was no need to stand on ceremonies. I was real glad to see the last of them. The first lap of our journey came thus to an end with only the loss of one horse.

Tsang-gar (monastery) buried in this far and out of the way glen, the Go-shub-nang, is built on the right slopes of the valley, the stream flowing deep below in a narrow trench. The lamasery is over 250 years old, but built a little later than La-brang Tra-shi-khyil, and houses about 500 lamas and a high incarnation which at our time of visit was the fifth. The first incarnation or rather the first generation, who later became reincarnated, came originally from the Pan-chhen Lama's domain in bKra-shis lhun-po (Tra-shi lhün-po), southern Tibet. The present incarnation Tsang wan-dita who is a brother of the steward of the lamasery, is from a tribe west of the Yellow River. The lamasery has three chanting halls or temples, and many small buildings housing the monks; it also has fifteen incarnations of various ranks but lower than Tsang Wan-dita, the first of whom was the founder of the monastery.

Tsang-gar is situated at an elevation of 11,000 feet, with the mountains which hem in this valley, rising high above it.

During our stay here of several days we visited the lamasery under the guidance of the steward who himself had built the latest chanting hall, a very substantial structure constructed entirely of rock. The main brass image of bTsong-kha-pa (Tsong-kha-pa) the founder of the Yellow Sect had been brought from Lhasa. The large chanting hall, built nearly sixty years ago, contained eighty pillars (supporting the roof) of tall spruce trees. In the vestibule were the usual frescos of the four guardians, Lokapalas, but in addition there were two others, one representing rMa-chhen spom-ra the mountain god of the Am-nye Ma-chhen Range, and the other that of their own mountain god of the region the local sa-bdag sGo-chhen after whom the mouth of the Do-gen Nang valley is named, Go-chhen meaning the «Great Gate». He is pictured riding a yak and brandishing a sword.

The tribe which inhabits the region is called the Yu-ngok?; their eastern boundary is the Nyin-zer pass (q.v.)

The gorges of the Yellow River south of Tsang-gar

While our caravan rested at Tsang-gar we took the opportunity to explore the Go-shub Valley and that of the Yellow River which in this region, prior to our arrival, had never been visited by white men. The lamas told us that there were forests in the lower parts of the Go-shub valley and in the Yellow River gorges proper, whence the timber came for the building of their lamasery. [Plate 44]

On May 13th we left Tsang-gar following the Go-shub valley down stream which became so rocky and narrow that it was impossible for horses to pass; we therefore crossed the valley and climbed the spur which separates it from the Zher-shib valley, both merge a short distance before reaching the Yellow River. As these valleys were too narrow to permit reaching the Yellow River, we went, at the suggestion of our lama guide, southeast, and south to the mouth of the Do-gen Nang called sGo-chhen or the Great gate.

The rocks in the Go-shub and Zher-shib valleys are slate and shale, very much crumpled and tilted. On the upper slopes grew bushes of *Juniperus glaucescens* Florin, with semi-globose fruits. The tops of the spurs hemming in these valleys are composed of loess and are grass-covered. From the Zher-shib valley we climbed to a bluff

overlooking the Yellow River which flowed 600 feet below us in a rocky gorge of slate and sandstone. Here we shot a new bird *Prunella fulvescens Nadiæ* B. et P., and took photos both up and down stream of the Yellow River (see Plates 45-47) from an elevation of 10,690 feet, looking northeast up a stream, and northwest down stream. The gorges of the Yellow River are here wooded with *Picea asperata* Mast., *Betula japonica* var. *szechuanica* Schneid., quite tall trees which grew to the water's edge. Willows abound along the streams such as *Salix myrtillacea* and *S. Wilhelmsiana* M. B. = *Salix taoensis* Görz n. hybr., *Salix rehderiana* Schn. var. *brevisericea* Schn., *Juniperus glaucescens* Florin, *Cotoneaster adpressus* Bois, which tightly covered boulders, at the bases of which flourished the fern *Cheilanthes argentea* (Gmel.) Kze. On dry loamy banks and rocks grew the pale yellow, rather sad looking, *Primula flava* Maxim.

The Yellow River flows here very swiftly in its prison of slate, shale and sandstone. From the bluff we descended over a very rocky path into the narrow mouth of Go-chhen in the Do-gen valley, the mountain walls flanking Go-chhen facing north are covered with forests of tall *Picea asperata* Mast., mixed with the *Betula* and willows above mentioned. Here along the banks of the stream we shot a troglodyte wren which only frequents the rocks along the very banks of streams, *Nannus troglodytes idius* (Richm.) The Yellow River which flows here at an elevation of 10,200 feet, is about 150 yards broad, very swift and full of swirl pools. Directly opposite Go-chhen there is an enormous rapid in which nothing could live or survive. Further up stream, in the Go-chhen valley, we found several willows as *Salix wilhelmsiana*, *Salix myrtillacea*, 12 and 8 feet in height respectively, the new hybrid *Salix taoensis*, *Salix rehderiana* var. *brevisericea*, 80 foot tall spruces *Picea asperata*, with short and descending branches and deep green foliage. On the rocky slopes grew *Caragana brevifolia* Kom., *Potentilla fruticosa*, *Juniperus glaucescens* Florin, and herbaceous plants not then in flower. The only *Primula* that braved the cold proved to be *Primula flava* Max., it was the first to flower, and occurred in most of the valleys tributary to the Yellow River, as well as in the Min Shan to the southeast.

From Tsang-gar to Ra-gya Gom-pa

On May 15th we said farewell to our lama friends, and with a caravan of sixty new yak we left Tsang-gar, retracing our steps up the Go-shub valley to below the red sandstone cliff and red clay, and turn up a small ravine of slate, shale and schist, also sandstone, especially in the upper strata. A short distance higher up in the valley, the schist gives way to sandstone and red clay altogether. The valley extends west-southwest and gradually becomes shallower and grass-covered, with the slopes low and gentle, as do nearly all valleys sending tributaries to the Yellow River. At their source they are wide and merge into the grasslands, but gradually cut into the loess and through the underlying red sandstone below which we find the schist, shale, and slate through which the Yellow River also found it easy to cut its way.

Crossing a small pass, elevation 11,388 feet we descended into a gentle sloping grass-covered valley. From now on it is continuous traversing of valleys and their intervening spurs, the trail leading at right angles to them. Weird sandstone bluffs flank them, the red cliffs terminating in castle-like towers and battlements, in the shallow

recesses of which small groves or forests of junipers with rich green foliage have taken a foothold. *Juniperus glaucescens* Florin, is the only species found in the valley of Goshub. In the mouth of the valleys are spruce forests facing north, while the dry south-facing slopes are covered with *Berberis*, *Potentilla fruticosa* L., and specially *Berberis tibetensis* bushes. A red, clayey, muddy trail brings us to the long Great Gold Valley or the gSer-chhen Nang (Ser-chhen Nang). Where the trail fords the stream the valley is quite broad, but north of it, it narrows into a red sandstone gorge with vertical cliffs honeycombed with caves, and partly covered with *Juniperus glaucescens* Florin, which seems partial to red sandstone. On the west side, a short distance down stream, there is a huge long cleft in the cliff through which has oozed, as one might say, a pillar of ice, spread at its base like the train of a wedding gown (see Plate 48). The upper half of the valley is again red sandstone while the lower half is composed of schist and slates. Deciding to explore this valley further we continued down stream, where we encountered one single nomad tent hidden in a juniper grove in this lonely gorge. We were not aware of any present till we were suddenly attacked and nearly mauled by fierce mastiffs whose habit is to make for a man's throat. The valley became narrower, and about three miles or ten li beyond, it was joined by another smaller one called the Small Gold Valley or the gSer-chhung Nang bringing red muddy water, while that of the larger valley was crystal clear. As it was impossible to continue in the valley due to its narrowness, we climbed the right flank of the ravine over loose shale covered partly with grass and with here and there a spruce tree. Before us lay the gorge of the Yellow River, and looking down from a bluff, elevation 10,300 feet, I photographed the River which here flowed southwest towards its source.

The river is here only about 80 yards wide and flows swiftly some 200 feet below the bluff. The gorge itself is not very deep, but its slopes fall steeply, and in places vertically go into the river, leaving no banks along the water, and this at low water mark. The drop in the Yellow River from the mouth of the Go-chhen Valley to that of the Ser-chhen is exactly 100 feet. In the sheltered gorge *Picea asperata* established itself also *Betula japonica* var. *szechuanica* Schneid., and junipers, but the latter kept together facing south.

The upper part of the gorge is flanked by huge vertical cliffs 600-1,000 feet high, which still further up end in a grand amphitheater with a majestic sweep; here eagles had their nests and the tops of the pinnacles were covered with junipers. Icicles, like mighty stalactites, hung from the walls of caves and their ceiling; it was a weird and wild setting, yet peaceful. The streambed was filled with willows as *Salix pseudo-wallichiana* Görz a shrub 10-15 feet tall, x *Salix taoensis*, *Ribes vilmorini* Jancz. four feet high, while on gravelly flats grew large *Juniperus glaucescens* with trunks 3-4 feet and more in diameter indicating an age of 500 to as thousand years. Here among the junipers and willows we shot *Phylloscopus (Motacilla) affinis* (Tickell), but other birds were scarce, except on the grassy summits of the spurs where Tibetan eared pheasants, *Crossoptilon auritum*, roamed, always flocks of eight to ten. Having followed to the end of the gorge, we returned to our trail and climbed the spur at an incredible angle to an elevation of 10,820 feet whence we continued west-southwest over grass-covered loess hills, then northwest, the Yellow River flowing in a gorge to our left. Going now west, we descended into Ser-chhung or the smaller Gold Valley where we met the same type

of red sandstone, the same junipers and willows, the latter in flower but almost leafless. Ser-chhen valley is the divide between the Yu-ngok? tribe under the rule of Tsang-gar and that of the sGar-rtse tribe (Gar-tse) to the west under Ra-gya monastery.

From the Ser-chhung valley the trail climbs a narrow ravine west-southwest to a pass 11,280 feet called A-ra-u-lag, a Mongol name. As the trail leads at right angles to the tributaries one is obliged to continuously descend deep valleys cross streams, and passes, such as the Lung-dmar-kha at an elevation of 11,090 feet, with the Lung-dmar or Red Valley below it which sends a red torrent to the Yellow River. Its sides are covered with willow bushes and treelets of *Hippophae rhamnoides*, *Sibiraea angustifolia* (Rehd.) Hao, *Betula* and *Juniperus glaucescens* Florin. Here we encountered and shot many of the Tibetan eared pheasants *Crossoptilon auritum*, always partial to wooded areas.

Instead of following Lung-mar valley, we climbed the right hand bluff as steeply as we had descended, up to an elevation of 10,300 feet. here, below us, flowed the Yellow River, angry and turbulent surging against its prison of red sandstone. Opposite to where the Red Valley empties into the Yellow River, a short valley called the dGâ-khog (Gâ-khog) joins the latter.

The Yellow River valley is here sprinkled with spruces, junipers, willows etc., loess covers the upper slopes with the red sandstone beneath; this formation can be found nearly everywhere as in the Hsi-ning Valley in the north, but it becomes only visible in deep valleys, where grass covers the loess above and the red sandstone is exposed under its thick layer.

Endlessly up and down the trail leads across several small valleys and their intersecting spurs till we emerge into the valley of the yellow River proper, descending steeply to its banks. Around a bluff, on a gentle-sloping meadow lies the Monastery Ra-gya dgon-pa, at the foot of a high cliff resembling a huge bird with outspread wings, it is the redeeming feature of the otherwise bleak landscape.

Ra-gya gom-pa and T'ung-te hsien 同德縣

The district of T'ung-te was established in the 24th year of Chinese Republic, 1935, and is actually ruled by Kuei-te hsien 貴德縣 situated on the south bank of the Yellow River several days journey to the northeast. It is a trading centre where cloth, salt, sugar, barley flour, tea and iron pans, etc., are exchanged for wool and musk. Only Moslem traders, and mainly those of the New Sect who have their headquarters in T'ao-chou Old City, come to trade with the nomads from west of the Yellow River. The New Sect Moslems were the only ones who could trade with impunity with the Go-log within the loop, and south of the Yellow River.

Ra-gya dgon-pa (Ra-gya gom-pa) and its neighborhood

Ra-gya monastery situated on the right bank of the Yellow River, consists of two sections separated by a shallow ravine, the larger section being west of the ravine. It nestles at the foot of a peculiar purplish-red conglomerate sandstone mountain (see Plate 49-53), the south face of which drops vertically; the top is cleft, and its lower

lateral rock walls give it the appearance of a huge bird hovering, or ready to take flight. It is this aspect which apparently has suggested to the lamas or Tibetans the name Khyung-sngon (Khyung-ngön) or the Blue Garuda, the great mythical bird, the enemy of the Nâ-gas or serpent spirits. It is the mountain spirit of the region and especially of Ra-gya lamasery, whose festival falls on the 11th day of the fourth moon, which in 1926 fell on the 22nd of May.

Everywhere within a radius of a mile around Ra-gya monastery roam hundreds of blue sheep, the *Ovis burrhel*. They are sacred and hence unmolested and unafraid, one can approach them and photograph them. East of Ra-gya in Lung-ma valley they are wild and numerous (see Plate 54).

The monastery comprises eight major temples of which two have more than two storeys. It contains also two large square buildings, one in each section; the one in the north section being much larger, houses the printing establishment of an edition of the bKah-hgyur or the translated word (Kanjur) the Tibetan classic or Buddhist canon of 108 volumes; it was not previously known that Ra-gya monastery had a printing establishment; it was not feasible then to obtain a set of the books, although this edition is unknown in the western world. In addition to these large buildings there are hundreds of small mud houses, the abodes of the 800-900 lamas or rather monks, who dwell here, plus the La-brang or Palace of its highest incarnation.

It boasts of one high incarnation who at our visit was a man of 20 summers; he was the incarnation, strange as it may sound, of the mother of Tsong-kha-pa the founder of the Yellow Sect who was born at Tsong-kha = the Onion Bank, where the famous monastery of sKu-hbum (Kumbum) now stands, some ten miles from Hsi-ning.

His incarnation is known as bLa-ma Shing bzah Pañdi-ta after the mother of Tsong-kha-pa Shing-bzah a-chhos. His name as transcribed in Chinese reads Hsiang-tsa la-ma 香咱喇嘛. Under him are two high incarnations and eighteen minor ones, incarnations of lamas who in past existences led saintly lives, but were no outstanding personalities as Tsong-kha-pa. The latter had declared on his death that he would not be reincarnated, and hence naturally the lamas never looked for his reappearance. Instead they found the incarnation of his father, who, during our stay at Kumbum, was absent, visiting Pei-p'ing (Peking) while his mother's incarnation was found in the boy of Ra-gya. The latter's dwelling is the highest located, back of the large printing establishment.

Although there is not a single Chinese living at Ra-gya and none would have dared across the grasslands for fear of the Go-logs, they established «on paper» a magistracy and called it T'ung-te 同德 or United Virtue. The only non-Tibetan people who come to Ra-gya are Moslem traders who live like Tibetans, dress like them, travel like them, and unlike the Chinese, need no rice for their subsistence.

The only reason I suppose to establish a magistracy (on paper) and the giving of a Chinese name to the place was for the sake of face. And in spite of of the red regime which is most anxious to establish its authority to the farthest ends of their realm, and what is not their realm, they will find it difficult to control the lawless tribes of the grasslands, for no Chinese be he red or white, can or will, care to endure the hardships of a nomad's existence. A Chinese can only live by agriculture, and nothing can be grown at the inhospitable heights on which the nomads live, so for Chinese to settle in the grasslands west or south of Ra-gya, is to be a discounted possibility.

After one day's rest at Ra-gya where Hsiang-tsa had assigned us commodious quarters southeast of the lamasery, the property of his uncle an incarnation who was then absent in the Go-log country, we called on Hsiang-tsa or Shing-bzah Rin-po-chhe as he was respectfully called by the Tibetans, to deliver to him a letter of introduction from the great incarnation of La-brang Monastery hJam-dbyangs-bzhad-pa (Jam-byang zha-pa or the laughing Jam-byang) whose real name was Ngag-dbang Ye-shes rgya-mtsho (Nga-wang Ye-she gya-tsho), then a boy of ten summers; both have however passed away since, like all mortals.

We presented Shing-za Rin-po-chhe with a white silk scarf, the Tibetan calling card, a watch, ten squares of gold brocade and a twenty dollar U.S. goldpiece, and suitable presents to his steward and other ranking lamas. We told him that we had come to explore the Am-nye Ma-chhen range and that we hoped he would help us attain our project, and to forward three letters we had been given by the La-brang incarnation to the three ruling Go-log Chiefs. They were to grant us protection especially the most powerful chief of all the Go-logs, the Ri-mang tribal chief, Ri-mang sprul-sku ldan-brag (Ri-mang trül-ku den-drag) who was also considered an incarnation or Trül-ku, and the chiefs of the two less powerful tribes the Khang-rgan (Khang-gan) and Khang-gsar (Khang-sar) respectively. In reply he, or rather his steward, made the following speech: Ever since 1921 when general Ma Chi-fu of Hsi-ning had attacked the Go-log, after having requested Ra-gya gom-pa to forward Ma's letters to all the Go-log chiefs demanding their submission, the Go-logs declared themselves enemies of Ra-gya for forwarding the letters, and were at dagger's point with the monastery. They had returned the letters and bluntly refused to submit. He stated that he personally was only on friendly terms with the chief of the Khang-gen tribe but that the Ri-mang chief could not be trusted even if he agreed to give protection. That there were three roads or trails around the Am-nye Ma-chhen, one fairly good one with few streams to cross, but that that road was full of robbers, and that only shortly before our arrival an incarnation from his lamasery had been robbed there of forty horses and four hundred sheep, in fact of all his belongings. The other roads were difficult, as one had to ford a very swift stream, a dangerous undertaking. That the best way would be to make a quick dash to the Am-nye Ma-chhen on horseback without any pack-animals, and that very soon, before the Go-logs became aware or heard of our presence at Ra-gya. To this I demurred as our object was not to make a quick trip, but to collect plants, take photos and explore the country more leisurely. He then agreed that the best way was to send the letters with suitable presents to the Go-log chiefs, and that he personally would write individual letters to them, and to await their replies. Furthermore, that in case the Go-log chiefs should fail to reply (which in fact they did, except one), we should go to the Ong-thag tribe (it was this tribe which attacked Roborowski) who lived northeast of the Am-nye Ma-chhen, and to whom he belonged, his elder brother being chief of the tribe. That their encampment was seven days journey by yak from Ra-gya, and that he would request his brother to have his men escort us around the Am-nye Ma-chhen, for, as he remarked, the Ong-thag tribe had never been defeated by the fierce Go-log, and were not afraid of them. He also told us that there was more forest in the gorges of the Yellow River, and in the estuaries of its tributaries than at the Am-nye Ma-chhen proper. We thereupon thanked him and returned to our quarters.

As there remained nothing else to do but to await the replies of the Go-logs, which could not be expected in less than twenty days, we made plans to explore the region around Ra-gya, the gorges of the Yellow River to the north of Ra-gya, and the brGyud-par Range (Gyü-par or Jü-par) in the north, all regions previously unexplored.

The Mountains Around Ra-gya

The mountains enclosing, or forming the Yellow River Valley at Ra-gya are all loess and mostly grass-covered, beneath the loess the strata is either red sandstone or sandstone gravel conglomerate with the lower third or less, shale and schist and some quartz. The mountains are bare, except to the south of Ra-gya, facing north, where spruce forests cover the steeper slopes, with junipers on the opposite side of the river near Ra-gya proper, facing south. The elevation of the mountains south of Ra-gya reach a height of over 13,500 feet and in May were still snow-covered.

The spruce *Picea asperata* Mast., the only conifer outside junipers, does here not reach the height as in the deep valleys further north, but is still a formidable tree of 50-60 feet with trunks of two feet in diameter indicating an age of 250 years or so.

The undergrowth is mainly thick moss (Mnium) in which little can grow except the white-flowered *Rubus idaeus* L. var. *strigosus* Max., which loves shade. On the outskirts of these forests we find the yellow-flowered *Thermopsis lanceolata* R. Br. a widely distributed plant from Siberia and Altai to Northeast Tibet. It takes here the place of *Piptanthus* which grows in similar situations in southwestern China as on the Li-chiang snowrange; willows are most common and while they are scattered all over the hillsides below the spruce forest, they are happier near the streambed and brooks of the valleys. *Salix myrtillacea* Anders., branching from the base grows to a height of 10 feet, and is associated with the new species *Salix Rockii* Görz of equal height; this latter species is also found on exposed rocky slopes among *Juniperus tibetica* Kom., and *Salix rehderiana* var. *brevisericea* Schneid., 6-8 feet in height. In the same locality occur two species of Ribes, *Ribes Meyeri* Max., and *R. Vilmorini* Jancz., the former also known from the Altai mountains and north China; a third very common species but frequenting open rocky situations is the Kan-su gooseberry *Ribes stenocarpum* Max., with fairly large but sour berries, first known from western Kan-su province, now reckoned as belonging to the Koko Nor or Ch'ing-hai. Hybrid *Salix* occur such as x *S. taoensis* Görz, *Salix juparica* Görz x *S. sibirica* Pall., the new variety *Salix oritrepha* var. *tibetica* Görz, and *Salix paraplesia* Schneid. Among rocks to both sides of the Yellow River grow the two inch tall *Ephedra monosperma* C. A. Mey, at an elevation of 11,000 feet, and the lovely *Androsace Mariae* Kan. var. *tibetica* (Max.) Hand-Mzt. with pinkish-white flowers, resembling *A. spinulifera* from Yün-nan. Another new hybrid *Salix myrtillacea* x *Rockii* Görz, frequents northern exposures with spruces, but usually along streambeds.

Of honeysuckles which prefer to grow alone on the upper margins of grassy spurs, the finest is *Lonicera syringantha* Max., with rose red, fragrant flowers, forming beautiful globose bushes, with *Lonicera microphylla* Willd., first known from eastern Siberia with yellow flowers and glaucous foliage; like its congener it forms lovely clean round bushes.

Among boulders in exposed places flourish *Caragana Maximowicziana* Kom., *Berberis Boschanii* Schn., also *Spiraea alpina* Pall., a shrub 3 feet tall with yellow flowers, and on the grassy slopes and bluffs the blue to purple flowered *Iris tenuifolia* Pall. holds sway in company with the prostrate, white-flowered scrophulariaceous *Lagotis brachystachys* Max.

Associated with the spruces occurs the handsome birch *Betula japonica* Sieb. var. *szechuanica* Schn., which here has a pinkish to flesh-colored bark while further south in the Min Shan its bark is bronze to copper-colored. *Sorbus thianschanica* Rupr., with white flowers and brilliant red fruits loves to be near spruces but never grows in their shade, more often it is confined to bluffs overlooking lower shrubs. Preferring plenty of light and higher altitude is *Rhododendron capitatum* Max., a shrub 3 feet high with bluish-purple flowers which grows in great masses above the spruce forests, in loess, often completely filling shallow grassy valleys. This plant the Tibetans call su-ru; enormous masses of it are cut and placed several feet thick on the top of the brick or stone walls of chanting halls in the larger lamaseries, immediately under the roofs of the buildings. The stems, of uniform thickness, are piled up to a depth of three feet or more, the ends flush with the wall are pressed tight and are then cut even, forming an ornamental panel into which are stuck the usual brass or bronze-gilt Buddhistic emblems. An *Iris* with yellow flowers grows among rocks, and in the actual spruce forest we find *Iris Potanini* Max., while *Primula flava* Max. loves open, exposed, loessy banks, and *Viola mongolica* Franch., (var. *floribus carneis*) adheres to grassy slopes as does *Hedysarum multijugum* Max. with purple flowers.

To rock walls and cliffs are partial *Paraquilegia anemonioides* (Willd.) Ulbr., with delicate mauve-lavender flowers and *Incarvillea compacta* Max., with rich red flowers and white stripes in its throat; it does however also occur on rocky or grassy bluffs with *Valeriana tangutica* Batal., with purplish fragrant flowers. Confined to the alpine meadows are the new variety *Trollius pumilus* Don. var. *alpinus* Ulbr. var. nov., with rich orange-yellow blossoms, *Orchis salina* Turcz., with deep purplish-red flowers, *Taraxacum mongolicum* Hand.-Mzt., *Iris gracilis* Max., displaying purplish lavender flowers with deep orange yellow stamens, *Aster heterochaeta* Bth., *Polygonatum bulbosum* Lev., with carmine flowers, and finally the stately *Rheum palmatum* L. forma *floribus rubris*, flouting its brilliant red flowers and growing to a height of 8 feet. Forming cushions over rocks and large boulders is *Sedum quadrifolium* Pall., with deep blackish-red flowers and yellow stamens. The deep red to purple Tibetan lady slipper *Cypripedium tibeticum* King, like in Yün-nan, is confined to open meadows as is the yellow flowered *Pedicularis versicolor* Wahlenb., at elevations of 11,000 feet, associated with the buttercup *Ranunculus pulchellus* C. A. Mey., *Anemone rupestris* Wall., with purple flowers, and the yellow *Meconopsis integrifolia* Franch., which often covers whole hillsides.

In the very wet alpine meadows we find the pink flowered, yellow-eyed *Primula gemmifera* Batal., which extends south to Hsi-k'ang and the deep pink-flowered *Primula sibirica* Jacq., a well known species, which extends from arctic Europe to arctic and central Asia, Alaska, and to the western Himalayas.

East of Ra-gya in the Lungmar or Red valley [plate 55-56] so named on account of its red clayey soil, we collected *Potentilla fruticosa* L. var. *parvifolia* Wolf, a common

plant on clayey slopes, with bright yellow flowers, first described from Sungaria, *Lonicera hispida* Pall., originally known from the Altai mountains, 3-4 feet high with pretty yellow flowers, *Sibiraea angustifolia* (Rehd.) Hao, 4-5 feet tall associated with willows, and *Rhododendron capitatum*. On the grassy slopes of Lung-mar valley grew *Stellera chamaejasme* L., but very different in its floral colors from the Yün-nan plant which has deep yellow and brownish purple flowers, while the northern plant has white flowers, pinkish purple in bud, and on the undersurface of the petals; these two color variations are constant, and never have we observed a yellow flowered one in the north nor a white and pink flowered one in the south, but pure white ones do occur in the north, but very rarely. *Viola biflora* L., its yellow flowers reminding of *Viola Delavayi* Franch., of the south, *Anemone rupestris* Wall., are also confined to the grassy slopes at 10,000 feet elevation and higher. Among rocks grow *Cotoneaster multiflorus* Bunge, a shrub 4-5 feet, first described from the Altai mountains, and *Caragana jubata* Poiret of variable habit, but with lovely pink flowers recalling sweet peas. On scree or talus slopes occur two species of *Corydalis*, as *Corydalis stricta* Steph., with reddish-purple flowers and a yellow-flowered unidentified one (no. 14018).

As spring advanced more and more herbaceous plants came into flower on the mountains around Ra-gya, and towards the end of May we collected on the grassy slopes at 10,000 feet, *Gentiana riparia* Karel and Kir., a pale-flowered species, *Viola bulbosa* Max., its flowers cream-colored and lower lip striped purplish, *Cardamine macrophylla* Willd., with lavender-pink, very fragrant flowers reminding of lilac, but much more intense *Microula sikkimensis* (Clarke) Hemsley, *Fragaria elatior* Chrh., and *Rheum pumilum* Max., while *Rosa bella* Rehd. & Wils., with red flowers, loved the shade of the spruce. Of ferns among rocks thrived at 10,000 feet *Polystichum molliculum* Christ., and *Polypodium clathratum* Clarke. Spring merged into the short summer with its daily downpours and electrical displays of great intensity, and although the thermometer did not rise much above freezing during the night, often showed seven degrees of frost at the 11,000 feet level where ice covered the streambed, and willow bushes encased in more than one foot of ice, flowered unconcernedly. From day to day there appeared new plants which had not flowered previously, such as *Fritillaria Roylei* Hook., a herbaceous plant with dull greyish blue bells, *Anemone rupestris* Wall., its flowers white but with petals bluish beneath, the composite *Scorzonera austriaca* Willd., first described from Europe with single flower-heads of a yellow color, and a species of *Polygonatum* (no 14106) with single greenish-yellow flowers; all but the last one which grew in spruce forest, occurred on the alpine meadows at an elevation of 12,000 feet. Some of these plants had flowered a little earlier at the 11,000 feet level, but as the snow melted the sun awakened them to bloom and hurry to produce seed to perpetuate themselves for soon they would again be covered with snow.

Open clearings were taken up by the grass *Torresia odorata* (L.) Hitch., among which grew various willows, while in ravines among rocks grew the blue-flowered labiate *Nepeta coerulescens* Max. f. *major*, the purple-flowered *Pedicularis kansuensis* Max., *Carum carvi* L., an umbellifer first known from Europe, the caryophyllaceous *Melandrium glandulosum* (Max.) Williams, and on conglomerate banks the pink flowered *Valeriana tangutica* Batal., endemic to this part of the world. Amongst rocks in general thrived the legume of prostrate habit *Gueldenstaedtia diversifolia* Max.,

which, with its dark purple flowers is endemic in this region. Covering Lonicera bushes among rocks on the banks of the Yellow River, flowered *Clematis tangutica* Korsh. var. *obtusiuscula* Rehd. & Wils., with the composites *Tanacetum falcatolobatum* H. Krash., a shrub 2 feet in height, and *Aster poliothamnus* Diels, both then newly described, the latter a handsome and distinct species with numerous lavender-colored flowerheads. Near them, the white-flowered *Anemone rivularis* Ham., hugged the gravel along the river. On the right alpine meadows at elevations between 12,000 and 13,000 feet thrived the rich purple flowered legume *Hedysarum obscurum* L., the lavender flowered *Phlomis rotata* Benth., *Rheum pumilum* Max. endemic here, and among rock outcroppings grew *Sedum Kirilowii* Reg., previously known only from the Celestial Mountains or T'ien Shan 天山; other plants found in the moist or wet high alpine meadows were *Corydalis dasyptera* Max., endemic here, also the new *Astragalus Peterae* Tsai et Yü, *Pedicularis cranolopha* Max., with yellow flowers and its congener *Pedicularis szechuanica* Max., proper with white flowers while the variety boasts purplish pink flowers. The labiate *Marrubium incisum* Benth., with pinkish flowers, first described from Siberia and later also found in North China, *Dracocephalum heterophyllum* Bth., flowers white, associated with a pure white *Stellera chamaejasme* L. fl. *alba*, of which only one plant was observed. Still higher at 13,500 feet grew *Ranunculus pulchellus* C. A. Mey. var. *sericeus* Hook. f. & Thoms., with *Anemone rupestris* Wall., which was at home at this height, as well as at the 10,000 feet level. Others belonging to the 12,000 feet level were *Astragalus Handelii* Tsai et Yü, but confined to wet meadows, the umbellifer *Pleurospermum linearilobum* W. W. Smith, *Ligularia virgaurea* (Max.) Mattf., first known from eastern Mongolia, then the deep yellow flowered *Corydalis stricta* Steph., confined to the rocky slopes, as was the white flowered *Morina chinensis* Bat. A thousand feet higher, in the alpine meadows, thrived the white flowered ground orchid *Aceratorchis tschiliensis* Schltr., first described from northeastern China. Several species of *Allium*, but not yet identified, grew on grassy slopes overlooking the Yellow River at 11,000 feet. Here also flourished *Brassica juncea* (L.) Czern. & Coss., an escape from cultivation, *Potentilla multicaulis* Bge., *Stachys baicalensis* Fischer, with purple flowers first known from Siberia, *Vicia* aff. *tibetica* Prain, *Pedicularis cheilanthifolia* Schrenk var. *isochila* Max., with yellow flowers, and finally the blue-flowered boraginaceous *Eritrichium strictum* (Dene.) A. DC.

In the Lung-mar valley there appeared by end of June besides those already enumerated, the bluish-lavender flowered *Polygala sibirica* L., the purple flowered geraniaceous plant *Erodium stephanianum* Willd., *Heracleum millefolium* Diels, with white flowers, first found by W. Filchner in Tibet, and the Edelweiss *Leontopodium Dedekensi* (Bur. & Fr.) Bod. Near the mouth of the Lung-mar valley on sandbanks of the Yellow River occurred the green flowered orchid *Habenaria spiranthiformis* Ames & Schltr., together with *Geranium Pylzowianum* Max., *Hypericum Przewalskii* Max.; in grassy places *Senecio thianschanicus* Reg. & Schmalt., *Pedicularis semitorta* Max., and *Pedicularis ingens* Max., found a foothold; most of the above are peculiar to the highlands of Northeast Tibet. Of as yet undetermined plants we collected a *Gentianella* (no. 14218) and an *Astragalus* (no 14219).

Common on the sandy banks of the Yellow River everywhere in the valley is the ordinary European thistle *Cirsium arvense* L., also *Oxytropis imbricata* Kom., and on the grassy slopes higher up *Oxytropis melanocalyx* Bge.

It will be seen that although the ligneous flora is very poor, the herbaceous one is well developed, and those that are endemic predominate. Gentians are rare in this region for we found only *Gentiana riparia* K. & K. apparently the earliest flowering species while all others flower in late summer or autumn.

We did not remain in the Yellow River valley at Ra-gya for the unfolding of the autumnal flora and therefore no Gentians, Aconites and Delphiniums are here recorded, but these were collected on journeys north to and from the Gyü-par (Jü-par) Range, and in the grasslands on the journey back to La-brang. Although certain species of the above mentioned genera may be found only in the Yellow River valley near Ra-gya and not elsewhere, yet those collected on the mountains north of Ra-gya, and the intervening grasslands, occur in all probability also on the mountains about Ra-gya. We have here a cross section of flora peculiar to the Yellow River gorges and that of its tributaries. As we go farther north the flora becomes poorer for the area north of the Gyü-par (Jü-par) Range and the Yellow River proper is adjoined by waterless desert areas, swept by winds.

The Gorges of the Yellow River North of Ra-gya and South of the (Gyü-par) Jü-par Range

On all modern maps, the great bend of the Yellow River from Sog-tshang dgon-pa the Chinese So-tsung-kung-pa north and west, as well as its course past the Am-nye Machhen to where it cuts through the Gyü-par Range (brGyud-par) appears still dotted, indicating that it is still unexplored. Although we explored the gorges of the Yellow River from gTsang-sgar to north of the Gyü-par (Jü-par) range as far back as 1926, this is the first accurate account of the region and its plant covering. Only a popular article about the region had been published in the *National Geographic Magazine* of Washington D.C., entitled: Seeking the Mountain of Mystery.³⁸ For many years I had been planning to publish a scientific account of our explorations from copious notes, maps, etc., made at the time, but this is the first opportunity that has presented itself, my previous time having been occupied with other work such as the translations of Na-khi tribal literature and a historic and geographic account of their territory.³⁹ A historic-geographic account of the region I hope to publish in the not too distant future with translations of Chinese and Tibetan texts pertaining to the history etc., of the area in question. It remains here to give a geographic and botanical account of the hitherto unexplored region, which had not been visited either before or after our visits from 1925-1927.

³⁸ *National Geographic Magazine* 57.1930, 131-185, 54 pl., 1 map.

³⁹ *The ancient Na-khi kingdom of South-west China*, published by the Harvard-Yenching Institute, Memoir Series vols. VII & VIII, 1947. 2 vols., 257 plates, 4 maps, and *the Na-khi Nāga cult and related ceremonies* in Rome Oriental series, 2 vols, 60 plates, 2 in color, 823 pp. text, 1952. [J.F.R.]

It was expected that on account of the considerable drop in the Yellow River between its source and where it reaches Kuei-te hsien there would exist waterfalls, especially where it passes through the deep gorges east of the Am-nye Ma-chhen, but no such waterfalls exist anywhere only terrifically swift rapids, and cataracts follow each other whose velocity we could not ascertain. All the Tibetans we interrogated about the possibility of following the Yellow River down in its gorges were unanimous in their statements that it is absolutely unfeasible, especially with a yak caravan, even to follow on the upper edge of the gorge on account of the many tributaries, all of which flow in narrow valleys intersecting the loess plateau here, but one could not follow on the edge of the gorge on account of the steepness of the ravines. The only way possible was by crossing valleys higher up and then pass along the intersecting spurs and observe and photograph the river from some prominent point.

In order to ascertain the truth of these statements we thought at first to make a preliminary investigation of the gorge by arranging a short trip down the Yellow River valley on the grass-covered edge of the gorge. We were however soon convinced that to follow the gorge down along the edge on the top, was actually impossible especially with a yak caravan.

The right wall of the Yellow River valley is less high than the left side which becomes higher and higher the further west one proceeds till the mountains finally merge into the Am-nye Ma-chhen range. The sides of the valleys are precipitous on both flanks in many places, especially on the west side where they are forested in parts with junipers facing south or southwest, and with spruces facing north or northeast. The entire valley is slate, schist and shale, with superimposed loess of tremendous thickness, the demarcation line is very prominently visible in the photographs. Some parts of the gorge especially nearer Ra-gya, show broad horizontal bands of sandstone conglomerate under the loess, and schale, schist and quartz below the conglomerate.

From Ra-gya the Yellow River flows in a northwesterly direction making many short turns around projecting spurs, till the great tributary the Tshab Chhu, which descends from the center of the Am-nye Ma-chhen east, is reached. There the Yellow River turns north as far as Ta-ho-pa 大河坝 where it described a shallow arc, proceeds north-northeast, cutting through the western end of the Gyü-par (Jü-par) Range, and then flows in a northeasterly direction towards Kuei-te 貴德.

On May 27th we started with a small yak caravan of ten animals and several horses on this preliminary excursion. All the left valley walls were partly covered with *Picea asperata* Mast., while those on the right were partly clothed with *Juniperus Przewalskii* Kom. I climbed to a bluff whence I took photos up and down stream, the river flowing here from south to northwest, the latter being the general direction (See Plate 57-58). The bluff or promontory was at the mouth of Hao-ba (Hao-wa) valley at an elevation of 10,902 feet, while the trail led at a height of 11,300 feet. From this spur we descended into Hao-wa valley or rather ravine full of *Juniperus Przewalskii* Kom., and many willow bushes which grow along the streambed as *Salix sibirica* Pall., *Salix Rockii* Görz, *Salix rehderiana* var. *brevisericea* Schn., *Salix wilhelmsiana* M. B., *Salix taoensis* Görz, all about 4-5 feet in height. These willows occurred also in the Nya-rug Nang or Nya-rug valley which the Tibetans designate the willow valley, which precedes the Hao-wa valley (east). Associated with them are *Caragana jubata* Poir., *Rosa bella*

Rehd. & Wils., *Salix myrtilleacea* And., and *Ribes Meyeri* Max.; on the grassy slopes grew a fleshy stemmed Euphorbia (no 13941), *Iris Potanini* Max., the latter preferring rocky situations. Above, on the alpine slopes, grew *Salix oritrepha* Schn. var. *tibetica* Görz with masses of *Rhododendron capitatum* Maxim., *Sedum quadrifidum* Pall. var. *fastigiatum* Fröderström (14042) (*venustum* Praeg.), formed large cushions on boulders and on the cliffs at 11,000 feet, its dark red flowers contrasting with the glaucous foliage.

With *Juniperus Przewalskii* Kom., there also grew *Juniperus tibetica* Kom., a tree 20 feet in height but only on the slopes of the intervening spur between Nya-rug Nang and Hao-wa valleys. Here in these juniper groves we shot the white-winged grosbeak *Perissospiza carripes carripes* (Hodgs.) with large thick, triangular beaks, they were feeding on the juniper forests. Partridges, *Alectoris graeca magna*, disported themselves in the willow bushes and on the rocky hillsides.

I descended the Hao-wa valley almost to the Yellow River, but half a mile from the mouth the valley becomes so narrow and steep that further progress was impossible. In the bushes of willows, Berberis, Caragana and Ribes we shot a pink finch, and on the trunks of *Juniperus Przewalskii*, which filled the valley floor, a woodpecker.

On May 29th we returned to Nya-rug Nang and from there climbed at a terrific angle to a pass 11,850 feet elevation (see Plate 59); whence in the distance north, there was visible a cairn or Obo on a high promontory. From there, so our nomad yak driver told us, one could see the Am-nye Ma-chhen Range to great advantage. The Obo is directly north-northwest bearing 316° and is known as Mo-khur-ri-ser-ma. On the long spur immediately below us grew *Juniperus tibetica* Kom., scattered over the hillside, while on the right bank of the Yellow River we noticed groves of Junipers mixed with Betula (birches). In the distance there was visible a bare mountain extending from northeast to southwest called Ha-rlung (Ha-lung), at the foot of which the Yellow River turns west; our objective, the long and forested valley called sTag-so nang was some distance south east of Mount Ha-lung.

We decided to descend into Hao-wa valley and there pitch our camp at an elevation of 10,980 feet. It was a peaceful night, hidden away as we were in the fragrant juniper grove. A brilliant and cool morning found us again on our way; we sent the yak caravan over an easier trail while we climbed the steep forested slopes of the canyon over a zig-zag trail to the top. To ride was of course impossible. On reaching a pass 11,100 feet elevation we obtained a magnificent view over the gorge of the Yellow River and its tremendous rapids. The right valley slopes are absolutely bare, but the left one is forested with spruces, the trees extending to near to the top of the mountain (see Plate 60-62). Below the pass is a bluff called rTa-ra-lung as is the valley near by. The trail was a difficult one as it led over knife-edge ridges from one canyon into another; descending from Ta-ra-lung we reached a very narrow canyon called Sa-khu-tu, its stream flowing at 10,420 feet elevation, the bushes and trees were the same as in the Hao-wa valley, with the exception that on the gravelly slopes we found two species of *Corydalis*, both yellow-flowered the *Corydalis adunca* Max., but the second species is as yet unidentified (no. 14047). Among the rocks near the streambed we shot a wren, *Nannus troglodytes idius* (Richm.), whose habit is to fly low along the water's edge.

From Sa-khu-tu the trail leads up a bluff elevation 10,910 feet and about 1,200 feet above the Yellow River. The region on the right (east) side of the Yellow River is one maze of narrow canyons while on the west side only two shallow, gentle sloping valleys debouch into the Yellow River, the Shog-chhung and Shog-chhen, these valleys are beyond the Sa-khu-tu ravine, while diagonally opposite is the long Shag-lung (valley) which has its source in a mountain or pass called the hBrug-dgu nye-ra (Drug-gu nye-ra), over which a trail leads to the Am-nye Ma-chhen.

Tsha-rgan-hor-sgo (Tsha-gen-hor-go) is another deep canyon separated from Sa-khu-tu by a ridge and pass 11,200 feet elevation whose crumpled, folded walls of schist and shale are nearly one thousand feet in height, its floor and slopes covered with *Juniperus Przewalskii* Kom., with here and there the common spruce. Along the streambed were the usual shrubs of *Caragana Maximovicziana* Kom., and *C. jubata* Poir., with *Potentilla fruticosa*, *Salix myrtilleacea*, *Sibiraea angustifolia* (Rehd.) Hao, and others. Here in this valley we met with some mighty monarchs of junipers (*J. Przewalskii* Kom.), hundreds of years old and loaded with the dark purplish, glaucous round dupes, the foliage of a pleasing green, very different from the dull brownish green *Juniperus zaidamensis* Kom., of the T'o-lai Range north of the Koko Nor. The trail crosses the streambed at 10,800 feet and leads up the valley among willows, etc., for a considerable distance, past some lonely nomad camps belonging to the sGar-rtse (Gar-tse) tribe or clan of whom our yak driver was a member. He knew the name of every valley, spur and bluff and as he was an old friend of W. E. Simpson, who also accompanied me, we could vouch for the correctness of all the names. Beyond the encampment the trail turns up a narrow rocky ravine, the rocks like those of the Yellow River valley being slate, schist and some white quartz, the ground was littered with the flat slabs of these rocks. In its lower part Tsha-gen-hor-go, like all the rest of the tributaries, is an appallingly steep canyon, while higher up it becomes a shallow valley, merging into the grassy plateau, but still showing the same rock outcroppings. The upper parts of these valleys are the camping grounds of Tibetan nomads, and as their mud-stoves are only capable of burning sheep manure, the Tibetans do not find it necessary to cut timber for fuel, thus the forests are intact, except that they suffer from the grazing of the sheep and yak. As the spruce forests have as sole ground covering moss (*Mnium* sp?) of over a foot in thickness, the sheep do not penetrate into these but confine their grazing to the bare hillsides or under the junipers which seem to prefer a dry or well-drained open slope. It is only where grass encroaches on the moss covering in the spruce forests, that both moss and spruce begin to die.

Short narrow valleys descend at right angles to the tributaries from the spurs which separate them, and one in Tsha-gen-hor-go leads to the pass called Mo-khur Nye-ra, 12,800 feet above sea-level. Mo-khur Nye-ra is on the ridge on which the Obo Mo-khur-ri-ser-ma is situated.

On the grassy slopes of the pass bloomed the dark mauve, to blackish-red *Anemone imbricata* Max., and the yellow flowered *Trollius pumilus* var. *alpinus* Ulbr., a new variety, and a little higher at 13,000 feet the pink flowered and very fragrant crucifer *Parrya villosa* Max., reminding on the scent of lilac.

On the Re-lung Nye-ra at 12,800 grew various shrubs as the prostrate *Lonicera tibetica* Bur. & Franch., its pink flowers exhaling a delicious fragrance, the 3 feet tall

Salix oritrepha Schn. var. *tibetica* Goerz, a new variety, *Potentilla fruticosa* L., and *Rhododendron capitatum* Max. From Mo-khur Nye-ra we had our first part-view of the Am-nye Ma-chhen Range, but only the northern massive dome was visible. In order to obtain a better view we climbed a higher peak to the right, northeast of the pass, to an elevation of 13,220 feet. I must confess that my first view of Am-nye Ma-chhen was rather diappointing, and this same disappointment was expressed by my Na-khi companions from Northwest Yün-nan, who dwell among snow mountains and who with me explored the snow ranges composing the so-called «hump» between India and China. We thought the Am-nye Ma-chhen less high than the Mekong-Salwin divide, but that may have been due to the many ranges, mostly flat topped, which intervened, while from the peaks of the Kha-wa-dkar-po there is a sheer drop of about 12,000 feet to the Mekong, which cause them to appear much higher. At any rate the Am-nye Ma-chhen is not nearly as sculptured as the ranges which form the Yün-nan-Tibet divide in the southwest.

From the pass we could see two outstanding features of the range, each at the opposite or extreme end of the range, the southern one a blunt pyramid, and the northern one a vast dome, the highest part of the range. Between these are lesser peaks, and the highest of these lesser is the Am-nye Ma-chhen after which the range derives its name. The highest peak could never bear the name Am-nye Ma-chhen for the latter is only a local sa-bdag or earth lord, while the higher pyramidal peak to the south of it bears the name of Spyan-ras-gzigs pronounced Chen-re-zig or the God of Mercy the patron deity of Lha-sa of which the Dalai Lama is considered the incarnation. Ma-chhen spom-ra is however the mountain god of the mGo-log tribes, who live in fear and dread of him who, as his classic reveals, controls the lightning, hail, etc.

The compass bearings of the range taken on the peak back of Mo-khur Nye-ra gave the following readings: extreme south promontory 268.5°, the pyramid Chen-re-zig 270°, intermediary peak 271°, Ma-chhen spom-ra (or Am-nye Ma-chhen) 272°, the summit of the dome 275°, and extreme northern end visible and all deeply in eternal snow, 277.5° For further details of this range see the chapter: The Am-nye Ma-chhen Range.

From Mo-khur Nye-ra the trail leads over a slope densely covered with the shrubby *Rhododendron capitatum* Maxim. which also extends into the next valley with a swampy floor called the Shangs-shub. This short valley extends northwest into the Ar-tsa Nang, a tributary of the Yellow River, the only one east of the great valley over 60 miles long, called sTag-so Nang (Tag-so Valley). Between Ar-tsa and Tag-so is a high spur elevation 11,700 feet forested mainly with *Juniperus Przewalskii* Kom. (see Plate 63). On the left (southwest) valley slopes of the Yellow River gorge are extensive forests of *Picea asperata* Mast.

Tag-so Nang and Its Flora

After days of traveling over the bare grassy uplands this valley proved a botanist's delight. We pitched camp at the only available flat space near the streambed at an elevation of 10,146 feet (see Plate 64). The tree which formed pure stands on the north-facing slopes was again the common spruces; it reached heights of 150 feet with trunks

several feet in diameter [Plate 65]; it clothed the steep walls of the canyon to the exclusion of everything else. [Plates 66-67]

Birches *Betula japonica* Sieb. var. *szechuanica* Schneid., lovely to behold in their rich green spring foliage grew on the outskirts of these forests. The ground cover was thick moss of a species belonging to the genus *Mnium*, to which the leguminous *Thermopsis alpina* Ledeb., an herb, about one foot high, with yellow flowers was partial. The clear crystal stream was bordered by *Berberis Boschanii* Schneid., and *Ribes Meyeri* Max., with red, drooping inflorescences. Encroaching the mossy forests were *Lonicera hispida* Pall., and *Sibiraea angustifolia* (Rehd.) Hao (see Plate 68), but confined to the streambed were *Caragana brevifolia* Kom., and the new shrubby willows *Salix pseudo-wallichiana* Goerz, *Salix juparica* Goerz, and *Lonicera syringantha* Max.; *Lonicera microphylla* Willd., formed compact shrubs 4-5 feet tall, perfectly globose, on rocky exposed bluffs as did *Cotoneaster acutifolius* Turcz., with pink flowers and reaching 4-5 feet in height. *Sorbus tianschanica* Rupr., overshadowed the willows, hugged the cliffs, or grew on top of fallen boulders in the streambed, its spreading crown bearing umbels of white flowers. The common *Ribes stenocarpum* Max., the Kan-su wild gooseberry, in company with *Hippophaë rhamnoides*, *Potentilla fruticosa*, and *Myricaria dahurica* Ehrenb., constituted the ligneous flora in the valley near the stream. On the grassy exposed slopes grew the tall *Rheum palmatum* L., with brilliant red flowers, *Stellera chamaejasme* L., *Iris gracilis* Max., *Viola biflora* L., and *Polygonatum bulbosum* Lev.

Near the upper edge of the canyon among rocks, *Berberis diaphana* Max., a shrub 4 feet high with single yellow flowers was associated with junipers which grew here and there on the south-facing slopes. On bluffs overlooking the Yellow River, partial to wet gravel, flourished the handsome *Incarvillea compacta* Max., displaying brilliant red flowers with white markings in its throat; higher still with *Potentilla* and *Caragana jubata* Poir., here a prostrate shrub, grew innumerable yellow poppies *Meconopsis integrifolia* Franch. On the wet, often swampy alpine meadows, on the flat tops of the spurs, *Primula Purdomi* Craib, displaying reddish-purple flowers with yellow eyes, and *Primula limbata* Balf. f. et Farr., had their being.

A considerable distance up the ravine is a small grassy area where huge spruces and junipers (*Juniperus tibetica* Kom.) form dense forests. (See Plate 69)

From a bluff elevation 10,900 feet on the northern valley wall of Tag-so canyon called Ngar-khi gzhug-ma (Ngar-khi zhug-ma or the lower Ngar-khi) a view is obtained down the Yellow River gorge showing the many cataracts, the river flowing northwest. The north-facing slopes (left bank) are forested with spruces and birches, a species of poplar grew scattered among them but could not be collected as it grew west of the river. The highest slopes above the right bank were covered with masses of *Rhododendron capitatum* Max., with aromatic small leaves, and lavender-blue flowers.

On these lonely slopes, high above the Yellow River, two nomad families had pitched their tents, such isolation and seclusion from human contact must leave its imprint on the mind, and foster suspicion towards strangers; they could not have pitched their tent in a more inaccessible spot. From this vantage point a wonderful view could also be had up Tag-so valley showing the forest demarcation line.

Below the camp the streambed narrowed, and to where it debouches into the Yellow River is but a stone trough of great depth, the water roaring through the defile washing both walls. Rocks or boulders 20 feet high blocked the streambed like steps of a giant's stairway. A waterfall prevented all progress and forced us to climb up steeply the left rock wall but without obtaining a view down into the mouth of the ravine. Through the rocky gate the surging waters of the Yellow River could be seen; the rapids were gigantic and the water was thrown many feet into the air.

The highest promontory above the canyon is Ngar-khi gong-ma (or the Upper Ngar-khi), elevation of 11,150 feet; from this vantage ground the trend of the Yellow River gorges could be observed for quite a distance. Further north the valley became more arid, and forests ceased, the rock formation was the same, numerous talus slopes extended into the Yellow River Valley on which a few birches had taken a foothold. On a rocky bluff near the summit grew the lovely *Incarvillea compacta* Max., also *Paraquilegia anemonioides* (Willd.) Ulbr., with purplish pink *Corydalis*, and the pathetic-looking *Primula flava* Max.

The decorative, white-flowered *Androsace Mariae* Kom. var. *tibetica* (Max.) H.-M., adhered to the rocks while the rather unlovely, dull *Primula tangutica* Duthie, one of the most graceless and homely looking species, its doleful, somber red flowers drooping as if it were ashamed of itself or aware of its homeliness, vaunted its ugliness above it.

The forest and the bushes along the stream were alive with birds, of which the following frequented the willow bushes, *Phylloscopus magnirostris*, *Phylloscopus Humei praemium* (M. & I.), *Phylloscopus Armandi* (Milne-Ed.) and *Phylloscopus proregulus proregulus* (Pallas), all willow warblers.

About eight miles from the point where the Yellow River flows north and beyond the mouth of the Tshab Chhu, the Yellow River receives a fairly large tributary, the hJang-chhung or the small Jang River; the same distance beyond the latter it acquires a still larger tributary the hJang-chhen or the Great hJang River, both have their sources west of the mDzo-mo La or the Dzo-mo Pass (= Half-Breed Yak-Cow Pass), at an elevation of 13,290 feet. In the former valley live the Yir-chhung Tibetans, and in the latter the Wam-chhog Tibetan clan. Half way between these two tributaries, the hBrong-sde nang (Drong-de nang) or the wild Yak valley empties its waters into the Yellow River from the west.

There are no other large tributaries, till we come to the long Bâ Valley (hBah), and beyond it to the short tributary called the Mu-gyang (Mu-yang) which has its source in the Tho-thug Nye-ra (pass) 13,900 feet elevation. From brGyud-par mtshar-rgan (Gyü-par tshar-gen) the highest peak of the Gyü-par Range, 14,456 feet elevation another tributary, whose name we could not learn flows into the Yellow River or rMa Chhu (Ma Chhu).

Where the Ta-ho-pa 大河坝 joins the Yellow River, the latter flows in a broad valley at the foot of steep, and much eroded loess bluffs of considerable height, only to enter the gorge it has cut through the northwestern end of the Gyü-par (Jü-par) Range.

Upper Tag-so Valley and the Grassy Plateau and Passes East of It

Looking south from an elevation of 12,300 feet a snow-covered range between 16,000 and 17,000 feet in height, extended from east to west, it is probably a part of the Am-nye Ma-chhen system, and is the border of the Go-log country. Northeast of Tag-so canyon at an elevation of 12,780 feet, on the grassy spur we met with the long-spined *Caragana jubata* Poir., here only about 2 inches high and prostrate, among which grew masses of *Meconopsis integrifolia* (Max.) Franch., also the ultramarine colored *Corydalis curviflora* Max., *Potentilla fruticosa* L., etc. The grassy spur merged into broad meadows in which thrived *Primula sibirica* Jacqu., and *Primula limbata* Balf. f. et Farr., its flowers a deep lilac-blue with dark blue throat and leaves a dull green.

Other alpiners, loving swampy situations, were *Draba oreodes* Schrenk. var. *racemosa* O. E. Schulz with yellow blooms, *Pedicularis oederi* var. *heteroglossa* Prain, also yellow flowered, a Euphorbia (no 14093) as yet unidentified with dark red flowers and bracts, and *Allium monadelphum* Turcz. var. *thibeticum* Regel. One of the handsomest plants found here was the new crucifer *Cheiranthus roseus* Max., forma *caespitosus* with deliciously fragrant pale pink flowers tinged purplish, associated with the similarly fragrant *Parrya villosa* Max., an exquisite herb with pinkish-mauve flowers, all happy at an elevation of over 13,000 feet, frozen and covered with snow and ice for the greater part of the year. The pink flowered *Caragana jubata* Poir., continued to an elevation of 13,200 feet as did the species *Cheiranthus roseus* Max., proper.

From this highest point of the ridge a marvellous view can be enjoyed of the Am-nye Ma-chhen Range on clear days for the mountains are lower here on the other side of the Yellow River, and due to the presence of a broad valley, the Tshab Chhu nang which extends directly from the Am-nye Ma-chhen east into the Yellow River. A small valley debouches here into the Tag-so canyon, called Kun-bde (Kün-de), on the inner side of which, on the gravelly slopes, the beautiful *Incarvillea compacta* Max., grew in profusion.

We followed the Kün-de valley into the Tag-so and were there overtaken by one of the fiercest electrical storms we had ever experienced, it made its way from the Am-nye Ma-chhen to our side of the Yellow River. The storm lasted for half an hour, a terrific downpour accompanied by hail and fierce lightning, a continuous discharge of electricity; the thunder rolled without interruption and sounded like a terrible battle at close range, peal followed peal in a terrifying continuity. There was nothing to be done but to continue down into the valley while the lightning crashed at 13,000 feet elevation on an open ridge. Near the mouth of Kün-de valley were many nomad tents, guarded by vicious Tibetan mastiffs the size of a small lion with huge manes. I hated the sight of nomad tents for it always meant fighting off the vicious brutes who have been trained to instinctively make for a man's throat. Whips are of little avail, they sometimes jump up the rear of a horse and bite the rider in the back, which happened once to one of my men. They came from all directions and I was forced to use my 45 colt automatic as one jumped up my horse trying to tear my limbs.

The Tag-so valley is here absolutely bare, the streambed is shallow and no one would surmise that in its lower part it harboured such lovely forests. Continuing for some distance we passed other encampments and to where two lateral valleys met we pitched camp on a grassy level spot. The valley extending southeast is called Wa-ru nang, the

other extending northeast, is the U-su-to, a narrow rocky ravine with a few *Juniperus tibetica* Kom., trees on its upper slopes.

The junction of these ravines is known as Wa-ru mdo and is at 11,300 elevation. Here in the ravine of U-su-to we shot several birds among them *Prunella rubeculoides Beicki* Mayr.

Returning to Ra-gya we followed up the Wa-ru valley east and then southeast, the ascent being gradual. The valley wall facing southwest is composed of much folded and tilted schist, the cliffs contain also slate and shale especially near the valley floor; on the opposite side the hills slope gently, are of loess and grass-covered. Wa-ru valley is of considerable length and absolutely bare, a lonely forlorn place. In its upper third it is joined by several lateral valleys, two on the left, and it is in the last or upper lateral valley that the trail leads to a pass. In the streambed the ice was here two and a half feet thick covering the whole width of the stream, and this in June. Here grew *Rhododendron capitatum* Max., *Potentilla fruticosa* L. the latter not in flower and several willow bushes, *Meconopsis integrifolia* Franch., grew scattered over the grassy slopes with *Caragana jubata* Poir., *Cheiranthus roseus* f. *caespitosus* and a tiny Euphorbia. The ascent to the Wa-ru la or Wa-ru pass is quite steep especially the last few hundred feet, the ground was composed of muddy gravel in which grew the lovely *Primula limbata* Balf. f. et Farr., with the large single flowered *Oxigraphis glacialis* Bge., of the Ranunculaceae, first described from Siberia, and the fleshy creeping, blue-flowered scrophulariaceous herb *Lagotis glauca* Gaertn. Wa-ru La (pass) is 13,720 feet above the sea, to the left (north) of the pass is a high scree and as it promised to give us a view of the Am-nye Ma-chhen we climbed it. We expected Saussureas to grow on the top of the scree but were disappointed; that Saussureas do grow there is certain for we found old rosettes from the previous year, but no new ones, the time being still too early. The rocky summit was 14,350 feet elevation and had it not been cloudy we would have had an unobstructed view of the Am-nye Ma-chhen; as it was we saw the lower glaciers and parts of the highest peaks above the clouds. From this vantage point the Am-nye Ma-chhen looked higher than it appeared from Mo-khur Nye-ra.

Looking south there was outlined in clearest atmosphere, a long snow-covered range which I estimated to be 17,000 feet in height judging from the immediate mountains around, all of which were over 15,000 feet yet without a vestige of snow, while those in the south were snow-covered for about a thousand feet. Here it was made evident that the snow-covered range in the south (within the knee of the Yellow River) joined the Am-nye Ma-chhen indirectly, that is it formed a shallow curve of which the Am-nye Ma-chhen peaks were the highest of the entire range, but towards the northwest, beyond the great dome, the range dwindles rapidly.

On the grassy slopes of the hill south of the Wa-ru La we found another primrose, *Primula Purdomi* Craib with flowers of a deep lilac color with a yellow eye, and coriaceous leaves, it was the only plant in flower, but leaf-rosettes indicated that others would soon join it in a burst of color. There were also many rosettes of *Meconopsis*, *Aconites*, *Delphiniums*, *Gentiana* and others, but for these it was still too early.

Directly south lay another long valley bearing the same name; the Tibetans have the custom, as already remarked, to give two opposite valleys whose heads culminate in a pass, the same name, which name is also applied to the pass between them. From this

pass the trail descends steeply into the Wa-ru nang over a swampy meadow and boggy slopes to the mouth of the valley, which branches here at 12, 870 feet; the left branch descends from the Wa-ru La, and the right one from the Wo-ti la, the two forming the main Wa-ru Nang. At the junction of these two valleys we shot three species of game birds, the partridge *Perdix Hodgsonii sifanica*, *Tetraogallus tibetanus Przewalskii* Bianchi and *Alectoris Graeca magna* and several hares.

The brGyud-par (Gyü-par) Range

From brGyud-par to the hBah (Bâ) Valley

As we had not yet been able to make arrangements for the journey to the Am-nye Machhen we decided to explore the Gyü-par, actually pronounced Jü-par Range in the upper bend of the Yellow River south of Kuei-te. We would thus also traverse previously unexplored territory between Ra-gya and the Bâ valley and beyond, the Gyü-par Range, which had been crossed on its extreme eastern end by Karl Futterer, but had never been explored or its peaks climbed. The range is not marked on some Chinese maps and on others the Tibetan name is transcribed Chu-p'a-erh Shan 朱帕尔山 in Chinese. The Yellow River cuts through its western end and flows northeast of it. The range itself extends from northwest to southeast and then east, describing a gentle arch. A long valley called the Gyü-par Nang stretches to the northeast, that is parallel to it, this valley has its main source in the Tho-thug Nye-ra, elevation 13,900 feet; a shorter branch joins it from the northeast with its source in the sGo-mang dgung-kha (Go-mang gung-kha). At the headwaters of the Gyü-par stream the mDah-tshang (Dâ-tshang) Tibetans have their encampments.

The very much feared robber tribe called the Shab-rang has its encampment both south and north of the Bâ Valley, their territory extending to the southern foot of the Gyü-par Range. At the mouth of the Gyü-par valley, south of the Yellow River dwell the dGah-hja (Gâ-ja) clan who are under the control of the lamasery of dGah-rang (Gâ-rang) situated west of the Gyü-par valley.

The Gyü-par Range has two high peaks, both located in the western fourth of the range, the highest being brGyud-par mtshar-rgan (Gyü-par-tshar-gen), elevation 14,546 feet, the second brGyud-par sher-snying (Gyü-par sher-nying), only slightly lower.

To the northeast of the Gyü-par Range is a waterless plateau known as the Ma-la-dge Thang (Ma-la-ge thang) which extends to the Yellow River, while further east and north of the range, actually an extension of the Ma-la-ge thang, are many sand dunes called Mang-ri bye-ma (Mang-ri je-ma). What the Gyü-par valley is to the northwestern end of the range, the sGo-mang nang (Go-mang nang) is to the other or eastern half of the range; it has its source in Go-mang gun-kha, but on the eastern slopes, and extends east the whole length of the range, it probably empties into a tributary of the Yellow River.

Owing to the feuds and internecine strife existing between the various Tibetan clans it was most difficult to hire yak to take us to the Gyü-par Range; it proved in fact impossible for any clansman to go into the territory of the other, for fear of being held as hostage. It was suggested that we hire yak from clan to clan. This I refused for one might be dropped in a neighboring tribal territory and left there, or be subjected to price exactions, if not exposed to robbery. We therefore hired yak from the western side of

the Yellow River and engaged three lamas of Ra-gya monastery who belonged to an encampment west of the river, to take us to the Gyü-par Range and back again to Ra-gya. Lamas are more or less immune, but not always, and none prayed more fervently than our lamas, while we were in the territory of the Sha-brang tribe of unsavory reputation. That tribe was feared by all, as its members are ferocious and no respectors of persons; they are quickly disposed to robbing, even murder if profitable.

Having made arrangements with our lamas we left Ra-gya June 19th with fifteen yak and three well armed lamas, ourselves also being armed with modern rifles, and automatic weapons.

We followed the Kuei-te trail back of Ra-gya lamasery in and out lateral ravines which extend into Dreg-yang nang (Dre-yang Valley), the latter's outlet is east of Ra-gya and like all tributaries, flows through a vertical rock gate as it approaches the Yellow River, thus forming a gorge, here of conglomerate as are the cliffs in the vicinity of Ra-gya.

The flora of Dre-yang valley is much like that found in other valleys near Ra-gya, but owing to the advent of summer, additional, later flowering species had made their appearance. Among the bushes of willows we found two species of *Thalictrum* one with purple (no 14126), and one with white flowers (no 14125) these have not been included in B. Boivin's recent (1945) work: *Notes on some Chinese and Korean species of Thalictrum*, but other numbers of the same collection were described by him. In the wet grass grew *Pedicularis semitorta* Max., the white flowered *Anemone rivularis* Ham., *Ajuga lupulina* Max., a labiate with cream-colored flowers and purplish tinge, and the crucifer *Draba lanceolata* Rayle var. *leiocarpa* O. E. Schulz, also found in Mongolia, Turkestan and in the Himalayas; another but new variety of the same species, var. *latifolia* O. E. Schulz occurred with it as did *Pedicularis scolopax* Max., with rather larger than usual, yellow flowers, first collected by Przewalski in Kan-su. Of crucifers besides the *Draba* we encountered *Torularia humilis* (C. A. Mey.) O. E. Schulz, and *Malcolmia africana* (L.) R. Br., the former a white and the latter a pink flowered species, and first described from Ethiopia. The primulaceous *Glaux maritima* L., and *Corydalis straminea* Max., the latter with yellow flowers, composed the herbaceous vegetation then in flower. The commonest shrub besides willows was the 2-3 feet high *Potentilla fruticosa* L. var. *parvifolia* Wolf., which occupied the rocky banks at the foot of the cliffs.

The grass flora was well represented and consisted of *Poa attenuata* Trin., *Poa flexuosa* Wahl., *Deschampsia caespitosa* (L.) Beauv., the new variety *brachystachys* of *Elymus sibiricus* L., *Koeleria argentea* Griseb., *Trisetum* sp? and others.

At 13,000 feet Primulas made their appearance, as *Primula limbata* Balf. f. et Farr., and *P. Purdomii* Craib, but were here less common than on the Wa-ru La. Yellow poppies *Meconopsis integrifolia* Fr., were in all their glory, their huge golden bells nodded all over the hillside. Less prolific grew the deep lavender poppy *Meconopsis quintuplinervia* Reg., and a bronze-colored *Fritillaria Roylei* Hook., with single nodding flowers. This is the renowned *Pei-mu*, a Chinese medicine, its small white bulbs forming an article of export. It is one of the most valuable wild products fetching high prices, as much as \$ 20.00 U.S. per lb. Over the hillside here and there were scattered bushes of *Rhododendron capitatum* Max. Aconites and Delphiniums were

plentiful but not yet in flower, and of *Pedicularis* only one species occurred, and that a new one *Pedicularis calosantha* Li sp. n., with purplish pink flowers, also found in the Min Shan to the south; it was associated with the new *Astragalus Peterae* Tsai et Yü, and *Carex striata* L. ssp. *pullata* (Boott) Kük. The pink *Caragana jubata* Poir., was in full bloom, but instead of growing erect kept close to the ground.

On the Wo-ti La, elevation 14,280 feet we collected among the rocks the small cushion plant *Arenaria kansuensis* Max., also *Potentilla Saundersiana* Royle, with yellow flowers, the purplish white *Oxytropis melanocalyx* Bge., the dark reddish-black flowered *Anemone imbricata* Max., and on grassy swampy spots *Coluria longifolia* Max., with *Draba oreodes* Schrenk. var. *Tafelii* O. E. Schulz, the yellow flowered *Cremanthodium Decaisnei* C. B. Clarke, *Saxifraga melanocentra* Fr. forma *Franchetiana* Engl. & Irmsch., while *Arenaria melanandra* (Max.) Mattf. an herb with pale pink flowers was partial to scree. On the swampy alpine meadows thrived the dull blue flowered, *Astragalus skythropos* Bge., the Edelweiss *Leontopodium linearifolium* H.-M., the crassulaceous *Sedum algidum* Led., whose flowers, when open, are of a pinkish-drab color, and the pale yellow flowered *Corydalis trachycarpa* Max. The only prostrate shrub found here was *Lonicera tibetica* Bur. & Fr., confined to the alpine meadows at over 14,000 feet elevation.

Looking south-southwest, there extended the Wa-ru nang (valley), and north-northwest Wo-ti nang. The rocks on the summit of the pass, and on the surrounding hills are slate. West of the Wo-ti La are two rocky hills one 14,350 feet, and the other 14,680 feet high, from the latter a fine view of the Am-nye Ma-chhen can be had. Here on the top, among the rocks we found *Anemone imbricata* Max., *Saxifraga Przewalskii* Engl., its flowers a yellowish red, *Oxytropis melanocalyx* Bge., the lovely *Primula Woodwardii* Balf. f., with its reddish-purple flowers displaying a yellow eye, *Corydalis dasyptera* Max., the crucifer *Cochlearia scapiflora* Hk. f. et Th., and *Pedicularis oederi* var. *heteroglossa* Prain, all were confined to the highest point west, up to an elevation of 14,680 feet.

On the loose slate grew one species of *Saussurea*, not then in flower, and a single Aster, *A. flaccidus* Bge., with purple disk and yellow ray florets.

The summit afforded an excellent view north of the Gyü-par Range whither we were bound, a long mountain range extending west across the Yellow River; its highest part in the west I judged to be 15,000 feet in height, but in the east it dwindles to low hills.

The descent into the Wo-ti nang (valley) is much more gradual than that from the Wa-ru la. The trail leads north from the pass; the whole hillside was one grand bog, and the mountains south of the Wo-ti la were snow covered. At the first grassy spot where it was feasible to pitch camp, we stopped. Our camp was one of the highest on the journey, 12,881 feet.

To the east of the Wo-ti valley, the mountains are higher in the immediate vicinity, while to the west a black range extends in front of the Am-nye Ma-chhen which I judged to be between 16,000 and 17,000 feet high. All around our camp were yellow poppies and willow bushes about 2 feet in height, *Salix oritrepha* Schneid., the same species which occurs also in the Wa-ru valley at about the same elevation.

The Wo-ti valley led into the upper Tag-so valley whose streams mingled at an elevation of 11,790 feet; the Tag-so stream comes from east-northeast and flows here

west-southwest, the head of the valley is still ten miles east. We could not learn the name of the pass where it has its source. Crossing the valley diagonally to the mDzo-mo Nang (Dzo-mo Nang) or the Half-Breed Yak-Cow Valley, which extends from north-northeast to west-southwest, we entered it, and followed it upstream; the valley floor was very boggy and difficult for our horses to negotiate. Here we found cushions of the tiny *Primula fasciculata* Balf. f. et Ward, (synonym *Primula reginella* Balf. f.) or rather embedded in cushions or tussocks of grass, the entire individual plant being only one third of an inch or less high; the flowers are a loud pink with a yellow throat; with it grew the very pubescent, yellow flowered *Astragalus tatsiensis* Bur. et Franch., and a *Euphorbia* (no 14241) with reddish purple bracts.

Gradually the trail leads to the pass, the Dzo-mo La, at an elevation of 13,290 feet, a much easier one than the Wo-ti La. There were very few plants out on this pass, and none that had not been found on the higher Wo-ti La, except for *Leontopodium linearifolium* H.-M. here a rather small plant.

To the left or west of the pass is a rocky bluff 13420 feet in height and this we climbed; we were rewarded with a fine view of the Gyü-par Range, the bearing for its highest peak being 340°; the Bâ plain was visible for nearly its length parallel to the base of the mountain. To the extreme northeast of the range bearing 24°, could be seen the sand dunes, and many miles of waterless desert over which a trail leads to Kuei-te. In the northwest, the large plain of rNga-thang (Nga-thang) west of the Yellow River spread between the Chhu-sngon and Ta-ho-pa Rivers. Beyond the Gyü-par Range in the distance was visible the snow-capped range separating Hsi-ning from the Yellow River; Günther Köhler⁴⁰ calls this range the Ama surgu, while Hao marks it on his primitive map as Lagi Shan, half what? and half Chinese. Köhler has on his map opposite the Bâ valley west of the Yellow River, and north of the Chhu-sngon (Chhu-ngön) which he calls Tschürnong, a mountain chain he designates as the Ugutu range, but there is the great rNga-thang or Great Nga Plain. It is probably the high range to the northwest of the plain and identical with our Shar-gang.

The descent from the Dzo-mo La is rather steep; the valley extending north from the pass is also called Dzo-mo Nang, but this valley merges with a large valley of many branches with a stream designated as the sGar-rgan Chhu (Gar-gen Chhu) which debouches into the Bâ valley near (west) of a mountain named sGam-bu sum-na (Gam-bu sum-na). Some distance down, the valley becomes quite broad, and the eastern slopes and hillsides were dotted with the black tents of the nomads of the U-hjah clan (U-jâ).

Several small valleys open out from west into the Dzo-mo Nang which is enclosed by bare grassy hills ranging from 500-600 feet in height (above the valley floor). The last one of these valleys is called dGun-khai mar-kha (Gün-khai mar-kha) up which a trail leads to the monastery of gSer-lag dgon-pa (Ser-lag gom-pa); this lamasery is situated in a small valley which joins the hJang-chhen valley a tributary of the Yellow

⁴⁰ See Walter Fuchs: Günther Köhler in memoriam, 1901-1958. *Oriens Extremus* 5.1958, 246-251, portrait. Rock seems to refer here to Köhler's *Der Hwang-Ho: eine Physiogeographie*. Gotha: Perthes 1929. 104 pp., ill., maps (Petermanns Mitteilungen. Ergänzungsheft 203.). This is the author's 1927 Munich doctoral dissertation.

River. At the junction of Gün-khai Valley and the Dzo-mo nang we shot a finch *Leucosticte nemoricula* (Hodgs.) among the herbaceous plants of the valley.

The Dzo-mo valley proved perfectly dry, so we were forced to continue till we came to a rocky cliff where we found a spring in the otherwise dry streambed, and as the valley floor was quite broad we decided to pitch our camp at an elevation of 11,890 feet. About 500 feet below the pass the valley slopes were wooded with *Rhododendron capitatum* Maxim., here two feet high and associated with one species of willow, *Salix oritrepha* Schneid.; over these bushes flew flocks of the rare and most curious finch, with its tail wine-red beneath. It is *Urocynchramus Pylzowi* Przew. named after Przewalski's companion M. A. Pylzoff⁴¹. For this finch a new genus was created. It flew close to the bushes and seemed to nest in them. We secured several specimens, also of another finch *Montifringilla nivalis adamsi* Adams. which also frequented these bushes.

While the U-jâ tribe or clan has its encampments in the Gar-gen valley, overflowing into the Dzo-mo Nang, the Wam-chhog inhabit the Jang-chhen valley, and the Nya-nag clan the region to the north of the latter valley. All these tribes are at feud with each other, and all fear the Sha-brang tribe of the Bâ Valley and plain.

Where the Dzo-mo Valley opens out into the Gar-gen valley, the latter is rather broad, and the junction of the two valleys is at 11,550 feet elevation. The Gar-gen valley extends from east-southwest to northwest and above the junction of the Dzo-mo nang, the Gar-gen receives a small affluent. The hills framing the valley are bare, with here and there rock outcroppings and are 500-700 feet in height in the vicinity of Dzo-mo nang. Gar-gen was dotted with the black tents of the U-jâ Tibetans and thousands of their sheep and yak roamed the hillsides.

Following the valley down along the left, west, hillside, we arrive at another branch of it coming from the southeast called Sha-la, it describes an arch towards northeast and has its source on the northwest side of the same spur whence the small valley Gün-khai-mar-kha descends, but in the opposite direction. The hills on both sides of the valley dwindle in height, and opposite the mouth of Sha-la valley is the small lamasery called sGo-chhen rdzong-sngon (Go-chhen dzong-ngön or the blue fort of the Great Gate or Outlet), above it on a hill is a large cairn or obo also known as Go-chhen.

The trail leads directly north, leaving the Kuei-te trail to the right, east, and follows a dry streambed up a steep valley bearing the Mongol name Wa-yan-sgol (Wa-yen gol, the last word meaning river in Mongolian) it is more a ravine than a valley, but half way up were nomad encampments; leaving these to our right the trail turns up a left branch of the valley to a pass, in the center of which is an obo, built up of rocks and stuck full of twigs, decorated with yak hair; the pass is 12,110 feet, no view can be had from it but from a grassy hill to the east, elevation 12,300 feet, a wonderful vista opened out over

⁴¹ Second Lieutenant Mihail Aleksandrovič Pyl'cov accompanied Prževal'skij on his first journey, 1870-1873. See the travel report: *Reisen in der Mongolei, im Gebiet der Tanguten und den Wüsten Nordtibets in den Jahren 1870 bis 1873*, von R. von Prschewalski, Oberstleutnant im Russischen Generalstabe. Aus dem Russischen und mit Anmerkungen versehen von Albin Kohn. (2nd pr.) Jena: Costenoble 1881. XIV, 538 pp. (Bibliothek geographischer Reisen und Entdeckungen älterer und neuerer Zeit 12.) Original edition: *Mongolija i strana Tangutov: Trehletnee putešestvie v vostočnoj nagornoj Azii* N[ikolaja Michailoviča] Prževal'skago, Podpolkownika Gen. Štaba. Sanktpeterburg: U. S. Balašev, 1875-76. 2 vols.

far-away mountain ranges, and deep valleys. Directly northwest there extended a high range which some shepherds told us was the Shar-sgang (Shar-gang), probably the Ugutu range mentioned by Köhler and found on the map of Przewalski; the name is probably Mongolian; it is northwest of the Nga-thang and not visible from further south, or it may have been hidden by clouds when we saw the Nga plain. The Gyü-par range as seen from here displayed absolute barren southern slopes, and some five miles to the south of it, flanking the northern rim of the Bâ Valley, rose a short chain, better termed mountain, called Lhab-bya (Lhab-ja). The Bâ plain is eight miles broad and is cut lengthwise by the Bâ valley; from its northern rim it slopes towards the foothills of the Gyü-par range. Part of the Yellow River gorge could also be seen, and though the Amnye Ma-chhen was hidden in clouds, the valley of the Chhu-ngön which extends west from that mountain chain was plainly visible.

From the pass the trail descends into the northern Wa-yen-gol, a narrow valley with a few nomad tents. Here we were attacked by twenty of their fierce dogs of which we freed ourselves with the greatest difficulty and not ere we had fired a salvo from a colt automatic into the air, which made them turn tail. This valley merges into the southern border of the Bâ plain and there we decided to camp at an elevation of 10,950 feet. We had hardly settled down when a terrific thunderstorm broke over the Bâ plain and deluged us, while a gale whipped our tents and almost snapped the tent poles.

Rain continued all night which turned into a drizzle in the morning. It was one of the most dismal camping places. Before us lay the huge Bâ plain enshrouded in mist and clouds nothing could be seen, it was as if every hill had vanished. Water stood everywhere in large pools, and the whole ground had been converted into a bog.

We cut straight across the vast plain with nothing to guide us, our lama yak drivers never having been here previously, and surrounded by the hostile Shab-rang tribe felt not altogether too comfortable. After a three mile ride we came upon the brink of the Bâ Valley.

The Bâ Valley

The entire Bâ plateau is loess, grass-covered, and in this plateau the Bâ stream has cut its bed. On the southern side of the valley the slopes are loess and coarse gravel, the northern side is deeply sculptured loess with bands of lighter colored gravel between deposits. (See Plate 70) The southern valley rim is at an elevation of 10,400 feet, and is covered with bushes as are the slopes, but only in stretches, the most common are the tussock-forming *Caragana tibetica* Kom., *Lonicera microphylla* Willd., *Lonicera syringantha* Max., the former with small yellow, the latter with larger, fragrant pink flowers; *Rosa bella* Rehd. & Wils., is here a shrub 6-8 feet tall and displays large, rich red, single flowers; *Cotoneaster multiflorus* Bunge, the white flowered *Potentilla fruticosa* L. var. *veitchei* (Wils.) Bean, the yellow *P. fruticosa* var. *parvifolia* (Fisch.) Wolf., *Berberis caroli* Schneid., and *Stellera chamaejasme* L., grew mainly on the gravelly slopes but also on the valley floor in rubble and loess.

The Bâ stream flows at an elevation of 9,941 feet, or 459 feet below the valley rim and plain. Willows are here represented by two species, *Salix wilhelmsiana* M. v. B., a shrub reaching a height of 15 feet, and the new *Salix juparica* Goerz. of similar stature,

also *Hippophaë rhamnoides* L., ever present where willows grow and their constant companion along streambeds. On the gravelly exposed slopes *Androsace Mariae* Kom. var. *tibetica* (Max.) H.-M., exhibited its whitish pink flowers, while *Primula sibirica* Jacq., flourished in swampy meadows on the banks of the stream. The most common herbaceous plant was a species of *Corydalis* as yet undescribed (no 14260). It was the largest I have ever come across, and formed bushes or large clumps three or even more feet in height, the plants being all of two feet in diameter, it was a very handsome showy species producing hundreds of brilliant flowers in large racemes.

Among the willows grew the new white flowered *Thalictrum Rockii* Boiv., and in their shade the very showy, purple flowered *Pedicularis muscicola* Max., with spreading branches formed cushions. The deep violet flowered *Solanum septemlobum* Bge., first described from Peking also preferred the shade of the shrubs, while the river bank was a profusion of pink *Primula sibirica* Jacq., the only species of that genus encountered. Here we shot *Passer montanus obscuratus* Jacobi, and in the bushes the stone pheasant *Phasianus colchicus Strauchii* Przew., whereas *Mergus merganser orientalis* Gould., fished in the waters of the Bâ stream. On the branches of the taller willows and on a rocky bluff perched *Milvus lineatus* (Gray), a species of kite. Botanically the region was rather poor, but the herbaceous flora proved richer than the ligneous one.

Along the streambed in loess and gravelly soil flourished various leguminous plants as the new *Astragalus Handelii* Tsai et Yü, *Astragalus adsurgens* Pall., *Oxytropis deflexa* (Pall.) DC., *Astragalus versicolor* Pall., *Astragalus* aff. *subumbellatus* Klotzsch., both blue-flowered species, as well as *Oxytropis Kansuensis* Bge., *O. falcata* Bge., and *Astragalus polycladus* B. & Fr. In the same locality occurred the new *Pedicularis bonatiana* Li, n. sp., *Pedicularis kansuensis* Max., the former with purple and the latter with pinkish-purple flowers, also *Astragalus tanguticus* Bt., with dark blue flowers which, like all the other *Astragalus*, formed prostrate rosettes. *Pedicularis cheilanthifolia* Schrenk var. *typica* Prain, its flowers a pale pink, and known also from south of Lhasa in Tibet proper occurred here with them.

In swampy meadows of the valley floor grew the white flowered *Gentiana leucomelaena* Max., also known from Mongolia and Tibet, a species of *Gentianella* of the section *Crossopetalus*, but not yet determined (no. 14247), *Juncus Thomsoni* Buch., and the ill-scented, dark reddish-black flowered *Scrophularia incisa* Weinm., first described from Siberia. In the long grass grew the orchid *Orchis salina* Turcz., with rich purple flowers, in the sand *Carum carvi* on the loess bluffs here and there a species of *Euphorbia* forming large clumps and as yet not determined (no 14259). *Hedysarum multijugum* Max., and *Triglochin maritimum* L. were also partial to the sandy streambed and first known from Europe. In the shade of the willows we found the boraginaceous *Microula sikkimensis* (Clarke) Hemsley. This comprised nearly the entire vegetation in this section of the Bâ valley.

The confluence of the Gar-gen and the Bâ stream is called sGam-bu-sum-na, and from here to the foot of the Gyü-par Range the plain is inhabited by the Sha-brang tribe, but east of the Gar-gen, and to the foot of the Gyü-par it is occupied by the Klu-tshang tribe (Lu-tshang). The Bâ receives various affluents from the south, and east of the Gar-gen, as the Nyin-shig nang, the Tsha-han-sgol, a Mongol name transcribed into Tibetan,

and the Yer-gong-nang, all three having their sources in the territory of the sBa-bo-mar (Ba-wo-mar) tribe, and north of the Chha-shing Chhu which is the northern branch of the Tshe Chhu. The head waters of the Bâ are many miles east of here in the tribal territory of the dBon-hjah (Wön-jâ) Tibetans, but the Lu-tshang extends still to the north of them as far as the great Wa-yin thang or Wa-yin plain. Here it receives three affluents from the northeast, that is from the mountains encircling the Wa-yin plain on the northeast which form the divide between the latter and a long valley and stream which flows from northwest to southeast and then south where it forms the Dar-smug Chhu (Dar-mug Chhu) in the tribal land of the sMad-shul (Me-shül); the southernmost of these affluents is called the Ngang-khung; one affluent coming from the west, the first nearest its source, is the Ngang-tshang. All that territory is composed of vast plains and grassy undulating plateaus without any tree growth.

This region of the Bâ valley would be of great interest to archaeologists, for here on both sides of the Bâ valley, on the plain, we came across hoary ruins over one thousand years old; the southern ruin was that of an ancient village site once occupied by the Hor. It was according to Tibetan oral tradition, the seat of the ancient Hor kingdom and the traditional site of the wars fought by King Ke-sar against the Hor, and of whose exploits Tibetan bards sing endless epics. To the north of the Bâ valley not far from its rim are the square ruins of ancient forts and villages situated on a promontory above the plain; they were said to have been erected against Ke-sar. We climbed to the top of one of the ruins and found it surrounded by a trench, but this had been recently dug and was used in warfare by either robbers or nomads, or vice versa, both terms being here synonymous. Remnants of Hor who were formerly Mongols, and are probably the descendants of the ancient Mongols of Jenghiz Khan, still dwell to the southwest of these ruins, but they are now indistinguishable from Tibetans, except by name. Unlike the Sog-wo A-rig they dwell however in Tibetan black yak hair tents and not in yurts.

The Bâ plain on the north side, is 10,575 feet elevation or about 650 feet above the stream. To the right, east of the trail stood the square ruins of the ancient Hor fort, previously mentioned. The direction of the trail across the Bâ plain is northerly or 7° west of north and the distance to the mouth of the mKhas-rabs nang (Khe-rab valley) at the foot of the Gyü-par Range, five miles. It traverses the Bâ plain in a direct southerly course and enters the Bâ valley between the two Hor ruins, and East of the trail. On the plain we met two young nomads who were sitting in the grass twisting yak hair into rope. We asked them about the trail across the Gyü-par mountains, and although we were almost at the foothills, and they belonged to the Sha-brang tribe, answered in a surly manner that they did not know. They were exceedingly unfriendly but said that they were Sha-brang Tibetans. They then asked us where we were going whereupon we replied «here», and this ended the interview. A short distance beyond we came to an encampment of eight tents and were as usually attacked by their fierce dogs. The whole atmosphere, the sullen temper of the nomads, their savage dogs, the dismal dreary plain with a black curtain of storm clouds about to discharge their contents, a bleak cold north wind driving the rain into our faces, all this, with the possibility of being attacked by the churlish nomads made me feel very lonely, and for once I wished myself elsewhere.

Arrived at the mouth of the Khe-rab valley where it emerges on the plain I took the altitude which showed 11,330 feet making an incline of 755 feet from the rim of the Bâ valley to the foot of the range.

The Gyü-par Range

According to the Tibetans of Ra-gya, the Gyü-par Range was said to be densely covered with forest on its northern slopes, but as much as I tried scanning the range with binoculars, I found no sign of a single tree, let alone forest. However the Tibetans were right for later we did find forests, if not vast ones. To nomads used to grasslands, forests need not be large, to be termed vast. Two forests were confined mainly to the extreme northwestern end of the range. (Plates 71-73)

Entering the Khe-rab Valley and hoping that it would bring us to a pass, and down to the northern slopes of the range, we followed the right branch where a trail indicated access to the northern face of the mountain. Here were the first signs of woody plants, in the yellow flowered *Caragana tibetica* Kom., bushes which clung to the much broken shale and schist with underlying slate of which the mountain is here composed; a white flowered *Corydalis* as yet undetermined (no 14408) grew on the rocky cliffs of Khe-rab valley together with the beautiful pale pink, to mauve-colored fragrant crucifer *Cheiranthus roseus* Max., while *Salix oritrepha* Schneid. covered the southern slopes of the valley. Other plants observed in Khe-rab valley were *Caragana jubata* (Pall.) Poir., the large brilliant yellow *Corydalis* (14260), *Androsace Mariae* var. *tibetica* H.-M., *Potentilla fruticosa*, *Lonicera hispida* Pall., the yellow poppy, and many other herbs.

The ravine is exceedingly rocky and narrow but soon opens out into a wide grassy valley into which several valleys merge. The narrow rocky ravine we had traversed leads only through the foothills of the Gyü-par Range which itself is quite bare on its southern slope. Directly ahead of us lay a gentle sloping valley and this we entered; travelling with a caravan of yak proved difficult in this region and applied also to our horses for the valley floor was either a rocky bed or a quagmire into which our animals sank a foot deep or even more. Splash, splash, we made our way through the morass, while the water ran down our coats from the incessant rains, we could see nothing for the driving rain, mist, and cold wind. We tried to wait for the caravan but waiting in the mud and rain became so unpleasant that we decided to continue. We passed a valley on our left and followed the main branch to a pass which proved to be exactly 13,000 feet in height. The pass called mKhas-rabs Nye-ra was boggy to a degree and the loaded yak could not ascend it by the main branch. The lamas sent one of our men ahead to tell us that they would take the smaller left valley, and for us, when arrived on the pass not to descend it, but to turn down a left valley, the trail to Kuei-te continuing straight down. This left valley and the one the caravan took would meet in a larger valley, and in the latter we were to wait for the yak. The hill tops were enshrouded in mist and clouds and arrived in the broad valley we waited for the caravan. The mist lifted over the spur enclosing the head of the valley and I saw with my field glasses our caravan on the top of the hill. They did not continue down but remained for a considerable time on the mountain. When looking again I saw them unpack and arrange our boxes on the ground,

behind which the lamas and some of our Tibetans stationed themselves using our baggages as a barricade. I thought that they were in trouble, so sent one of my men, we were all mounted waiting for them, to see what had happened. It was fortunate that we did not all ride up to the head of the valley; the lamas had taken us for bandits and would have opened fire on us had we approached together, to defend themselves from behind our loads. Seeing only one man approach they waited, the lamas holding the loaded rifles ready to shoot, while one of them went within calling distance. When they found out who we were they reloaded the yaks and descended; they were a chagrined bunch when they joined us, but at any rate they proved their alertness. The valley was called the sTong-chhags (Tong-chhag) which emptied into the sGo-mang Nang. The Tong-chhag valley was nothing but a bog, water was standing everywhere and it was difficult to find a fairly decent camping ground. Wherever the water was stagnant the grass was yellow, but where it could run off the grass was green. We pitched camp behind a rocky promontory in the center of the valley fairly sheltered from the wind. It kept on pouring with rain, the temperature at 3 p.m. was 42° F., while not cold, it was the penetrating dampness which made one feel cold and miserable.

Our camping place was at 12,230 feet elevation; the rain continued all night, but by 5 a.m. next morning, June 25th, blue sky was visible directly above us, while the mountains around us were still enshrouded in mist. When we left our camping place the sun had conquered, the mist was dispersed and the sky blue and cloudless, the atmosphere was so clear that every ridge was sharply outlined.

We descended the Tong-chhag valley to where it joins to long Go-mang valley, at the mouth of which we found an encampment of the kLu-tshang (Lu-tshang) tribe from whom we obtained a guide in payment of four squares of cotton drilling (blue dungaree) to show us the way to the forested region of the Gyü-par mountain.

Entering the Go-mang valley we followed it up on the right flank crossing spur after spur ranging from 12,500 to 12,600 feet elevation till we reached a pass at the head of the valley at 12,850 feet. From this pass we descended into the long Gyü-par valley which extends the whole northern flank of the Gyü-par range, and joins that of the Yellow River in a northwesterly direction. Actually the northern foothills of the Gyü-par chain slope gradually towards the Yellow River when they drop steeply into the Yellow River valley.

We now followed the Gyü-par Valley west, the mountain slopes being still bare of any tree. At 10 a.m. the thermometer registered 48° F., and by then heavy cumulus clouds had gathered over the hills all around us permitting only here and there a blue open space to be seen. The elevation of the Gyü-par valley floor was 12,400 feet, and the vegetation consisted here mainly of small willow bushes 2 ½ feet, with *Caragana jubata*, but instead of growing prostrate or forming a branching shrub, it grew perfectly erect, single stemmed as we had found it also on the northern slope of the Min Shan 岷山, in the south, resembling the habit of a *Carnegiea* cactus. Other associates were *Potentilla fruticosa* L. var. *Veitchei* Dean, the new *Salix juparica* Goerz, and *Salix tibetica* Goerz. In the gravel here and there grew *Incarvillea principis* B. et Franch., with its lovely white tubular flowers, and in the wet meadows hundreds of *Meconopsis integrifolia* (Max.) Franch. whose petals the Tibetan lamas collect to extract a yellow dye.

The valley becomes constricted and further down impassable, forcing us to ascend a steep lateral valley to the right, to an elevation of 11,800 feet, thence to the left across a spur and down the main Gyü-par valley on the grassy slopes 600 feet above the stream. The yaks had great difficulty continuously crossing these high spurs and were nearly all completely played out. After crossing a 12,400 feet high pass we descend into the mGrin-gong gong-ma (Drin-gong gong-ma or Upper Drin-gong) valley; so far there was as yet not a sign of forest but still there was another spur and pass to be negotiated. As the yak caravan was nowhere in sight we decided to camp at 4 p.m. at an altitude of 12,100 feet. The sky was again overcast and gloomy and rain began to fall and continued all night until 7 a.m. the next morning when we broke camp. We crossed the middle and lower Drin-gong valleys and in the latter, on the northwestern slopes, we found the first spruce forest, but many of the trees were dead undoubtedly due to grazing. Further down the valley nomads were encamped; turning into and continuing down a large ravine where there was lovely forest of spruce, but alas again of the species *Picea asperata* Mast., we pitched our camp several hundred feet above the streambed which was also lined with spruces and birches *Betula japonica* Sieb. var. *szechuanica* Schneid., its constant companion. Poplars were also present.

Below our camp I spied an interesting plant which turned out to be *Potentilla salesoviana* Steph., rare in this region, and only found besides here in the Pien-tu-k'ou 扁都口 gorge across the eastern end of the Richthofen Range or Nan Shan 南山; it was first described from Siberia. It is a lovely shrub 3-4 feet tall with large white flowers and leaves silvery beneath. With it grew *Potentilla fruticosa* L. var. *Veitchei* Bean., *Caragana brevifolia* Kom., *Lonicera syringantha* Max., and many willows as the three new species *Salix juparica* Goerz, *Salix tibetica* Goerz, and *Salix pseudo-wallichiana* Goerz, and *Salix oritrepha* Schneid., the latter a small shrub 2-3 feet, while the former reached over 15 feet in height, also *Salix rehderiana* Schn. var. *brevisericea* Schn., a small tree of similar stature as the last one. All the above lined the streambed where, in the sandy margins, we collected *Astragalus chrysopterus* Bunge, growing under or on the outskirts of the willows as well as *Aster tongolensis* Franch., with purplish lavender flowerheads. In fact nearly all the shrubby vegetation was confined to or congregated near the streambed, with other moisture loving shrubs as *Cotoneaster multiflorus* Bge, and *Lonicera hispida* Pall. *Sorbus tianschanica* Rupr. was confined to the spruce forest, some of the spruces of which reached a height of 150 feet, with trunks three and four feet in diameter.

The rocks along the streambed are slate, crushed by large blocks of superimposed schist. We explored the valley in its upper part which narrows into a gorge where a cross section of the rock walls forming the gorge showed the lower strata to be composed of thin slate crushed by a wall of schist, large blocks of which were lying on the top of the slate. At the foot of these walls grew *Caragana jubata* Poir., willows, *Loniceras*, *Rubus* sp?, *Ribes Meyeri* Max., etc. As can be seen from the enumeration of the woody plants, the ligneous flora is certainly not rich, and the herbaceous plants proved also to be poor in species. This undoubtedly is due, like in the northern Nan Shan, to the proximity of the desert and prevailing northern or northwestern winds from the barren, waterless wastes. Yet precipitation is here abundant, however the short

summer and cold temperatures do not permit the development of a varied flora, and allow only such species to become established which are hardy in such a climate.

Many of the plants found here occur also in Siberia; genera with more than one species are mainly *Salix* and *Astragalus*, while of *Sorbus* only one species reaches this far north. Of primula only *Primula sibirica* Jacq., of such wide distribution as from arctic and central Asia to Alaska, Tibet, and the northwestern Himalaya occurs here. The underlying rock formation has also a great deal to do with a plant cover, and it has been my observation that in these latitudes, mountains of schist, shale and slate support a much poorer flora than limestone mountains, vide Lien-hua Shan, only one degree latitude further south, a limestone mountain rising in a country of practically pure loess with underlying sandstone, schist and shale. It is a typical boreal flora with some endemic elements. Of conifers only one species, *Picea asperata* Mast., is widely spread from the Min Shan to the Nan Shan facing Inner Mongolia, now known as Ning-hsia; north of La-brang (Hsia-ho Hsien) this species forms pure stands, and where one could find *Abies* above the spruces as in the south, here its place is taken by the willows and junipers, the latter genus being rich in endemic species.

On the alpine meadows of the Gyü-par Range at elevations of 13,500 feet occur *Corydalis dasyptera* Max., *Rheum palmatum* L., *Astragalus acythropus* Bge, and *Cremanthodium plantagineum* Max. Other herbaceous plants found on meadows but on the western part of Gyü-par Range were a species of *Pleurospermum* (no 14307) related to *P. Candollei* C. B. Clarke, *Meconopsis quintuplinervia* reg., and *Primula tangutica* Duthie.

The spruces extend to an elevation of a little over 11,000 feet, and growing in the moss of the spruce forest we encountered again *Rubus idaeus* L. var. *strigosus* Max. [Plate 74] The valley slopes in the Gyü-par Range are very steep and the spruces cling to them tenaciously, but many landslides have taken place and in general it appeared that the spruce forest of this range was doomed.

Several thunderstorms, as many as four a day occurred while camping on this mountain range, with intervals of clear skies. On June 28th we decided to explore the dryer slopes of the range down to the valley of the Yellow River. This necessitated first to cross the Gyü-par stream, and the climbing of a steep rocky hillside west of the stream, to an elevation of 11,300 feet, after which we followed the grassy slopes, skirting lateral valleys, some forested with spruces and willows, others bare. The trail led to 11,600 feet with the Gyü-par stream deep below in a veritable canyon which becomes narrower, and the walls steeper, as it approaches the Yellow River. About half way between our camp and the Yellow River we began to descend into steep ravines until we arrived at bare, yellowish red, gravelly bluffs covered here and there with grass. To our left was a narrow, spruce-forested, ravine and to our right the Gyü-par canyon. We followed a central spur on to a higher bluff which we found covered with large tussocks of *Caragana tibetica* Kom. (see Plate 75).

From here we obtained an extensive view of the Yellow river and the surrounding country. The land towards the Yellow River valley is very much broken up into ravines and canyons. The Yellow River valley consists mainly of loess with strata of sandstone and gravel, while at the bank of the river is deep lead-blue slate, above that is gravel followed by red sandstone and a thick covering of loess (see Plate 76).

The river, after cutting through the extreme western end of the Gyü-par Range, takes a complete turn to north-northeast. From a bluff 10,480 feet elevation I took several photos up stream looking southwest; the river described many sharp bends, and in the south-southwest there was visible a snow mountain, probably the Ugutu Range, while the Ta-ho-pa stream joins the Yellow River near the great bend, around the western end of the Gyü-par Range.

Directly northwest the Yellow River has the configuration of a trough, and beyond these bends the Gyü-par stream debouches into the Yellow River. From a lower bluff 10,380 feet, looking north-northeast, downstream, there were visible large poplar trees growing on its banks. A long rocky spur, east of the Gyü-par valley, stretches for a considerable distance into the Yellow River and forces it to make a sharp turn around it.

Northeast on the northern side of the Yellow River are extensive sand dunes, and beyond them, a large grassy plain, a vast loess plateau which is deeply eroded into innumerable steep and short canyons. They are back of the terrace on which is situated a lamasery called A-tshogs dgon-pa (A-tshog Gom-pa) consisting of only a few houses and one chanting hall. Looking north there stretches a long sand-spur in the centre of which rises a conical mountain called Am-nye Wa-yin, a landmark in the region.

The vegetation on the bluffs overlooking the Yellow River consists mainly of the tussock-forming *Caragana tibetica* Kom., the white-flowered *Cotoneaster tenuipes* Rehd. & Wils., a shrub 3-4 feet tall, the low shrub (1-2 feet high) *Caragana Roborowskyi* Kom., the herb *Peganum Harmala* L., with pale yellow flowers confined to the gravelly slopes, and a purple flowered Iris (no 14322) which grows in the *Caragana* bushes, and also in clumps of *Berberis Caroli* Schneid.

As regards the forests of the Gyü-par Range, they are doomed; spruce forests are now found only in patches and on the more inaccessible places on the steep valley slopes and ridges. The nomads with their sheep and yak have ruined this region. From all appearances the forests covered once all the valley slopes, at least those facing north, and wherever in this region forests occur, they are in a dying condition. Their undergrowth like that of the forests of Tag-so is a species of Mnium moss, and this has here almost entirely disappeared, and only where there are small groups of healthy trees to be found, this moss is also present, often over a foot in thickness and covering the ground completely. Thousands of dead trees are witness to the evil work of the yak and sheep. Where the forests have died willows have sprung up everywhere. When grass once encroaches on the spruce forest the moss is killed off, and when the latter is gone the spruces follow. A really healthy spruce (*Picea asperata* Mast.) [Plate 77] forest such as I found on Niu-hsin Shan in the T'ò-lai Range south of the Nan Shan, has no undergrowth whatever only moss, except *Rubus idaeus strigosus* Max. and *Thermopsis alpina* Ledeb. which penetrate a few feet deep only or remain on the very edge of the mossy carpet. All other shrubs such as roses, *Berberis*, willows, *Lonicera*, etc., are confined to the banks of the streams and long brooks, but never enter the somber spruce forest where no light penetrates, on account of the density of these forests.

In the Yellow River valley itself, looking west, spruce trees covered the upper valley slopes in patches. The actual limit of the spruce is here 12,000 feet, these are followed by willows but mainly by the new variety of *Salix oritrepha* Schneid. var. *tibetica* Goerz. (a shrub 2-3 feet high), while the others remain in the valleys along the streams.

The species *Salix oritrepha* Schneid. is also confined to high alpine meadows and rarely occurs along streambeds, unless it is in the high alpine regions.

One characteristic of the tributaries of the Yellow River which have their source in the high alpine grasslands is, that at their head they are wide and shallow, and as they approach the Yellow River become exceedingly narrow, being mere rock gates a few feet wide but of great depth.

Gyü-par Tshar-gen the Highest Peak of the Gyü-par Range

Having exhausted the botanical possibilities of the Gyü-par forests we broke camp and proceeded to the upper part of the Gyü-par valley to near the foot of the highest peak of the range Gyü-par tshar-gen where we pitched our camp on a small meadow near the Gyü-par stream at an elevation of 11,660 feet (boil. pt.)

The most common plant in this region is the pink-flowered *Caragana jubata* Poir., next common the yellow flowered variety of *Potentilla fruticosa* L. var. *parvifolia* Wolf, which is confined to the higher levels, then *Salix oritrepha* Schneid., *Salix myrtilleacea* And., *S. brevisericea* Schneid. and *Salix Rehderiana* Schneid. var. *brevisericea* Schneid., but the two latter confined to the streambed.

Lonicera hispida Pall., with hirsute branchlets and yellow flowers and the red flowered *Rheum palmatum* L., grow on the grassy slopes of the valley, while *Juniperus tibetica* Kom., although it extends high above the spruces, descends here to 11,400 feet associated with *Berberis caroli* Schneid. On the cliffs in the upper part of the Gyü-par valley one met with the reddish flowered *Sedum algidum* Led. var. *tanguticum* Max., *Cheiranthus roseus* Max. forma *elatior*, a *Hedysarum* (no 14347), an *Astragalus* (no 14340), a yellow flowered *Corydalis* (no 14344), and *Geranium pratense* L., first described from Europe. The rocks are all slate and schist and the streambed is here and there hemmed in by cliffs.

On June 30th we ascended Gyü-par tshar-gen. At 5 a.m. the temperature had dropped to 32° F., and ice had formed on the margins of the stream and our tents were frozen. We left camp at 5.30 a.m. with a nomad guide who had his encampment above the grassy head of the valley. We ascended the ridge to the left of our camp and then descended into the valley of Tshar-gen Khog which opens into the Gyü-par valley from the west. It is so named because it leads to the foot of the peak. We followed the lonely Tshar-gen valley up stream about three miles, and then turned up a lateral valley to the right to the foot of Gyü-par Tshar-gen.

The vegetation in these valleys is composed mainly of grass with here and there a yellow poppy still in bloom and a few stunted plants of *Caragana jubata*, nothing else was visible. There was still another grassy valley or steep gully to ascend, and then the zigzag trail up the main ridge of the mountain, still grass covered. The last stretch was over gravel to the top of the peak, a small flat area with a cairn or obo. We made the height by boiling point 14,546 feet above sealevel.

We had a race with the clouds which had gathered, although the sky was a deep blue and free of clouds when we had started. An easterly wind had brought clouds in its train

behind us up the peak. Had we arrived ten minutes later we would have had no view at all, but as luck favored us there before us lay the whole Am-nye Ma-chhen Range.

West-southwest of the Yellow River is the Nga thang or Nga plain, the river flows here at the foot of the eroded loess cliffs, and in the immediate foreground were the bare slopes of the western end of the Gyü-par Range.

The Amnye Ma-chhen suggests very much the Gangs-chhen mdzod-Ingá (Gang-chhen-dzōnga) known to foreigners as Kanchenchunga, of the Himalayas. The lower slopes of the Amnye Ma-chhen are not visible from here on account of a black, then snow streaked, range which extends parallel to the Am-nye Ma-chhen. The eastern rim of the Nga plain drops vertically into the Yellow River and is eroded into thousands of pinnacles and turrets, similar to those at Hsün-hua to the east. To the right, 2° south of west, the Ta-ho-pa stream which the Tibetans call the Hang Chhu, enters the Yellow River coming from west-northwest; on terraces near the streambed, forest could be observed as well as at the foot of the loess bluff forming the bank of the Yellow River. Northeast there was visible a huge sandy plain or rather desert of sand dunes, flanked by high mountains beyond.

The summit of the Gyü-par tshar-gen consists of slate and schist with here and there quartz outcroppings. The plants found on the summit represented no great variety, and as the ligneous flora, so proved the herbaceous one, poor in species. Partial to grassy areas was the yellow *Trollius pumilus* D. Don, first described from Nepal but found throughout west China; in the gravel grew the very lovely *Pedicularis pilostachya* Max., first collected by Przewalski, with deep carmine flowers and thickly greyish-pubescent spikes, *Lagotis brevitiba* Max., with bluish-white flowers which extends to the eastern Himalaya, the intense yellow flowered *Corydalis melanochlora* Max., and a still undescribed species with rich, deep blue flowers, exuding a fragrance like roses, *Corydalis* sp? (no 14328); a rhubarb, *Rheum spiciforme* Royle, a prostrate fleshy plant with broad leaves appressed to the ground, was partial to the muddy gravelly slopes, while *Meconopsis racemosa* Max., with deep steel blue flowers grew among rocks protruding from the meadows. On the scree occurred a *Saussurea* (no 14337), *Polygonum sphaerostachyum* Meisn., with a white globose inflorescence, *Chrysosplenium nudicaule* Bge, a greenish-flowered saxifrage first known from the Altai mountains, the yellow flowered *Iris Potanini* Max., the white flowered crucifer *Eutrema compactum* O. E. Schulz, first described from Turkestan, but occurring in Tibet, North China and Mongolia, the Edelweiss *Leontopodium linearifolium* Hand.-Mz., and *Saxifraga Przewalskii* Engl.; on alpine meadows adjoining the scree, but not on the latter, *Corydalis dasyptera*, was at home.

Here on the rocky summit of the Gyü-par mountains we shot *Prunella collaris tibetanus* (Bianchi), these birds are found at very high altitudes, and only on rocks; on the much higher Li-chiang Snow Range we collected a related species *Prunella collaris ripponi* Hart., also at high elevation, nearer 16,000 feet, among limestone crags.

As a matter of record I give here the bearings of the Amnye Ma-chhen as viewed from the highest point of the Gyü-par Range. The southernmost snow-covered part was 219°, the second peak 222.5°, the third 226.5° and the highest dome-shaped peak 228°, the last or northern snow-covered peak was 231°; a glacier descended between bearings 222.5° and 226.5°. The atmosphere was too hazy to make out other glaciers.

From the Gyü-par Range to Ragya via the Tho-thug Nye-ra and the Ho-tog Nye-ra

From the Gyü-par range the trail follows the Gyü-par valley its entire length, the valley being forked near the source of the stream, to a pass called the Tho-thug Nye-ra, elevation 13,900 feet. A rocky bluff to the left (southeast), elevation 14,100 feet, and a higher peak on the right (northwest) proved to be 14,570 feet elevation, or 34 feet higher than Gyü-par tshar-gen the highest peak of Gyü-par Range. However, Tho-thug Nye-ra and the hills flanking it were part of the Gyü-par Range, in about the center of it with the Gyü-par Nang to the left, and the Go-mang Nang to the right. Looking northeast the eye met a vast expanse of sand dunes the Mang-ri bye-ma (Mang-ri je-ma) which drop abruptly on to a grassy plain. Directly east there stretched a high mountain range, the highest peak of which is known as Am-nye Brag-dkar (Am-nye Drag-kar) or the White Rock (peak) which I judged to be 16,000 or more feet in height, the range being situated south of Kuei-te. A peak in this range is marked on some maps as Mt. Djakhar with a height of 3,779 m, or about 12,400 feet. The name Djakhar corresponds to Drag-kar which is the correct spelling, the «dr» is sometimes pronounced like «dj», but khar is wrong as kh represents an aspirated k which it is not. Am-nye being only an honorific prefix. Apparently the range itself has no particular name. The Am-nye Machhen Range was however hidden in clouds.

Northeast of the Gyü-par Valley a stream which has probably its source north of Go-mang gung-kha flows at first parallel to the Gyü-par valley, but then turns west-northwest to enter the Yellow River; the valley is called rMang-ra (Mang-ra) and the junction with the Yellow River rMang-ra mdo (Mang-ra mdo) or simply Mang-mdo.

The flora of the higher of the peaks at the Tho-thug Nye-ra proved quite interesting. In the scree occurred three *Saussurea*, one *Saussurea medusa* Max., resembled very much the Li-chiang species *S. laniceps* H.-M., with an oblong large, hood-like inflorescence densely covered with a white flocculent substance with deep purple flowerheads embedded in the latter, *Saussurea hypsipeta* Diels, and *Saussurea* sp? (no 14368). *Astragalus mattam* Tsai & Yü, formed mats with bluish-purple flowers, adhering flat to the ground, while *Draba lichiangensis* W. W. Sm., preferred gravelly mud as did *Pleurospermum thalictrifolium* Wolff.; also partial to gravel and scree proved *Anemone imbricata* Max., *Sedum juparense* Fröd. sp. n. (14365), *Corydalis melanochlora* Max., and in muddy gravel *Rheum spiciforme* Royle, anchored with a big taproot. On the scree which covered the slopes of the hill we shot four *Tetraogallus tibetanus Przewalskii* Bianchi (see Pl. 78), these birds seem to live on medicinal alpine plants, causing its flesh to taste bitter; they can only be found on the highest scree where they are hardly distinguishable from the rocks, the color of their feathers being mottled, even when shot we had often difficulty finding them.

From the pass the trail descends south-southwest into the Tho-thug Nang which becomes rather narrow, very rocky, and most trying for both man and beast. The Tho-thug Nang leads out on to the Bâ plain and Bâ valley which here is a veritable bog where flies and mosquitoes were most annoying. The altitude of the valley floor is 9,593 feet boiling point, aneroid 9,600 feet. We followed down the Bâ valley towards its junction with the Yellow River, it was however impossible to reach its mouth.

In the Bâ valley are several small hamlets, the only villages in the entire grassland area. [Plate 79] The inhabitants are Tibetans who had migrated from Rong-bo (Rong-wo), and as they first lived in caves in the loess walls of the Bâ Valley the nomads called them Sa-og rong-ba (Sa-og Rong-wa) or the Rong-wa (living) under soil or ground. Another village further down the river is called Gad-mo-chhe (Ge-mo-chhe) elevation 9,500 feet and inhabited by five families, these sedentary Tibetans had settled here only since 1919. The houses of the Tibetans are built of loess and bricks, with flat roofs and dirt floors. In their fields they cultivated mainly barley and wheat; wild grew *Convolvulus arvensis* L. var. *sagittifolius* Fish., *Convolvulus Ammanii* Desr., and *Geranium pratense* L. In the swampy meadows of the Bâ valley grew *Orchis salina* Turcz., *Cremanthodium plantagineum* Max., and the yellow flowered *Pedicularis longiflora* typica Rud., while above on the dry embankment *Nitraria Schoberi* L., and *Peganum harmala* L., were common. The streambed was filled with willows mentioned previously, also Hippophaë.

The arid upper loess slopes were covered with the cushions of *Caragana tibetica* Kom., *Oxytropis kansuensis* Bge. and *Allium polyrhizum* Turcz. Mosquitoes, despite the elevation, proved here a veritable plague. The trail ascends the gravelly slopes of the Bâ valley where all the shrubs, as *Lonicera*, *Cotoneaster*, *Berberis*, and *Caragana* were already past flowering, except *Stellera chamaejasme* L., which scented the air with its fragrance, not being dependant on seed for reproduction it could continue to flower till winter came.

The Bâ plain is here at an elevation of 10,400 feet, whence a way leads across it to the mouth of the Ho-tog Nang (valley) up to a pass, the Ho-tog Nye-ra, elevation of 12,300 feet. Skirting the head of a valley on the southern side of the pass and going southeast, the trail descends into the eastern gSer-lag valley (Ser-lag), leaving the western one in which gSer-lag gon-pa (Ser-lag Gom-pa) is situated on the right; the latter having its source in a pass to the west of the Ho-tog nye-ra. The lamasery houses about 300 monks all sons of nomad families of the encampments around here, each monk being supported by his family. As the lamaseries rule over the nomad clans of a given area, the families who have sons represented in the lamasery have thus an influential voice in any decisions arrived at.

The Ser-lag valley joins the Sha-la valley at an elevation of 11,542 feet. The Ser-lag and Sha-la valleys are usually dry, except at their junction with the Gar-gen valley where there are springs. In the Gar-gen and Dzo-mo valleys and on the Dzo-mo pass, a number of plants had come into flower not previously seen as *Polygonum Hookeri* Meisn., *Corydalis glycyphyllos* Fedde, *Corydalis hannaë* Kanitz, *Arenaria melanandra* (Max.) Mattf., *Astragalus Fenzelianus* Pet.-Stieb., *Cremanthodium plantagineum* Max., *Crepis Hookeriana* C. B. Clarke, *Saussurea medusa* Max., *Primula optata* Farr., *Microula Rockii* Johnston, *Hedysarum tanguticum* Fedt., *Meconopsis racemosa* Max., and *Potentilla Saundersiana* Royle all growing at an altitude of 13300 feet.

After having crossed the Dzo-mo La or Dzo-mo pass, our lama yak drivers yelled «the gods are victorious» for there was now nothing more to fear from Tibetan robbers; we could now sleep peacefully and unconcerned about possible night attacks, for we had come again into the territory of the Gar-tse under Ra-gya lamasery.

On the Wo-ti La we found a few plants which we had not encountered on our way up, these were *Potentilla Forrestii* W. W. Sm., the new *Parrya* var. *albiflora* O. E. Schulz, *Cremanthodium decaisnii* C. B. Clarke, *Astragalus Licentianus* Hand.-Mzt., *Pedicularis oederi heteroglossa* Prain, a native also of central Himalaya to Tibet, with deep yellow flowers, the white flowered *Cochlearia scapiflora* Hook. f. et Thom., the pale blue *Microula tangutica* Max., the crucifer *Dilophia fontana* Max., with white flowers, the prostrate, rosette-forming *Dontostemon glandulosus* (Kar. & Kir.) O. E. Schulz, with pale pink flowers and the yellow flowered *Corydalis hannaë* Kanitz.

Many of the alpine Compositae, Delphinium, Aconitum, etc., showed as yet no flowers, but three *Meconopsis* bloomed, the yellow *M. integrifolia* (Max.) Franch., the lavender *M. quintuplinervia* Reg., and the blue *M. racemosa* Max., the yellow flowered one being always first, followed by the second, and the last named the latest to open its flowers. It was strange that we did not observe a single plant of *Meconopsis punicea* Max., although this is a later flowering species and for that reason did not come under our observation, yet further south in the Min Shan where its station is less high it flowers in June.

South of the Wo-ti La in the Wa-ru valley we encountered the white flowered *Incarvillea principis* Bur. et Franch., but it was rare; with it grew *Ligularia plantaginifolia* Franch., with yellow flowers, at an altitude of 13,000 feet on July 6th. In the swampy meadows south of the Wo-ti la at 12,800 feet occurred *Pedicularis rhinanthoides labellata* (Jacq.) Prain., and the dark purple flowered *Cremanthodium discoideum* Max. In the streambed of the Wa-ru valley grew *Ranunculus affinis* R. Br., and the lavender and white flowered *Phlomis rotata* Benth., at an elevation of 13,000 feet. Had we been able to visit the region at a later time, in late summer or autumn, undoubtedly the number of species would have been considerably augmented. But as it was we did cover part of that ground on our return journey to La-brang, later in summer, and the plants collected then will give a fair picture of the plants covering of the region.

The valley slopes of the Dzo-mo (nang) and upper Tag-so were one mass of the lavender-flowered *Rhododendron capitatum* Maxim., which forms impenetrable thickets of over 12,000 feet, the only shrub in this region.

Ice covered the streambed in places to a thickness of a foot or even more, indicating that in these regions it never melts.

The Am-nye Ma-chhen Pom-ra (Am-nye rMa-chhen sPom-ra)

The Go-log tribes

There are three main tribes of the mGo-log (Go-log) who look upon Ma-chhen pom-ra also called rMa-rgyal-spom-ra (Ma-gyal-pom-ra) as their mountain god. Ma-gyal Pom-ra, legend relates, was the tea boiler of Chen-re-zig the god of mercy. (The Yellow River also bears his name rMa, pronounced Ma, chhu = river). The mountain god or *sadag* = earth owner, is known as the great Ma, Pom-ra, or the King Pom-ra.

The Am-nye Ma-chhen always had attractions for foreigners, ever since General George Pereira a British Brigadier General expressed the idea or belief that the range exceeded Mount Everest in height.

Pereira was preceded by many years by the Russian travelers Przewalski and Roborowski, the latter of whom approached nearer the Am-nye Ma-chhen than any traveler either before or after him.

The greatest obstacle to the exploration of that famous mountain range have been the Go-log tribes who jealously guard that mountain, and who are strenuously opposed to any one not Tibetan to visit that mountain. Should any one wish to tarry at the range or still more photograph it, they will put every obstacle in his way, even threaten murder if he should have the audacity to come near their encampments or their mountain. They are a most suspicious, superstitious, and unfriendly lot, unapproachable, perfidious and crafty, whose mountain fastness guarantees them complete isolation. The difficult struggle for existence and the stern nature of their environment have left their mark on them, their features are coarse and never a smile lights their face. Accustomed as they are to being surrounded by adversaries they are always ready for battle and woe to the outsider who penetrates to their mountain fastness. Nominally they were under the rule of the Moslems of Hsi-ning who controlled the Koko Nor or Ch'ing-hai but who could never subdue them or make them pay taxes.

In 1921 General Ma Chi-fu of Hsi-ning who was then in control of Ch'ing-hai 青海 sent letters addressed to the chiefs of the main three Go-log tribes named the Ri-mang, Khang-gsar, and Khang-rgan; these letters he sent to the high incarnation A-rig Ra-gya dgar de'i bla-ma Shing bzah pañ-di-ta (A-rig Ra-gya gar-dei la-ma Shing-za Pandita) to be forwarded to the afore mentioned Go-log chiefs. This the incarnation was obliged to do, as he was under the control of the Moslems of Hsi-ning. The Go-logs having had word that such letters were being sent, and who had also a knowledge of their purport, refused to accept the letters and promptly returned them to Ra-gya. They declared that all the Go-logs will be the enemy for life of the Ra-gya incarnation, and the whole lama fraternity for forwarding the letters. They had been ordered to pay a grass and water tax, one silver dollar per yak per year.

Thereupon Ma Chi-fu organised a punitive expedition consisting of 5,000 soldiers with machine guns, etc., against the Go-logs; he first attacked the most powerful Ri-mang tribe, drove off their sheep and yak and impoverished them completely. This forced the Go-logs to declare their submission and to agree to the payment of the tax. When Ma Chi-fu sent his tax collectors the following year to the Go-logs they killed them all. Ma Chi-fu himself told me that he found it impracticable to enforce the tax payment, for it would cost more to collect it than the tax was worth.

At our visit the Ri-mang chief Trul-ku Dan-drag [IDan-brag] was absent in Lha-sa to declare his submission to the Dalai Lama of Lhasa. What the communist have been able to achieve with the Go-logs is not known, but it is very doubtful if their teachings will have much influence on these war-like people, and one thing is certain, they will never be able to disarm them. The Go-logs are ruled by their own chiefs who are crafty and whose word cannot be trusted.

The Go-logs do not differ from the other Tibetans in their mode of living, but there is something about a Go-log which makes him stand out from other Tibetans, yet it is not

his mode of dress. Their heads are as round as a bullet and once one has seen a Go-log he can never mistake a Go-log for another Tibetan nomad. They have their own dialects which also distinguish them from the other Tibetans.

These marauding tribes bring terror to the hearts of their neighbours and passing caravans. Even lamaseries are not immune to their depredations. The year before our arrival at Ra-gya Gompa, a group of Go-logs crossed the Yellow River, occupied the house and compound where we were put up by the lama of Ra-gya, and there robbed all and sundry; they drove off the yak and sheep of the high incarnation who ruled Ra-gya and for days they robbed anyone who came to the lamasery whose inmates were powerless against them.

A foreigner can only travel here if he is adequately armed with modern weapons and in a larger group, but the larger the party the more cumbersome his caravan. When traveling in this area one must be mobile, have no slow yak, but only fast horses, plenty of ammunition and superior rifles. The low mentality and their most primitive way of life give great scope to monstrous superstitions, and we were often told that with our field glasses we could see through mountains, and that the powder of our guns was sufficient to kill animals without any bullet hitting them. At that time they had not seen aeroplanes, but they said they had heard that we could get into eagles and fly.

They are arrogant and rude, and their actions are unpredictable. They are at home on these bleak mountain fastnesses and seeing a caravan of a foreigner incites wild curiosity and the pleasant anticipation of robbing him to find out what treasures he carries and to come into their possession.

When traveling in the land of the Go-log or in Tibetan nomad country in general one must be prepared for all eventualities; the Go-log not acquainted with high powered rifles that carry much further than his flint lock guns or his guns of 1870 from the Franco-Prussian war, relies on his numerical strength and is surprised when he meets unexpected resistance by a small party and due to superior arms can stave him off. To travel in that area is hazardous to say the least, and one must be constantly on the look out and prepared for one might be treacherously attacked at any moment. They have been the bane of caravans who cross from Hsi-ning on the main caravan road to Tibet, for Go-logs often go in large bands, at times of six hundred or more, to loot and rob.

After the first world war rifles of American make have come into the hands of Go-log and Tibetan nomads in general. These rifles had very primitive stocks and were made for the Russians at a time when they had practically nothing to fight with towards the end of the first world war. I was told that they could be bought for nine US dollars a piece in the United States. The Russians, not having had any further use for these rifles, sold them to Mongol and Moslem traders who again sold them at a tremendous profit to the Go-logs and Tibetans, smuggling them from Mongolia into the Kokonor or via Ordos where Chinese had little or no control.

The Go-log are the proudest and most independent of all Tibetans, they call themselves a free people and declare that King Ke-sar of Ling who fought wars with the Hor, the Chinese and many other people, had his tents at the Am-nye Ma-chhen and that his miraculous sword, still hidden somewhere in the Am-nye Ma-chhen has lost nothing of its power. Their courage is derived from Ke-sar and his miraculous sword, and from Am-nye Ma-chhen Pom-ra their protector. There are few tribes who dwell around the

Am-nye Ma-chhen who have not been conquered by the Go-logs, the exception being the Ngu-ra and the Ong-thag tribes, the first living within the knee of the Yellow River, and the second northwest of the Am-nye Ma-chhen. It was the latter tribe which attacked Roborowski and his caravan. He speaks of later meeting what was then a former incarnation of Shing-za Pandita the highest incarnation of Ra-gya Gom-pa; the last one whom we met was a brother of the chief of the Ong-thag tribe. Although a young man of 20 years, he has since died and whether his incarnation has been found or not is now not known, it is very likely that the present regime will prohibit incarnations from re-appearing.

It can thus be seen that to work peacefully and to explore as one might elsewhere in China, in the wild and inhospitable land of the Go-logs is next to an impossibility. There was no necessity on the part of Leonard Clark⁴² to make a rush-dash, hurried trip, and then run. With such an outfit, or such large escort, with machine guns and what not, one could have stayed a month or longer; they could have had nothing whatever to fear, and it is a pity, that having had such an opportunity, no better use was made of it, except to produce a phantastic story.

As regards K. S. Hao's journey⁴³, any one who knows the country can see at a glance that the line on the map which is to indicate his itinerary is not reconciled with the terrain as it actually exists, and as he figures it on his primitive map. No one who claims to have made the long detour within the loop of the Yellow River could have ignored the large rivers as Chhu-ngön and the Tshab Chhu. Had he gone to the east of the Am-nye Ma-chhen as indicated on his map, he would have had to cross the Chhu-ngön River which is unfordable in that region; he never even indicates the existence of such a river. He states that he spent three days at the Amne Matchin, as he calls the mountain, which he puts in an entirely different location from the one it actually is. He gives a French name, from an old French atlas a range, which is near where the real Am-nye Ma-chhen is, but draws it as extending from east to west, when it really stretches from northwest to southeast. Where he has been is probably at one end of the range which is the divide between the To-su Nor, the Chinese T'o-szu Hu 托絲湖, and the Tibetan sTong-ri mtsho-nag, or the Black Lake of the Thousand Mountains; To-su Nor is the Mongol name, and the Chhu-ngön which flows from west of the Am-nye Ma-chhen, makes a big bend north, and debouches into the Yellow River a little above the Bâ River. He marks no range southeast of the To-su nor (which he calls Tso-go) and the Chhu-ngön, this alone is sufficient to show that he could not have been further than to the northwestern side of the To-su nor and the Chhu-ngön divide, for the latter river, the largest and most difficult to cross on account of its many rapids and cataracts, except in its northern bend, is not at all on his map. Then the most impossible of all, he shows his route as crossing practically the center of the range. No more need be said. Had he actually been even at the western foothills of the Range he would not have drawn or published the map he did. The map shows a total ignorance of the country.

During our absence from Ra-gya robbers had come to our quarters and stole some bags of grain, but nothing of importance, my men, a few of whom I had left behind,

⁴² *The marching wind*. By Leonard Clark. New York: Fung & Wagnalls 1954. XVI, 368 pp.

⁴³ K. S. Hao: Pflanzengeographische Studien über den Kokonor-See und über das angrenzende Gebiet. *Botanische Jahrbücher* Bd 68.1938, 515-668.

chased them off with rifle shots; the lamas begged them not to kill any robbers, they could catch them, but must not shoot at them. A rather peculiar system, the robbers are permitted to shoot and kill, but one must not shoot *them*. A peculiar incident happened during our absence. Moslem traders had come from Rong-wo in the north with grain, mostly barley, to exchange for wool from the nomads. They had gone across the Yellow River where Go-logs were encamped, to buy yak from them to transport the wool back to Rong-wo. They had bought 88 yak, but it was dark before the bargain had been struck and the yaks paid for. As it was known to the ferry men at Ra-gya that the traders were buying yak, and they notified their encampment which was not far from the Yellow River that there was an opportunity to steal some yak during the night, for it had been too late to swim the yak across the river to Ra-gya monastery. During the night robbers came and tried to drive off some yak, the third time the robbers came, they had been chased away twice, the Moslem traders opened fire and unfortunately they killed one of the would-be bandits. The remainder fled to their encampments, and the Moslems being scared, crossed the Yellow River to Ra-gya and left their yak on the other side.

Early in the morning the whole tribe had come down to revenge the would-be robber's death, and the first act of theirs was to drive off the 88 yak. Not satisfied, they threatened to cross over to Ra-gya to fetch the traders. The latter were scared, and as the Tibetans demanded life money for the man they had shot, they sent them 50 taels of silver about \$30.00 U.S., one rifle and ammunition and three horses to appease them and prevent them from coming over to the Ra-gya side. The members of the tribe to whom the dead robber belonged thereupon demanded 4,000 taels for the life of their confrere which equalled about 2,960 dollar U. S. However, they were satisfied with the horses, one rifle and 40 taels of silver plus 88 yak and stayed on the other side. This gives a fair idea of conditions under which people carry on trade with these haughty devils.

As to the different Tibetan clans or tribes who dwell in the region of the knee of the Yellow River and the Am-nye Ma-chhen, the following notes will be of interest as they give for the first time the names of clans and the territory each owns. They are nomads only to the extent that they move from their winter encampments which are at lower elevations to their summer encampments on the higher alpine meadows up to 13,000 feet and more. Each clan jealously guards its tribal lands, for should other clans herd their sheep in either the winter or summer encampments during the clan's absence, their animals would starve to death if others should have allowed their sheep or yak to overgraze the land.

To the right, north of the Am-nye Ma-chhen is a red rocky range, mostly scree called Mang-dgun Ula (Mang-gün) the last is a Mongol word meaning mountain. A pass leads over the range called the Man gü'n La reached by Roborowski in the winter of 1895. He was there attacked by what he calls Tanguts. It is the Ong-thag tribe who live at the Mang-gün Ula; this range is visible in the picture of the Am-nye Ma-chhen taken from Am-nye Drug-gu. It is the dark range which seems to extend from the northern end of the Am-nye Ma-chhen, but is actually east of it, the Mang-gün pass is also visible in the photograph, it is the deep gap in the range. It seems that the incarnation of Shing-za of Ra-gya has been found several times among the family of the chief of the Ong-thag

tribe, for when Roborowski met the Shing-za incarnation it was in the territory of the Ong-thag where he had been attacked. He told him that if he had only met him previously the attack would not have taken place and he invited him to come to Ra-gya, but Roborowski left for the Koko Nor.

At the headwaters of the Dom Khog the Lür-di [Lus-rde] tribe has its encampment. This tribe was ruled over by a so-called queen. She became known as the queen of the Go-log, but the way she acquired the title was rather a distasteful one. During the war between the Go-log and the Moslems of Hsi-ning she was captured and brought to La-brang and held there; General Ma conceived the idea to cohabit with her, and when she had produced a son he declared her queen of the Go-log, thinking that by so doing he would gain the favor of the Go-log. As it was the Go-log rejected her for she was the first to submit. At the time when she was captured there was also taken prisoner the mother of the powerful chief of the Ri-mang Go-log, who, to save his own life fled across the Yellow river on a raft and sent the raft down with the current, leaving his mother on the bank of the river.

Later on the so-called queen of the Go-log ransomed the mother of the Ri-mang chief with 500 heads of yak, whereupon she was permitted to return to her tribe, but she is not now, nor ever was queen of the Go-log, it was a Mohammedan invention. She only ruled over 600 tents.

The Tshang-rgur tribe, whose chief is called Tshang-ba rku-chhung (Tshang-wa kunchung) has its encampments at the head of Gur-zhung Valley which extends from south to north and debauches into the Tshab Chhu. [Plate 80-81]

The hBu-tshang mGo-log live to the south of the Ri-mang tribe, that is south of the Sha-ri yang-ra range (see Plate 82). To the southwest of the Am-nye Ma-chhen is a red scree range called gLang-me-btsag-dmar (Lang-me tsa-mar) which is the mountain god of the Me-tsang Ta-wo; in reality they are not a Go-log tribe, but one of the nomad Tibetan clans who suffered constantly at the hands of the Go-log robbers, and in order to gain the protection of the powerful Khang-sar chief they joined his tribe and thus became naturalized Go-log.

The largest of all the Go-log, the Ri-mang, have their encampments south of the Yellow River and west of the Nga-ba tribe. The Khang-sar live to the west of Ri-mang and the Khang-gen to the west of the Khang-sar. Their mountain god is the beautiful limestone range gNyan-po-gyu-rtse-rdza-ra (Nyen-po-yu-tse-dza-ra).

We were still trying to make arrangements for yak and guides to take us to the Amnye Ma-chhen, when the high incarnation Shing-za sent word to us that he would like to see us. I sent Mr. Simpson to his dwelling and he informed us that there was an opportunity to leave for the Am-nye Ma-chhen early next morning and under the following circumstances: A few days previously an incarnation from Ra-gya had returned from the Am-nye with his steward and some lamas, where they had been camping among the Go-log to bless their herds etc. On their return journey they were waylaid by some Go-logs who shot the steward and robbed the lamas. Ra-gya lamasery had decided to send sixty lamas to the territory of the tribe to curse them and we were to join the lamas on their cursing expedition to the tribe whose encampment was at the foot of the Am-nye Ma-chhen.

The news only reached us in the evening and it was impossible to get yak and arrange for such a trip at a few hours notice, and we saw the lamas leave the next morning unable to join them as our yak which we had sent for had not shown up.

In the meantime word was sent to us from the tribes living at the Am-nye Ma-chhen that should we decide to come they would lie in wait for us and would kill us. They also threatened tribes living near Ra-gya that should any of one take us across they would be their enemy for life.

Everybody was scared to rent us yak or take us across the river to their sacred mountain, until on July 14th we actually left having made arrangement with the rGya-bzah (Gya-zâ) clan, a Tibetan tribe which had its encampment west of the Yellow River in the Shag-lung Valley, to take us as far as it was wise and possible. We engaged all the male members of the clan; only the chief came to our quarters the morning of our departure while the other Tibetans were waiting for us at their encampment where we were to spend the first night. The ferry people who took us across on their skin rafts shook their heads and chided the Gya-zâ chief for taking us to the mountain. [Plate 83-84]

The cook had packed the necessary food for a fortnight, I took my small tent and the men theirs, the Tibetans had no need for a tent, they pulled their sheepskin garment over their heads and slept on their saddle blankets. In fact we took just the absolutely necessary, we were all armed and hoped to shoot for the pot, for game on the other side of the Yellow River is plentiful.

Start for the Am-nye Ma-chhen

Early on July 14th we crossed the Yellow River on the flimsy goatskin raft, the horses swimming. Through the carelessness of the ferry men, or on purpose, one horse went adrift and was lost in the current. It was not a propitious beginning. We had hardly been all across with our riding and packing animals when a terrific thunderstorm overtook us.

The blackest clouds I ever saw discharged their contents over the Ra-gya valley, so that I took shelter in a nomad tent near the river. The lone woman in the tent had nothing but a scowl for us, such hostile and unfriendly people I have never met anywhere in the world, it seems that a smile never crosses their coarse features. As soon as the storm had somewhat abated, it was then 3.30 p.m., we followed the sandy streambed to the little U-lan Valley at the mouth of the Yellow River defile. The U-lan brook had become a brown torrent which we had to cross and recross many times, the steep hillside had become an impassable, red clay, mud slide. Riding was impossible and the ascent from the Yellow River proved most difficult. The storm had passed over Ra-gya and the hills beyond, while towards the west blue sky became visible. We reached a pass 11,150 feet with a few tents to the left (south), then came to a higher one 11,650 feet, and from there we could look west into a clear sky. From this last pass our trail led down a small gully which brought us into the Shar-lung valley, an affluent of the Shag-lung Chhu, which has its source in the hBrug-dgu Nye-ra (Drug-gu Nye-ra). It flows first east and then north in a canyon into the Yellow River, opposite the Kha-khi pass. The water was a deep cinnabar red, but the fording did not prove difficult. Continuing up a lateral valley and skirting small gullies, we crossed a spur and arrived

at the encampment of the Gya-zâ (rGya-bzah) clan at 7:30 p.m., just before the darkness set in. This was the first time that any white man had pitched camp west of the Yellow River, and east of the Am-nye Ma-chhen.

We rose at 5 a.m. and after a frugal breakfast we assembled our Gya-zâ nomad escort and sallied forth into the unknown. There seemed to be no trail, but we went in a southwesterly direction over bare grassy hillsides without a tree visible anywhere, till we came to cliffs of red conglomerate, in a line with those back of Ra-gya but east-southeast. These cliffs culminate into high rocky red bluffs which were crowned by *Juniperus tibetica* Kom. These red conglomerate crags represent the mountain god of the Gya-zâ clan who is called Am-nye dGe-tho (ge-tho); at the base of the cliffs, on the left of the trail (going southwest) is an obo or cairn of rocks, sticks and rags where the clan burns juniper boughs as offering to Am-nye Ge-tho. The elevation at the Obo is 11,800 feet. The trail continued to lead west over grassy hills, up and down at an elevation of 12,100 feet, turns northwest leaving a deep valley to our left with sunken terraces, one above the other called rDo-btseg (Do-tse), this valley the trail descends, it is the left branch of the Shag-lung, here called the Dragon Valley or hBrug-nang (Drug-nang) which led to a pass, the Drug-gi Nye-ra [hBrug-gi nye-ra] or the Pass of the Dragon, at an elevation of 14,250 feet.

The vegetation on this pass is very similar to that found on the Wo-ti La, with the exception that here we found an abundance of the red poppy *Meconopsis punicea* Max., which is absent east of the Yellow River. On the schist scree we found the dark purplish blue *Saussurea hypsipeta* Max. Another still undescribed species (*Saussurea* sp? no 14413) with dark, blackish to purple flowerheads we collected on a high rocky range to the east of the pass at an elevation of 15,000 feet, where it forms clumps. A crucifer *Dilophia macrosperma* O. E. Schulz, with white flowers flourished on the scree on the hills around the pass, together with *Anemone rupestris* Wall., here with dirty-straw-colored to white flowers, forming rosettes, while the rest of the vegetation was the same as found east of the Yellow River on the high passes leading north.

The ascent as well as descent of the Drug-gi Nye-ra were very difficult as the pass was one huge bog. A short distance below the pass we spied three huge sheep, they were of enormous size, with horn which must have been a foot or more in diameter at the base, they are called rNyan (Nyen) by the Tibetans. Their horns did not spread laterally but extended forward in close spirals as I could see with my glasses. I fired but missed, the bullet kicking up the rocks under their feet. They differed considerably from the big horns I have seen in the New York Natural History Museum, as *Ovis Ammon*, and *Ovis Poli*, and I am firmly convinced that the Am-nye Ma-chhen big horn or Nyen represents an undescribed species. The Tibetans told us that old ram often die of starvation, as owing to their huge horns whose spirals extend forward, beyond their snouts, they cannot reach the grass in the winter or dig it out of the snow.

This pass is the divide between the Gya-zâ and the gYon-gzhi (Yön-zhi) tribe, and led into the Tsha-chhen Valley; their territory extends to the Tshab Chhu and Yellow River, and the number of tents which make up their encampments do not exceed two hundred. In order not to meet with the Yön-zhi tribe so as not to give them an opportunity to spread the news of our presence, we camped in a small valley called

mTshan lung (Tshen-lung) above juniper forests (*Juniperus tibetica* Kom.) at an elevation of 12,890 feet.

After a tranquil night in our secluded valley we made our way down into the valley of Tsha-chhen and there encountered lovely groves of *Juniperus tibetica* Kom., huge trees with large trunks of two and more feet in diameter and forty to fifty feet in height (see Plate 85). On the gravelly slopes of the high spurs enclosing the Tsha-chhen we found *Hedysarum pseudostragalus* Ulbrich, a prostrate plant at an elevation of 14,200 feet, in company with *Primula Purdomi* Craib, and among rocks a species of *Saussurea* (no 14425) as yet not described, with flowerheads which exuded a sour-sweetish, sickly odor resembling that of decayed bananas. In the shade of the junipers grew the deep bluish-purple *Salvia Prattii* Hemsl., and on the moist meadows occurred *Primula sikkimensis* Hook., the only place where we found it in the entire region. We stopped for lunch in a meadow in the Tsha-chhen Valley which was one mass of the blue poppy *Meconopsis racemosa* Max., now called *M. horridula* Prain; it is possible that the two plants are identical, but I prefer to keep this plant of the highlands of the far northwest separate from the southern plant, first found in the west Tibetan Himalaya, or retain it at least as a variety of *horridula*.

While we were collecting plants and taking photographs of the Tsha-chhen Valley and part of our Nomad escort, Mr. Simpson and the chief of the Gya-zâ clan went up a small valley to see the chief of the Yön-zhi clan; he had however shifted his camp to the mouth of the Tsha-chhen Valley near the Yellow River.

The scenery increased in beauty as we ascended the valley both sides of which were forested with junipers. The blue poppy and the yellow *Primula sikkimensis* Hook., grew everywhere in the wet meadows. Willows were common as *Salix oritrepha* Schneid., and its variety *tibetica* Goerz var. nov. and *Salix Rockii* Goerz nov. sp., *Sibiraea angustata* (Rehd.) Hao, *Potentilla fruticosa* L., with varieties, *parvifolia* with yellow flowers, and var. *Veitchii* with cream colored flowers, also small flowered *Spiraea alpina* Pallas, and the yellow flowered *Caragana brevifolia* Kom., all of which grew along the stream or in moist meadows at the foot and valley slopes.

Climbing the left valley slopes, as the valley itself became too narrow, we descended at the mouth of the Ta-rang Valley where we encountered the new *Pedicularis calosantha* Li sp. n., with pink flowers spotted purple, it grew in meadows of the Ta-rang Valley with *Pedicularis szechuanica* Max., *typica* Li, at 13,000 feet elevation, also *Leontopodium linearifolium* H.-M., *Leontopodium Souliei* Bod., and the new *Pedicularis paiana* Li.

The trail led through absolute virgin forest of *Juniperus tibetica* Kom., and here suspended over the trail on yak hair string from a juniper branch were a row of mutton and yak shoulder blades, one below the other, inscribed with the sacred formula Om mani padme hum. In order to pass along the trail it became necessary to push the string of bones aside, for they hung very low, thereby saying the prayers written on the bones, for the benefit of the person who so suspended them.

Our aim was to reach the foot of Am-nye Ma-chhen Drug-gu a high mountain in the territory of the Yön-zhi clan whence a fine view could be obtained of the Am-nye Ma-chhen.

After crossing the wooded spur over an execrable and slippery trail we descended into a lateral valley, the hBrug-dgu Nang (Drug-gu Nang) or Nine Dragon Valley forested with *Picea asperata* Mast., on the northern slopes and *Juniperus tibetica* Kom., on the southern. In this valley we encountered the tents of the Yön-zhi tribe or clan; they seemed quite friendly to us, although they are absolutely a law unto themselves, and acknowledge no authority. Yet they seemed perplexed about our cavalcade, strange tents, and the escort which consisted practically of all the male members of the Gya-zâ clan [plate 86], for we had appeared as out of nowhere. They were so suspicious that during the following night they packed up, and in the morning they had vanished and there was not a vestige of a tent or a nomad to be seen.

Some infectious disease had broken out among them, probably relapsing fever, carried by lice, of which the Tibetans are never free. We saw some dying outside their tents covered with rags, and chief Gomba of the Gya-zâ clan who was with me, held his nose and gave them a wide berth and motioned to me to do likewise.

We followed up to the head of the valley past all the nomads and pitched camp at the foot of the Am-nye Ma-chhen Drug-gu at an elevation of 12,500 feet. [Plate 87-88] As we had arrived quite early, I decided to climb to the top of the mountain to see if I could obtain a view of the Am-nye Ma-chhen; it was a stiff climb after a hard day's ride, but we reached the summit in due time and made the altitude of 14,450 feet, or nearly 2,000 feet above our camp. On the top were a few prayer flags an indication that the Yön-zhi Tibetans burnt juniper boughs as offerings to the mountain god Am-nye Ma-chhen. Am-nye Drug-gu is the protector and mountain god of the Yön-zhi tribe. We had occasional glimpses of the mountain mostly hidden in clouds. The scenery was superb; below, in front of us flowed the mGur-zhung (Gur-zhung) in a deep valley, the river not visible, and debouching into the Tshab Chhu, and the latter into Yellow River about 15 miles below the Tsha-chhen. To the right of the Am-nye Ma-chhen we could see the Ye Khog (valley), and to the left the Yön Khog (valley) which together with the hDom Khog form the Tshab Chhu.

The vegetation on the summit of Am-nye Drug-gu consisted mainly of scree plants as *Saussurea hypsipeta* Max., *Dilophia macrosperma* O. E. Schulz, an endemic crucifer with white flowers; on muddy gravel flourished *Cremanthodium Decaisnii* G. B. Clarke, with yellow flowerheads. In large rubble of schist thrived the peculiar *Saussurea medusa* Max., *Arenaria Przewalskii* Max., a very ornamental white flowered caryophyllaceous plant, the umbelliferous *Pleurospermum thalictrifolium* Wolff, a prostrate plant with grey flowers, a purple? flowered *Saussurea*, undetermined as the flowers were not fully developed, *Meconopsis racemosa* Max., and *Pedicularis chenocephala* Diels, its flowers a rich red; not on the scree, but on the grassy slopes below the summit, at 13,000 feet, and five hundred feet lower, grew the lovely *Codonopsis bulleyana* Franch.; but it may be a related species.

On the summit in grassy areas occurred also the pink flowered *Caragana jubata* Poir., here a prostrate shrub quite stunted and very pubescent, and a thousand feet lower *Meconopsis punicea* Max., whose red drooping flowers swayed in the wind like little bells. It is strange that it should be found west of the Yellow River and not again east until one approaches La-brang. Preferring the moist alpine slopes at 15,000 feet, that is half way up the mountain from the camp, we found many individuals of *Pedicularis* as

Pedicularis Przewalskii Max., with deep red flowers and its yellow-flowered congener *Pedicularis lasiophris* Max., also a monkshood *Aconitum rotundifolium* K. & K. var. *tanguticum* Max., with purplish blue flowers. Scattered on the grassy slopes grew close to the ground in the form of a hollow rosette with yellow flowers, *Crepis Hookeriana* G. B. Clarke, and on the scree near the summit the saxifrage *Saxifraga melanocentra* Franch., var. *pluriflora* Engl. & Irmsch., a curious plant with white corolla and deep purple calyx, but no *Corydalis*. These with the here common *Anemone imbricata* Max., and *A. rupestris* Wall., formed the plant growth on this mountain.

We spent some time on the summit, enjoying the glory of a setting sun over the huge massive of the Am-nye Ma-chhen.

The following morning was absolutely cloudless and we made haste to reach the summit of Am-nye Drug-gu; it was a perfect morning and the range lay before us in all its whiteness and purity, the sun shining on its dazzling glaciers directly to the west of us, and thus making it appear somewhat flat. I had no means to measure its height but judging from the elevation from which we beheld the range, I thought then that it probably might be in the neighborhood of 28,000 feet. but after having seen Mi-nyags Gangs-dkar from a much higher elevation, and knowing the height of it, I cannot help but come to the conclusion that the Am-nye Ma-chhen is between 20,000 and 21,000 feet, and especially since having seen Mt. Everest so recently (1950-51) and so close, from a plane which flew at 12,500 feet, there is no comparison as height is concerned between these two mountain ranges. As to Clark's recent measurements trying to prove the mountain higher than Everest, and reckoning the height from a base elevation which he found on a Chinese map, needs no further comment.

We took many photographs of the range (see Plate 71-73) also of the bare ranges to the north with the Gyü-par mountains in the distance and the gorges of the Yellow River indicated by the opposite converging slopes of the much dissected plateau.

We descended from Am-nye Drug-gu a spur which led directly north-north-east to a bluff whence we could overlook the Yellow River in its gorges, as there was no trail it was more or less difficult as willow bushes and masses of *Rhododendron capitatum* Max. barred our way. The bluff was about 1,500 feet above the Yellow River whence we took photos down and up stream. *Picea asperata* Mast., and *Juniperus tibetica* Kom., and *Juniperus Przewalskii* Kom., grew below the bluff with willows, and up to the grass-covered spur *Rhododendron capitatum* Max. Looking north the Yellow River flows in bare canyons making sharp zig-zags which are visible in the photograph.

Hardly had we returned to our camp when a thunderstorm deluged it. As the place was not a delightful one but was selected only so as to make the ascent of Mount Drug-gu more easy, we struck camp and descended the Tsha-chhen Valley where we pitched camp in the juniper forest at an elevation of 10,950 feet. Our camp was in the midst of *Primula sikkimensis* Hook., and *Meconopsis racemosa* Max.; here was also a small cave where our Tibetans could sleep more or less protected from rain.

A few words about the Tshab Chhu Valley: The valley is forested on its northern slopes with spruces, *Picea asperata* Mast., and with junipers on the southern slopes, the former occur only near the mouth where it opens into the Yellow River, while the latter extend much further further up the valley. The region is poor botanically. Although the summer was well advanced there were few herbaceous plants about, gentians were

absent, *Pedicularis* and *Corydalis* were scarce, *Delphiniums* and *Aconites* had not yet flowered. The region is apparently too high and the summer too short for the development of an alpine flora such as is found on the Min Shan and the mountains further south.

Everywhere one looked there was game, near the stream in a bend of the valley we met a huge stag but did not get a shot at it. Musk deer were abundant, but the great sheep, the Tibetan Nyen, were restricted to the very high crags at 15,000-16,000 feet; unlike the blue sheep who go in large groups, the Nyen are only to be found in pairs or with one young. They are very wary and difficult to approach.

Camp was pitched below the Drug-gi Nye-ra at 12,700 feet opposite a small valley called Ti-nag near the head waters of the Tsha-chhen valley. Back of our camp was a high rocky spur and this I climbed to get another view of the Am-nye Ma-chhen Range. The summit of the spur was 14,900 feet, the rocks were schist and shale and some with quartz, but there were very few plants to be seen and none we had not already collected. As it proved we could see only the great pyramid Chen-re-zig, the eastern peak of the range. To the west I saw a high rocky range of scree which formed the wall of the Ta-rang Valley, and I decided to climb that range to the highest point to get a closer view of the Am-nye Ma-chhen.

It rained all night and in the early morning the rain had changed to snow, as I looked out of my tent the whole landscape was covered with a mantle of pure white. Several inches of snow had fallen, and as I could not see our Tibetans, I called, when the snow moved and out looked the Tibetans from under their snow covered felt rain coats which had served as their bedding, they laughed, the first time I saw nomads laugh; they were very cheerful and seemed to enjoy the situation. Clouds hung low over the passes and the mountains which enclosed our valley. The thermometer registered 32° F. at 7 a.m. In spite of all the snow, the petals of the blue and red *Meconopsis* which were common here in the grass, were as bright and fresh and unharmed, each flower wore a cap of snow, the leaves buried in snow, it was a beautiful picture and showed the hardiness of these alpinists, as hardy as the nomads who inhabit these mountains.

When the Nomads had boiled their tea, a man would take a large ladle, dip it into the large pot, and amidst the chattering of prayers would throw the tea into the air as offering to the mountain gods; only then would they sit down and eat their frugal meal of buttered tea and tsamba (roasted barley flour).

We left our camp opposite the Ti-nag valley and climbed the opposite valley wall deeply covered with snow, and this on July 19th; the snow increased in depth as we ascended and the ground became boggy. We reached a pass at 14,100 feet and saw the clouds lifting and the sun peeped faintly through the mist, necessitating snow glasses against snow blindness. From the pass we descended into the Ta-rang valley which we followed down stream for a short distance and left our men to pitch camp at the mouth of a small lateral valley which led to the summit of Sha-chhui-yim-khar (Sha-chhui-yim-khar). Chief Gomba of the Gya-zâ clan and some of my men had been hunting and brought back a male musk deer with large tusks, I was glad for it replenished our provisions. In the evening the sky had cleared and we hoped for fine weather in the morning; the elevation of our camp in the Ta-rang valley was 12,300 feet. The vegetation consisted of willow shrubs, of *Salix oritrepha* Schneid., and its variety

tibetica Goerz, *Salix Rockii* Goerz, *Spiraea alpina* Pall., and *Potentilla fruticosa* L. var. *parvifolia* (Fisch.) Wolf., while junipers grew in the mouth of the valley.

The morning of July 20th dawned brightly without a cloud in the sky. It was a difficult climb to the summit of the Sha-chhui-yim-khar as there was no trail. We left our horses at the foot of the scree and climbed over the frozen scree and slate; the peak we saw from our camp was only a preliminary one, a rocky eminence, the main peak being still quite a distance beyond it. On the slaty slopes grew blue-flowered *Saussureas*, tiny rosettes with wooly heads on the top of which protruded the blue flowerheads; the plant has not yet been determined (no 14412) and should it prove to be new, I would like to propose the name *Saussurea Simpsoni*, in honor of William E. Simpson Jr. an intrepid traveller and an expert in Tibetan; he had an extensive knowledge of the grasslands and of the nomads. He fell victim to the bullets of Moslem bandits while on an errand for his father in Shensi.

From the slopes of the mountain I gained a peep of the large pyramid of Chen-re-zig of the Am-nye Ma-chhen Range and we shouted for joy, being certain of a glorious view from the summit for there was not a cloud in the sky.

A cold wind blew at the top which we made 15,200 feet, and as the temperature was 25° F., we wrapped ourselves in our fur coats. It felt bitterly cold for the 20th of July. Soon the wind ceased and the sun appeared and we soon forgot about the cold for before us lay one of the grandest mountain ranges of Asia. The dome in the north is the highest part, but it is not so imposing as the large pyramid at the southern end. There was no haze and we secured some good photos. In front of us lay the Gur-zhung Valley extending from South to North, and the Tshab Chhu from East to West, the Gur-zhung bearing junipers on its upper slopes.

It was difficult for me to tear away from this sublime view, especially as I knew I would never see it again. The range was covered for about 4,000 feet with eternal snow and was indeed a grand spectacle, the pyramid of snow Chen-re-zig being especially beautiful. I could have remained for hours on that summit never tiring of this grand view, Simpson and I being the first white men privileged to view the range from west of the Yellow River. The Go-logs so far had been ignorant of our presence, we were above their camps. While we were photographing the range there appeared a Go-log from the Gur-zhung valley to burn juniper boughs to the Am-nye Ma-chhen. We were astonished and so was he. He did not tarry long after he had set his junipers on fire and mumbled his prayer. He was certainly to spread the news of our presence.

After all had descended I still remained on the summit of Sha-chhui-yim-khar drinking in the the glorious view and collecting the queer *Saussureas* on the slaty summit. With a heavy heart I tore myself away, and with one last glance back at the great Am-nye Ma-chhen I descended the steep slopes to our camp.

After a repast of musk deer and rice we struck camp and followed up the Ta-rang Valley to near its head, the valley is shallow, its sides gently sloping, its head an amphitheater of slaty scree, and boggy. We turn left up a pass to 14,200 feet whence we had one more view of the snowy range against a grey sky for clouds were beginning to gather. We descended a narrow valley composed of slate in its upper part and red conglomerate in its lower. We made haste to leave the region before the Go-logs should be aroused and perhaps pursue us, for the chief of the Bu-tshang Go-logs, who was the

steward of the incarnation in whose house we lived in Ra-gya, swore before crossing the Yellow River that should we come anywhere near his encampment he would kill us. The reason being that I refused to give him one of our colt automatics.

On the Brag-nag Nye-ra (Drag-nag nye-ra) or Black Rock pass, elevation 14,520 feet, we found a lone *Corydalis* which proved new and was named by the late Dr. Fedde⁴⁴ *Corydalis Rheinbabeniana* Fedde, also the *Astragalus tongolensis* var. *glaber* Peter-Stib.; other plants found were *Pedicularis szechuanica* Max. *typica* Li; *Pedicularis calosantha* Li sp. n. *Leontopodium linearifolium* Hand.-Maz., and *Leontopodium Souliei* Beauvd.

We now returned to the Gya-zâ encampment the same way we had come and finally to Ra-gya Gom-pa without delay.

The Summer Flora of the Grasslands Between Ra-gya and La-brang

In the Wa-ru valley grasses did not form regular meadows but among them grew willows, and the familiar bushes of *Potentilla*, *Sibiraea*, *Caragana*, *Ribes*, etc. The most common grasses were *Poa attenuata* Trin., *Koeleria argentea* Grieseb., *Poa arctica* R. Br., *Deschampsia cespitosa* (L.) Beauv., *Elymus sibiricus* L., and its variety *brachystachys* Keng, a species of *Trisetum*, *Festuca ovina* L., *Stipa mongolica* Turcz., and the new *Koeleria enodis* Keng, among them grew *Leontopodium linearifolium* H.-M., a species of *Allium* (no 14449) but this extended also to the conglomerate cliffs of the Wa-ru Valley, and a yellow-flowered *Pedicularis* as yet not determined (no 14450).

On Wa-ru Khang-mdun pass (Wa-ru Khang-dün) elevation 13,840 feet, the pass being opposite the Wa-ru La, up to an elevation of 14,150 feet I found the first *Delphinium albocoeruleum* Max., well named for its pale blue flowers, it was restricted to the gravelly slopes as was its congener *Delphinium Souliei* Franch., which contrasted by its deep blue to dark purplish flowers. Associated with them were *Leontopodium linearifolium* H.-M., the lavender flowered *Meconopsis quintuplinervia* Reg., *Cremanthodium decaisnei* G. B. Clarke, the cyperaceous *Kobresia Prattii* C. B. Cl., the new *Pleurospermum Dielsianum* Fedde, and *Pedicularis cheilanthifolia* Schrenk *typica* L.; the latter white-flowered, a rather uncommon color for a *Pedicularis*, which turn however yellow on drying; it extends from Mongolia to the East Himalaya range and the Koko Nor. All these plants grew on loose scree from a elevation of 13,800 feet up to the summit of the bluff, *Pedicularis* invading also the grassy slopes.

In the Ser-chhen Valley up stream we found in the grass the rosette-forming *Microula tibetica* Benth., with blue flowers like a forget-me-not and belonging to the same family.

At 13,000 feet on the moist slopes among rocks thrived the pink flowered *Primula stenocalyx* Max., and on the grassy slopes the *Saussurea pygmaea* Spreng., or perhaps a variety of it, with purple flowers. This species is also known from the Altai and T'ien Shan 天山, and seems to reach here its southern limit. At 13,200 feet in swampy

⁴⁴ Friedrich Fedde, editor of *Repertorium novarum specierum regni vegetabilis*. Berlin 1905 ff.

meadows with stagnant water were masses of the yellow flowered *Cremanthodium plantagineum* Max., one of the commonest composites in swampy areas.

One episode occurred on our return journey worth recording. The whole of the sGar-tse (Gar-tse) tribe had assembled in the upper Ser-chhen Valley and hundreds of their black tents were spread over the flat grassy slopes, but the scene did not have a peaceful aspect for mounted armed men rushed about excitedly. Four men rode up to us and asked us if we had engaged the U-jâ tribe in a fight and how many we had killed. We looked at them in astonishment whereupon they informed us that while they were celebrating a sort of thanksgiving for the increase of their herds, their neighbors the U-jâ people, who have their encampment across a spur to the north in the Gar-gen valley, had come over and robbed the Gar-tse clan of a hundred yak which they had driven off. It seemed particularly unkind of the U-jâ people to come and rob when all the members of the Gar-tse tribe were attending their annual summer prayers, but I suppose the Gar-tse people had played similar tricks to the U-jâ, and the latter were probably only retaliating.

We came to a circle of white lama tents, one with windows painted on the canvas, this was occupied by rNyng-ma-pa or red sect lama-sorcerers who were performing a religious ceremony. Seated on the ground within the tent were twenty-five lama sorcerers with their long hair (this sect never cuts the hair but lets it grow to enormous length) wrapped around their heads like a turban. From the ceiling of the tent were suspended ten flat, circular drums which the sorcerers were beating rhythmically, while others were blowing brass trumpets and clashing cymbals. They all chanted in a peculiar voice very different from Yellow sect lamas. In front of the tent stood three sorcerers with exceedingly long strands of dirty hair, one in particular had let his hair fall over his shoulder on his arm and then again thrown over his shoulder from which it hung down to the hem of his robes near his feet. The strands of hair were the thickness of a rope and filthy beyond description. Each of the three wore a large round hat from the brim of which hung long black fringes which reached to their mouth. On the top of the hat was the hideous head of some demon, while small skulls were fastened around the rim of the hats. One wore a red garment, the center lama an imitation tiger garment, and the right hand one a purple garment. To the left, further back of the three chanting sorcerers stood a tall old lama with long strands of grey hair wound around his neck and falling over his shoulders. He held a spear in his hand to which was tied a square flag, black in the middle with a red border. In the center was the syllable hum. This banner he dipped while he chanted Om-a-hum, a mystic formula in many repetitions. His cheeks were sunken and so was his mouth for lack of teeth, and in all he had a very peculiar physiognomy. The chanting continued alternately and then a single voice would drone forth to be joined by the chorus of the assembled sorcerers. From the black hats of the sorcerers flowed silk scarfs of red, yellow, green, white and blue. In the rear and center of the tent hung a painted scroll covered with scarfs. The left sorcerer of the three in front of the tent was given a brass bowl in which reposed a gtor-ma (tor-ma) an offering, pyramidal in shape, and made of barley flour and butter, with this he walked about 200 yards followed by the other two and threw the tor-ma out on the grass, all this was carried out in slow motion.

We left the sorcerers and followed up the valley where I found that our tents had been pitched near the stream in the middle of the valley. We met more excited and armed men on horseback who asked us if we had engaged in the fight. They all were after the U-jâ nomads in the next valley, and that fighting was going on between the two clans. I was about to retire when I heard shooting and people running about, five had already been killed on the Gar-tse side, also six horses, and many had been wounded. Not to be in the midst of the fray we moved our camp up a small ravine farther up the valley, at 12,700 feet elevation, so as to be out of the line of fire should the fight spread into the Ser-chhen valley.

All the male members of the Gar-tse tribe were being gathered together and everyone who owned a horse was obliged to go and fight the U-jâ clan. This, I learned to my consternation, included the man from whom we rented the yaks for he informed us that he could not take us any further for he had to join the other Gar-tse men and fight the U-jâ.

To this I demurred for he had agreed to take us to La-brang; I said we could not remain in the midst of tribal warfare and expose ourselves and our belongings to the danger of being either killed or looted. He thereupon suggested that we go with him to his chief's tent to arrange for him to hire a substitute, that is a man who did not own horses, and who was thus not obliged to participate in this war. The Tibetan is a poor infantry man, and in fact foot soldiers are non-existent.

Fortunately we were able to buy a substitute for our yak owner and so were glad to get away the next morning from the scene of war. When we left camp, all the remaining Gar-tse men were also leaving to pursue the U-jâ tribe and try to recover their yak.

I was very glad to get away from the Ser-chhen valley and into other tribal territory, that adjoining the Gar-tse in the east, the Rong-wo clan. The grass was very long and many flowers were out as the pink *Primula stenocalyx*, *Pedicularis*, *Cremanthodium*, *Delphinium* and all the grasses previously enumerated. Here we also shot a new owl *Athene noctua imposita* B. & P. which was sitting on rocks in the bare valley. The valley is all of forty miles long and at its head is a bog whence a trail leads to a pass called Tshe-bde-ra (Tshe-de-ra) which is the divide between the Gar-tse and Rong-wo encampments. The name of the pass being derived from the Tshe Chhu River. At this pass, and below on the eastern slopes, were large herds of gazelles or huang yang [黃羊], but no blue sheep who are partial to rocks and cliffs.

On the pass in the scree at an elevation of 13,550 feet we encountered *Saussurea apus* Max., with purple flowerheads forming mats 1-2 feet in diameter first discovered by Przewalski; in its company grew *Melandrium apetalum* (L.) Fenzl., which enjoys a wide distribution from the Himalayas westwards of Afghanistan and Turkestan. These were the only plants we had not met with on the other passes to the west, but those encountered previously grew here also. This included also most of the grasses.

The trail leads from the pass to a plain with the tents of the Rong-wo nomads (see Pl.), the plain is called Na-mo-ri-on-chhung-ba (Na-mo-ri-ön-chhung-wa), this we follow east along the edge of the swampy hummocky expanse. The head waters of the Tshe Chhu are directly west only about six miles distant. The Tshe Chhu consists of two parallel flowing branches about 18 miles long, of which the lower or southern is considered the main Tshe Chhu, which has its source in the Tshe-de-ra (pass), while the

northern one is called the Chha-shing Chhu; these two unite and flow around a mountain called Sa-ri mkhar-sgo in a southwesterly direction, and then straight south to the Sog-wo A-rig encampment where we crossed it on our way to Ra-gya.

The only plant of interest and not collected previously grew on the gravelly banks of the Tshe Chhu, namely *Senecio thianschanicus* Reg. & Schmalh., with yellow flowerheads.

The trail traverses the Na-mo-ri-on-chhe-ba (Na-mo-ri-ön-chhe-wa) in the center of which is a small hill which the nomads designate as Na-mo-ri on-rdza-sde (Na-mo-ri-ön-dza-de). Southwest of Rong-wo, a lamasery situated northwest on the dGu Chhu (Gu-chhu) or Gu River, is a rocky range with a great Y-shaped gap, called sGam-chhen and the peak to the right of it Sha-dar which I estimated to be 16,000 feet in height. There are so many ranges and peaks which to explore thoroughly would take years, the country is so vast and diverse, although the high elevation and the northern latitude and short summer, flanked in the north by arid regions and actual deserts, prohibit the development of a rich flora and I doubt if many more species would be added to those found traversing the region from east to west; the northern end undoubtedly becomes poorer and the southern one richer in ratio.

South of the Rong-wo encampments, i.e. in the lower half of the plain are the summer grounds of the Hor tribe now a Tibetan nomad clan, probably the descendant of Turco-Mongol tribes with whom the famous Ke-sar, King of Ling, fought many battles. Their winter encampments we had encountered in the Bâ valley south of the Gyü-par range where the ruins of ancient Hor forts are still to be observed. Beyond the Hor nomad tents, at the extreme eastern end of the plain, are the pastoral ground of the Sonag clan. The camps of all these various clans are always arranged in a large circle to enable them to accomodate their herds of sheep and yak in the centre and prevent their being driven off by marauding nomads.

The Na-mo-ri-ön-chhe-wa plain has an average elevation of 12,000 feet, swampy in places which necessitates travelling along the enclosing foothills, for the central part is often covered with a tussock formation, as is the very end of the plain.

East of a low spur elevation 11,937 feet is a smaller plain southeasterly of which are the tents of the Sog-wo A-rig tribe. Directly east, and extending from north to south is a long rocky range apparently without a name, which is crossed by three passes the dBang-chhen Nye-ra (Wang-chhen Nye-ra) in the north, the mKhas-chhags Nye-ra (Khe-chhag Nye-ra) in the center, and the mKhas-thung Nye-ra (Khe-thung Nye-ra) to the southeast.

A mountain called Sa-ri mkhar-sgo (Sa-ri khar-go) separates the plain from the Na-mo-ri-ön-chhe-wa. In the far distance south-southeast is visible the kLui-chhab-rag Range or the Bathing place of the Nagas, a beautiful limestone mountain mass similar to the Min Shan of which undoubtedly it is a part, although separated by many miles of grassland; both lie in the same direction but the latter is somewhat to the south of the former. As has already been remarked the Lui-chhab-rag, which is the Chinese Hsi-ch'ing Shan is placed too far north on foreign maps, there is no perpetual snow on that range, nor on the Min Shan.

The ford across the Tshe Chhu, not deeper than a foot, is near an old ruin of a former monastery, of which only part of one mud house was still standing. This place is called

Seng-ge khang-chhags (Seng-ge khang-chhag), the altitude at the ford is 11,600 feet, or 350 feet higher than the ford 16 miles further south. There are quite large fish in the Tshe Chhu but none could be preserved for identification; of birds, sheldrake, *Casarca ferruginea*, snipes and cranes are common here.

On the rocky slopes flourished *Pedicularis ingens* Max., a yellow flowered species, first known from northern Ssu-ch'uan 四川, where it was discovered by Potanin, while the dull bluish-purple, new *Delphinium labrangense* Ulbrich, grew on the banks of the stream associated with the pinkish-mauve, and fragrant, *Nardostachys Jatamansi* D.C., an undetermined *Saussurea* sp? (no 14485) with purple flowerheads more confined to the meadows at an elevation of 11,600 feet, and with it the common *Potentilla anserina* L., a prostrate herb with pale yellow flowers and nodulose roots which are collected by the Tibetans who call them Gro-ma, pronounced like Jo-ma or dro-ma. These form an article of diet of the nomads; the plants are especially common near encampments. The pale lavender *Aster Bowerii* Hemsl., the blue flowered, prostrate *Oxytropis dichroantha* C. A. Mey., the common Edelweiss *Leontopodium linearifolium* H.-M., and the umbelliferous, prostrate *Heracleum millefolium* Diels, first found by Filchner in Ch'ing-hai province, were all confined to the banks of the stream.

The Tshe Chhu forms the boundary between the territory of the Sog-wo A-rig tribe which numbers about 2,000 families and the dGon-shul (Gön-shül) tribe; that of the former adjoins the Ngu-ra in the south within the knee of the Yellow River, and that of the latter extends east of the Tshe Chhu. The trail follows up a valley with a small stream which debouches into the Tshe Chhu and whose source is on the slopes of the Wang-chhen Nye-ra. Here on the eastern bank of this valley on grassy slopes grew the bluish flowered *Delphinium densiflorum* Duthie, the yellow-flowered *Aconitum anthora* L., the prostrate pink flowered thistle *Cirsium Souliei* Franch., and the pink *Saussurea arenaria* Max., first discovered by Przewalski in Tshai-dam, the salt swamps west of the Koko nor (Lake), endemic to the region.

Beyond the plain a round hill at an altitude of 11,600 feet is called Am-nye sGar-dang (Am-nye Gar-dang) near an affluent of the Tshe Chhu. Northeast stretches the hJo-bu Thang (Jo-wu Thang) or Jo-wu plain to the foot of the range which is crossed by the Wang-chhen Nye-ra. Here on the banks of the stream we shot two terns of *Sterna hirundo tibetana* Saund.

The trailless landscape is vast and marshy and covered with grassy hummocks which necessitates keeping to the foot of the hillsides. The Jo-wu Thang (plain) averages here a height of 12,000 feet and is the home of large herds of gazelles or antelopes. South of this plain there is visible a long range composed of old grey limestone which I judged 15,000 feet in height; it is called Sho-mdo-tsha-hkhor-ri and extends from east to west connecting with the higher craggy limestone range, the Lui-chhab-rag Range, which, as already remarked, is undoubtedly a part of the Min Shan system, being of the same geological formation. The T'ao River or Lu Chhu or Nâga River, after cutting through it, flows north and then east at the foot of the Min Shan. To the south of the source of the T'ao River and the Lui-chhab-rag Range, a lower range extends from northeast to southwest which can be crossed by a pass called dBu-ru-a-si (U-ru-a-si). The geological formation of this range is not known. North of the T'ao River a pass leads in a line with U-ru-a-si, over the Lui-chhab-rag, called the Dar-rdzong-dkar-hjah-la (Dar-dzong-kar-jâ

La) leaving the T'ao River to the right (east), flowing through a limestone gorge north. It receives two southern affluents the western one called the Am-nye nang, and the eastern one near its bend north, the Mir-rdzang nang (Mir-dzang nang), between these two streams is a mountain called the Am-nye Mir-dzang, each stream being designated by one half of the name of the mountain they enclose.

The U-ru-a-si Range forms the Yellow River and the T'ao River divide, and several tributaries which have their source on the southern slopes flow into the Yellow River, while smaller ones flow from the northern slopes into the lower or third branch of the Lu Chhu or T'ao River.

The Jo-wu Thang (plain) was one mass of yellow from the thousands upon thousands of *Senecio thianschanicus* Reg. & Schmalh., which extended to the very foothills; associated with them were the deep blue flowered endemic *Gentiana siphonantha* Max., a species of *Gentianella* (no 14497), a prostrate, pink flowered thistle *Cirsium Souliei* Franch., and many of the grasses previously enumerated.

From the plain a small valley extends to the northern pass over the range, called the Wang-chhen Nye-ra, whence the trail becomes distinct, and leads steeply over slate and schist and gravel. Delphinium were in their glory and five species, *Delphinium albo-coeruleum* Max., *D. Souliei* Franch., the new *D. labrangense* Ulbr., *Delphinium Henryi* Franch., *D. Forrestii* Diels, as well as another as yet undetermined species (no 14505) grew on the gravelly slopes and meadows of the pass at an elevation of 13,400 feet. The moist grassy slopes were also dotted with the brilliant red-flowered *Meconopsis punicea* Max., the rich deep blue, greenish striped *Gentiana algida* Pall., or perhaps a form of it, the species is spread from Siberia to west China; *Arenaria Przewalskii* Max., white flowered, and forming thick patches, the boraginaceous *Microula tangutica* Max., a pale blue flowered species, and the new *Microula Rockii* Johnston, also with pale blue flowers occupied the moist grassy slopes. On the summit in the grassy patches occurred the yellow flowered *Cremanthodium bupleurifolium* W. W. Smith, *Aconitum tanguticum* (Max.) Stapf, with deep blue flowers, and among rocks the yellow flowered *Saxifraga unguicula* Engl., with the purple flowered *Saussurea phaeantha* Max., only known from these grasslands. *Crepis Hookeriana* C. B. Clarke with hollow stems, entire leaves, and yellow flowerheads, preferred the eastern slopes not far below the pass; here we also met with another species of *Delphinium* (no 14520) as yet undetermined and probably new.

The larkspurs were of special interest as they displayed all shades of blue, from smoky grey to almost white, and then again deep purple blue; they formed stocky, bushy plants, a foot or more in height.

From Wang-chhen Nye-ra the trail descends to the head waters of the dBang-chhen Nang (Wang-chhen Nang) which was lined with Delphiniums and most of the other alpiners previously enumerated. Directly ahead there loomed up a large, perfect cone of a mountain the dBang-chhen Shar-snying (Wang-chhen Shar-nying), commonly called the Bullock Heart Mountain of Wang-chhen, past which the trail leads up a valley to a small pass 12,250 feet, and down another called dBang-ra-rgan Nang (Wang-ra-gen Nang) the head of which is at an elevation of 12,200 feet.

At the foot of the grassy cone as well as on the slopes there basked in the sunshine the grayish blue flowered *Codonopsis ovata* Benth., the yellow flowered *Pedicularis*

lasiophrys Max., *Crepis trichocarpa* Franch., or perhaps a related species, with lyrate leaves and yellow flowers; *Saxifraga pseudohirculus* Engl., an herb with yellow flowers, *Ligularia virgaurea* (Max.) Mattf., resembling a *Senecio* in habit, were common in the tall grass with the white flowered *Pedicularis cheilanthifolia* Schrenk. Of grasses *Deschampsia cespitosa* (L.) Beauv., as well as *Stipa mongolica* Turcz., with *Poa*, *Elymus*, *Koeleria* and *Trisetum* formed over 60% of the vegetation.

The plain from which Bullock Heart Mountain rose is called Dar-chhog Thang, it gradually sloped towards the streamlet which formed the Wang-ra-gen Valley, an affluent or branch of the larger Chhu-nag Nang or Black River Valley. This joins the Wang-chhen further south and united they flow into T'ao River south, under the name «The Great Wang River».

The trail continues east, then north of east, across marshy undulating country, past many nomad encampments of the Sang-khog clan, traverses several very boggy places and thence at the foot of grassy hills with the Sang Khog (Valley) below it. It crosses over the Sang chhu and T'ao river watershed, merely a low marsh, gently sloping on either side, but so inconspicuous, that one would never suspect the marsh to be the divide between the two rivers. Our route was well marked across the grassland here called the rTa-brag-gi (Ta-wrag-gi pronounced so by the nomads of this region) ranging from 11,500 to 11,800 feet in height.

Here grew *Ligularia sagitta* (Max.) Mattf., *Delphinium Forrestii* Diels, with flowers greyish purple and yellowish tinge, and the new *Pedicularis decorissima* Diels, with exceedingly long corolla tubes, large petals, and twisted keel, it is of a beautiful rose pink, and one of the most striking *Pedicularis* of the genus.

Directly south the huge limestone range Lui-chhab-rag could still be seen, phantastically served into fluted columns and pyramids, certainly one of the most extraordinary of mountain ranges, rivalling the Min Shan, further southeast. The trail skirts many valleys, crossed many streams up and down, till the last pass is reached called Yob-sha Nye-ra sGar-dang (Yob-sha Nye-ra Gar-dang). On the grassy slopes at an elevation of 11,600 feet grew *Gentiana dahurica* Fisch., first described from *Dahuria*, white flowered and of rather prostrate or spreading habit. It is a veritable species as far as color of flowers is concerned for deep purple shades occur also, but here only the white form flourished. Here and there occurred *Aster Vilmorini* Franch., with deep lavender ray florets and orange colored disc florets, *Leontopodium linearifolium* Han.-Mazt., and *Pedicularis decorissima* Diels.

Yob-sha Nye-ra Gar-dang is 11,700 feet above the sea and hardly worthy of the name of pass as one saunters gradually from one valley into the other, the valley east of the pass being called Yob-sha Nang. From the latter the Yob-gzhung Nang (Yob-zhung Nang) is reached, with its stream at an elevation of 10,740 feet. From this valley it is only half a day's journey to La-brang.