

# ZOOLOGICAL RESULTS OF THE SECOND DOLAN EXPEDITION TO WESTERN CHINA AND EASTERN TIBET, 1934-1936. PART I,—INTRODUCTION

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## PURPOSES AND PLANS

In January of 1934 the time seemed to me ripe for an extensive expedition into Western China, Eastern Tibet, and the Kokonor, to secure collections of mammals, birds, and mollusca which would interlock wherever possible with those collections secured by the First Dolan Expedition to Western China and Eastern Tibet in 1931-32, of which the Academy of Natural Sciences of Philadelphia was sponsor and beneficiary.

The purposes of the Expedition were set forth to Mr. Charles M. B. Cadwalader, President (at that time Managing Director) of the Academy of Natural Sciences as follows:

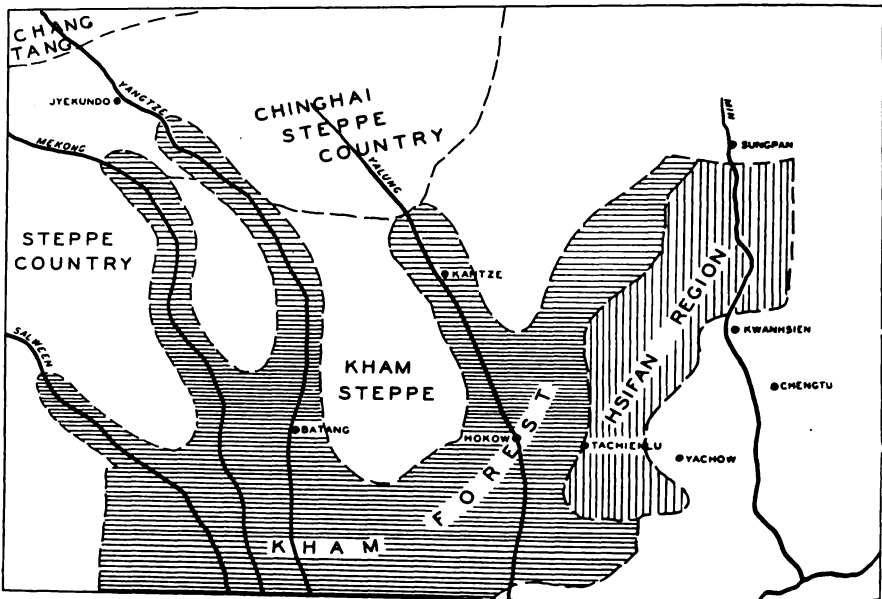
1. To secure systematic collections of Khams and high Tibetan fauna.
2. To obtain the large mammals of Tibet for the erection of life groups in the Academy's Museum.
3. To unravel the problem of the large Cervidae of the East Tibetan border.
4. To explore the Eastern and Southeastern slopes of the great snow-range Amnyi Machen in Kokonor.

1. *Systematic Collections.*—As in 1931, systematic collections of mammals, birds, and land shells, were to constitute our chief objectives and intensive collecting was to begin where we left off in 1931, subject, of course, to difference in seasons, hiatuses in our 1931 collections, etc. In 1931 the nucleus of our collections was made in Szechuan Province of China along the high mountainous marches of Tibet and China considered geographically, although not drawn on present political lines. This region of Himalayan or older formation was in early times entirely inhabited by folk of Tibetan stock (the 18 kingdoms of Chiarong) and the Chinese epithet for them "Hsifan" (the Western Tribes) has been applied by zoologists to the fauna of the region.

Our collecting (in 1931) began in Wassu, a dense rain-forest, in April; in June and July we explored north and northwest of Sungpan, which Dr. Hugo Weigold ("Süd-ost Tibet als Lebensraum") sets as the northerly limit of the Hsifan fauna. Northwest of Sungpan we touched the edge of the Tibetan steppe. In September and October we worked around

Tachienlu, which the above author sets as the western limit of the Hsifan fauna. On the road home Dr. Weigold and Mr. Schäfer again touched the edge of the Tibetan plateau country between Tachienlu and Baurong, collecting en route from Tachienlu in Szechuan via Hokow, Baurong, Yungning, Likiang, and Tengyuch, to Bhamo on the Burma border, east of Mandalay.

Thus in 1931, the First Dolan Expedition concentrated its efforts on the Hsifan fauna of the border ranges, although collecting along the entire route. In Wassu (of the same character as Moupin, Péré Armand David's famous collecting ground) we worked for seven weeks in the rich center



TEXT-FIGURE 1. Map of Faunal Areas of Eastern Tibet. After Hugo Weigold.

of Hsifan. Around Sungpan, on the road to Tachienlu, and near the latter city, we worked the northern and western perimeters of the Hsifan area, which are far poorer due to greatly reduced rainfall and show considerable invasion of Tibetan and Siberian forms. Rainfall is unquestionably the key to the rich fauna of Wassu, Moupin, and the northern Lolo country. As the monsoon clouds are tapped by successive mountain ranges, the precipitation declines and flora and fauna grow successively poorer.

Intensive collecting of The Second Dolan Expedition was to begin on the western perimeter of Hsifan at Tachienlu and be carried on from July of 1934 until September or October of 1935 along a circle which the expe-

dition would describe westward through Khams to Batang (collecting what Dr. Weigold described as the Kham-fauna under the title cited above), northward and westward to Jyckundo; then northward to the source-waters of the Yellow River in the high Tibetan country of Kokonor where we hoped to secure systematic Tibetan collections; eastward to cross a northerly spur of Amnyi Machen and down to Radja Gomba on the Yellow River; finally southward and eastward across Gnaba to Sungpan and down the Min River to Chengtu, thus completing the circle, the trip to consume roughly fifteen months.

2. *Specimens for exhibit.*—In 1931, The First Dolan Expedition had been fortunate enough to secure adequate specimens of two rare mammals peculiar to the Hsifan marches: the Giant Panda (*Aeluropoda melanoleuca*) and the Tibetan Takin (*Budorcas tibetana*). Thanks to the generosity of my mother, Mrs. Thomas J. Dolan and several friends of the Academy, it was possible to erect habitat groups of these two animals in the Museum.

In 1934-5 the Expedition proposed to collect specimens of the high Tibetan large mammals, for exhibit in the museum of the Academy. The Tibetan mammals were to include: the wild yak; the wild ass or kiang; the chiru or Tibetan antelope; the goa or Tibetan gazelle; the steppe bear and whichever wild sheep we should find in the Amnyi Machen, (*O. ammon comosa* or *O. a. hodgsoni*?).

3. *The large Cervidae of Eastern Tibet.*—These were slightly known to us from the First Dolan Expedition. Near Sungpan we had purchased a large set of dark rough maraloid antlers and referred them tentatively to *C. canadensis kansuensis* of the Min Shan, a forested range just north of the border of Szechuan and Kansu provinces. In Tachienlu and Sungpan and on the road we had seen horns both in the velvet and dry. Tibetan hunters near Sungpan spoke of only one stag: "ma lu" or horse deer, but around Tachienlu we heard of two, "hung lu", the red deer, and "pei lu", the white; the conjecture as to the identity of these deer was never absent from my mind. Could one of them represent the stag to that hind shot so long ago by Capt. M'Neill near Litang, named in his honor *C. cashmiriensis macneilli*?

4. *The Wilderness of Amnyi Machen.*—Thanks are due to Dr. Joseph Rock for our interest in the wilderness to the east, and under the shadow of Amnyi Machen, the great unmeasured snowpeak that has drawn explorers like a lodestone, he told me of seeing big-horned sheep called "nien" by the natives (nihn is the name in S. Tibet for big-horned sheep). He saw stag there also. He explained the quantity of animal life as being under the protection of the Abbot of Radja Gomba. We planned to visit Radja and gain the confidence and support of the Abbot for an exploration of this region.

## PERSONNEL

There was no question in my mind as to the two men best qualified for an expedition into Eastern Tibet. Mr. Ernst Schäfer (now Dr. Schäfer) had collected birds for the First Dolan Expedition of which Dr. Hugo Weigold had been chief ornithologist. Dr. Schäfer's rifle had also been responsible for the bulk of the mammal collection. He accepted my invitation to take charge of mammal and bird collections for the Second Dolan Expedition. Mr. Marion H. Duncan had served for ten years with the Disciples of Christ Mission at Batang on the border of autonomous Tibet. He could speak both Chinese and Tibetan. He believed that he could enlist the services of six to ten Tibetans at Batang for a journey into Tibet and the Kokonor. Mr. Duncan accepted my invitation to serve as interpreter and take charge of native personnel, commissary, and transport.

## PROCEDURE

On May 10, 1934, Mrs. Dolan and I reached Shanghai on the S. S. President Coolidge. We were joined a week later by Ernst Schäfer, who arrived via Suez on a North German Lloyd Liner. Marion H. Duncan reached Shanghai in June.

At Nanking Mr. Wyllis Peck, Counsellor to the U. S. Legation (now the Embassy), took me to see Dr. S. S. Liu, Chief of the Department of European and American Affairs in the Chinese Foreign Ministry. I presented my request to Dr. Liu for passports and for free entry of equipment into China. Permission for the latter would have to come from the Ministry of Finance and, as specially relating to arms, ammunition and field glasses, from the Ministry of War.

Official action, however, is contingent upon the attitude of the powerful semi-political Academia Sinica toward any scientific project. To Dr. Tsai Yuan-pei, the President of that organization, we presented our Academy credentials, and he referred us to Mr. Wu, the Director of The Metropolitan Museum of Natural History in Nanking. Dr. Chi Ping, President of The Science Society of China and an old friend, also recommended us highly to Mr. Wu with whom we concluded a co-operative agreement whereby we invited the Metropolitan Museum to participate in the Expedition and promised to present that institution with duplicates of all biological specimens represented in the collections to be made during 1934 and 1935. Mr. Wu then wrote to Dr. Liu in the Foreign Ministry, and in due course of time we received duty exemption, passports, and gun licenses. This procedure, while rather complicated, repays all parties concerned in the long run. It protects the Foreign Ministry from issuing passports to adventurers on quests of pure exploitation, and the special passport issued by the Foreign Office carries great weight.

On July 10 we embarked, with all of our equipment, on the S. S. Ichang of the Yangtze Rapids Line cleared for Hankow, Ichang, and Chungking. On July 13 we reached Hankow where Mrs. Edgar Hykes of the Standard Oil Co. generously entertained our party. On the 17th we left Ichang, the former head of steam navigation, and entered the famous gorges of the Yangtze reaching Chungking, the start of our overland trek on July 20.

In Chungking Mrs. Dolan and I were very kindly entertained by Mr. and Mrs. A. E. Fitzsimmons of the Standard Oil Co. Mr. C. C. Chang, director of the Bank of China for Szechuan and Mr. Djiao of the Chungking Branch were extremely helpful to us, as were also Mr. Lee of the Chinese Maritime Customs and Mr. Ho, Chief of the Navigation Bureau. Mr. Hsiao, Foreign Secretary for General Liu Hsiang, issued us passports for Chengtu and arms' permits for central Szechuan. Mr. Bahnson, the owner of the Ford Agency, arranged hire for us of two lorries for our equipment and for ourselves a touring car for the new motor road to Chengtu.

Mr. J. R. Schwer, of the Chungking Ice Company, was helpful to us in many ways. As in 1931 he offered his head boy Lee to us and we formed the nucleus of our staff with Lee as No. 1 boy, Tsai Kwei-fu, bird skinner in 1931, in his former capacity, and Ts'ang Wen-ch'ing, a cook who had been with Duncan before. All three men served faithfully throughout the expedition.

On July 24, my wife returned to Shanghai in a China National Aviation Co. ship; there she met my mother, Mrs. Thomas J. Dolan, who had travelled out to China to join her.

On July 25 the expedition left Chungking with its motor caravan driving the 250 odd miles to Chengtu in two days. Chengtu is the capital city of Szechuan province's forty millions and is the seat of West China Union University. Messrs. Small and Dickinson entertained us on the campus and, I hope, forgave us for the general air of pandemonium we injected into their orderly bachelor's mess. Mr. Small arranged our porter train to Yachow, the first lap of the Tachienlu road. While we were in the far interior he helped us virtually with mail, money and supplies.

With Mr. Dickinson as interpreter we called on Field Marshal Liu Hsiang, the Governor of the province. Field Marshal Liu was elected an honorary life member of the Academy in 1931 for his kind co-operation with our first expedition. We presented our Nanking passports and he ordered a provincial pass to be issued to us.

The expedition expense account was with the Bank of China and from the main office at Shanghai we had credits transferred to the Chungking and Chengtu branches. Mr. Cavalieri, the Postal Commissioner at

Chengtú, cashed our checks and forwarded orders to us in Tachienlu to be cashed on the local post office. All money was handled so while we were in the far interior, checks on Tachienlu being cashed in our absence by Mr. Robert Cunningham, of the China Inland Mission, who either forwarded cash by caravan or arranged credit with merchants who traded with interior markets. Mr. Cavalieri has been a friend to expeditions for many years and did everything possible to help us, both in 1931 and 1934-35.

#### THE EXPEDITION IN THE FIELD

Our baggage train of porters left Chengtú on July 30 and on August 5, two days late, thanks to the monsoon and a heavy spate of the River Ya, we reached Yachow where we were the guest of Miss Shurtlieff of the American Baptist Mission. Gen Liu Wen-hui, Border Pacification Commissioner, through Gen. Hsiang, his second in command, issued us strong passports for the new province of Sikong which consists of Chinese Tibet or Khams west of Tachienlu. He was kind enough to telegraph news of our coming to every military outpost on the border.

Bird collecting was begun at Chengtú and collections of birds and mollusca were made on the road to Yachow and Tachienlu.

At Yachow (elev. 2000 ft.) a caravan of horses and mules was engaged and on September 20, three days late, after floundering across the mud slides of a heavy monsoon, we reached Tachienlu. Mammal collecting began at Waszekou (also Wa-su-kou) on the Tung River, a half-day's ride below Tachienlu. Schäfer shot two immature goral (*Naemorhedus goral griseus*) on the north slope of the Tachienlu stream just west of its juncture with the Tung.

In Tachienlu (elev. 8900 ft.) we were welcomed by our old friends, Mr. and Mrs. Robert Cunningham and Mr. and Mrs. J. Huston Edgar, of the China Inland Mission. Only the members of the expedition can appreciate the generous and unflagging assistance rendered them by Bob Cunningham.

Serious mammal collecting started in the end of August two days north and northeast of Tachienlu on the road to the valley of Kongyu which drains east into the Tung. We collected there a series of Tibetan takin (*Budorcas tibetana*), a serow (*Capricornis sumatrensis milne-edwardsii*), and a blue sheep (*Pseudois nayaur szechuanensis*). On the Tachienlu Mountains just north, northwest and north-northwest further up the valley, Schäfer trailed a stag which the natives ascribed to "Hung lu", the red deer. "Hung lu" we eventually discovered to be the white lipped deer (*Cervus albirostris*). If the natives were correct, this would fix what we now feel sure represents the eastern limits of its range.

Duncan meanwhile had been preparing our first Tibetan caravan including three Tibetans, Gegen Atring, Trelay, and Lobsang Dendru, who had come to join us from Batang.

On September 8 we left Tachienlu with a hired caravan of yak for Hokow, crossing, on September 9, the Cheto La, a 14,200 ft. pass which represents, as pointed out in "Plans and Purposes", a definite divide between the fauna of the Hsifan marches and that of Khams or Southeast Tibet. From the pass the vista to the west is topographically Tibetan (Plate 12), younger and more gentle of contour than the deep cut trenches and precipitous ranges of the Hsifan country. The heavy monsoon is behind. Larch appears as we descend and dwarf rhododendron takes the place of the large shrub. Partridges and ravens are in plenty.

On September 14 we reached Hokow (elevation 9400 ft.) and shot a fine series of goral in the limestone cliffs above the Yalung (Tib. Nyachuka) River.

On September 16 we crossed the Rama La (a 15,000 ft. pass) and at Camp 11 collected the first goa (*Procapra picticaudata*). Between the ditches of the Yalung and the Yangtze, a twisting tongue of Tibetan plateau-land or neo-steppe forces its way southward although beset by valleys tributary to the two rivers bearing the typical forests of Khams. Gazelles, wolves, cranes, storks, ruddy sheldrake, larks and pipits, are character forms of the plateau. In the forests of the tributary valleys,—spruce, birch, poplar, fir and prickly oak,—are the white-lipped deer, M'Neill's deer, musk deer, tufted deer, serow, and steppe bear (Plate 15).

Litang we reached on September 26. The Tibetan market, lamasary, and Chinese garrison lie on the edge of a huge plain at an elevation of 13,800 ft. The plain of Litang teems with life. We collected there gazelles, cranes (*Grus nigricollis*), black stork (*Ciconia nigra*), lammergeier (*Gypaetus barbatus aureus*), many larks, pipits, and passerines between September 26 and October 15 (Plate 16). Two and a half days southeastward on the fringes of Malashi (Camps 18, 19, 20) we hunted large deer and saw one stag which we had reason to believe represented the white-lipped deer. In the Litang market we saw many antlers both of white-lipped and M'Neill's deer, although at that time we could not identify the latter.

From Litang we crossed the principality of the Yura Bönbo or Washi Prince in company with several merchant caravans banded together for protection against raiders from Shangcheng. On October 24, after an 8-stage march we dropped down into the arid, agricultural (irrigated) valley, and town of Batang (elev. 8600 ft.).

The ruined mission of the Disciples of Christ, Marion Duncan put at our disposal and there we spent the early winter working into the mountains

northeast, east and southeast of Batang and down the trench of the Yangtze to Leh and Drupalong.

The Yangtze River near Batang runs at circa 8000 ft. elevation in a deeply carved gorge. The range east of the river rises to peaks of not less than 18,000 ft. elevation. Inasmuch as the largely exhausted monsoon rain-clouds require high elevations for precipitation, resulting in a ribbon of forest with timber line below as well as above, the life-zones run the gamut from neotropical to alpine. Therefore, in order to explain the great differences in fauna perhaps ascribed to one locality in our collections, I divide the fauna and flora of the Yangtze slope into rough elevational groups, citing characteristic forms familiar to me which I hope will serve as adequate sign-posts to the general ecology.

#### *The Kham Forest at Batang*

1. The arid zone: from the river bank at 8,300 ft. to 10,000 ft. Flora: stipa grass, cotanasters, barberry, artemesia, roses, plums. Large mammal fauna: leopard, sambhar, goral, blue sheep.
2. Lower edge of forest belt: from 10,000 to 11,500 ft. Flora: Prickly oak (*Quercus ilex*), pine, birch, poplar. Fauna: sambhar, serow, tufted deer, musk deer.
3. Heavy forest belt: from 11,500 ft. to 13,000 ft. Typical forest of Khams. Flora: prickly oak, birch, fir, spruce, rhododendron. Fauna: bear (*Ursus arctos pruinosus*), lynx, serow, musk deer, white-lipped deer, and probably M'Neill's deer (Plates 13 and 14).
4. Alpine zone: from 13,000 to 17,000 ft. Flora: rhododendron, spruce up to 14,500 ft., dwarf rhododendron and grass to undetermined elevation. Fauna: musk deer, white-lipped deer, probably M'Neill's deer, bear, lynx, snow leopard, and blue sheep.

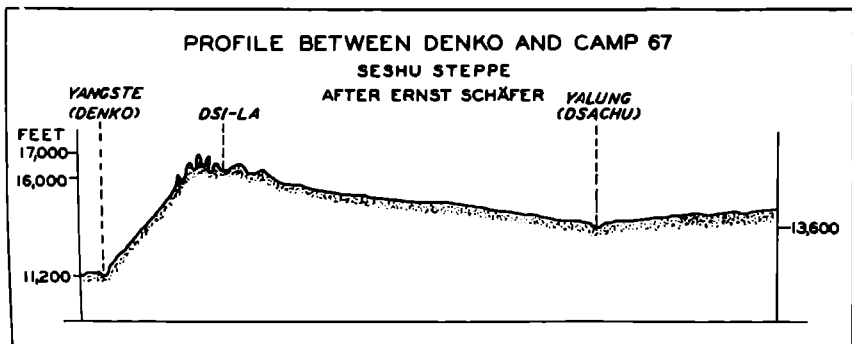
All mammals cited in this division were secured by the expedition while at Batang with the exception of M'Neill's deer and the leopards. Collections of mammals, birds, and mollusca, we sent back from time to time with merchant caravans to Mr. Robert Cunningham in Tachienlu for storage in rooms hired by us for that purpose in a Tibetan house.

In the end of December we began to organize and round out our staff of Tibetans; to buy supplies, additional equipment, and riding animals for the journey to Kokonor. On January 20 we set out with a convoy of 60 mules hired from Ba lama for the trip to Jyekundo. The first stage, due to the necessity of avoiding the country of the Deco Diemba, at war with the garrison in Batang, proved to be a 17-day detour eastward, northward and northwestward, to regain the Derge road at Sama. This road, unfortunately, entailed backtracking toward Litang and crossing five passes of circa 16,000 ft. elevation; it put out of commission permanently the riding horses which we had been foolish enough to buy (instead of hire) in Batang (Camps 29-26, 36-41).



From Sama (Camp 41) we travelled via Denna (Dene) Tang, Beyü (Pehyul), Horbo, and Sotong to Derge (Dege) Gönchen (Camp 52), the chief lamasary of the Sakyapa in Eastern Tibet. Beyond Derge at least as far as Jyekundo and back to Kanze in the east we had before us a large area unexplored by naturalists. Weigold had been in Derge and Kanze; Kozlov in Jyekundo; but the big triangle between these three towns was a mystery which we were eager to explore.

From Derge on February 16 we set out north again, travelling via Göze Gomba and Nojeling Gomba to Denko (Camp 58) on the upper Yangtze River. We were entertained there by the magistrate and the major of the Chinese garrison obtaining by their good offices fresh supplies of wheat and barley (rice being a delicacy only) before crossing, on February 24, the Dsi La, a 15,800 ft. pass onto the first steppe of topographical high Tibet. This is the steppe of Seshu, sloping down to the Upper Yalung (Text fig. 2), and would have been a surprise of the first



TEXT-FIGURE 2. Profile of the Tibetan steppe of Seshu. Modified after Ernst Schäfer.

water had we not been regaled by Chinese officials on the road with accounts of the strange animals to be found there. Just below the pass we found skulls of *Ovis ammon hodgsoni* and heard, for the first time, the name "nien" or "nihn" by which the Tibetans describe the argali. We reached the garrison of Seshu (Ju Gomba) (Camp 61) on February 25 and on a three day hunt secured a series of wild ass or kiang (*Equus hemionus kiang*) establishing a record for Szechuan Province.

Seshu represents the first high steppe of Kokonor Tibet (Plate 18), extending down from the Chang Tang or Great Northern Plain of Tibet along the shores of the Dsachu or Yalung almost to Kanze.<sup>1</sup> The contours are extremely level, rising to low island-like ranges of granite, the habitat of the few *Ovis ammon* remaining in the region. Gazelles, wolves, foxes,

<sup>1</sup> Spelled "Kantze" on map and Text-fig. 1.

and steppe foxes (*Vulpes ferrilata*) were extremely plentiful, and steppe buzzards (*Buteo hemilaseus*). We saw falcons (*Falco cherrag milvipes*) but failed to secure any at this time.

At Seshu we were regally entertained by the magistrate who leads a terrible existence in this last outpost of the republic. Many soldiers die here of influenza, I suspect, for of our crew we had three men out for a week expecting to die of "poisonous winds".

Not until March 7 were we in fit condition to travel and then struck northward crossing the Yalung on March 9 and marching northwestward across a great steppe alive with kiang into the southeasterly end of the Baian Kara range, to be turned back by intense cold, lack of grazing and, most of all, by the determination of our guides to travel not one mile further northward (Plate 17). At Camp 66 we found the first wild yak horn and were told by our guides that they had not occurred here for many years. On our return to Seshu, Schäfer remained at Waterh (Wata) (Camp 62) to make collections while Duncan and I returned to Seshu, picking up Schäfer on March 19 at Seshu Gomba (Camp 68) on the final stage of the journey to Jyekundo (Camp 72), which we reached via the 14,700 ft. Ngamba La (pass), Sheru Gomba and Drebumdo on March 23.

Jyekundo is a market town of adobe caravanseries standing at the juncture of the Kokonor road with the Tachienlu-Lhasa tea road. It stands also on the boundary of three authorities, (Lhasa, Chengtu, Sining) so that we found there a military magistrate and a Brigadier General (?) commanding a large cavalry garrison and representing the Mohammedan authority of General Ma Pu-fang, the Governor of Kokonor, whose seat is in Sining. Both officials were resolved that we should proceed no farther either across the Yellow River, as planned, or in any other direction save back to Szechuan whence we came. Our staff they completely demoralized with tales of the Ngolok, the war-like nomads living in the knee of the Yellow River southwest of Radja. Ourselves they restrained from leaving the environs of the town, forbidding the use of their military wireless by which we might have communicated with the American Legation in Peking and thus had our case brought to the attention of the Ministry of Foreign Affairs.

On April 3 my gun bearer, Jimmy, whom we sent secretly out of Jyekundo, returned with two hinds of M'Neill's deer (*Cervus macneilli*) which he had shot a day and a half to the west of the town.

The local prince of that district, a strict lamaist, Jimmy was told, forbids any killing of the deer and has punished at least one offender by removing his hands at the wrists.

Gradually we seemed to have convinced the local authorities of the innocence of our hearts as well as of the firmness of our intention to carry

out our plans. We were one day given leave sub rosa to enlist guides and to purchase supplies and transport animals. On April 12, having signed documents releasing the officials from responsibility in any calamity that might befall us, we left Jyekundo, with our own caravan of fifty yak and five local guides in addition to our regular staff of eleven men, on the long road to Radja Gomba.

On April 14 we passed the village of Tongbumdo where Dutreuil de Rhins was murdered on June 5, 1894. On the following day we crossed the upper Yangtze, known to the Tibetans as Drechu, at Lamdo, ferrying over in a huge bateau, the yak being driven in to swim across. Everyone was in high spirits; we were well on our way to Kokonor.

That evening, April 15, three soldiers, rode up the river on the Jyekundo road. As soon as I saw them, I knew the burden of their message. We were ordered, by the magistrate, to return to Jyekundo. A wireless had been received from the Foreign Office in Nanking that we were to proceed no farther. The message shown us looked spurious, and, deciding that our chances of bluffing the magistrate were fair, and that he would not dare any violence, we refused to comply. We agreed, however, to proceed no farther than Chinto, the last small military post on the road to Kokonor, and to parley there.

On April 17 we camped five miles beyond Chinto where there was grass for our animals, and in the afternoon I obeyed a summons to appear before the Lieutenant in charge of the post. His orders and his manner were unequivocal. We were to return to Szechuan Province immediately! We were not to remain a day longer in Chinto!

We would not return to Szechuan Province. We would stand on our reciprocal rights to travel anywhere in the Chinese Republic and remain in Chinto, dispatching a man to Kanze in Szechuan to send a wireless to the American Consulate, and we would shortly be authorized by the Chinese Foreign Ministry to proceed wherever we chose. As a stormy session seemed to be developing, I left and rode back to camp in very low spirits. The situation briefly was, that we had come a road of many months to be turned back at the very gates of Kokonor and Northern Tibet. In the face of such opposition, there seemed little likelihood of obtaining authorization from the Foreign Ministry, for the diplomatic representatives of the U. S. A. are unwilling to exert undue pressure in a suit such as ours, and an exchange of telegrams could not fail to establish the fact that we were not altogether welcome visitors to Kokonor.

One solution seemed possible, if not certain of success. We talked it over for hours, Schäfer, Duncan, and I. I should travel with Jimmy, and one of our Tibetan guides, Bozong, who was willing, and of whose courage Jimmy was satisfied, the 490 odd miles to Sining, there to interview General

Ma Pu-fang, the Governor of the Territory, and to put our plea before him. His permission wirelessly back to Jyekundo would set the expedition moving northward, and I would return to join the party at or near the Tossun Nor Lake.

I adopted the disguise of a Chinese merchant travelling across these wastes and, relying upon passing the last nomad encampments during the night, we set out with three mules and provisions for sixteen days, which is the time used by mail runners for the journey from Jyekundo to Sining. The route followed is shown on the map as "Dolan's Route" and is something over 400 miles in length. As I was unable to make collections en route, I will outline only the salient features of the trip.

On the first night we passed Drechu (Tongchi) Gomba from which the route is marked by cairns of sod as far as the Machu or upper Yellow River; nomad tribes, among them the Shuma, graze their yak and sheep in the watershed of the Dsachu or upper Yalung as far up as the benches below the Trala, the pass over to Machuka, as the drainage of the upper Yellow River is known. We were lost in a blizzard for three days on the road to the Trala which we reached on the ninth day out of Chinto.

The prospect looking northward over Machuka from the pass (Trala, or Chiala, elev. 15,500 ft.) was unbelievably desolate. The drainage and contours of the low wandering hills looked aimless to a degree, although the drainage is not actually indeterminate. Chocolate mud splotted with snow, and fading into the murky atmosphere of rapid evaporation was the texture of this uninviting wilderness.

Game is not plentiful at this time of year. The dead grass of the previous summer was close cropped by kiang and goa. Our mules, marching six hours a day across alternating steppes and low ranges of snow and mud with very sparse pasture, went down pitifully in the five days between the Trala and the Machu.

On May 2 we forded the Machu or Upper Yellow River, in spite of melting snows. Jimmy and Bozong were fortunate to reach the north bank. That night we saw the first and last party of Ngolok across the river. We raised our rifles inhospitably and the Ngolok rode higher up the river to cross.

Beyond the Machu, there are no more sod-cairns and the road is marked only by the droppings of caravans. After crossing a low range, where we found dozens of wild yak skulls, we lost the road on May 5. It speaks very well for Jimmy and Bozong that they did not press me to return at this stage, for our prospects were far from cheerful. Hsiao Lo, my mule, had to be abandoned on May 6, all but a few cupfuls of our staple, barley flour, was exhausted, and we were "feasting" on wild ass flesh.

On May 7 we picked up the road again and shot two bears. They were evidently just out of hibernation, in superb pelage, and very fat. The mean diurnal temperatures were between 32° and 45° F., falling to between 18° and 25° F. at night. The steppes were almost barren of life, including ravens and birds of prey, with the exception of a marshy steppe crossed on April 30, thirty miles south-southwest of the Machu where Indian barheaded geese, ruddy sheldrakes, and terns, were congregated in some numbers.

On May 9 we again lost the track just east of the Tossun Nor Lake as we learned when we were found on May 11 by a merchant caravan bound like us for Sining. On these huge steppes one loses the road in the following manner: Caravans habitually camp on the same general site at the edge of a steppe but the site may be extended to a mile in length by the quest for fresher pasture. The caravaneers know the road by heart and in the morning simply steer an approximate course toward some distant focal point where the main road follows the easiest features of a mountain range. Only by making a huge circle could we be sure of cutting the main road (to be recognized as a wide enough band of yak droppings) and on the last occasion we were fooled for an entire day by a Ngolok road leading too far to the eastward. A blizzard then descended, covering the tell-tale yak chips.

We were able to purchase supplies from the merchants and we travelled with them for four days. At daybreak of May 14 from an encampment named Jitsida near the Lake Beri-toun-tso, I had a glorious view of the great snow peak Amnyi Machen probably seventy-five miles away.

On May 15 we crossed the Dsasola, (elev. 14,600 ft.) into a lower country far more advanced in season than the steppes of Machuka behind us. On May 16 we saw the first habitations, the tents of the shy Banak nomads, and on May 17 passed the Mohammedan outpost of Da Ho Pa, where I was first recognized as a foreigner but escaped questioning.

From May 17 to May 21 we crossed an almost waterless Mongolian plateau country, reaching the hamlet of Chabcha (Cha-P'u-Cha) on May 21. On May 23 we passed within a few miles of the southern end of Lake Kokonor and on the 24th, after a 37-day journey, reached Tangkar where I was most hospitably received by my old friends Mr. and Mrs. Marcel Urech of the China Inland Mission, who had been our hosts at Tachienlu in 1931.

I left Tangkar, having made arrangements with Mr. Urech for another caravan, with which we planned to travel together as far as Barun Tsaidam, leaving in the end of June when I should have returned. From Barun I planned to travel southward to meet Schäfer and Duncan.

At Sining I obtained the promise of General Ma Pu-fang that the expedition be permitted to travel and hunt in the western Kokonor and northern Tibet with the understanding that the party return to China via Jyekundo and Szechuan Province. This I had long since determined in my mind was the only course open to us in the face of the sheer physical difficulties of travel in northern Kokonor, to say nothing of official opposition.

It was necessary for me to return to Shanghai for refinancing and re-outfitting with film, ammunition, and general equipment. From Lanchow, the Capital of Kansu Province, where I was the guest of Mr. Bell and the other very kind members of the China Inland Mission, I flew on a ship of the Eurasia Line via Sian-Fu, Chengchow, and Nanking to Shanghai.

At Nanking I approached our Consulate-General and I learned, to my dismay, that a special permit would be necessary to visit the Kokonor. Tentative agreement was given by the Foreign Office with the stipulation that the authorities of Kokonor approve such a permit. The recent movements of the Communist armies around Sungpan toward Kokonor were given as an objection, as I feared they would be and the permit was not granted. Accordingly with a 70-day trip into Jyekundo via Szechuan as an alternative, active participation in the expedition was over for me. I wirelessly to Philadelphia and on July 10 my wife joined me in Shanghai.

*The Work of the Expedition from April 15 Until October 15, 1935*

Following my departure from Chinto (Camp 77) Duncan was able to conclude an agreement with the Mohammedan military, whereby the party proceeded to Drechu Gomba (Camp 79). This lamasery which Schäfer subsequently used as a base for intensive collecting lies at the edge of the winding Dsachu Steppe. Rolling hills of scarce, tufted grass and low, granite ranges roll north and south from the edge of the plain to the Yangtze watershed and the height of land south of the Machu or Upper Yellow River. Both big-horned and blue sheep range the mountains; steppe bears are plentiful. The plain and the adjoining bluffs are the breeding place of thousands of cranes, Indian bar-headed geese, ruddy sheldrake, and other waterfowl. Hunting out from Drechu Gomba, Schäfer and Duncan collected a series of *Ovis a. hodgsoni* in the mountains to the westward (Camps 80-83). This trip was terminated by a blizzard. The sheep were found to be already commencing their moult (April 20-May 3). In the environs of Drechu Gomba, Schäfer made large bird collections (Plate 19).

Returning to Jyekundo, on about May 8 Schäfer set out south-southwestward into Tibet, crossed the Gurla Pass and on May 14 and May 16 from Camp 90 in the Mekong drainage found and killed specimens of M'Neill's deer, including the all important stags never before collected. Into the Mekong watershed toward Chiamdo he collected also a specimen

of the rare eared pheasant *C. crossoptilon drouyni*, returning to Jyekundo on May 19. On May 22 he set out once more southwestward again crossing the Gurla and collecting specimens of M'Neill's deer and bear, returning to Jyekundo on June 1. These two trips represent Camps 86-97.

In the meantime Duncan had remained in Jyekundo attending to our finances and continuing to press for permission to penetrate into the wild yak country. At this time, it was granted me by Gen. Ma Pu-fang in Sining that the expedition be permitted to make a journey into that territory on condition that the party return to China via Szechuan. This permission was transmitted to Jyekundo by the military wireless and communicated to Duncan on June 1. At the same time, a Chinese gentleman of influence, Colonel C. C. Ku, arrived in Jyekundo from Sining investigating for the Department of Agriculture the grazing lands and livestock of Kokonor. He befriended us in many ways, standing sponsor for our social and financial credit. It was arranged that Schäfer should be allowed a journey onto the Chang Tang, the Great Northern plain of Tibet, and that Duncan should remain at Jyekundo as a hostage to our promise and as collateral on various debts for which money from Tachienlu had not yet arrived.

In the brushy valleys around Jyekundo Schäfer collected a series of eared pheasants intermediate between *Crossoptilon c. crossoptilon* and *C. harmani* which Rodolphe de Schauensee has done me the honor of naming *Crossoptilon c. dolani*.

On June 6 Schäfer left Jyekundo for the Chang Tang travelling on our former course as far as Drechu Gomba. It is necessary to bear in mind when following our route by camp numbers on the accompanying map that identical camps were used for different stages of different journeys, and that, for reasons of identification and space, we have not changed the original number of any camp. The next number in logical sequence appears at the next fresh camp.

Schäfer's journey in search of wild yak and chiru was attended by great difficulties of transport and personnel. He lost many yak and several riding animals from exhaustion and in quicksands, at unknown river crossings, etc. His men were a constant problem, rebelling with each day's journey against further travel into the drear and disheartening wastes of the Chang Tang.

This is a land of high steppes similar to those crossed by me en route to Sining and described above. The level of the Chang Tang steppes varies between 13,800 and 16,000 ft. with mountain ranges up to 18,000 between the steppes. Snow is the order of summer, and high river-levels, mud, and quicksands.

Schäfer travelled first north-northwestward to the Karma Tang, the source-land of the Machu or upper Yellow River and, failing to find yak there where they formerly abounded, continued his journey northward toward the Borhan Bhota, the range separating the Chang Tang from Tsaidam. From there he cut southwestward across tremendously high country finding and killing yak (*Poephagus grunniens mutus*) at Camp 117 or thereabouts in the last days of June.

The chiru still continued elusive and he travelled westward in the face of mounting rebellion, crossing what he believes to have been the Chumar branch of the Upper Yangtze, securing chiru (*Pantholops hodgsoni*) finally at his westernmost camp (Camp 124) on July 5 to the southeast of the Kukushili range (Plate 20). He returned to Jyekundo as rapidly as his exhausted animals would permit, having collected yak, chiru, white-lipped deer (high above any timber but dwarf rhododendron and willow), and Hodgson's sheep, reaching Jyekundo on August 3 or 4 (Camps 102-134).

Duncan meantime had returned to Tachienlu to arrange finances and transport of the collections out. About August 7, Schäfer set out for Seshu in Szechuan, where he made systematic collections of birds and returned again to Jyekundo, leaving there for the last time about August 23 with all the collections in hand. At Seshu he sent the caravan on to Tachienlu via Kanze and Dawo, southward, stopping, himself, at Dzogchen Gomba (September 4-8). In the mountains to the southwest of the lamasary, in high rhododendron growth, Schäfer found a herd of M'Neill's deer and collected several males. In the beginning of September he found the large stags with velvet stripping off and clean horn beneath. The younger stags were still carrying full velvet. They are under the protection of the Abbot of Dzogchen Gomba. He collected there also a buck and roe of *Capreolus capreolus bedfordi*, encountered and collected by us in 1931, west and northwest of Sungpan, on both occasions establishing a southerly record.

Schäfer and Duncan met in Dzogchen on September 7 and Schäfer proceeded on to Rongbatsa, Kanze and Dawo, where he spent a number of days, reaching Tachienlu on September 25, Duncan following with the caravan, arriving on September 27. Duncan at once set about preparing the caravan for the journey to Yachow, while Schäfer made a final collecting trip to Waszekou.

From Tachienlu, where they bade a fond farewell to our kind hosts and friends Mr. and Mrs. Bob Cunningham, they returned down the road to Yachow, which we had ascended in August 1934, and on October 22nd I met them at Yachow, where, after repacking and arranging our cases of specimens and what was left of our equipment in the compound of our old friend Miss Shurtlieff, we took a raft down the Ya River to Kiating, a junk down the Tung River to Suifu, and a small motor ship down the Yangtze to Chungking.



In Chungking, our passports for the interior having expired and the Maritime Customs having received no instructions concerning our collections, we were delayed interminably although our kind hosts Mr. J. R. Schwer of the Chungking Ice Co. and Mr. and Mrs. Morisoff, as well as other good friends, did much toward making our stay a pleasant one. Flying back to Shanghai and Nanking, I secured the necessary releases and Schäfer and Duncan, who had remained to care for the collections, arrived in Shanghai on a Yangtze River steamer on November 20.

In Shanghai we concluded formalities with the Academia Sinica and the Metropolitan Museum, whose authorities secured release by the customs of our collections and equipment for shipment to Philadelphia. Duncan sailed from Shanghai for the United States just before Christmas, 1935. Schäfer accompanied Mrs. Dolan and myself to Philadelphia where he will long be remembered by his many enthusiastic friends.

#### GENERAL RESULTS

The collections secured can be summarized as follows:

*Mammals*: 310 specimens, large and small.

*Birds*: 2615 specimens.

*Mollusks*: 2600 specimens of which about 150 represent wet preparations.

The expedition was in the field of work some fourteen months and in view of this extended period the collections do not seem large. Several factors, one of them not generally present in modern exploration, were instrumental in restricting the size of the collections.

In the first place every step of the three thousand odd miles traversed by the party in the actual field of collecting was covered afoot or on horse-back. Collecting and preparation work during periods of laborious travel—to say nothing of the physical obstacles to collecting in Tibet between the months of October and June—are naturally difficult. Detailed study of the reports here presented will quickly show to what extent we were dependent upon prolonged halts for systematic collections. Such localities as Tachienlu, Litang, Batang, Jyekundo, Drechu Gomba, and Dawo, localities in which we stayed for periods of many days or weeks will recur on every other page of the three systematic reports to follow.

Another factor influencing the size of our collections was my conviction that the large mammals, many of them on the road to extinction even in that secluded land, were the most important objectives. That many will disagree is natural. Nevertheless, we could have had no more productive rule from the standpoint of large mammals, for of this group, only the leopard and snow-leopard (of which we had been able to purchase trade skins in 1931) eluded us. We were successful in collecting the mammal

fauna of the high Tibetan steppes. We secured and established the hitherto unknown eastern ranges of the large Tibetan stags, *Cervus albirostris* and *Cervus macneilli*. Of the latter we collected the first males.

The bird collection is outstanding in fine series of rarities and is a credit even to the superior collecting talent of Dr. Ernst Schäfer. The collection includes five new races, previously published in the Proceedings of this Academy (1937).

For the mollusk collections, we can lay no claim to completeness. The richest life-zone for this group of animals in Hsifan, Khams, and Chinghai, due perhaps to the high level of the forests and the cold climate generally prevailing there, is in the deep arid trenches of the great rivers and their tributaries which as a rule did not hold the expedition except as corridors of travel. However, extensive collections were made in the gorge of the Upper Yangtze River below Batang.

As to the value of the exploratory work done by the expedition, the field of Khams, and lower Chinghai, although traversed repeatedly by geographical explorers had been only partially explored by zoologists. Walter Zappé had penetrated no further westward than Litang, Kozlov had come down from the north to Jyekundo. Dr. Hugo Weigold, as ornithologist for The Stötzner Expedition had worked as far north as Derge but had then turned back eastward to Kanze passing along the southern edge of the mountains whose northern slopes would have shown him the great steppes of the Upper Yalung with their high Tibetan fauna. On these steppes in the triangle formed by Derge, Jyekundo and Kanze, with the Upper Yalung as hypotenuse, we established many new southern and eastern records for Tibetan life-forms.

#### ACKNOWLEDGMENTS

I wish to tender sincere thanks to the following persons whose names do not appear in the above text, but whose kindness and cooperation not only contributed materially to the success of the expedition but also added greatly to the enjoyment of our visit to China: Mr. and Mrs. Leonard Everett, Mr. and Mrs. Heinrich Höne, Mr. and Mrs. Clarence Meyer, Mr. and Mrs. William T. Hunt, Mrs. Harold Ogden, Mrs. Jack Young, Mr. Kermit Roosevelt, Mr. Thomas Tsai, and Mr. William Sipprell.

To Mr. and Mrs. Arthur deC. Sowerby who made their charming house in Shanghai our own, whose knowledge of China was of untold help to us as it has been to the members of many expeditions, and who were un-failingly interested in the success of the expedition and the wellbeing of all of us, we owe a debt of thanks that cannot be redeemed.

CAMPS AND LOCALITIES OF THE SECOND DOLAN EXPEDITION TO WESTERN  
CHINA AND EASTERN TIBET

The numbers given for the camps are those shown on the accompanying map in their respective positions.

<i>Date</i>	<i>Camp</i>	<i>Locality</i>	<i>Biota</i>
Sept.	7.	1. TACHIENLU (elev. 8900 ft.).	Situated in a deep valley. Barley plantations, poplar, birch, prickly oak, rhododendrons.
	8.	2. Cheto .....	Outer perimeter of Hsifan: rhododendrons, conifers.
	9.	Pass; Cheto La, elev. 14,200 ft.	Boundary between Hsifan and Kham faunas.
	9.	3. Tizu .....	Khams: rolling grassland, dwarf rhododendron, willows, larches. Many partridges.
	10.	4. Chorten .....	Khams: Anya Valley, sown to barley. Grasslands, larches, patches of conifers. Many marmots.
11, 12.	5.	Tunggnolo .....	Khams: Barley plantations, poplar, birch, prickly oak ( <i>Quercus ilex</i> ). Eared pheasants.
	13.	Pass: Gazhi La, elev. 14,800 ft.	A double pass with a saddle representing the first finger of Kham Steppe.
	13.	6. Oroshe .....	Dense Kham Forest: spruce, fir, prickly oak, many shrubs. Musk deer, serow, sambhar, other stags(?).
	14.	7. Shawa Rimba .....	Lower Kham Forest: prickly oak, golden oak, birch, poplar, pine, barley fields. Sambhar, parrots.
15, 16.	8.	Hokow (on the Yalung, elev. 9400 ft.).	Deep, arid river-trench: thorny shrubs. Goral, Yunnan birds (come up the warm river-corridor).
	17.	9. Nyachuka (on the opposite bank and incidentally the Tibetan name for the valley of the Yalung).	
	18.	10. Magidrong .....	Upper Kham Forest: conifers, prickly oak, rhododendron. Musk deer, serow.
	19.	Pass: Rama La, elev. 15,400 ft.,	giving onto the easternmost projection of the central Kham Steppe.

<i>Date</i>	<i>Camp</i>	<i>Locality</i>	<i>Biota</i>
Sept.	19.	11. Melangong (elev. 14,000 ft.).	Kham Steppe: a winding plateau of high grassland, beset by forested valleys. Gazelles.
	20.	12. Hsignolo .....	Fine Kham Forest: spruce, birch, fir, etc., invading the Kham Steppe along the valley of Hsignolo, in which flows a tributary of the Yalung. Stags.
	21.	13. Changkako .....	Upper Kham Forest: coniferous and juniperous; shrubs, grassland. Musk deer, gazelles.
	22.	14. Tangkama .....	Kham Steppe: grassland, dwarf rhododendron. Larks, gazelles, lammergeiers. Nomad encampment.
	23.	15. Horchu .....	Kham Steppe: grassland. Ruddy sheldrakes, ravens, gazelles.
	24.	16. LITANG (elev. 13,800 ft.).	Kham Steppe, grassland, dwarf rhododendron. Gazelles, wolves, cranes, storks, many ruddy sheldrakes, larks, pipits, ravens, lammergeiers.
	28.	17. Bemah .....	Southeastern edge of Litang Steppe.
	29,30.	18. Tralitsong (Malashi) ..	Upper Kham Forest: conifers, rhododendron. Musk deer, white-lipped deer; M'Neill's deer(?).
Oct.	1-3.	19. Din Dunko (Malashi) ..	Splendid Kham Forest: spruce, fir, rhododendron, grassy glades. Mammals as at Camp 18.
	4.	20. Rihchako (Malashi) ..	Similar to Camp 19.
	5-14.	21. (16) Litang .....	Characterized as Camp 16.
	15.	22. Chukundo .....	Kham Steppe in the valley of the Litang River.
	16,17.	23. Bonya Tang (plain) ...	Wide steppe of the Litang River. Encampments of the Washi nomads.
	18.	24. Upper Bonya Tang ....	Elev. 14,200 ft. Southwesterly corner of the Litang Steppe. Many gazelles.
	19.	25. Below Shari La .....	Alpine meadows, junipers, dwarf rhododendron.
	20.	Pass: Shari La (Gari La), elev. 15,900 ft.	

<i>Date</i>	<i>Camp</i>	<i>Locality</i>	<i>Biota</i>
Oct.	20.	26. Shari Ngotso . . . . .	Upper Kham Forest: cedars, dwarf rhododendron. Blue sheep, musk deer; stags(?).
	21.	27. Upper Gemoh . . . . .	Grassland, Kham Forest: conifers, cedars. Wild dog, musk deer.
	22.	Pass: Tsong Ben La. elev. 16,500 ft.	
	22.	28. Above Bon Tramoh . . .	Dwarf rhododendron, junipers, willows. Just above rich, coniferous forest. Blue sheep, musk deer.
	23.	29. Mili Ting . . . . .	Lower Kham Forest: Poplar, pine, prickly oak, birch, plantations. Sambhar.
Oct.	24.	30. BATANG (elev. 9000 ft.).	Deep, arid valley: barberry, plums, roses, cotoneaster. Goral, Yunnan birds.
		Leh and Drupalong on the	Yangtze River below Batang at elev. circa 8000 ft. are similar life-zones with the addition of stipa grass slopes from the river up to the lower timberline at elev. 9400 ft.
		until	
Jan.	19.	Batang Mts. (elev. 8000-17,000 ft.).	
	20.	31. (29) Mili Ting . . . . .	Characterized as Camp 29.
	21	32. Above Bon Tramoh . . .	Upper Kham Forest: sparse coniferous woods, junipers, willows. Blue sheep, lynx.
	22.	Pass: Tsong Ben La, elev. 16,500 ft.	
	22.	33. Upper Gemoh . . . . .	Characterized as Camp 27.
	23.	34. Melundrato . . . . .	Characterized as Camp 26. Cedar forest.
	24.	Pass: Shari La, elev, 15,900 ft.	
	24.	35. Below Shari La . . . . .	Characterized as Camp 25. Partridges, rock-pigeons, ruddy sheldrake, wolves.
	25.	36. Upper Bonya Tang . . .	Kham Steppe: many wolves and gazelles.
	26.	37. Head of the Litang River (western branch).	Kham Steppe.
	27.	Grassland Pass: 16,000 ft.	
	27.	38. Upper Lingkashi . . . . .	Upper Kham Forest: grassland, dwarf rhododendron, juniper, sandthorn ( <i>Acacia</i> ). Encampment.

<i>Date</i>	<i>Camp</i>	<i>Locality</i>	<i>Biota</i>
Jan.	28. 39.	Meloumba .....	Upper Kham Forest: grassland, cedars. Nocturnal temperature —17 degrees Fahrenheit.
	29.	Pass: 16,000 ft. elev.	
	29. 40.	Deep Valley .....	Kham Forest: conifers, cedars, rhododendrons.
	30.	Pass elev. 16,300 ft.	
	30. 41.	Sama (elev. 11,500 ft.)	Lower Kham Forest: prickly oak, poplar, birch, barley cultivation.
	31. 42.	Sho Du Tang (elev. 11,000 ft.)	Lower Kham Forest: prickly oak. Sambhar, tufted deer, <i>Grandala</i> .
Feb.	1. 43.	Denna (Dene) Tang (elev. 10,300 ft.)	Lower Kham Forest: prickly oak, brush, cultivation.
	2. 44.	Sho Tang .....	Heavy Kham Forest: spruce, rhododendron. Alpine meadows.
	3.	Pass: Me La, elev. 14,400 ft.	
	3. 45.	Below Pass .....	Coniferous Kham Forest. Many cared pheasants.
	4-6. 46.	BEYÜ (PEHYUL) (elev. 10,700 ft.)	Brush zone. Coniferous forest above.
	7.	Pass: Nyozo (Mizo) La, elev. 16,300 ft.	
	7.	Pass: Jyacho La, elev. 15,000 ft.	
	7. 47.	Gartoh Gomba (elev. 13,400 ft.)	Willows; coniferous forest below. Many lammergeiers.
	8. 48.	Horbo (elev. 10,400 ft.)	Brush zone just below coniferous forest. Plantations.
	9. 49.	Sotong (on the Yangtze)	Arid brush zone: Barberry, plums. Goral, Tufted deer. Tree-line of poplar and birch much lower in relation to the river than at Batang.
	10. 50.	Deshu (on the Yangtze)	Locality similar to Camp 49.
	11. 51.	Derge Jonrah .....	Arid valley: barberry, plums, roses. Goral.
	12-16. 52.	Derge (Dege) Gönchen (elev. 10,800 ft.)	Locality similar in character to Camp 51. Coniferous forests above.
	17. 53.	Kolondo (elev. 11,700 ft.)	Coniferous and juniperous Kham Forest.
	18. 54.	Below Pass .....	Grassland, coniferous and juniperous forest. Many water ousels.

Date	Camp	Locality	Biota
Feb.	19.	Pass: elev. 14,900 ft.	
	19.	55. Marung (12,710 ft. elev.)	Coniferous and heavy juniperous forest. Many white, eared and blood pheasants.
	20.	56. Gözc Gomba (elev. 12,300 ft.)	Open grassland and brush.
	21.	57. Nojeling (Nojili) Gomba (elev. 12,800 ft.)	Grassland, willows.
	22.	58. Denko (on the Yangtze, elev. 11,200 ft.)	Arid, sparse brush zone. Cedars and willows above.
	23.	59. Buho . . . . .	Narrow rocky gorge. Junipers, willows.
	24.	Pass: Dsi La, elev. 15,800 ft.	Drops down to the first country of high Tibetan character. Fig. 2.
	24.	60. Da Dsi (elev. 14,800 ft.)	Bare bleak steppe (see Map: "Chinghai Steppe"). Wild ass or kiang, <i>Ovis ammon hodgsoni</i> .
Feb. until Mar.	25.	61. SESHU (Ju Gomba, elev. 13,900 ft.)	High steppe: kiang, goa, wolves, steppe foxes, pikas, steppe buzzards and steppe falcons.
	8.	62. Waterh (on the Yalung, elev. 13,600 ft.)	Tibetan Steppe: of similar character to Camp 61. Many waterfowl.
	9, 10.	63. Getze Gongma . . . . .	Tibetan Steppe. Encampments.
	11.	64. Hachu Nandra . . . . .	Tibetan Steppe. Encampments.
	12.	65. Minoh Lungchen . . . . .	Tibetan Steppe: small, steep mountains with sparse willow on the slopes. <i>Ovis ammon hodgsoni</i> .
	13.	66. Hachu (elev. 15,000 ft.)	High, bare tableland, almost without vegetation. Former range of wild yak.
	14.	67. . . . .	Tibetan Steppe: at the edge of a huge plain, pasture for hundreds of wild ass.
	15.	62. Waterh . . . . .	Characterized as Camp 62.
16-19.	61.	Seshu (Ju Gomba) . . . . .	Characterized as Camp 61.
	19.	68. Seshu Gomba . . . . .	Tibetan Steppe.
	20.	69. Ten miles west of Seshu Gomba.	Tibetan Steppe. Many waterfowl: barheaded geese, mallards, scaup, golden-eye.

<i>Date</i>	<i>Camp</i>	<i>Locality</i>	<i>Biota</i>
Mar.	21.	Pass: Ngamba La, elev. 14,700 ft.	Leads back into the main Yangtze drainage.
	21.	70. Sheru(g) Gomba . . . . .	Juniperous wood and willows.
	22.	71. Drebumdo (on the Yangtze)	Brush zone. Many partridges.
	22.	Yangtze River Crossing, elev. 11,700 ft.	
Mar. until Apr.	23.	72. JYEKUNDO (elev. 12,300 ft.)	Arid, brush zone: cultivation, mountains grass-covered.
	12.		Willows, junipers, other shrubs in the small valleys.
	12.	73. Lanyipa . . . . .	High mountain-saddle: scattered willows.
	13.	74. Sacha Sumdo . . . . .	Head of Tongbumdo valley. Brush zone.
	14.	75. Ts'in Da . . . . .	Arid gorge of the Yangtze: brush.
	15.	76. Lamdo . . . . .	Arid gorge of the Yangtze: brush.
	16.	77. Below Pass . . . . .	Brush zone: willows. Tibetan snowcock.
	17.	78. Beyond Chinto . . . . .	Grassland, willows.
(Beyond Camp 78 all data are based on the observations of Dr. Schäfer and Mr. Duncan.)			
Apr. 18-20.	79.	Drechu Gomba (elev. 13,800 ft)	Tibetan Steppe: the plain of the Upper Yalung or Dsachu. Breeding waterfowl, cranes etc. Bears, wolves, foxes, pikas.
Apr. to May	20.	80-84. . . . .	Tibetan Steppe: rolling, bare mountains. <i>Ovis ammon hodgsoni</i> , steppe bears, pikas.
	3.	85. Near Lamdo on the Yangtze.	Brush zone.
		72. Jyekundo	<i>Crossoptilon crossoptilon dolani</i> .
May	9-19.	86-97. Two trips toward Chamdo.	High Mountains of the Yangtze-Mekong watershed (Gur La, pass). Kham Forest and brush zone. M'Neill's deer in high, dwarf rhododendron cover. Kham birds. <i>Crossoptilon crossoptilon drowynii</i> .
May to June	22.		
	1.	72. Jyekundo	
		98-100. . . . .	Tibetan Steppe and brush zone.
	7.	72. Jyekundo.	
	8.	76. Lamdo.	
	10.	79. Drechu Gomba.	



<i>Date</i>	<i>Camp</i>	<i>Locality</i>	<i>Biota</i>
June 10-13.	102-104.	.....	Tibetan Steppe: along the Dsachu or Upper Yalung. Schäfer's lesser Sandplover.
13, 14.	105-106.	.....	Sources of the Dsachu (elev. 14,500 ft.?).
15, 16.	107-108	.....	Tibetan Steppe and bare mountains. Golden plover.
17-21.	109-113.	.....	Sourcelands of the Machu (Yellow River), including the Karma Tang (plain). Within the present range of wild yak. General elev. circa 14,200 ft.
	114-116.	.....	South of the Borhan Bhota Range. Tibetan Steppe.
June 29.	117.	.....	Tibetan Steppe: wild yak.
July 1.	2.	118.	.....
	3.	119	.....
	4-16.	120-127	.....
July 17.	128.	.....	Tibetan Steppe.
	18.	.....	.....
	22.	132.	.....
	23.	.....	.....
	28?	79.	Drechu Gomba.
Aug. 3-7.	72.	Jyekundo.	
	8.	135.	On the Yangtze ..... Brush zone.
	10.	136.	Near Sheru Gomba .... Brush zone.
	11.	137.	Above Seshu Gomba. Tibetan Steppe. Using former camps (and numbers) Schäfer visited Seshu and returned to Jyekundo.
	138.	Near Jyekundo on the	Yangtze. Brush zone. Leaving Jyekundo about August 25, Schäfer returned again to Seshu.
	30.	139.	East of Seshu ..... Tibetan Steppe.
	31.	140-144.	..... Southeasterly prolongation of Chingai-Tibetan Steppe along the Yalung.
Sept. 4. 5-8.	145.	Dzogchen Gomba (elev. 13,800 ft.)	Tibetan Steppe to the north. Kham Forest on the mountains to the southwest. M'Neill's deer, roedeer.

<i>Date</i>	<i>Camp</i>	<i>Locality</i>	<i>Biota</i>
		Pass: Muri La, elev. 15,950 feet.	
	147.	Yilung (Jülung) . . . . .	Wide valley of the Yilung, steppe-like in character. Splendid Kham Forest on the mountains.
Sept.	12.	148. Rongbatsa (elev. 11,600 ft.)	Southwesterly indentation of the Yalung plain. Under cultivation. Forests to the south.
	149-152.	. . . . .	Rolling Kham steppes and in the valley of the Shechu, fine, Kham Forest.
Sept.	17-22.	153. Dawo (elev. 10,200 ft.)	Grasslands and Kham Forest.
	154-156.	. . . . .	Rolling Kham Forest and Steppe.
		Pass: Cheto La, elev. 14,200 ft.	Boundary between Kham and Hsifan faunas. }
Sept.	26.	1. Tachienlu.	
Oct.	5-15.	Waszekou (elev. 6,000 ft.?)	

ROUTE OF THE SECOND DOLAN EXPEDITION TO WESTERN CHINA AND EASTERN TIBET 1934-35-36

- Route & Camp Numbers  
Ecological Zones traversed by the Expedition
- ① Hsifan Region characterized by rich rain forests such as Wassu and less favored areas westward to the Cheto pass at Tachienlu.
  - ② Kham steppes. Steppe country extending southward from the upper Yalung or Dsachu steppes
  - ③ Kham Forest. The forest of eastern Tibet with timberline both below and above, ranging in character from neo tropical to arctic.
  - ④ Chinghai-Tibetan steppe. The steppe of the Dsachu elevations 13,600-16,000 feet. No vegetation but grass. Suitable for grazing.
  - ⑤ Chang Tang or Great Northern Plain of Tibet. Elevation 14,000-17,000 feet. Desolate and uninhabited. The last refuge of wild Yak and Chiru.

REFERENCE MAPS  
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