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FRANK LUDLOW (1885–1972) AND THE LUDLOW–SHERRIFF EXPEDITIONS TO BHUTAN AND SOUTH-EASTERN TIBET OF 1933–1950

By WILLIAM T. STEARN

SUMMARY

The botanical collections made in Bhutan and south-eastern Tibet between 1933 and 1950 by Frank Ludlow (1885–1972), George Sherriff (1898–1967) and their companions on a series of expeditions amount to over 21,000 gatherings from areas hitherto virtually unknown and constitute a contribution of first importance to knowledge of plants of this area. The first set of their specimens is in the Department of Botany, British Museum (Natural History), with duplicates in other herbaria.

This paper gives a short biography of Ludlow, a list of the Ludlow and Sherriff expeditions with itineraries taken from Ludlow's publications, a gazetteer of their collecting places in south-eastern Tibet and another of places in Bhutan and Sikkim, and a list of Ludlow's publications.

INTRODUCTION

MAINLY for political reasons, which long prevented European entry into the Himalayan region east of Sikkim, i.e. into Bhutan and adjacent south-eastern Tibet, this large area remained botanically almost unknown until 1933 when Frank Ludlow (1885–1972) and George Sherriff (1898–1967) began to reveal its floristic richness by their massive collections. William Griffith had visited Bhutan in 1837 and 1838 and R. E. Cooper in 1914 and 1915 but seemingly William Booth, many of whose collections are attributed to 'Bootan', never got beyond the Balipara Frontier Tract of Assam in 1850, as Ludlow (1972, no. 19) has shown. Thus above all to Ludlow and Sherriff belongs the credit for bridging that gap in our knowledge of the Sino-Himalayan flora between Yunnan and Sikkim. Neither was a botanist by profession. Ludlow's hobbies for many years, while an educationalist and political officer in India, were ornithology and shooting. Sherriff was an army officer who became a keen and successful gardener. From the Royal Horticultural Society, Sherriff in 1953 received its highest honour, the Victoria Medal of Honour, for his services to horticulture by the introduction of plants, but Ludlow, who was justly offered the same honour, refused it, his excessive modesty proof against entreaty. For both, however, plants became their dominating interest during their later years.

As their botanical collections, now in the British Museum (Natural History), amount to over 21,000 gatherings, which have added much to knowledge of plant distribution in the eastern Himalaya and have included many species new to science, it is fitting to summarize their expeditions here.*

* Grateful acknowledgement is made to the Editors of *Ibis* and the *Journal of the Royal Horticultural Society* for permission to quote at length from Ludlow's contributions to these journals. A more detailed account of the travels of Ludlow and Sherriff will be found in Harold R. Fletcher, *A Quest of Flowers: the Plant Explorations of Frank Ludlow and George Sherriff told from their Diaries* (xxix+387 pages; Edinburgh University Press; November 1975), with a long historical introduction by George Taylor, published when the present article was in proof. In addition to portraits of Ludlow and Sherriff and illustrations of plants and scenery, this provides 20 sketch maps which are cited below as: Fletcher, *Quest*, map .... (p. ....).

Few naturalists have been privileged as they were to spend so much time virtually on the roof of the world in virgin territory abounding with beautiful unknown plants; probably none could have made better use of the opportunities thus presented.

Frank Ludlow was born in Chelsea, London, on 10 August 1885 and educated at Wellington School, Somerset, and Sidney Sussex College, Cambridge, where he graduated in 1908 in Natural Sciences. He then joined the staff of the Sind College, Karachi, served during the First World War with the 97th Indian Infantry in Mesopotamia, returned to India and was for three years an Inspector of European Schools at Poona. In 1923 he went to Gyantse in south-eastern Tibet, at the invitation of the Tibetan Government, to set up an educational system and he remained there until 1926, gaining the respect and goodwill of the Tibetans which much aided his later collecting activities in Tibet. This led to his publication of 1927–28 on the 'Birds of the Gyantse neighbourhood' (*Ibis* XII. vols 3–4). In 1927 he moved westward to Srinagar in Kashmir and began to collect birds. While on an expedition to Chinese Turkistan in September 1929 he met George Sherriff at Kashgar and there began the close friendship and the fruitful partnership in activities which lasted until Sherriff's death in 1967. Their first joint plant-collecting expedition was to Central Bhutan in 1933 with F. Williamson, Political Officer in Sikkim, followed in 1934 by one to eastern Bhutan and the Mago district of Tibet.

The success of the 1933 journey led Ludlow and Sherriff to plan for subsequent years a series of expeditions progressing eastward to the great bend of the Tsangpo river, a series which continued, despite interruptions, until 1949. Concerning these expeditions Ludlow wrote in 1968 :

> 'In all matters connected with our expeditions Sherriff and I thought alike. There was no disagreement. Our main object was to survey botanically and ornithologically the temperate and alpine regions of Bhutan and South Tibet, and all our efforts were subordinate to this purpose. We realized at the start that the success of our expeditions depended almost entirely on having a happy and contented staff. Our staff was a very mixed one. It consisted of Bhutanese, Sikkimese, Kashmiris and Lepchas, so there was always a danger that on a long journey squabbling and quarrelling would occur. This never happened. Sherriff had the gift of getting the best out of his men. They were well fed, well clothed, well paid, and he made them feel that their work was of great importance, as indeed it was, so they gave of their best. But Sherriff and I were always acutely aware that such success as we achieved was almost entirely due to their loyalty. Without their aid we should not have got very far or done very much.
>
> 'Sherriff was a skilled photographer. When we started collecting in the early thirties photography was a much more tedious process than it is today and a vast amount of time was spent in calculating exposures, changing plates and setting up tripods. Yet, despite these difficulties, Sherriff obtained thousands of pictures, in colour and black and white, of the majority of the plants we met with. These are housed in the British Museum (Natural History), and are available for scientific study.

'Transport of living plants by air was in its infancy when we started to collect and Sherriff was one of the first to use this method of transportation. The seeds of some species of plants – petiolarid primulas for instance – become infertile soon after collection and so it becomes necessary to despatch living plants or plants in a dormant state if they are to be introduced. Sherriff sent by air, at no little personal expense, many crates of such plants which on arrival in England were sent to Kew, Wisley, Edinburgh and private gardens.

'Although transport and supplies in Bhutan and Tibet were cheap, expeditions on the scale we organized were not run without incurring considerable expense. Occasionally we received grants from funds at the disposal of the British Museum (Natural History) and members of the expeditions at times contributed according to their means, but it was Sherriff who defrayed the greater part of the costs. Without his financial help our efforts would have been far more restricted and our collections much more modest.'

In 1938 on an expedition to the Pachakshiri, Takpo and Kongbo districts of Tibet they were joined by Dr G. Taylor (now Sir George), then on the botanical staff of the British Museum (Natural History).

The Second World War interrupted these botanical activities. In 1940 Ludlow became Joint Commissioner in Ladakh, whence he was transferred in the spring of 1942 to take charge of the British Mission in Lhasa, Tibet, an appointment he held for a year ; here he spent his leisure collecting plants and observing birds around the city, the results of the latter being recorded in the *Ibis* **92** : 34–45 (1950) ; the tameness of the birds amazed him. Sherriff replaced him here in 1943 and he returned to Ladakh as Joint Commissioner.

In 1945, in company with Mrs Sherriff and Henry Elliot of the Indian Medical Service, Ludlow and Sherriff made an expedition to the Kongbo and Pome districts of south-eastern Tibet.

In 1947, having reached the age of 60, Ludlow came back to England, returning to India in 1948 and again in 1949 for an expedition to Bhutan. He finally returned to England in 1950. Thereafter most of his life was spent in the Department of Botany, British Museum (Natural History), diligently, quietly and happily studying not only the Ludlow and Sherriff collections but also those of other collectors in the Himalayan region. The intricate genus *Corydalis*, which he knew so well in the mountains, became his major interest and is the subject of the posthumous paper 'New Himalayan and Tibetan species of *Corydalis*' but he also gave critical attention to other groups. In 1956 he published a series of descriptions of new species under the heading 'Novitates Himalaicae'. The posthumous 'Reliquiae botanicae Himalaicae' below give some of the results of his later work.

Unfortunately, Ludlow had a severe accident in 1962, breaking his thigh by a fall on an icy road ; recovery took a long time but he returned to work in the Museum with his customary diligence and enthusiasm. Nevertheless he suffered much from sciatica caused by a couple of intervertebral discs pressing on the sciatic nerve in the lumbar region. His health deteriorated again in the autumn of 1971 ; he became very anaemic. He died at Harefield, Middlesex, on 25 March 1972.

The botanical work of Ludlow's later years is equalled in importance by his ornithological work, as specialists have well recognized. Thus Dr Charles Vaurie dedicated his monumental *Tibet and its Birds* (1972) to Ludlow and remarked that, although helped by many persons and institutions, 'my greatest debt is to Frank Ludlow whose unrivalled experience in southern Tibet and with its birds he has shared with me constantly from the start with the greatest goodwill. My book is dedicated to Ludlow with gratitude and in appreciation for his great contribution to the ornithology of Tibet.' From the ornithological standpoint, Vaurie stated, 'the three expeditions of Ludlow and Sherriff to southeastern Tibet were fruitful beyond all expectations. A large number of species were found in Tibet that had not been suspected to occur north of the main range of the Himalayas, some of them representing families and genera that were new for Tibet. Among them were *Chloropsis hardwickii* (Irenidae) and *Pericrotus ethologus* (Campephagidae), which were new families ; three or four flycatchers ; more than 20 timaliids, including representatives of nine new genera ; and several nonpasserines, chiefly woodpeckers' (Vaurie, *op. cit.*, 75). Ludlow's Fulvetta, *Fulvetta ludlowii* Kinnear, commemorates him.

Ludlow was an extremely likeable colleague whose modesty tended to obscure his great ability and competence, but who always readily made available his extensive knowledge of Himalayan geography, ornithology and botany to any enquirer.

THE LUDLOW AND SHERRIFF EXPEDITIONS

The following summary of the Ludlow and Sherriff expeditions is largely taken from Ludlow's publications ; the collecting numbers used on each have been extracted from their field notebooks in the British Museum (Natural History).

1933 (26 April–7 October). Bhutan and Tibet. Nos 1–537.

'This was our first expedition. In company with the Williamsons, Sherriff and I travelled along the central highway of Bhutan from Ha to Bumthang. The road is aligned at right angles to parallel ranges given off from the main Himalayan axis and so we were constantly crossing passes and dipping down into adjoining valleys.

'At Bumthang we met His Highness the Maharaja and then Sherriff and I set off on our own for the Me La on the East Bhutan boundary. This pass, which means in Tibetan the "Pass of Flowers", held a rich flora and we returned to it twice in after years! From the Me La we crossed into the valley of the Kuru Chu, and entered Tibet by the Kang La. Proceeding northwards past the Pomo Tso we struck the Lhasa road at Nangkartse and thence turned west to Gyantse and so back to India. Our collection of five hundred gatherings of plants was small compared with those made on subsequent expeditions. Perhaps the most interesting find was the rediscovery of *Meconopsis superba*, previously known in the wild only from the type-collection of 1884. At the end of this journey Sherriff and I decided on a plan of campaign for the future. In brief this was to work gradually eastwards through Tibet along the main Himalayan range, each succeeding journey overlapping its predecessor, until we reached the great bend

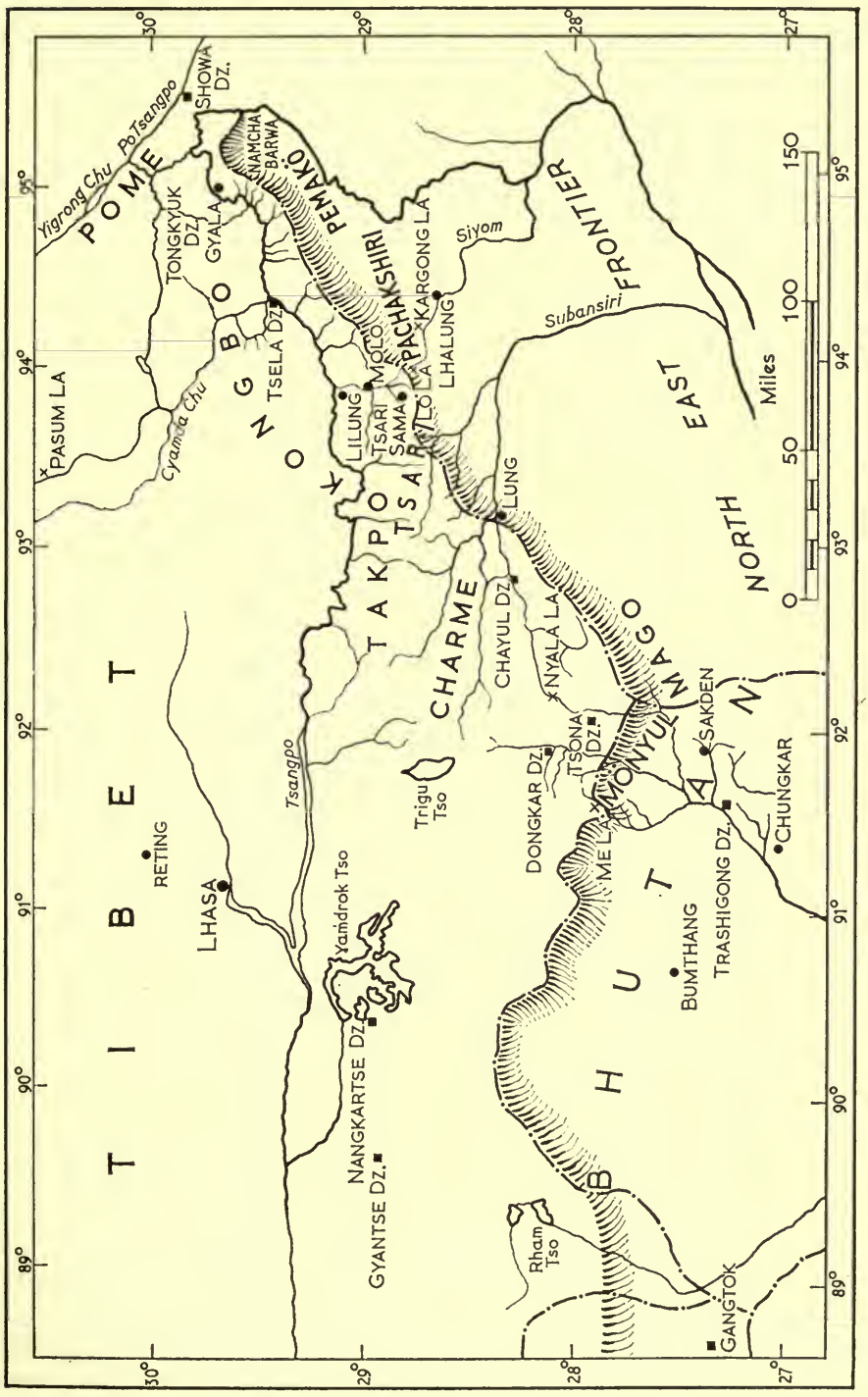

FIG. 1. Map showing area of the Ludlow and Sherriff expeditions.

of the Tsangpo. Thus progressing gradually eastwards we hoped to obtain valuable information concerning the distribution of plants. In addition to herbarium material the collection of seeds and living plants was also very much in our minds, and also the collection of birds, as the avifauna of the country we proposed to visit was totally unknown.' (Ludlow, 1968.)

Ludlow published a detailed account of this expedition in *Ibis* **79** : 8–13 (1937) with an itinerary giving dates, stages, altitudes and passes crossed (indicated by the Tibetan name *La*) as follows (Fletcher, *Quest*, map 1 (p. 3), map 2 (p. 29)) :

26 April–4 May	Gangtok	6000 ft
5 May	Karponang	9000 ft
6–12 ,,	Changu	12,400 ft
13 ,,	Chumpithang	13,000 ft (Natu La, 14,100 ft)
14–19 ,,	Yatung	9800 ft
20–31 ,,	Sharithang	11,400 ft
1–10 June	Damthang	10,000 ft (Chu La, 14,200 ft, Ha La, 14,000 ft)
11–20 ,,	Ha	9100 ft
21 ,,	Chanana	10,000 ft (Cheli La, 12,500 ft)
22–27 ,,	Paro	7750 ft
28 ,,	Pemitanka	8350 ft (Bela La 11,500 ft)
29 ,,	Tsalimape	7700 ft
30 ,,	Lometsawa	6700 ft (Dokyong La, 10,500 ft)
1–2 July	Wangdi Potrang	4500 ft
3 ,,	Samtegang	7000 ft
4 ,,	Ritang	8200 ft
5 ,,	Chendebi	7500 ft (Pela La, 11,000 ft)
6 ,,	Tsangsa	7500 ft
7–8 ,,	Trongsa	7100 ft
9–10 ,,	Gyetsa	9800 ft (Yuto La, 11,200 ft)
11–17 ,,	Bunthang	9700 ft
18 ,,	Tangnaru	9400 ft
19 ,,	Pimi	9000 ft (Rudo La, 12,600 ft)
20–21 ,,	Khane Lhakhang	8000 ft
22 ,,	Tamachu	5000 ft
23 ,,	Lhüntse	4500 ft
24 ,,	Linji	6500 ft
25–26 ,,	Donga Pemi	10,000 ft
27 ,,	Sana	8400 ft (Donga La, 12,500 ft)
28–30 ,,	Trashiyangsi	5800 ft
31 ,,	Shapang	6500 ft
1 August	Tobrang	7500 ft
2 ,,	Lao	9200 ft
3–10 ,,	Shingbe	12,750 ft (Me La, 14,950 ft)
11 ,,	Lao	9200 ft
12 ,,	Tobrang	7500 ft
13 ,,	Camp (Pang La east)	10,000 ft
14 ,,	Camp (Pang La west)	7500 ft (Pang La, 14,000 ft)
15 ,,	Sawang	6000 ft
16 ,,	Tosumani	10,500 ft
17 ,,	Singhi	12,500 ft
18–28 ,,	Narim Thang	13,900 ft

29 August	Menchumo	14,000 ft (Kang La, 16,300 ft)
30–31 ,,	Hamo	13,500 ft (Pü La, 16,300 ft)
1–2 September	Lhakhang	10,000 ft
3 ,,	Mug	11,500 ft
4 ,,	Singhi Dzong	12,000 ft
5–7 ,,	Towa	12,600 ft
8 ,,	Lhalung	13,100 ft
9 ,,	Mönda	13,500 ft
10 ,,	Pomo Tso	16,200 ft (Monda La, 17,200 ft)
11 ,,	Ling	14,600 ft
12 ,,	Talung	14,700 ft
13 ,,	Nangkartse	14,700 ft
14 ,,	Dzara	15,600 ft
15 ,,	Ralung	14,500 ft (Karo La, 16,600 ft)
16 ,,	Gobshi	13,900 ft
17–24 ,,	Gyantse	13,260 ft
25 ,,	Sowgon	13,500 ft
26 ,,	Khangma	13,900 ft
27 ,,	Kala	14,600 ft
28–29 ,,	Dochen	14,700 ft
30 ,,	Tuna	14,750 ft
1 October	Phari	14,300 ft (Tang La, 15,200 ft)
2–7 ,,	Phari–Kalimpong	(Jelap La, 14,390 ft)

1934 (23 June–9 November). Bhutan and Tibet. Nos 538–1116.

'In accordance with the plan outlined above we made preparations to work the Tsona and Mago districts of Tibet, the former lying north and the latter south of the main axis. Our start was disastrous. Owing to delay in the receipt of our passports we reached rail-head at Rangiya on June 17, the very day the monsoon broke and we were forced to spend a week on a tea estate at the foot of the Diwangiri ravine waiting for the floods to subside. Eventually we got away and took the road to Trashigong and Tsona. On the third day at Chungkar (6,000 feet) we had an extraordinary piece of good fortune. On a cliff face just out of reach Sherriff spotted a lovely mauve primula. Standing on a branch of a large shrub, he discovered another primula, a little scrubby thing, growing in a clump of moss. All three plants were new! The mauve primula became *Primula sherriffiae*, the large shrub *Luculia grandifolia* and the little scrubby plant, *Primula ludlowii*. After this we had more bad luck. At a place called Sakden the whole party, except Sherriff and our two Lepchas, were stricken with malaria, and again we were held up for a week. For a time it looked as if the expedition would have to be abandoned, but we had a good supply of quinine and after a while were sufficiently recovered to proceed to Tsona. It was at Sakden, by the by, that Sherriff found a particularly fine form of *Meconopsis grandis*, known to horticulture as "L & S 600". From Tsona, where *Paraquilegia anemonoides* grew in all its delicate loveliness, we went east to Mago and then returned to Tsona and crossed into the Nyam Jang Chu valley to Dongkar and then south again to the Me La and East Bhutan. Six hundred gatherings of plants resulted from this expedition. We were still a little too selective in our choice of plants.' (Ludlow, 1968.)

Ludlow published a detailed account of this expedition in *Ibis* **79** : 13–19 (1937), including the following itinerary (Fletcher, *Quest*, map 3 (p. 42), map 4 (p. 57), map 5 (p. 63)) :

17–21 June	Menoka Tea Estate	
22 ,,	Diwangiri	2500 ft
23 ,,	Satsalor	3050 ft
24 ,,	Chungkar	6400 ft
25 ,,	Khomanagri	4600 ft
26 ,,	Balfai	6800 ft
27–28 ,,	Ronglung	5000 ft (Yönpu La, 8200 ft)
29 ,,	Trashigong	3250 ft
30 ,,	Rungzyung	4000 ft
1 July	Phongmi	5450 ft
2–10 ,,	Sakden	9700 ft
11 ,,	Muktur	8250 ft
12–13 ,,	Tawang	10,200 ft (Nying Sang La, 12,200 ft)
14 ,,	Shao	13,300 ft (Bum La, 15,000 ft)
15–18 ,,	Tsona	14,300 ft (Kechen La, 15,600 ft)
19 ,,	Thang	14,500 ft (Nyong Chung La, 15,600 ft)
20 ,,	Gu	15,700 ft (Rala La, 16,700 ft ; Gu La, 16,650 ft)
21 ,,	Zangthang	15,400 ft (Dza La, 17,200 ft)
22 ,,	Lungur	13,500 ft (Tulung La, 17,200 ft)
23–25 ,,	Mago	11,600 ft
26 ,,	Camp (Gorja Chu Valley)	12,500 ft (Chera La, 13,500 ft)
27–28 ,,	Lap	14,200 ft
29 ,,	Camp (Gorjo Chu Valley)	12,500 ft
30 July–7 Aug.	Mago	11,600 ft (Chera La, 13,500 ft)
8–14 August	Mago-Tsona	
15 ,,	Camp	15,500 ft (Gorpo La, 17,750 ft)
16–17 ,,	Dongkar	13,350 ft (Sang La, 17,100 ft)
18–19 ,,	Dhukar	13,600 ft (Cha La, 15,300 ft)
20 ,,	Camp	14,300 ft
21 ,,	Karmu	13,000 ft (Cho La, 16,150 ft)
22–27 ,,	Shingbe	12,750 ft (Me La, 14,950 ft)
28 ,,	Lao	9200 ft
29 Aug.–5 Sept.	Tobrang	7500 ft
6 September	Shapang	6500 ft
7–8 ,,	Trashiyangsi	5800 ft
9 ,,	Camp, Dib La	8000 ft
10–14 ,,	Camp, Dib La	12,000 ft
15–20 ,,	Camp, Dib La	11,500 ft
21–24 ,,	Camp, Dib La	10,000 ft
25–29 ,,	Camp, Dib La	8000 ft
30 Sept.–1 Oct.	Trashiyangsi	5800 ft
2–8 October	Sana	8400 ft
9–10 ,,	Trashiyangsi	5800 ft
11 ,,	Shali	6450 ft
12 ,,	Tsirgom	3100 ft
13–14 ,,	Trashigong	3250 ft
15 ,,	Rungzyung	4000 ft

16 October	Phongmi	5450 ft
17 ,,	Taktoo	7850 ft
18–25 ,,	Sakden	9700 ft
26–28 ,,	Taktoo	7850 ft
29 ,,	Phongmi	5450 ft
30 ,,	Rungzyung	4000 ft
31 ,,	Ronglung	5000 ft
1–3 November.	Yönpu La	8200 ft
4–5 ,,	Khomanagri	4600 ft
6–8 ,,	Chungkar	6400 ft
9–10 ,,	Satsalor	3050 ft
11–14 ,,	Diwangiri	2500 ft
15 ,,	Rangiya Railway Station	

1935 (11 July–24 September). Kashmir. Nos 1401–1536.

1936 (14 February–3 May). Bhutan and Tibet. Nos 1117–1400.
(3 May–26 November). Tibet and Bhutan. Nos 1537–2917.

'In 1936, with Dr K. Lumsden, we returned to Tsona and then turned eastwards across a high pass called the Nyala La (17,150 feet) into the valley of the Chayul Chu. This river forms the western branch of the Subansiri and we followed it down to Lung (9,000 feet) where it cuts its way through the main range in a heavily forested gorge. Here we encountered a semi-barbaric tribe of Daphlas. From Lung we crossed into the valleys of the Char Chu and Tsari Chu, both of which held a rich flora, particularly the latter. Tsari is holy ground, a place of pilgrimage where cultivation and even grazing are forbidden. As can be imagined it proved a plant hunter's paradise. Whilst Sherriff remained in Tsari and acquired merit by performing the circuit of the holy mountain called Takpashiri, Lumsden and I went east to Molo and then south over the Lo La into Pachakshiri.

'From a horticultural point of view this 1936 expedition was one of the most rewarding we ever made. Amongst the sixty different species of primula collected fourteen were new and the same may be said of rhododendrons of which thirteen were new. In addition, Sherriff discovered the beautiful pink *Meconopsis sherriffii*. The flowering season over, we returned to India by the route followed on our upward journey with nearly two thousand gatherings of pressed plants, two crates of living plants, and innumerable packets of seed.' (Ludlow, 1968.)

Ludlow published an account of this 1936 expedition in *Himalayan Journal* **10** : 1–21 (1938) and in *Ibis* **86** : 45–52 (1944), with the itinerary as follows (Fletcher, *Quest*, map 6 (p. 79), map 7 (p. 87), map 8 (p. 101), map 9 (p. 111), map 10 (p. 121)) :

			ft	Lat. ° ′	Long. ° ′
14–21 Feb.	Bhutan	Diwangiri	2100	26 52	91 30
22 Feb.	,,	Satsalor	3000	26 56	91 29
23–25 Feb.	,,	Chungkar	6500	27 03	91 27
26 Feb.	,,	Demri Chu	2500	27 06	91 28
27 Feb.	,,	Jiri Chu	2800	27 08	91 29
28 Feb. to 1 Mar.	,,	Yönpu La	8300	27 13	91 35
2–5 Mar.	,,	Ronglung	5000	27 15	91 34

			ft	Lat. ° ′	Long. ° ′
6 Mar.	Bhutan	Trashigong Dz	4000	27 18	91 34
7 Mar.	,,	Rungzyung	4000	27 20	91 45
8 Mar.	,,	Phongmi	5450	27 20	91 48
9–10 Mar.	,,	? Takhto	7000	27 20	91 52
11–14 Mar.	,,	Sakden	9700	27 21	91 55
15–18 Mar.	,,	Sakden–Trashigong			
19 Mar.	,,	Ghunkarah	3100	27 23	91 35
20 Mar.	,,	Kinney	4900	27 27	91 38
21 Mar.	,,	Changpu	7100	27 29	91 40
22 Mar.	Mönyul	Sanglung	5600	27 30	91 40
23–24 Mar.	,,	Gyipu	7400	27 36	91 43
25–26 Mar.	,,	Shakti	7250	27 38	91 46
27 Mar. to 3 April	,,	Pangchen	7200	27 41	91 48
4 April	,,	Le	8350	27 47	91 50
5–8 April	,,	Lepo	9600	27 53	91 52
9–11 April	,,	Trimo	10500	27 55	91 53
12–15 April	Tsona	Tsona Dz	14300	28 00	92 01
		(Po La, 14900′)			
16 April	,,	Tre	14500	28 05	92 06
		(Doka La, 15500′)			
17 April	,,	Gyisum	15200	28 05	92 10
18 April	Chayul	Loro Tö	14300	28 12	92 15
		(Nyla La, 17150′; lat. 28° 08′, long 92° 13′.)			
19 April	,,	Jora	12700	28 13	92 25
20 April	,,	Tro Shika	12350	28 16	92 34
21–23 April	,,	Chayul Dz	11200	25 18	92 48
24 April	,,	Kap	11400	28 18	92 55
25 April	,,	Trön	10200	28 20	93 01
26–27 April	Abor Country	Natrampa	10000	28 21	93 04
28–30 April	,, ,,	Lung	9200	28 21	93 09
1–6 May	,, ,,	Lung–Chayum Dz.			
7 May	Chayul	Gyandro	13500	28 24	92 49
8–10 May	Charme	Kyimpu	12500	28 25	93 01
		(Le La, 17150′)			
11 May	,,	Charme	10600	28 26	93 05
12–13 May	,,	Sanga Chöling	10700	28 33	93 00
14 May	,,	Zimsatti	14200	28 38	93 03
15 May	Tsari	Chösam	14100	28 44	93 10
		(Cha La, 16600′)			
16–17 May	,,	Senguli	13300	28 43	93 13
18–20 May	,,	Yarap	12400	28 43	93 23
21–22 May	,,	Podzo Sumdo	11000	28 43	93 34
23 May to 1 June	,,	Migyitun	9600	28 40	93 38
2–11 June	,,	Camp (Bimbi La)	12000	28 48	93 28
12–13 June	Takpo	Tsemachi	13700	28 50	93 28
		(Bimbi La, 15700′)			
14 June	,,	Sumbatse	12100	28 52	93 28
15–17 June	,,	Kyimdong Dz	10600	28 59	93 28

			ft	Lat. ° ′	Long. ° ′
18–19 June	Takpo	Taktsa	13000	28 59	93 32
20 June	Kongbo	Camp	14300	28 58	93 42
		(Lang La, 15800′)			
21 June	,,	Kethong	11500	28 57	93 46
22–24 June	,,	Molo	10300	29 57	93 53
25 June to 1 July	,,	Singo Samba	11400	28 52	93 52
2 July	,,	Camp (Lo La North)	13000		
3 July	Pachakshiri	Camp (Lo La South)	10700		
		(Lo La, 13300′)			
4 July	,,	Chudi	8800	28 43	94 01
5–10 July	,,	Camp (Nyug La)	10000	28 42	94 03
		(Nyug La, 11000′)			
11–15 July	,,	Nyug La–Singo Samba			
16–17 July	Kongbo	Langong	11900	28 51	93 47
18 July	,,	Camp (Pa La)	14600	28 52	94 67
19–20 July	Takpo	Camp (Pa La)	13500		
		(Pa La, 15900′)			
21–22 July	,,	Kyimdong Dzong	10600	28 59	93 28
23 July	,,	Nge	10500	29 01	93 17
24 July	,,	Chote Shu	11100	29 01	93 12
		(Kongbo Nga La, 14570′)			
25 July	,,	Peru	11600	28 51	93 10
26–27 July	,,	Tsobunang	13500	28 46	93 10
28 July	Tsari	Chösam	14100	28 44	93 10
		(Sur La, 15700′; lat. 28° 45′, long. 93° 11′)			
29 July	,,	Chorten Namu	14700	28 44	93 04
30 July to 5 Aug.	Charme	Sanga Chöling	10700	28 41	93 02
		(Cha La, 16600′)			
6 Aug.	,,	Bung	12000	28 34	92 47
7 Aug.	,,	Sho Shika	13000	28 35	92 45
9–10 Aug.	,,	Camp (Traken La)	14500	28 43	92 42
11 Aug.	,,	Karpo	13000		
		(Traken La, 16900′)			
12 Aug.	,,	Camp	15500	28 41	92 57
		(Sokpo La, 16600′)			
13 Aug.	,,	Camp	15000	28 42	92 59
		(Mihrang La, 17000′)			
14 Aug.	Tsari	Chösam	14100	28 44	93 10
15–20 Aug.	Takpo	Tsobunang	13500	28 44	93 10
		(Sur La, 15700′)			
21 Aug.	Tsari	Senguli	13300	28 43	93 13
		(Sur La, 15700′)			
22–24 Aug.	,,	Chikchar	12500	28 42	93 18
25 Aug.	,,	Podzo Sumdo	11000	28 42	93 34
26–29 Aug.	,,	Migyitun	9600	28 40	93 38
30 Aug. to 3 Sept.	,,	Camp (Na La)	12900	28 40	93 39
4 Sept.	,,	Migyitun	9600	28 40	93 38

			ft	Lat. ° ′	Long. ° ′
5–14 Sept.	Tsari	Camp (Bimbi La)	12000	28 48	93 28
15 Sept.	,,	Chikchar	12500	28 42	92 18
16–18 Sept.	,,	Chösam	14100	28 44	93 10
19–20 Sept.	Charme	Zimsatti (Cha La, 16600′)	14200	28 38	93 03
21–26 Sept.	,,	Sanga Chöling	10700	28 33	93 00
27–30 Sept.	,,	Charme	10600	28 26	93 05
1–8 Oct.	,,	Kyimpu	12500	28 25	93 01
9 Oct.	Chayul	Gyandro (Le La, 17150′; lat. 28° 27′, long. 92° 56′)	13500	28 24	92 49
10–11 Oct.	,,	Chayul Dz	11200	28 18	92 48
12 Oct.	,,	Tro Shika	12350	28 16	92 34
13 Oct.	,,	Jora	12700	28 13	92 25
14 Oct.	,,	Loro Tö	14300	28 12	92 15
15 Oct.	Tsona	Gyisum (Nyala La, 17150′)	15200	28 05	92 10
16 Oct.	,,	Tre	14500	28 05	92 06
17–19 Oct.	,,	Tsona Dz (Doka La, 15500′)	14300	28 00	92 01
20 Oct.	,,	Camp, Kechen La	15000		
21 Oct.	,,	Shao (Kechen La, 15600′)	13300	27 45	92 00
22 Oct.	Monyul	Tawang (Bum La, 15000′; Milakatong La, 14200′)	10200	27 34	91 56
23 Oct.	,,	Muktur	8250	27 32	91 58
24–25 Oct.	Bhutan	Sakden (Nying Sang La, 12200′)	9700	27 21	91 55
26 Oct.	,,	Phongmi	5450	27 20	91 48
27 Oct.	,,	Rungzyung	4000	27 20	91 45
28–29 Oct.	,,	Trashigong Dz	4000	27 18	91 34
30 Oct. to 2 Nov.	,,	Yönpu La	8300	27 13	91 35
3–5 Nov.	,,	Khomanagri	4600		
6–10 Nov.	,,	Chungkar	6500	27 03	91 27
11 Nov.	,,	Satsalor	3000	26 56	91 29
12–26 Nov.	,,	Diwangiri	2100	26 52	91 30

1937 (24 April–26 August). Bhutan. Nos 2918–3573.

'Sherriff spent the flowering season in Central Bhutan collecting in the vicinity of a high peak called the Black Mountain, returning with a valuable collection of six hundred gatherings.' (Ludlow, 1968.) Fletcher, *Quest*, map 11 (p. 128).

1937 (November). Tsingpen. Nos 3574–3579.

1938 (20 February–26 November). Tibet, Sikkim and Bhutan. Nos 3580–7289.

'In 1936 we had collected in the upper reaches of the Subansiri. This year we decided to collect within the drainage of the Tsangpo from the vicinity of Molo on the Lilung Chu down to Gyala at the entrance to the gorge. Dr G. Taylor – now Sir George – was our companion on this occasion. Medical reasons prevented him from joining the expedition at Kalimpong in February, so we agreed to meet at Molo in mid-May, and set out for Pachakshiri via the Tsangpo valley. Pachakshiri lies south of the Main Range which had to be crossed by the Lo La – the pass I had used in 1936. The Lo La was deep under snow when we reached it in late April but we scampered over it at night whilst the snow was frozen and in four days reached Lhalung (6,700 feet) on the Siyom. We did well with plants during the twelve days we spent here, but leeches, ticks, and blister flies made life very unpleasant and we were glad to return to Tibet. We reached Molo on May 17, and before we could even pitch camp Taylor arrived from England! Some staff work. A few days were spent in getting re-organized and then we separated. Taylor and I worked the Main Range down to the gorge and Sherriff collected from Tsari Sama to the Kucha La. We met again at Tsela Dzong the end of July, and then I set off alone for the Pasum La leaving Taylor and Sherriff to work the ranges on the lower Gyamda Chu. A fortnight later I received an alarming message from Sherriff to say that Taylor was seriously ill with suspected appendicitis. Happily this was not the case and I returned to find Taylor still weak but on the road to recovery. Eventually he became strong enough to begin the rather arduous return journey to India via Tsari, Tsona and East Bhutan. On this expedition we amassed a vast amount of herbarium material, over four thousand gatherings. With Taylor urging us to be less selective in our methods, we took everything we saw, from lichens to lilies. We collected seed also on a large scale and living plants as well. It is sad to reflect that the outbreak of World War II largely nullified our efforts.' (Ludlow, 1968.)

Ludlow published an account of this expedition in *Himalayan Journal* **12** : 1–16 (1940) and in *Ibis* **86** : 52–60 (1944) with an itinerary as follows (Fletcher, *Quest*, map 12 (p. 156), map 13 (p. 171), map 14 (p. 191), map 15 (p. 214), map 16 (p. 223)). The abbreviation 'Dz' is used here for 'Dzong', meaning fort.

			ft	Lat. ° ′	Long. ° ′
20–24 Feb.	Sikkim	Kalimpong–Kupup			
25 Feb. to 13 Mar.	S. Tibet	Kupup–Gyantse, via Tang La, 15200′, and Jelap La, 14390′			
14–19 Mar.	,,	Gyantse–Kongka Dz, via Karo La, 16800′			
20–25 Mar.	,,	Kongka Dz–Tsetang by coracle down the Tsangpo			
26 Mar.	,,	Rongchakar	12050	29 13	92 03
27–28 Mar.	,,	Lhagyari	13100	29 06	92 12
29 Mar.	Takpo	Lasor (Pitrang La, 16500′)	12200	29 05	92 25
30 Mar.	,,	Lhapso	11650	29 06	92 32

			ft	Lat. ° ′	Long. ° ′
31 Mar.	Takpo	Lenda	11000	29 09	92 42
1 April	,,	Rabdang	10800	29 06	92 50
2–3 April	,,	Tromda	10800	29 05	92 55
4 April	,,	Nang Dz	10700	29 03	93 10
5 April	,,	Nge	10600	29 01	93 17
			(Kongbo Nga La, 14570′; lat. 29° 01′, long. 93° 12′)		
6–10 April	,,	Kyimdong Dz	10600	28 59	93 28
11 April	,,	Taktsa	13000	28 59	93 32
12 April	Kongbo	Camp	13000	28 58	93 42
			(Lang La, 15800′; lat. 28° 58′, long. 93° 42′)		
13 April	,,	Kethong	11500	28 57	93 46
14–20 April	,,	Molo	10300	29 57	93 53
21 April	,,	Camp, Langong Chu	11000	28 51	93 47
22–23 April	,,	Camp, Lo La North	12500	28 50	93 57
24 April	Pachakshiri	Camp, Lo La South	10700		
			(Lo La, 13300′)		
25 April	,,	Chudi	8800	28 43	94 01
26 April	,,	Camp	8000	28 42	94 03
			(Nyug La, 11000′)		
27 April to 8 May	,,	Lhalung	6300	28 42	94 12
			(Kargong La, 8800′; lat. 28° 42′, long. 94° 11′)		
9–17 May	,,	Lhalung–Molo, via Nyug La and Lo La			
18–23 May	Kongbo	Molo	10300	29 37	93 53
24 May	,,	Charko	10000	29 04	93 56
25 May	,,	Lilung	9800	29 07	93 54
26 May	,,	Simbiteng	9900	29 11	93 56
27 May	,,	Yusum	9700	29 11	94 01
28 May	,,	Shoka	9600	29 14	94 09
29 May	,,	Kangka	9600	29 18	94 16
30 May to 4 June	,,	Tse	9600	29 23	94 22
5 June	,,	Chamna	9800	28 26	93 05
6 June	,,	Lusha	9500	29 27	94 35
7 June	,,	Camp	10500		
8–14 June	,,	Camp, Lusha La	12500	29 20	94 35
			(Lusha La, 14600′)		
15–17 June	,,	Lusha	9500	29 27	94 35
18 June	,,	Tamnyen	9500	29 27	94 38
19–23 June	,,	Camp	10800	29 20	94 43
			(Tamnyen La, 14500′)		
24 June	,,	Tamnyen	9500	29 27	94 38
25–26 June	,,	Sang	9600	29 29	94 41
27–30 June	,,	Camp	13500		

			ft	Lat. ° ′	Long. ° ′
1–3 July	Kongbo	Tumbatse	11600 (Sang La, 14500′ approx.)	29 42	94 47
4 July	,,	Camp	13500 (Nyima La, 15200′)	29 38	94 52
5 July	,,	Timpa	9700	29 33	94 52
6–7 July	,,	Pe	10000	29 31	94 54
8 July	,,	Tripe	10000	29 36	94 56
9–10 July	,,	Gyala	9300	29 43	94 56
11–12 July	,,	Gyala–Pe			
13–16 July	,,	Camp	12500 (Doshong La, 13500′)	29 29	94 59
17–19 July	,,	Pe	10000	29 31	94 54
20–23 July	,,	Pe–Gyala			
24–27 July	,,	Gyala–Pe			
28 July	,,	Tamnyen	9500	29 27	94 38
29 July	,,	Chamna	9800	29 25	94 26
30 July to 6 Aug.	,,	Tse	9600	29 23	94 22
7–9 Aug.	,,	Tsela Dz	9700		
10 Aug.	,,	Mape	9800	29 33	94 20
11 Aug.	,,	Chomo Dz	9900	29 38	94 16
12 Aug.	,,	Nyarlu	9900	29 41	94 09
13 Aug.	,,	Dzeng	9900	29 47	93 55
14 Aug.	,,	Tongshong	10000	29 52	93 48
15–16 Aug.	,,	Namse	10100	29 53	93 46
17 Aug.	,,	Nye	10400	29 56	93 47
18 Aug.	,,	Drukla Gompa	11000	30 05	93 45
19 Aug.	,,	Nanda	11300	30 07	93 32
20 Aug.	,,	Pangkar	11800	30 17	93 31
21 Aug.	,,	Camp	12100		
22–23 Aug.	,,	Camp	14000 (Pasum La, 17250′)	30 27	93 22
24 Aug.	,,	Pangkar	11800	30 17	93 31
25 Aug.	,,	Pang	11200		
26 Aug.	,,	Shoga Dz	10600	30 00	93 48
27 Aug.	,,	Drepang	10800	30 00	93 50
28 Aug.	,,	Pasum Tso	10800	30 01	94 01
29 Aug.	,,	Lotu	10800	30 01	94 14
30 Aug.	,,	Camp	13500		
31 Aug.	Pome	Nambu Gompa	13800 (Nambu La, 14970′; lat. 29° 59′, long. 94° 26′)	29 59	94 31
1 Sept.	,,	Camp	11500		
2 Sept.	,,	Ketang	9000	30 00	94 47
3 Sept.	,,	Tongkyuk Dz	8600	29 56	94 50
4 Sept.	,,	Chunyima	10900	29 48	94 45
5 Sept.	Kongbo	Tumbatse	11600	29 42	94 47
6 Sept.	,,	Camp	13000 (Temo La, 14000′)	29 35	94 37

			ft	Lat. ° ′	Long. ° ′
7–15 Sept.	Kongbo	Dzeng	9500	29 29	94 30
16 Sept.	,,	Lusha	9500	29 27	94 35
17–19 Sept.	,,	Camp (Lisha La, 14600′)	12500	29 30	94 35
20–22 Sept.	,,	Lsuha	9500	29 27	94 35
23 Sept.	,,	Chamna	9800	29 25	94 26
24–26 Sept.	,,	Tse	9600	29 23	94 22
27 Sept.	,,	Kangka	9600	29 18	94 16
28 Sept.	,,	Shoka	9600	29 14	94 09
29 Sept.	,,	Miling	9600	29 11	94 05
30 Sept.	,,	Trongsa	9600	29 11	93 58
1–4 Oct.	,,	Lilung	9800	29 07	93 54
5 Oct.	,,	Gacha	10200	29 07	93 41
6 Oct.	,,	Trome	10000	29 10	93 33
7 Oct.	,,	Kamchang	10100	29 06	93 29
8–11 Oct.	Takpo	Kyimdong Dz	10600	28 59	93 28
12 Oct.	,,	Sumbatse	12100	28 52	93 28
13 Oct.	,,	Tsemachi	13700	28 50	93 28
14 Oct.	Tsari	Camp (Bimbi La, 15700′)	12000	28 48	93 28
15 Oct.	,,	Chikchar	12500	28 42	93 18
16 Oct.	,,	Chösam	14100	28 44	93 10
17 Oct.	Charme	Zimsatti (Cha La, 16600′; lat. 28° 41′, long. 93° 02′)	14200	28 38	93 03
18–20 Oct.	,,	Sanga Chöling	10700	28 33	93 00
21 Oct.	,,	Charme	10600	28 26	93 05
22 Oct.	,,	Kyimpu	12500	28 25	93 01
23 Oct.	Chayul	Gyandro (Le La, 17150′; lat. 28° 27′, long. 92° 56′)	13500	28 24	92 49
24 Oct.	,,	Chayul Dz	11200	28 18	92 48
25 Oct.	,,	Yar Shika	12000	28 14	92 40
26 Oct.	,,	Jora	12700	28 13	92 25
27 Oct.	,,	Loro Tö	14300	28 12	92 15
28 Oct.	Tsona Dz	Tre (Nyala La, 17150′)	14500	28 05	92 06
29 Oct.	,,	Tsona Dz (Doka La, 15500′)	14300	28 00	92 01
30–31 Oct.	Mönyul	Trimo (Pö La, 14900′)	10500	27 55	91 53
1 Nov.	,,	Le	8350	27 47	91 50
2 Nov.	,,	Pangchen	7200	27 41	91 48
3 Nov.	,,	Shakti	7250	27 38	91 46
4 Nov.	,,	Kapteng	5600	27 33	91 43
5 Nov.	Bhutan	Changpu	7100	27 29	91 40
6 Nov.	,,	Ghumkarah	3100	27 23	91 35
7–8 Nov.	,,	Trashigong Dz	4000	27 18	91 34
9–26 Nov.	,,	Trashigong Dz–Diwangiri			

1939 (16 June–17 August). Simla Hill States. Nos 7300–7540.
(20 August–24 September). Kashmir. Nos 7560–8577.

1941 (August–September). Assam. Nos 10092–10094.

1942 (16 March). Kashmir. No. 8578.
(30 March–5 October). Sikkim and Tibet (Lhasa). Nos 8579–9103.
(7 August–24 December). Sikkim. Nos 10095–10114 D.
(6–18 October). Sikkim and Tibet. Nos 10000–10091.

1943 (10 March–11 October). Sikkim and Tibet (Lhasa). Nos 9444–9962.
(21 June–27 August). Kashmir. Nos 9104–9385.

1944 (9–13 July). Tibet (Reting). Nos 9963–9999.
(13 July–13 September). Tibet (Lhasa). Nos 11000–11155.
(24–25 October). Mishmi Hills. No. 11156.

1945 (28 April). Tibet. No. 11157.
(30 May). Sikkim. No. 11158.

'The war, of course, destroyed all hopes of further expeditions, at least for as long as it lasted. However, in the spring of 1942 I was sent to Lhasa as Assistant Political Officer in charge of the British Mission and was succeeded in this post by Sherriff with his wife in the spring of 1943. During our stay in Lhasa we collected most of the plants that grew within a radius of 60 miles. There were a number of novelties especially from an area called Reting 60 miles north of Lhasa. One of our more interesting "finds" was the re-discovery of *Meconopsis torquata* first obtained in 1904 by Walton on the Younghusband Mission.' (Ludlow, 1968.)

Ludlow published a note on his stay at Lhasa in 1942–43 in *Ibis* **92**: 34–36 (1950).

1946 (24 May). Kashmir. No. 9402.

1946 (21 October–1947 (4 October). Tibet. Nos 12000–12692, 13000–13390, 13500–15831.

'The war over we set out again for S.E. Tibet, this time with Betty Sherriff and Colonel Henry Elliot of the Indian Medical Service. We decided on winter travel to enable us to reach our collecting grounds in Pome and the great gorge of the Tsango by early spring. Travelling through the familiar Tsangpo valley we reached Tongyuk Dzong in Pome on Xmas day and Trulung (6,000 feet) on the Po Tsangpo early in the New Year. After visits to the lower Yigrong and Showa we returned to Trulung where the Sherriffs descended the Po Tsangpo to its junction with the Tsangpo at Gompo Ne. About this time Sherriff, who never spared himself on any expedition, began to suffer from an overstrained heart, and after consultation with Elliot he decided, very reluctantly, to return to lower altitudes in India. The departure of the Sherriffs rather upset our plans, but Elliot and I agreed that at all costs we *must* explore the Tsangpo gorge, so we set out for Gyala at the entrance, and after four difficult marches, reached Pemakochung, a small flat at the mouth of a glacial valley descending from Namcha Barwa. All around us rhododendrons flowered in great profusion, but there were no paths as

the gorge is uninhabited and the only tracks were those of Takin. We had to hack our way through this jungle and did not progress more than 1,000 yards from the flat on which we were camped. Nevertheless in the four days we spent at Pemakochung we obtained twenty-three different species of rhododendrons! Some day someone will spend a flowering season in this great gorge and what a harvest he will reap! After our descent of the gorge Elliot and I separated, he to work valleys in the upper Yigrong whilst I worked the southern slopes of the range north of Shoga Dzong. Our Lepcha plant collector we sent to Showa in Pome, but here he found the inhabitants uncooperative and returned prematurely. This was to prove our last Tibetan expedition though we didn't realize it at the time. In October, Elliot and I began our return journey via the Tsangpo valley, a barren route, botanically uninteresting which we did not wish to take, but which we were compelled to follow.' (Ludlow, 1968.) (Fletcher, *Quest*, map 17 (p. 253), map 18 (p. 273)).

Ludlow published an account of this expedition in *Ibis* **93** : 547–553 (1951), and in volumes 141–143 of the *Gardeners' Chronicle* (1957–58).

1948 (28 February–19 April). India and Sikkim. Nos 15832–15847.

1949 (27 March–23 October). Sikkim and Bhutan. Nos 16000–17572, 18500–21484.

'We had both left India and this was to be our final fling. Strange to relate we planned to separate. Sherriff was attracted by the Mishmi Hills and I by the vision of a summer in the Tsangpo gorge. Both our applications were refused so we turned again to Bhutan, and once more His Highness the Maharaja gave us permission to travel wherever we wished. On this occasion we decided to work the whole of temperate and alpine Bhutan from west to east, and for this purpose we split up into three parties. Dr J. H. Hicks, who had joined us as Medical Officer and Mrs Sherriff went to East Bhutan, Sherriff to Central Bhutan, and I to the western region. Our collection of five thousand gatherings was the largest we ever made, and included the remarkable *Lilium sherriffiae* with tessellated brown and yellow flowers. An unfortunate accident, however, marred this last journey in July. Owing to a loose saddle girth Mrs Sherriff fell from her mule and broke an arm. Hicks was not able to set this and it was thought advisable for her to return to India for an X-ray. On reaching Kalimpong it was found that all was well and further treatment unnecessary. And so we came to the end of our travels.' (Ludlow, 1968.) (Fletcher, *Quest*, map 19 (p. 309), map (p. 329)).

1950. Bhutan. Nos 21486–21599.

Gazetteer of Ludlow and Sherriff Localities. Tibet

Locality	Latitude	Longitude	Locality	Latitude	Longitude
Adju La	29° 52′ N	95° 08′ E	Besang Landup	30° 25′ N	93° 48′ E
			Bimbi La	28° 47′ N	93° 29′ E
Bachumo	30° 05′ N	94° 43′ E	Bira Tso	29° 59′ N	94° 15′ E
Ba La	30° 22′ N	94° 09′ E	Bo	30° 11′ N	93° 30′ E
Barang Shika	28° 55′ N	93° 53′ E	Budi Tsepo La	29° 27′ N	94° 57′ E

Gazetteer of Ludlow and Sherriff Localities. Tibet (*cont.*)

Locality	Latitude	Longitude
Buku	30° 21′ N	93° 34′ E
Bum La	27° 43′ N	91° 55′ E
Bung	28° 34′ N	92° 49′ E
Cha	29° 34′ N	94° 18′ E
Cha La	28° 41′ N	93° 02′ E
Chab	29° 45′ N	94° 11′ E
Chachima	30° 02′ N	94° 15′ E
Chaksam (bridge over Tsangpo near Lhasa)	29° 21′ N	90° 44′ E
Chakzam (bridge over Yigrong Chu)	30° 07′ N	95° 08′ E
Chamna	29° 25′ N	94° 26′ E
Changlung Chago	30° 00′ N	95° 30′ E
Changpu (Bhutan and Mönyul Frontier)	27° 30′ N	91° 40′ E
Charme	28° 26′ N	93° 05′ E
Chayul Dzong	28° 18′ N	92° 48′ E
Chera La	27° 39′ N	92° 15′ E
Chikchar	28° 43′ N	93° 22′ E
Chilung La	28° 22′ N	91° 52′ E
Chiniung La	28° 41′ N	93° 50′ E
Chira	29° 14′ N	91° 28′ E
Chitisha	29° 18′ N	91° 07′ E
Cho La	28° 02′ N	91° 47′ E
Chomo Dzong	29° 38′ N	94° 16′ E
Chongye Dzong	29° 07′ N	91° 44′ E
Chösam	28° 44′ N	93° 10′ E
Chubumbu La	28° 41′ N	93° 48′ E
Chudi Chu (at source of Siyom on Lo La)	28° 49′ N	94° 00′ E
Chukor	29° 27′ N	94° 21′ E
Chumdo	30° 05′ N	95° 43′ E
Chumpithang	27° 25′ N	88° 53′ E
Chunyima	29° 48′ N	94° 49′ E
Chupung La	28° 19′ N	93° 12′ E
Chushal	29° 22′ N	90° 44′ E
Dechen Dzong	30° 00′ N	90° 38′ E
Dem	30° 02′ N	95° 15′ E
Deyang La	29° 22′ N	94° 52′ E
Dochen	28° 09′ N	89° 18′ E
Doka	30° 07′ N	95° 07′ E
Doka La	28° 02′ N	92° 02′ E
Dokar	29° 49′ N	95° 20′ E
Dongkar Dzong	28° 09′ N	91° 55′ E
Dore	30° 25′ N	93° 48′ E
Dorjitra	29° 19′ N	91° 09′ E
Doshong (Doshung)	29° 32′ N	94° 51′ E
Doshong La	29° 29′ N	94° 59′ E
Drepung Gompa	29° 40′ N	91° 02′ E
Drichung La	28° 24′ N	93° 00′ E
Drölma La	28° 39′ N	93° 21′ E
Drukla Gompa	30° 05′ N	93° 45′ E
Dyuri	27° 40′ N	92° 13′ E
Dza La	27° 58′ N	92° 12′ E
Dzala	30° 15′ N	94° 02′ E
Dzam	29° 10′ N	92° 33′ E
Dzama	29° 56′ N	95° 07′ E
Dzara	28° 53′ N	90° 15′ E
Dzeng (Gyamda Chu Valley)	29° 47′ N	93° 55′ E
Dzeng (near Tsela Dzong, Tsangpo Valley)	29° 29′ N	94° 30′ E
Egar	30° 25′ N	93° 50′ E
Gacha	29° 07′ N	93° 42′ E
Ganden Gompa	29° 41′ N	91° 27′ E
Gautsa	27° 35′ N	89° 03′ E
Gobshi	28° 50′ N	89° 51′ E
Gompo-ne	29° 50′ N	95° 11′ E
Gorpa La	28° 08′ N	91° 59′ E
Guru Namgye Dzong	29° 02′ N	92° 58′ E
Gyachung La	28° 27′ N	91° 43′ E
Gyadzong	30° 11′ N	95° 05′ E
Gyala	29° 42′ N	94° 56′ E
Gyala Peri	29° 49′ N	94° 58′ E
Gyamda Dzong	30° 01′ N	93° 07′ E
Gyandro	28° 24′ N	92° 49′ E
Gyantse Dzong	28° 53′ N	89° 33′ E
Gyare	29° 58′ N	93° 50′ E
Gyatsa Dzong	29° 10′ N	92° 42′ E
Gyipu	27° 36′ N	91° 43′ E
Gyisum	28° 05′ N	92° 10′ E
Je	30° 02′ N	94° 02′ E
Jora	28° 13′ N	92° 25′ E
Kala (Yigrong Valley)	29° 58′ N	93° 49′ E
Kala (Phari–Gyantse Road)	28° 16′ N	89° 25′ E
Kamchang	29° 05′ N	93° 30′ E

Gazetteer of Ludlow and Sherriff Localities. Tibet (*cont.*)

Locality	Latitude	Longitude
Kangma	28° 33′ N	89° 41′ E
Kap	28° 18′ N	92° 55′ E
Kapteng	27° 33′ N	91° 44′ E
Kargong La	28° 42′ N	94° 11′ E
Karma La	29° 56′ N	95° 07′ E
Karo La	28° 54′ N	90° 11′ E
Karpo	28° 41′ N	92° 51′ E
Karutra Temple	28° 21′ N	93° 11′ E
Kashong La	28° 20′ N	93° 08′ E
Kechen La	27° 55′ N	91° 59′ E
Kethong	28° 57′ N	93° 46′ E
Khamba La	29° 12′ N	90° 32′ E
Khambapadze	29° 13′ N	90° 33′ E
Kongbo-nga-La	29° 01′ N	93° 12′ E
Kongkar (Gangkar) Dzong	29° 16′ N	90° 46′ E
Kucha La	29° 13′ N	94° 33′ E
Kumang	29° 44′ N	94° 58′ E
Kyabden	29° 39′ N	94° 17′ E
Kyikar	29° 37′ N	94° 56′ E
Kyimdong Dzong	28° 59′ N	93° 28′ E
Kyimpu	28° 25′ N	93° 01′ E
Lamdo	29° 20′ N	94° 19′ E
Lang La	28° 58′ N	93° 42′ E
Langong	28° 46′ N	93° 48′ E
Langpe	29° 38′ N	94° 55′ E
Lap	27° 38′ N	92° 23′ E
Lapu	28° 42′ N	93° 22′ E
Lasor	29° 05′ N	92° 25′ E
Layoting	30° 00′ N	94° 55′ E
Le	27° 47′ N	91° 50′ E
Le La	28° 27′ N	92° 56′ E
Lenda	29° 09′ N	92° 47′ E
Lepo	27° 53′ N	91° 52′ E
Lhagyari Dzong	29° 06′ N	92° 12′ E
Lhakang Dzong	28° 04′ N	91° 04′ E
Lhalung (Halung, in Pachakshiri Dist.)	28° 42′ N	94° 12′ E
Lhapsö Dzong	29° 07′ N	92° 32′ E
Lhasa	29° 40′ N	91° 05′ E
Ligding	29° 27′ N	94° 23′ E
Lilung	29° 08′ N	93° 54′ E
Ling	28° 44′ N	90° 34′ E
Ling La	28° 37′ N	90° 33′ E
Lingtsang La	28° 48′ N	93° 41′ E
Lisum	30° 06′ N	94° 30′ E
Lochen	30° 28′ N	93° 38′ E
Lochen La	30° 25′ N	93° 35′ E
Lokmo	30° 01′ N	94° 45′ E
Lo La	28° 58′ N	93° 58′ E
Lolung Leku	29° 12′ N	94° 27′ E
Loro Tö	28° 12′ N	92° 15′ E
Lotu	30° 01′ N	94° 14′ E
Lubong	29° 58′ N	95° 06′ E
Luguthang	27° 32′ N	92° 11′ E
Lung	28° 21′ N	93° 09′ E
Lunang	29° 44′ N	94° 48′ E
Lusha	29° 27′ N	94° 35′ E
Lusha La	29° 18′ N	94° 37′ E
Makandro	29° 54′ N	95° 02′ E
Mera La	29° 30′ N	94° 09′ E
Migyitun	28° 40′ N	93° 34′ E
Mihrang La	28° 42′ N	92° 59′ E
Milakatong La	27° 41′ N	91° 57′ E
Miling	29° 12′ N	94° 04′ E
Mipa	28° 37′ N	93° 18′ E
Molo	28° 54′ N	93° 53′ E
Mönda La	28° 29′ N	90° 36′ E
Mug	28° 09′ N	90° 59′ E
Mugu	28° 59′ N	91° 41′ E
Murchumo	30° 08′ N	94° 04′ E
Na La	28° 40′ N	93° 36′ E
Nambu Gompa	29° 59′ N	94° 28′ E
Nambu La	29° 59′ N	94° 19′ E
Namcha Barwa	29° 38′ N	95° 04′ E
Namdi	30° 00′ N	95° 00′ E
Nam La	29° 35′ N	95° 04′ E
Namla Karpo	30° 09′ N	94° 18′ E
Namse Gompa	29° 53′ N	93° 46′ E
Nanda	30° 07′ N	93° 32′ E
Nang Dzong	29° 03′ N	93° 10′ E
Nangartse Dzong	28° 59′ N	90° 25′ E
Nangtse	29° 46′ N	90° 47′ E
Natrampa	28° 21′ N	93° 06′ E
Nayu	29° 12′ N	94° 06′ E
Netang	29° 35′ N	90° 59′ E
Ningshi	29° 42′ N	94° 16′ E
Ningshi La	29° 53′ N	94° 22′ E
Nyala La	28° 08′ N	92° 13′ E
Nyarlu	29° 41′ N	94° 09′ E
Nye (Tsangpo Valley)	29° 01′ N	93° 17′ E
Nye (Yigrong Valley)	30° 25′ N	94° 00′ E
Nyerong	28° 23′ N	92° 50′ E
Nyima La	29° 38′ N	94° 52′ E
Nyoto Sama	30° 25′ N	93° 50′ E
Nyug La	28° 42′ N	94° 03′ E

Gazetteer of Ludlow and Sherriff Localities. Tibet (*cont.*)

Locality	Latitude	Longitude
Nyuksang (in Tsangpo Gorge)	29° 46′ N	95° 00′ E
Nyuri	27° 40′ N	92° 13′ E
Oka Dzong	29° 22′ N	92° 19′ E
Orong	29° 08′ N	93° 44′ E
Paka	29° 20′ N	94° 18′ E
Pa La	28° 46′ N	93° 42′ E
Palung	28° 58′ N	93° 33′ E
Pamse	28° 55′ N	93° 49′ E
Pang	30° 07′ N	93° 31′ E
Pang La (Tsari Dist.)	28° 40′ N	93° 37′ E
Pangchen	27° 41′ N	91° 48′ E
Pasum Kye La (Trasum Kye La)	30° 27′ N	93° 22′ E
Pasum Tso (Trasum Tso)	30° 01′ N	94° 00′ E
Pe	29° 31′ N	94° 53′ E
Pede	29° 08′ N	90° 27′ E
Pemakochung (in Tsangpo Gorge)	29° 45′ N	95° 05′ E
Penam Chu (at entrance to Pasum Tso)	30° 02′ N	92° 02′ E
Penda	30° 21′ N	94° 09′ E
Pen La	27° 58′ N	92° 15′ E
Pero La	29° 32′ N	95° 00′ E
Peru	28° 54′ N	93° 10′ E
Peteng (Pomé)	29° 57′ N	95° 20′ E
Peteng (Tsangpo Valley)	29° 12′ N	94° 04′ E
Phari Dzong	27° 43′ N	89° 10′ E
Podzo Sumdo	28° 41′ N	93° 28′ E
Pö La	27° 56′ N	91° 56′ E
Pomo Tso (on Eastern shore)	28° 35′ N	90° 30′ E
Potrang	28° 29′ N	93° 13′ E
Pumpatse	29° 43′ N	94° 48′ E
Pungkar Gompa	30° 17′ N	93° 31′ E
Putrang La	29° 03′ N	92° 22′ E
Rabdang	29° 06′ N	92° 51′ E
Ragoonka (Ragunka)	30° 25′ N	94° 20′ E
Ra La	28° 48′ N	92° 51′ E
Ralung	28° 50′ N	90° 03′ E
Rama	28° 18′ N	89° 40′ E
Raprang	28° 25′ N	93° 09′ E
Reting	30° 22′ N	91° 28′ E
Rham	28° 08′ N	89° 25′ E
Rib (Rip) La	28° 41′ N	93° 09′ E
Rimbu	28° 44′ N	93° 40′ E
Rongchakar (Rong)	29° 13′ N	92° 03′ E
Sakang (Sowgon)	28° 43′ N	89° 40′ E
Samoda	28° 23′ N	89° 33′ E
Sang	29° 29′ N	94° 41′ E
Sang La (Mönyul Dist.)	28° 09′ N	91° 58′ E
Sang La (Kongbo Dist.)	29° 35′ N	94° 43′ E
Sanga Chöling	28° 33′ N	93° 00′ E
Sanglung	29° 40′ N	95° 13′ E
Satang	29° 59′ N	95° 19′ E
Satang Peri	30° 00′ N	95° 25′ E
Sengdam	29° 45′ N	94° 57′ E
Senge Dzong (Tsangpo Gorge)	29° 47′ N	95° 03′ E
Senguti	28° 43′ N	93° 15′ E
Sera Gompa	29° 41′ N	91° 05′ E
Shacha Pebo	28° 42′ N	93° 55′ E
Shagam La	28° 36′ N	93° 18′ E
Shakti	27° 38′ N	91° 46′ E
Shangu La	28° 35′ N	93° 13′ E
Shi Dzong	29° 59′ N	93° 54′ E
Shinje Chögyal	29° 43′ N	94° 50′ E
Shio	28° 07′ N	92° 31′ E
Shirap	28° 38′ N	92° 38′ E
Shoga Dzong	29° 58′ N	93° 48′ E
Shoka	29° 14′ N	94° 10′ E
Shoka La	29° 07′ N	94° 16′ E
Showa Dzong	29° 55′ N	95° 25′ E
Showa La	29° 52′ N	95° 21′ E
Shu (Lisho)	29° 00′ N	93° 26′ E
Simbiteng	29° 11′ N	93° 56′ E
Simoneri	28° 39′ N	93° 09′ E
Singhi Dzong	28° 16′ N	90° 54′ E
Singo Samba	28° 48′ N	93° 56′ E
Sobhe La	30° 07′ N	94° 54′ E
Sokpo La	28° 41′ N	92° 57′ E
Su La	29° 49′ N	95° 24′ E
Sumbatse	28° 55′ N	93° 33′ E
Sur La	28° 46′ N	93° 11′ E
Takar La	28° 39′ N	93° 06′ E
Takpashiri (Chayul Dist.)	28° 11′ N	92° 51′ E
Takpashiri (Tsari Dist.)	28° 36′ N	93° 14′ E
Takpashiri (east of Migyitun)	28° 42′ N	93° 40′ E

Gazetteer of Ludlow and Sherriff Localities. Tibet (*cont.*)

Locality	Latitude	Longitude
Taktsa	28° 58′ N	93° 35′ E
Taktsang	28° 35′ N	93° 13′ E
Talung	28° 48′ N	90° 27′ E
Tama La	28° 35′ N	93° 17′ E
Tamnyen	29° 27′ N	94° 38′ E
Tamnyen La	29° 18′ N	94° 45′ E
Tana La	29° 54′ N	95° 07′ E
Tang	29° 43′ N	94° 02′ E
Tang La	27° 50′ N	89° 11′ E
Tangme	30° 07′ N	95° 08′ E
Tatti	29° 44′ N	93° 58′ E
Tawang	27° 34′ N	91° 56′ E
Temo Chamna	30° 15′ N	94° 56′ E
Temo Gompa	29° 30′ N	94° 30′ E
Temo La	29° 35′ N	94° 38′ E
Timpa	29° 33′ N	94° 52′ E
Tomtsang	28° 36′ N	93° 13′ E
Tonbe	30° 15′ N	95° 00′ E
Tongkyuk Dzong	29° 58′ N	94° 50′ E
Totsen	28° 43′ N	93° 17′ E
Towa Dzong	28° 23′ N	90° 49′ E
Trakan La	28° 43′ N	92° 45′ E
Trashijung	28° 45′ N	93° 53′ E
Tre	28° 05′ N	92° 06′ E
Trigu Dzong	28° 43′ N	91° 44′ E
Trigu Tso (middle of Lake)	28° 40′ N	91° 46′ E
Trimo	27° 55′ N	91° 54′ E
Trip (Sip)	29° 56′ N	94° 52′ E
Tripe	29° 37′ N	94° 56′ E
Tromda	29° 05′ N	92° 55′ E
Trön	28° 21′ N	93° 01′ E
Tro Shika	28° 16′ N	92° 34′ E
Truka La	27° 35′ N	92° 12′ E
Trulung	30° 03′ N	95° 03′ E
Tsakchugong	29° 53′ N	95° 09′ E
Tsanang La	29° 12′ N	94° 29′ E
Tsari Sama (an area or District)	28° 43′ N	93° 50′ E
Tse	29° 24′ N	94° 22′ E
Tsechen Gompa	28° 56′ N	89° 34′ E
Tsela Dzong	29° 26′ N	94° 22′ E
Tsemachi	28° 50′ N	93° 29′ E
Tsera	30° 03′ N	95° 13′ E
Tsetang	29° 15′ N	91° 51′ E
Tsobunang	28° 48′ N	93° 10′ E
Tsogo	30° 05′ N	94° 03′ E
Tso Kar	28° 40′ N	93° 42′ E
Tsona	28° 00′ N	92° 01′ E
Tulung La	27° 49′ N	92° 14′ E
Tumbatse	29° 40′ N	94° 47′ E
Tum La	29° 03′ N	94° 13′ E
Tuna	27° 58′ N	89° 13′ E
Tundo	29° 13′ N	94° 08′ E
Yang Tso	28° 28′ N	91° 44′ E
Yarap	28° 43′ N	93° 21′ E
Yar Shika	28° 14′ N	92° 40′ E
Yatung	27° 28′ N	88° 54′ E
Yigrong Tso (south end of Lake)	30° 12′ N	95° 00′ E
Yu La	28° 44′ N	93° 38′ E
Yum Tso	30° 00′ N	94° 12′ E
Yume	28° 39′ N	93° 08′ E
Yusum	29° 11′ N	94° 01′ E
Yuto	28° 40′ N	93° 07′ E
Zimsatti	28° 38′ N	93° 03′ E

Gazetteer of Ludlow and Sherriff Localities. Bhutan and Sikkim

Locality	Latitude	Longitude
Adung	27° 16′ N	90° 04′ E
Badar La	27° 34′ N	90° 47′ E
Balfai (Bulphai, *Griffith*)	27° 13′ N	91° 31′ E
Barshong (Parshong)	27° 42′ N	89° 33′ E
Batte Dzong	27° 15′ N	89° 25′ E
Bela La	27° 26′ N	89° 29′ E
Benkar (Trashigong Dzong ; Benka, *Griffith*)	27° 18′ N	91° 34′ E
Black Mountain (Dunshinggang)	27° 17′ N	90° 24′ E
Bumdangtang (Bhoomlungtung, *Griffith*)	27° 36′ N	90° 50′ E
Bumtang (Byagur, *Griffith*)	27° 33′ N	90° 43′ E
Buxa	26° 45′ N	89° 36′ E
Byiti Sam	27° 12′ N	90° 40′ E
Chanana	27° 24′ N	89° 22′ E
Changpu (Bhutan-Mönyul Frontier)	27° 30′ N	91° 40′ E
Changsethang	27° 44′ N	90° 18′ E
Changu (Tsomgo)	27° 22′ N	88° 47′ E

Gazetteer of Ludlow and Sherriff Localities. Bhutan and Sikkim (*cont.*)

Locality	Latitude	Longitude
Chelai La (Cheli La)	27° 22′ N	89° 20′ E
Chenbi Rongang	27° 45′ N	91° 09′ E
Chendebi (Chindupjee, *Griffith*)	27° 27′ N	90° 20′ E
Chera La	27° 42′ N	92° 14′ E
Chesha La	27° 49′ N	90° 01′ E
Cheypechey	27° 57′ N	89° 28′ E
Chhukha Dzong (Chuka, *Griffith*)	27° 03′ N	89° 36′ E
Chizukang	27° 38′ N	90° 16′ E
Cho La	28° 03′ N	91° 46′ E
Chojo Dzong	27° 55′ N	90° 08′ E
Chöling La	27° 20′ N	91° 42′ E
Chorten Korra	27° 45′ N	91° 29′ E
Chumiten	27° 57′ N	89° 33′ E
Chungkar (Keri Gompa ; Khegumpa, *Griffith*)	27° 03′ N	91° 27′ E
Chungsing	27° 03′ N	90° 34′ E
Chunzu Gompa	27° 13′ N	89° 30′ E
Damthang	27° 27′ N	89° 12′ E
Demri Chu	27° 07′ N	90° 34′ E
Denchung	27° 44′ N	91° 14′ E
Dhur	27° 37′ N	90° 41′ E
Dib La	27° 36′ N	91° 41′ E
Dikchu	27° 19′ N	88° 31′ E
Diwangiri	26° 52′ N	91° 30′ E
Dokyong La	27° 29′ N	89° 45′ E
Donga La (Doonglala, *Griffith*)	27° 34′ N	91° 19′ E
Donga Pemi	27° 34′ N	91° 17′ E
Donkya La	27° 59′ N	88° 47′ E
Dotena	27° 35′ N	89° 38′ E
Drugye Dzong	27° 30′ N	89° 19′ E
Dunkar La	27° 07′ N	90° 25′ E
Dungshinggang (Black Mountain)	27° 17′ N	90° 24′ E
Dunkhar	27° 50′ N	91° 07′ E
Dur Chutsen	27° 51′ N	90° 31′ E
Foomay	27° 48′ N	89° 56′ E
Gafoo La	27° 57′ N	90° 15′ E
Gale Chu	27° 05′ N	90° 30′ E
Gamri Chu (at junction with Dangme Chu)	27° 22′ N	91° 35′ E
Gangtok	27° 20′ N	88° 40′ E
Gnatong (Natang)	27° 18′ N	88° 50′ E
Goktang La	27° 48′ N	90° 34′ E
Gongte Gompa	27° 28′ N	90° 10′ E
Gufu	27° 25′ N	90° 12′ E
Gunisa	27° 38′ N	89° 15′ E
Gunkarah	27° 24′ N	91° 35′ E
Gyasa Dzong	27° 45′ N	89° 46′ E
Gyetsa (Jaisa, *Griffith*)	27° 30′ N	90° 39′ E
Ha	27° 22′ N	89° 18′ E
Ha La	27° 26′ N	89° 09′ E
Hamo	28° 05′ N	91° 08′ E
Hatisar	26° 53′ N	90° 30′ E
Hinglai La	27° 26′ N	89° 45′ E
Jelap La (Sikkim–Tibet Frontier)	27° 22′ N	88° 53′ E
Jigche La	27° 30′ N	90° 12′ E
Jirgang Chu (at junction with Mangde Chu)	27° 12′ N	90° 40′ E
Jiri Chu (source of stream near Balfai)	27° 13′ N	91° 31′ E
Jiu La	27° 47′ N	90° 35′ E
Jiutang	27° 53′ N	90° 32′ E
Julu	27° 48′ N	91° 14′ E
Kangchuka	27° 35′ N	90° 13′ E
Kangla Karchu La	27° 51′ N	89° 52′ E
Kang La	28° 00′ N	91° 13′ E
Kantanang	27° 47′ N	90° 46′ E
Kapcha Dzong (Chupcha, *Griffith*)	27° 12′ N	89° 34′ E
Karmu	Near Cho La	
Karponang	27° 23′ N	88° 38′ E
Khane (Khinay) Lhakang	27° 31′ N	91° 06′ E
Khem La	27° 46′ N	90° 24′ E
Kheri Gompa (Khegumpa, *Griffith*)	27° 03′ N	91° 27′ E
Khoma Chu (at junction with Kuru Chu)	27° 39′ N	91° 12′ E
Khomanagri (Khoomun, *Griffith*)	27° 08′ N	91° 26′ E
Kinga Rabden	27° 24′ N	90° 30′ E
Kitipu	27° 34′ N	90° 42′ E
Kohina	27° 49′ N	89° 48′ E

Gazetteer of Ludlow and Sherriff Localities. Bhutan and Sikkim (*cont.*)

Locality	Latitude	Longitude
Kulong Chu (Koolong ; at junction with Manas River)	27° 26′ N	91° 37′ E
Kumathang	27° 44′ N	89° 22′ E
Kyipup	27° 21′ N	88° 51′ E
Kyi-kyi La	27° 33′ N	90° 41′ E
Kyü La	27° 26′ N	89° 07′ E
Lachen	27° 44′ N	88° 33′ E
Lachung	27° 42′ N	88° 45′ E
Lagyap (Laghep)	27° 22′ N	88° 42′ E
Lamse La	27° 25′ N	90° 15′ E
Lao	27° 52′ N	91° 28′ E
Lao La	27° 32′ N	90° 09′ E
Lap	27° 40′ N	92° 15′ E
Laya	27° 54′ N	89° 48′ E
Leji	27° 52′ N	90° 06′ E
Lhuntse Dzong	27° 39′ N	91° 10′ E
Lingshi Dzong	27° 55′ N	89° 27′ E
Lingshi La	27° 57′ N	89° 27′ E
Linji (Lingitsi ; Linje, *Griffith*)	27° 36′ N	91° 13′ E
Lometsawa	27° 31′ N	89° 48′ E
Longte Chu (at junction with Mangde Chu)	27° 26′ N	90° 29′ E
Loona (district near Leji)	27° 48′ N	90° 00′ E
Lubsing La	27° 47′ N	90° 45′ E
Lungur	27° 47′ N	92° 14′ E
Mago (district in which Nyuri and Dyuri are the principal localities)	27° 40′ N	92° 10′ E
Mangde Chu (Trongsa Chu)	River about	90° 40′ E
Mara Chu (at junction with Mo Chu)	27° 12′ N	90° 00′ E
Marlung	27° 56′ N	90° 38′ E
Marutang	27° 35′ N	90° 16′ E
Me La	27° 58′ N	91° 37′ E
Mem La	27° 39′ N	89° 21′ E
Menjibi	27° 33′ N	91° 10′ E
Menoka Tea Estate	26° 45′ N	91° 30′ E
Mera	27° 19′ N	91° 50′ E
Mo Chu	River on which Punaka is situated	
Mon La	27° 05′ N	90° 37′ E
Mön La Karchung La	28° 05′ N	90° 39′ E
Mönle La	27° 24′ N	89° 59′ E
Muktur	27° 32′ N	91° 58′ E
Nabzi	27° 08′ N	90° 29′ E
Naha	27° 45′ N	89° 29′ E
Namda La	27° 51′ N	90° 34′ E
Namdating	27° 52′ N	90° 32′ E
Narimthang	27° 57′ N	91° 13′ E
Natang (Gnatong)	27° 18′ N	88° 50′ E
Natu La (Sikkim–Tibet Frontier)	27° 23′ N	88° 50′ E
Nelli La	27° 51′ N	89° 23′ E
Nyingsang La	27° 27′ N	91° 55′ E
Nyongchung La	28° 02′ N	92° 05′ E
Nyuksang La	27° 20′ N	91° 53′ E
Omta Tso	27° 37′ N	90° 17′ E
Oke La	28° 10′ N	90° 02′ E
Okse La	27° 06′ N	90° 29′ E
Orka La	27° 23′ N	92° 01′ E
Padima Tso	27° 42′ N	90° 21′ E
Pang La (West Bhutan)	27° 45′ N	89° 22′ E
Pang La (East Bhutan)	27° 44′ N	91° 18′ E
Pangotang	27° 50′ N	90° 42′ E
Pangte La	27° 45′ N	89° 22′ E
Paro	27° 25′ N	89° 25′ E
Passu Sepo	27° 57′ N	90° 22′ E
Pedong	27° 09′ N	88° 38′ E
Peipe La	27° 40′ N	90° 48′ E
Pele La	27° 32′ N	90° 12′ E
Pemionchi (Pemayangtse)	27° 18′ N	88° 15′ E
Pemitanka	27° 26′ N	89° 32′ E
Phadonchen (Sedonchen)	27° 14′ N	88° 46′ E
Phage La	27° 49′ N	90° 25′ E
Phalut	27° 12′ N	88° 01′ E
Pho Chu	Large river joining the Mo Chu at Punaka	
Phobshika	District near the Black Mountain	
Phongmi	27° 23′ N	91° 45′ E
Pimi (Pémee, *Griffith*)	27° 34′ N	90° 59′ E
Pü La or Pö La or Bod La	28° 02′ N	91° 14′ E
Puduna	27° 20′ N	89° 18′ E
Pumo La	27° 27′ N	89° 35′ E

Gazetteer of Ludlow and Sherriff Localities. Bhutan and Sikkim (*cont.*)

Locality	Latitude	Longitude
Punaka (Punukha, *Griffith*)	27° 36′ N	89° 51′ E
Pung La	27° 41′ N	91° 12′ E
Rangpo	27° 11′ N	88° 32′ E
Rhenok	27° 10′ N	88° 38′ E
Ridang (Rydang, *Griffith*)	27° 34′ N	90° 10′ E
Rinchen Chu (source in Thampe La)	27° 40′ N	90° 17′ E
Rip La	27° 42′ N	91° 13′ E
Rocha Chu (at junction with Kulong Chu)	27° 34′ N	91° 30′ E
Rongli (Rangli)	27° 12′ N	88° 41′ E
Ronglung (Roongdong, *Griffith*)	27° 15′ N	91° 34′ E
Rudo La (Rodoola, *Griffith*)	27° 35′ N	90° 55′ E
Rukubi	27° 29′ N	90° 18′ E
Rungzyung	27° 22′ N	91° 40′ E
Saga La (West Bhutan)	27° 28′ N	89° 17′ E
Saga La (Central Bhutan)	27° 54′ N	90° 26′ E
Sakden	27° 24′ N	91° 54′ E
Samtegang (Santagoung, *Griffith*)	27° 31′ N	90° 01′ E
Sana (Sanah, *Griffith*)	27° 34′ N	91° 25′ E
Sandakphu	27° 07′ N	88° 01′ E
Sang La	28° 09′ N	91° 58′ E
Sassi (Sassee, *Griffith*)	27° 08′ N	91° 27′ E
Satsalor	26° 56′ N	91° 29′ E
Sawang	27° 42′ N	91° 14′ E
Sebu La	28° 08′ N	88° 36′ E
Sedonchen	27° 14′ N	88° 46′ E
Sefu	27° 32′ N	90° 19′ E
Sergong La	27° 52′ N	91° 03′ E
Shabjetang	27° 39′ N	90° 43′ E
Shali	27° 29′ N	91° 35′ E
Shambling	27° 46′ N	91° 09′ E
Shamgong Dzong	27° 14′ N	90° 39′ E
Shapang	27° 39′ N	91° 27′ E
Sharitang	27° 25′ N	89° 02′ E
Shimitang	27° 46′ N	90° 43′ E
Shingbe	27° 55′ N	91° 33′ E
Shinje La	27° 58′ N	89° 39′ E
Shole La	27° 25′ N	90° 06′ E
Sibsi La	27° 40′ N	91° 20′ E
Singtam	27° 14′ N	88° 30′ E
Singhi Dzong	27° 55′ N	91° 13′ E
Surelakha	27° 01′ N	90° 32′ E
Taglung La	27° 41′ N	89° 21′ E
Takila	27° 34′ N	91° 12′ E
Takse	27° 20′ N	90° 37′ E
Taktoo	27° 23′ N	91° 47′ E
Tamachu (Tumashoo, *Griffith*)	27° 34′ N	91° 11′ E
Tang Chu (at Mo Chu junction)	27° 28′ N	89° 54′ E
Tangnaru	27° 36′ N	90° 53′ E
Tanglu	27° 02′ N	88° 07′ E
Telegang (Tolegang)	27° 49′ N	90° 40′ E
Thampe La	27° 40′ N	90° 17′ E
Thampe Tso	27° 41′ N	90° 19′ E
Thang (Tang)	27° 35′ N	90° 52′ E
Thimbu Chu	Tributary of Wong Chu near Trashi Chö Dzong	
Thita Tso	27° 38′ N	90° 18′ E
Tibdey La	27° 24′ N	90° 42′ E
Timnyung Dzong	27° 41′ N	91° 10′ E
Tobrang	27° 45′ N	91° 28′ E
Tosumani	27° 51′ N	91° 15′ E
Tranza (Tranzo)	27° 57′ N	90° 09′ E
Trashigong Dzong (Benka, *Griffith*)	27° 18′ N	91° 34′ E
Trashiyangtse Dzong (Tassyassy or Tassangsee, *Griffith*)	27° 34′ N	91° 20′ E
Trashi Chö Dzong (Thimbu ; Tassisudon, *Griffith*)	27° 29′ N	89° 38′ E
Trashiling (Tasseling, *Griffith*)	27° 27′ N	90° 27′ E
Trongsa Dzong	27° 31′ N	90° 31′ E
Tsalimape	27° 26′ N	89° 39′ E
Tsampa	27° 49′ N	90° 43′ E
Tsanka	27° 29′ N	90° 28′ E
Tsele La	27° 25′ N	90° 10′ E
Tseli La	27° 14′ N	89° 16′ E
Tunle La	27° 27′ N	90° 37′ E

Gazetteer of Ludlow and Sherriff Localities. Bhutan and Sikkim (*cont.*)

Locality	Latitude	Longitude	Locality	Latitude	Longitude
Ungar (Oongar, *Griffith*)	27° 33′ N	91° 02′ E	Woji	27° 51′ N	89° 57′ E
			Worthang	27° 54′ N	90° 28′ E
Waitang (Weitang)	27° 55′ N	90° 45′ E	Yale La	27° 52′ N	89° 26′ E
Wangdi Potrang (old spelling Angdu Phorang, Wandipore, *Griffith*)	27° 28′ N	89° 54′ E	Yari La	28° 00′ N	89° 36′ E
			Yönpu La	27° 13′ N	91° 35′ E
			Yuto La	27° 31′ N	90° 35′ E

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RELIQUIAE BOTANICAE HIMALAICAE

By FRANK LUDLOW

SUMMARY

Androsace nortonii (Primulaceae), *Corydalis brevicalcarata*, *C. sherriffii* (Papaveraceae), *Cremanthodium bhutanicum*, *C. campanulatum* var. *pinnatisectum* (Compositae), *Geum macrosepalum* (Rosaceae), *Haplosphaera himalayensis* (Umbelliferae), *Saussurea neglecta* (Compositae) and *Senecio kongboensis* (Compositae) from the Himalayas and adjacent south-eastern Tibet are new. *Geum versipatella* Marquand is considered conspecific with *G. sikkimense* Prain, the protologue of which covered two species, *G. sikkimense* (for which a lectotype is designated here) and *G. macrosepalum*. The flowers of *Diapensia wardii* W. E. Evans, originally based on non-flowering material, are described.

INTRODUCTORY NOTE

FRANK LUDLOW (1885–1972) devoted most of the last twenty years of his life to the study of the large botanical collections which he and George Sherriff had amassed during their expeditions to Bhutan and south-eastern Tibet between 1933 and 1950. Whenever possible these plants were put into the hands of specialists for naming, P. C. Tsoong, for example, dealing with *Pedicularis*, T. T. Yü and G. Klotz with *Cotoneaster*, H. Smith with *Saxifraga* and *Gentiana*, J. L. van Soest with *Taraxacum*, P. H. Raven with *Epilobium*, W. T. Stearn with *Allium*, H. Hara with *Chrysosplenium*, W. W. Smith and H. R. Fletcher with *Primula* and Frances Balfour-Browne with Fungi. Ludlow himself, with the help of the botanical staff of the British Museum (Natural History), determined most of those remaining. This necessitated their comparison with material from adjacent regions, notably Sikkim, Nepal and western China, and led to the recognition of many new species. Ludlow published some of them under the title 'Novitates Himalaicae' in *Bull. Br. Mus. nat. Hist.* (Bot.) **2** : 65–78 (1956). At the time of his death he had prepared descriptions and notes on yet others. These are published below with a few minor emendations and additions. Figs 4, 5 and 7 were drawn by Mr D. Erasmus, Figs 8 and 9 by Miss Victoria Goaman, Figs 2 and 6 by Miss E. M. Stones. The specimens cited are in the British Museum (Natural History) unless stated otherwise.

W. T. STEARN

GEUM SIKKIMENSE AND ALLIED SPECIES (ROSACEAE)

The three Himalayan species discussed below differ from *Geum* proper, with *G. urbanum* L. as lectotype, in having straight styles and belonging to the group sometimes generically separated from *Geum*, e.g. by Greene (1906), Rydberg (1913), F. Bolle (1933) and Hutchinson (1964), under the name *Acomastylis* Greene, with *Sieversia rossii* R. Br. (*Geum rossii* (R. Br.) Seringe) as lectotype. In *Geum* proper the style is differentiated into a lower (proximal) part and an upper (distal) part by a sigmoid bend ; as the achene matures the upper part breaks off at the bend, leaving the lower part with a hooked tip which becomes rigid and aids dispersal of

the achene by catching on to the fur of mammals. However, a number of species commonly included in *Geum* have completely persistent styles and the three Himalayan species do not appear closely related to the Arctic species placed in *Acomastylis*. It would seem that more information is to be lost than gained by dividing *Geum* into several small genera ; moreover, W. Gajewski, 'A cytogenetic study of the genus *Geum*' (*Monographiae Bot.* **4** : 1–416 (1957)) keeps *Geum* intact while recognizing eleven subgenera. These species are accordingly here retained in *Geum*.

An examination of the type-sheets of *Geum sikkimense* Prain at Kew revealed that two species, not one, are involved. This species was originally founded on three gatherings, all from western Sikkim. Two of these were made by King's collector, one at Onglathang near Jongri in 1887, the other in the following year at an unspecified locality. The third gathering was made in September 1901, at a place called Hewalungi (spelt Huhalanghi in the text) by Prain's own collector. Although this third gathering is in fruit, the calyx, corolla and stamens still persist, and these suffice to show that this plant is very different from that obtained by King. For whereas in King's plant the calyx lobes are triangular, the petals hairy only at the base, and the stamens 3–4 mm in length, in Prain's plant the calyx lobes are broadly ovate, the petals hairy on the outside from base to apex, and the stamens 7–8 mm long. The chief difference, however, lies in the style, which in Prain's plant is almost entirely deciduous, whereas in King's plant (as is evident from maturer gatherings than those obtained by King) the whole style is persistent.

The description and illustration of *G. sikkimense* in *J. Asiat. Soc. Beng.* **73**(2) : 200, t.7 (1904) were clearly based on all three gatherings cited by Prain. The differences in calyx between the flowering and fruiting collections he obviously accepted as being due to development after flowering. Other differences he accepted as being due to variation. Prain did not mark any of the gatherings as type, but since the major part of his description and also most of the illustration is of the flowering material collected for King, it is reasonable to select a lectotype from this ; it is therefore proposed that the sheet in the Kew Herbarium marked 'Dr. King's Collector, June 1887', which is inscribed 'Geum sikkimense Prain in Journ. As. Soc. Beng. LXXIII. 200' in Prain's own hand, shall be the lectotype of that name. This being so, a new name must be found for the fruiting specimen from Hewalungi. Fortunately, of recent years, Ludlow and Sherriff, Kingdon-Ward, and Cooper have all collected Prain's plant on several occasions in Bhutan, Assam and south-eastern Tibet, so that ample material is now available for the description of this new species here named *G. macrosepalum*.

The three Himalayan species of *Geum* with straight styles may be distinguished as follows :

Terminal leaflet of basal leaves scarcely longer and not much broader than lateral leaflets . . . . . 3. *G. elatum*

Terminal leaflet of basal leaves very much longer and broader than lateral leaflets :

Sepals 3–6 mm broad, green ; petals glabrous . . 2. *G. sikkimense*

Sepals 8–10 mm broad, almost the same colour as the petals ; petals hairy 1. *G. macrosepalum*

The only other Himalayan species of *Geum* is *G. roylei* Wall. ex F. Bolle in *Beih. Repert. nov. Spec. Regni. veg.* **72**: 66 (1933), the Himalayan counterpart of the European and Western Asiatic *G. urbanum* L., which has the style bent sigmoidally in flower and the achenes hooked at the tip of the persistent style-base. This ranges from Chitral and Kashmir to Central Nepal.

1. ***Geum macrosepalum*** Ludlow, sp. nov. (Plate 30A ; Text-fig. 2.)

Herba perennis usque ad 50 cm alta, *rhizomate* praemorso lignoso adscendente, plusminusve 2 cm longo et 1 cm diametro, *caulibus* simplicibus erectis puberulis. *Folia radicalia* 6–10, conferta, lyrata, herbacea, utrinque pilosa, 6–18 cm longa, usque ad 4–5 cm lata, ambitu obovati-oblonga, basin versus angustata, simpliciter pinnata, lobis 5–10 jugis ; lobus terminalis late ovatus vel subcircularis vel reniformis, 2–5 cm longus et 2–4·5 cm latus, marginibus crenati-dentatis ; lobi laterales minuti, sessiles, circulares, marginibus crenati-dentatis. *Folia caulina* 2–4, utrinque subhispida, sessilia, ambitu obovata vel late oblanceolata, 1–4 cm longa, 0·5–2 cm lata, marginibus dentatis ; *stipulae* binae oppositae, foliaceae, ambitu ovatae, 1–1·5 cm longae et plusminusve 1 cm latae, marginibus serrati-dentatis.

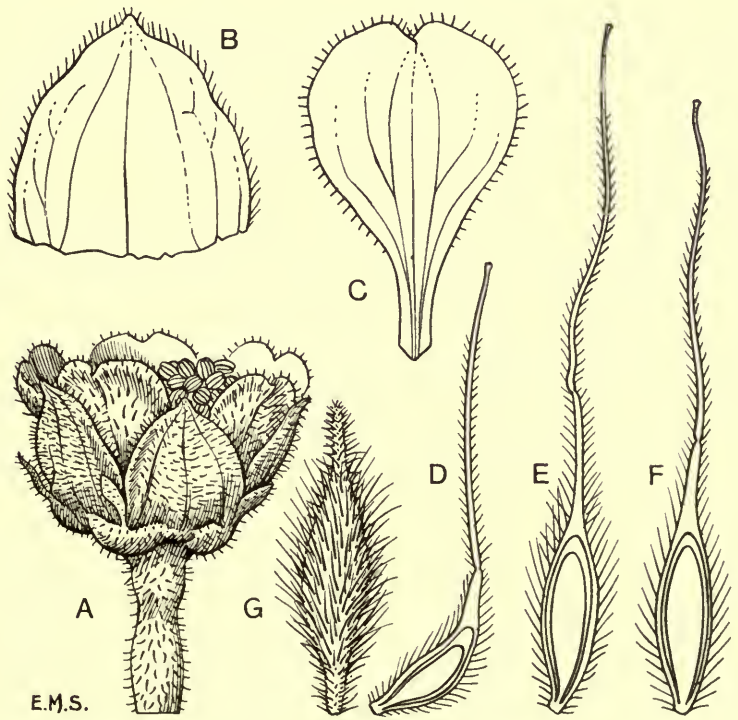

FIG. 2. *Geum macrosepalum* Ludlow ; A, flower (*L & S 19171*, holotype), ×2 ; B. sepal (*L & S 19171*), ×4 ; C, petal (*L & S 19171*), ×4 ; D–F, gynoecium (D. E, *L & S 1684* ; F, *Kingdon-Ward 12002*), ×8 ; G, mature achene (*Prain's collector 204*), ×8.

Flores solitarii rare bini, usque ad 3 cm diametro. *Bracteolae* 5, lanceolatae, 5–6 mm longae, hispidae. *Calyx* 5-lobatus, coloratus, luteus, flavo-virens vel fulvus; lobi ovati ad late ovati, 1–1·5 cm longi, 0·8–1 cm lati, apiculati, extus hispidi intus glabri. *Petala* 5, lutea fulva flava eburneave, obovata, basi unguiculata, apice retusa ad emarginata, 1–1·2 cm longa, 0·6–0·7 cm lata, extus praecipue apicem versus pilosa. *Stamina* numerosa (50–80); *antherae* ellipticae, plusminusve 0·8 mm longae; *filamenta* 6–10 mm longa, basi libera, apicem versus pilosa, gracillima. *Receptaculum* conicum, basi plusminusve 4 mm longum et 4 mm latum. *Carpella c.* 70; *stylus* porrectus, 6–10 mm longus, hirsutus, gracilis, apicem versus gradatim attenuatus, supra basin constrictus, parte superiore in statu maturo decidua. *Achenia* ellipsoidea, in statu maturo 5–6 mm longa, brevissime pedunculata, apice rostro 1–2 mm longo instructa, plusminusve dense hirstua.

SIKKIM: Hewalungi, September 1901, *Prain's collector 204* (K).

BHUTAN: Rinchen Chu (27° 38′ N, 90° 17′ E), 4200 m, 'common on open stony hillside; corolla pale yellow, calyx lemon yellow to red yellow', 5 July 1937, *Ludlow & Sherriff 3389*. Saga La, Upper Mangde Chu (27° 55′ N, 90° 25′ E), 4200 m, 'grassy alpine slopes; calyx red green or green, corolla ditto', 14 July 1949, *Ludlow, Sherriff & Hicks 16824*. Pangothang, Tsampa (27° 50′ N, 90° 42′ E), 4200 m, 'flowers dull yellow, calyx greenish yellow', 16 June 1949, *Ludlow, Sherriff & Hicks 19171* (holotype in Herb. Brit. Mus.). Shingbe, Me La, (27° 56′ N, 91° 33′ E), 3800–4200 m, 6 June 1949, *Ludlow, Sherriff & Hicks 20322*. Parshong Timpu (27° 42′ N, 89° 34′ E), 4000 m, 'flowers white', 27 July 1914, *Cooper 1963*.

ASSAM: Luguthang (27° 32′ N, 92° 11′ E), 4000 m, 'flowers scarcely open, white or yellow', 6 June 1935, *Kingdon-Ward 11639*.

S.E. TIBET: Lang La (28° 58′ N, 93° 42′ E), 4200 m, 'flowers yellow or reddish', 16 July 1935, *Kingdon-Ward 12002*. Takar La, Tsari (28° 40′ N, 93° 05′ E), 4000 m, 'corolla pale lemon yellow, calyx lemon green', 27 June 1936, *Ludlow & Sherriff 2226*. Langong (28° 51′ N, 93° 47′ E), 4400 m, 'corolla pale lemon yellow, calyx slightly darker', 28 May 1938, *Ludlow, Sherriff & Taylor 3899*.

Several characters distinguish this new species from other Himalayan members of the genus. The most important are (a) large broad ovate calyx lobes which are almost the same colour as the petals; (b) petals which are hairy on the outside from base to apex; (c) stamens varying in length from 6 to 10 mm according to age; (d) a jointed style, the greater part of which is deciduous.

2. ***Geum sikkimense*** Prain in J. Asiat. Soc. Beng. 73 : 200, t. 7 (1904).

Acomastylis sikkimensis (Prain) F. Bolle in Beih. Repert. nov. Spec. Regni veg. **72** : 83 (1933).
Geum versipatella Marquand in Curtis's Bot. Mag. 157 : t. 9344 (1934).

NEPAL: Tukucha, Kali Gandaki Valley, 3500 m, 15 June 1954, *Stainton, Sykes & Williams 1152, 1154*. Larjong (S. of Tukucha) 3000 m 'calyx and filaments green, petals reddish white', 23 July 1954, *Stainton, Sykes & Williams 1953*. Sauwala Khola 3600 m, 4 June 1954, *Stainton, Sykes & Williams 2976*. Rambrong, Lamjung

Himal, 4000 m 'petals cream', 1 July 1954, *Stainton, Sykes & Williams 6057*. S. of Khola Kharka, 4250 m, 'flowers white', 15 July 1949, *Polunin 1062*. Tangba, 4250 m, *Lall Dhwoj 216*. Michet, 4500 m, *Lall Dhwoj 78*.

SIKKIM: Onglathang near Jongri, June 1887, *King's Collector* (lectotype of *G. sikkimense*, K).

BHUTAN: Tang Chu, Ritang, Central Bhutan, 3600 m, 'corolla white, back of petals sometimes pink', 6 June 1937, *Ludlow & Sherriff 3194*. Rinchen Chu, Central Bhutan, 3600–4000 m, 'corolla pink to very pale pink', 4 July 1937, *Ludlow & Sherriff 3382*. Thita Tso, Central Bhutan, 4000 m, 'corolla reddish pink with a lot of white internally and towards the base', 10 August 1949, *Ludlow, Sherriff & Hicks 17097*.

When Marquand described *Geum versipatella* he stated that it differed from its most closely allied species 'in the flowers being white instead of yellow, in the much longer pedicels and in having rather more numerous stamens with longer filaments'.

When examining the numerous gatherings in the British Museum (Natural History) which seemed to agree completely with the type material of *G. sikkimense* at Kew, I noticed that none had yellow flowers, and that all had white or pinkish-white flowers. Since the colour of the flowers is not mentioned on King's sheet of *G. sikkimense* at Kew, or on those in the Calcutta Herbarium, it seems possible that Prain erred in describing the flowers as yellow. The flowers *look* yellow in King's type, it is true, but they also look yellow in white-flowered specimens collected in recent years in Nepal and Bhutan. As already remarked, Prain erroneously associated the yellow-flowered plant obtained by his collector at Hewalungi with *G. sikkimense* and in the absence of any note on the colour of the flowers in King's specimens he may well have assumed that they were likewise yellow. The greater length of the pedicels in *G. versipatella* appears unimportant. Ten sheets of this plant in the British Museum (Natural History) with white or pinkish-white flowers have pedicels varying in length from 1 cm to 8 cm. As regards the stamens Marquand states that in *G. versipatella* the filaments are 'up to 4 mm long'. In the ten gatherings mentioned the filaments are 3–4 mm long, the older plants tending to have longer filaments. Prain gives no filament measurement for *G. sikkimense*. Actually in the type material the filaments are just over 3 mm long, though the illustration by the Indian artist shows them to be over 4 mm long. It can hardly be said, therefore, that the filaments in *G. versipatella* are appreciably longer than they are in *G. sikkimense*. Prain gives 40–50 as the total number of stamens in *G. sikkimense*. Marquand states that the stamens in *G. versipatella* are 'very numerous (exceeding 50)'. The number of stamens in *Dhwoj 216*, which Marquand cites as being equivalent to *G. versipatella*, is over 100, and in the ten gatherings with white or pinkish-white flowers in the British Museum (Natural History) the number varies from 80 to 115, often over 100. Prain almost certainly under-estimated the number of stamens in King's gathering of *G. sikkimense*, for in one of the flowers on the type sheet it is possible to count over 50 filaments, and others would undoubtedly come into view if dissection were made. Since dissection would injure the type, a gathering, *Ludlow & Sherriff 3194*, from Bhutan was chosen as being an almost

exact replica of King's type and here the number of stamens on dissection was found to be over 100.

There remains the poise of the flower. Marquand states, and his illustration shows, that the flowers in *G. versipatella* face downwards. Prain states that the flowers in *G. sikkimense* are erect. In the field notes accompanying the ten white-flowered gatherings in the British Museum (Natural History) there is no mention of nodding flowers, and as far as it is possible to judge from dried material most appear to have been erect. But plants with long pedicels collected in the autumn *do* appear to have had flowers which faced downwards. Moreover, the photograph of *G. sikkimense* in Hara & others, *Spring Flora of Sikkim Himalaya*, fig. 94 (1963) shows an almost nodding flower.

In short, all the evidence indicates that *G. versipatella* Marquand is conspecific with *G. sikkimense* Prain.

3. ***Geum elatum*** Wall. ex G. Don, Gen. Syst. Gard. Bot. 2 : 526 (1832). – Hook. f., Fl. Brit. Ind. 2 : 343 (1878).

Geum elatum Wall., Numer. List : 21, no. 711 (1829) ; nomen nudum.
Sieversia elata Royle, Illustr. Bot. Himal. : t. 39 f. 1 (Sept. 1834), p. 207 (April 1835).
Acomastylis elata (Wall.) F. Bolle in Beih. Repert. nov. Spec. Regni, veg. 72 : 83 (1933).

In a 'Note on the varieties of *Geum elatum*, Wallich' (*Notes R. bot. Gdn Edinb.* **14** : 27–30 ; 1923), W. E. Evans pointed out that the specimens listed under the number Wall. Cat. 711, consist of two distinct gatherings, one by Robert Blinkworth from Kumaun and the other by Dr Govan from Sirmore, and that the achenes in these two gatherings are either hispid or almost glabrous. He suggested that it was likely that all specimens from one of these localities (it was impossible to say which) had either hispid or glabrous achenes, and he proposed epithets (1) var. *typicum* and (2) var. *leiocarpum* for these variants respectively. Royle figured the achene as hispid and stated that it had a 'hairy achenium'. Examination of the abundant material of *G. elatum* in the herbarium of the British Museum (Natural History) does not support Evans' view. On nine occasions both hispid and glabrous achenes have been found in plants of the same gathering, though not on the same plant. Had this happened once, or even twice, it would have been reasonable to conclude that the gatherings had become mixed, but it is impossible to believe that this could have happened on nine different occasions. The hispid or glabrous nature of the achenes in *G. elatum* is not therefore important enough to warrant varietal distinction. Moreover there are intermediate stages. In some instances the achenes are neither hispid nor completely glabrous but show a limited amount of hairiness at the apex. Evans' plate CXCV illustrating *G. elatum* var. *typicum* W. E. Evans is from a duplicate of Blinkworth's gathering in the Hooker Herbarium at Kew. In the Wallich Herbarium at Kew there are two Blinkworth sheets from Kumaun and two Govan sheets from Sirmore. In all four sheets the achenes, as far as can be seen, are hispid, and this state seems to be far commoner than the glabrous state. Royle's private herbarium is at Liverpool (cf. Stansfield in *Liverpool Bull.* **3** : 5–38 ; 1954), and

through the courtesy of Mr H. Stansfield, Keeper of Botany, City Museum, Liverpool, I have been able to examine the *Geum* material which Royle collected. There are four gatherings in all, and one of these, no. 64/30 from Kedarkanta, in all probability formed the basis of his description of *Sieversia elata*. Royle originally gave this plant the manuscript name of *Geum grandiflorum* and this name is also written in Urdu on the back of his label. Later, probably after he had compared his own gathering with material in the Wallich Herbarium, he added in pencil '*G. elatum* Wall. 711'. All the achenes in Royle's gatherings are hairy, thus agreeing with his description and illustration.

G. elatum var. ***humile*** (Royle) Hook. f., Fl. Brit. Ind. 2 : 343 (1878). – W. E. Evans in Notes R. bot. Gdn Edinb. 14 : 28, t. 196 (1923)

Geum adnatum Wall., Numer. List. : 21, no. 712 (1829) ; nomen nudum.
Sieversia elata var. *humilis* Royle, Illustr. Bot. Himal. : 207 (1835).
Potentilla adnata Wall. ex Lehm., Nov. Minus Cogn. Stirp. Pug. 9 : 9 (1851).–Lehm., Revis. Potentill. : 47, t. 17 (1856), reimpr. ex Nova Acta Acad. Caes. Leop. Carol. 23, Suppl. (1856).
Acomastylis elata var. *humilis* (Royle) F. Bolle in Beih. Repert. nov. Spec. Regni veg. 72 : 84 (1933).

In Royle's herbarium at Liverpool there is a gathering of a *Sieversia*, no. 64/31, collected at Shalma in the Tons Valley north of Mussoorie. Unfortunately it is in a somewhat imperfect state. Originally there was a single flower head but this has been broken off, and the flowering stem has become detached from the parent plant. Nevertheless it is highly probable that this specimen is the true type of Royle's *Sieversia elata* var. *humilis*. The label in Royle's handwriting shows that, at first, he identified this plant with *Geum montanum* and that name appears also in Urdu on the back of the label. Subsequently he scored out the epithet *montanum* and replaced it by *auriculatum*. Finally he wrote on the label the words 'An sieversiana' in pencil. On the left-hand side of the label is a mysterious pencil sketch of an achene with a looped style, which is certainly not that of *Sieversia* but resembles that of *Geum urbanum* L. There are two gatherings of '*G. urbanum*' (i.e. *G. roylei*) in Royle's herbarium, no. 64/29 from Choor, Nagkunda and no. 64/32 from Kashmir, but both these gatherings have their own correct labels written by Royle himself. Whatever the explanation of this pencilled drawing may be, there can be no doubt that this Shalma gathering is *Sieversia elata* in respect of its leaves and stem, and accords with his description of var. *humilis* 'caule unifloro, foliisque minoribus'.

At Kew, in the Hooker Herbarium, there is a sheet of *Sieversia elata* Royle on which, in addition to the typical plant, there has been mounted a specimen of var. *humilis* (though not named as such) with a flowering stem bearing a single open flower, and two undeveloped buds. The stem in this specimen, as in that of the Shalma plant, is longer than the leaves. Unfortunately the flower has been mounted face downwards so that it is impossible to say whether the achenes are hispid or glabrous. *G. adnatum* Wall. Cat. 712 from Gossain Than, Nepal, appears to have had hispid achenes in the one flower where they are visible. There are also specimens of *G. adnatum* in the Bentham Herbarium where the achenes are glabrous, and in the

Hooker Herbarium where they are not visible. Neither of these sheets is marked as a duplicate of *Wall.* 712, though probably both are of the same collecting. In Hooker's own gathering of *G. elatum* var. *humile* at Yumthan in upper Sikkim, and in Norton's sheet from Karma near Everest, the achenes are hispid. In the British Museum (Natural History), Herbarium, on a sheet from Sikkim collected by King, the achenes are again hispid, but on a sheet from Nepal collected by Bailey they are glabrous. The flowering stems are sometimes no longer than the radical leaves but more often they are longer, and though the flowers are generally solitary, stems bearing 2–3 flowers may occur. Altogether var. *humile* seems little more than a dwarf alpine state of *G. elatum*.

G. elatum forma ***rubrum*** Ludlow, forma nov. (Plate 30B.)

A typo (forma *elato*) petalis filamentisque rubris differt.

KASHMIR: Bangas, Kaj Nag Range, *Miss Carmichael* s.n. (Herb. Kew).

NEPAL: Babaria Lekh, 3650 m, 29 May 1952, 'open moorland, flowers bright red', *Polunin, Sykes & Williams 2115*. Hills south of Jumla, 3500 m, 2 July 1952, 'petals bright red, filaments red', *Polunin, Sykes & Williams 4419* (holotype in Herb. Brit. Mus.). Maharigaon, 4400 m, 13 July 1952, 'growing abundantly on grassy slopes, flowers bright red', *Polunin, Sykes & Williams 141*. Sirtibang Lekh, 3500 m, 11 July 1954, *Stainton, Sykes & Williams 3454*. Sirtibang Lekh, 3500 m, 14 October 1954, 'seed and live roots collected', *Stainton, Sykes & Williams 9020*.

This is a particularly handsome colour form of *Geum elatum*. According to the collectors, it grows abundantly on grassy slopes and open moorland above tree level between 3500 and 4250 m, and does not appear to be mixed with the typical yellow-flowered plant in its natural state. It is now in cultivation in Britain having been introduced from Nepal in 1954 under S.S.W. 9020. Although in the wild state the flowers are said by the collectors to be either deep red or scarlet and not to exhibit intermediate colour phases, this is not so in cultivation where deep orange or apricot flowers frequently occur.

J. R. Sealy and W. T. Stearn have greatly helped me in the preparation of these notes.

HAPLOSPHAERA (UMBELLIFERAE)

Haplosphaera himalayensis Ludlow, sp. nov. (Plate 31, Text-fig. 3.)

Herba perennis, erecta. *Radix* descendens, parce ramosa, circiter 50 cm longa, collum versus 1–1·5 cm crassa, ad apicem folia marcida anni praecedentis gerens. *Caulis* erectus, sulcatus, fistulosus, usque ad 120 cm altus, basi 0·75–1 cm crassus. *Folia basalia* numerosa; petiolus laminam aequans vel ea parum brevior, 10–15 cm longus, basi longe vaginatus et leviter inflatus; lamina ambitu ovato-triangularis tri-pinnata, 12–15 cm longa et 13–15 cm lata, in sicco firma; pinnae 3–6 ad apicem laminae versus vix decrescentes, imae 3–4-jugo-pinnulatae petiolis usque ad 1·5 cm longis instructae, ceterae pinnatisectae, sessiles, ambitu triangulares vel anguste

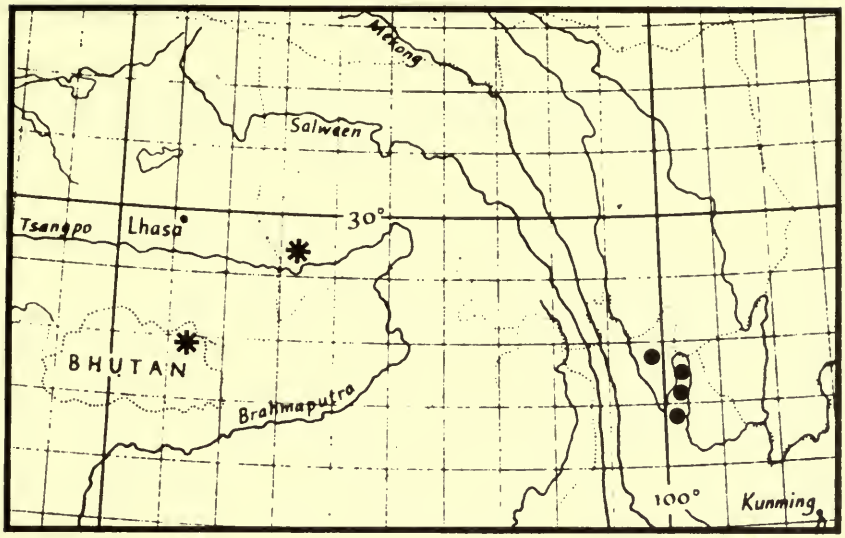

FIG. 3. Distribution of the genus *Haplosphaera*: *, *H. himalayensis* Ludlow; ●, *H. phaea* Hand.-Mazz.

ovato-triangulares vel lanceolatae; pinnulae 3–4, imae breviter petiolatae ceterae sessiles, profunde pinnatisectae, lobis mucronatis, acute dentatis; *folia superiora* et fulcrantia (si obvia) basalia subconformia sed gradatim breviora, superiora sessilia. *Umbellae* 2–6, globosae vel subglobosae, 1·5–2·5 cm diametro, in statu immaturo ut videtur simplices in statu maturo compositae; pedunculi 5–10 cm longi; involucri bracteae nullae; *umbellulae* 6–18-florae, pedicellis crassis, 2–3 mm longis; involucelli bracteae 4–8, aciculatae, circiter 6 mm longae. *Sepala* inconspicua, triangulata. *Petala* late ovata, cucullata, obscure brunnea, apice acuta, circiter 1·5 mm longa et 1–1·25 mm lata. *Staminum* filamenta grisea, circiter 1 mm longa; anterae virides, 0·75 mm longae. *Fructus* in statu immaturo 3 mm longus et 1·5 mm latus, latere visus obovatus; mericarpia pentagona, 5-juga.

BHUTAN: Shingbe (Me La), 3900 m, 'flowers greenish brown, on open hillside; whole plant very aromatic when crushed', 24 August 1949, *Ludlow, Sherriff & Hicks 21102*.

S.E. TIBET: Mira La, Nyang Chu, 3900 m 'up to 4 ft; stony situations in clearings in abies forest; ovary dark green, petals dull brown' 17 August 1938, *Ludlow, Sherriff & Taylor 6087* (holotype in Herb. Brit. Mus.).

This new species is placed in the genus *Haplosphaera* with some hesitation. When Handel-Mazzettii published this genus in 1921 for his Chinese plant *H. phaea*, he drew particular attention to the fact that it possessed simple umbels. Although at first glance the umbels of *H. himalayensis* appear to be simple, their compound nature becomes apparent as they mature. However, in the all-important characters of fruit and reproductive organs the two species are similar, whilst in general appearance, despite differences in foliage, they are obviously closely related. For the time

being, therefore, it seems best to include this new Himalayan species in the genus *Haplosphaera*.

The brown petals make this plant easily recognizable among Himalayan Umbelliferae ; they contrast with the greenish-white filaments and dull green anthers. The fruit is olive green ; each mericarp is pentagonal, with the dorsal costa prominent.

CREMANTHODIUM (COMPOSITAE)

Cremanthodium bhutanicum Ludlow, sp. nov. (Plate 32A.)

Species *C. lineari* Maxim. affinis sed minor, ligulis apice obtusis tridentatis, non longe acutis.

Herba perennis, caulibus solitariis 8–25 cm altis, 1–2 mm diametro, striatis, superne arachnoideis ceterum glabris ; *caudex* petiolis angustis fibrosis erectis marcidis involucratus. *Folia* basalia 6–10, petiolata ; lamina linearis vel oblanceolato-linearis, 2–10 cm longa et 2–9 mm lata, glabra, integra, apice obtusa vel rotunda, basi angustissime cuneata, marginibus reflexis, supra pallide viridis subter glauca ; petiolus 1–5 cm longus, plus-minusve alatus, basi fibris brunneis numerosis circumdatus ; folia caulina 4–9, sessilia, linearia, apicem versus abrupte decrescentia, inferiora 2–3 cm, superiora 1–1·5 cm longa. *Capitula* in apice caulis solitaria, nutania, 2·5–3·5 cm diametro. *Involucri* squamae anguste lanceolatae ad lanceolatae, acutae, glabrae, laete vel obscure virides, saepe marginibus pallidis, 8–12 mm longae et 1·5–3 mm latae, venatione intus distincto extus obsoleto. *Bracteolae* 1 vel numerosae, graciles, basi capituli instructae. *Flores* radii feminei plerumque 12–13, omnes fertiles, tubo 1·5–2 mm longo ; ligula 1·25–2 cm longa et 2·5–5 mm lata, apice obtusa rare subacuta tridentata 4–7-nervia ; flores disci numerosi (30–40), hermaphroditi, omnes fertiles ; corolla 6–6·5 mm longa basi angustata, lobis acutis 0·75–1 mm longis. *Antherae* brunneae 2·5–3 mm longae. *Ovarium* glabrum ; stigmatis lobi fusci papillosi ; pappi squamae albae corollam superantes. *Achenia* fusca, glabra, ambitu oblonga vel anguste oblonga, 2–2·5 mm longa et 0·5–0·75 mm lata.

BHUTAN : Thampe la (27° 40′ N, 90° 16′ E), 4570 m, 'involucre olive green, ray florets pale yellow', 22 August 1949, *Ludlow, Sherriff & Hicks 17177* (holotype in Herb. Brit. Mus.). Worthang la (27° 57′ N, 90° 12′ E), 4250 m, 19 September 1949, *Ludlow, Sherriff & Hicks 17313*. Ju La, Mangde Chu Valley (27° 47′ N, 90° 34′ E), 440 m, 19 July 1949, *Ludlow, Sherriff & Hicks 16901*. Marlung, Tsampa (27° 56′ N, 90° 38′ E), 4570 m, 14 July 1949, *Ludlow, Sherriff & Hicks 19427*. Waitang, Tsampa (27° 57′ N, 90° 45′ E), 4700 m, 22 June 1949, *Ludlow, Sherriff & Hicks 19219*. Narim Thang (27° 57′ N, 91° 13′E), 4250 m, 26 July 1949, *Ludlow, Sherriff & Hicks 21355*. Narim Thang, Kang La, 4250 m, 18 August 1933, *Ludlow & Sherriff 471*. Narim Thang, Kurted, 4575 m, 1 August 1915, *R. E. Cooper 4279*. Singhi, Kurted, 4575 m, September 1915, *R. E. Cooper 4976*. Shingbe, Me La (27° 55′ N, 91° 33′ E), 4250 m, 13 June 1949, *Ludlow, Sherriff & Hicks 20728*. Shingbe, 4100 m, 2 September 1949, *Ludlow, Sherriff & Hicks 21141*.

Assam: Ze La (27° 31′ N, 92° 07′ E) 4575 m, 20 August 1938, *Kingdon-Ward 14123*.

The only *Cremanthodium* with linear leaves with which this new species might be confused is *C. lineare* Maxim. collected by Przewalski in Kansu in 1880. The shape and length of the ray florets readily serve to distinguish them. In *C. bhutanicum* the ray florets are from 1·25 to 2 cm long, with blunt, seldom subacute tips which are normally tridentate; in *C. lineare* the florets are from 2 to 3·5 cm long with long acute tips which are normally entire and only rarely notched.

In addition the Chinese plant is much the longer of the two with flowering stems up to 40 cm long bearing 9–14 cauline leaves, and with 12–14 radical leaves devoid of well-marked petioles. Moreover, in the abundant material of *C. bhutanicum* which is available the flowering stem is always solitary whereas in *C. lineare* there are frequently two stems on the same rootstock. So far as is known at present *C. bhutanicum* is confined to central and eastern Bhutan and extreme western Assam. It has not been recorded from Sikkim or south-eastern Tibet.

Cremanthodium campanulatum (Franch.) Diels in Notes R. bot. Gdn Edinb. 5 : 190 (1912).

Var. ***pinnatisectum*** Ludlow, var. nov. (Plate 32B.)

A typo (var. *campanulato*) foliis pinnatisectis distinguitur.

Burma–Tibet Frontier: Adung Valley (28° 20′ N, 97° 40′ E), 3950 m, 'scattered among low scrub on steep apline grass slopes. Flowers purple nodding. Involucral bracts deep purple covered with long bristly hairs. Ray florets 0. Leaves much divided with scattered hairs along the veins beneath. Flowers closely resemble those of 9861 but are much smaller. Leaves quite different', 27 July 1931, *Kingdon-Ward 9874* (holotype in Herb. Brit. Mus.). Adung Valley, 3960 m, 'two plants with sulphur yellow flowers otherwise like 9874; found on steep alpine turf slope amongst the very abundant no. (?)', 12 August 1931, *Kingdon-Ward 9930*.

The pinnatisect radical and cauline leaves of the above two gatherings contrast markedly with the reniform leaves of *C. campanulatum* but apart from this difference in leaf shape I can find no other character which is dissimilar. Since *C. campanulatum* itself varies considerably in size and colour it seems better to accord only varietal rank to these two gatherings from the Upper Irrawaddy.

SAUSSUREA (COMPOSITAE)

Saussurea neglecta Ludlow, sp. nov. (Plate 33A; Text-fig. 4.)

Species affinis *S. deltiodeae* C. B. Clarke et *S. hypoleucae* Spreng. ex DC.; ab ambabus statura humiliore usque ad 30 cm alta, foliis basi caulis aggregatis pagina superiore lanata vix scabrida discrepat.

Herba perennis, usque ad 30 cm alta, rhizomate lignoso conico crasso valido. *Caules* floriferi erecti 1–4 distincte striati lanuginosi in vivo rosei. *Folia basalia*

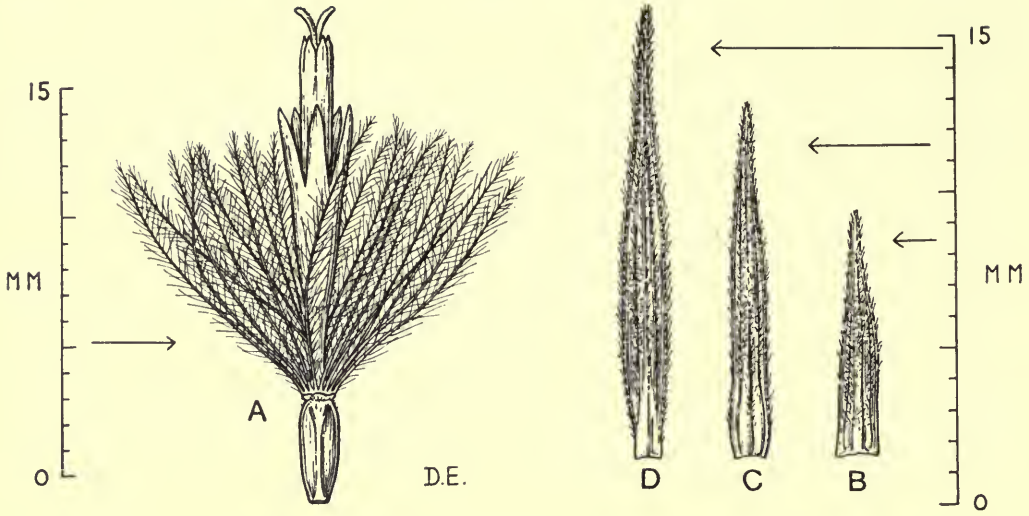

FIG. 4. *Saussurea neglecta* Ludlow ; A, floret ; B–D, involucral scales, B, outer, C, medium, D, inner (all from *Lowndes 1189*, holotype).

12–18 cm longa (petiolo incluso) 1·5–4 cm lata, lyrato-pinnatifida ambitu obovato-oblonga vel lanceolato-oblonga, supra lanuginoso-floccosa subtus dense albo-tomentosa, lobis lateralibus irregulariter sinuato-denticulatis, lobo terminale plerumque deltoideo ampliatoque, venatione indistincto ; *folia caulina* in parte inferiore caulis conferta, basalibus similia, in parte superiore dispersa et valde minora. *Capitula* nutantia, 2–3 cm diametro, in apicibus ramorum disposita, saepe cum 2–4 capitulis minoribus axillaribus. *Involucri phylla* 4–5-seriata, anguste lanceolata ad linearia, acuminata ; exteriora 6–8 mm longa, 0·75 mm lata, intus glabra et lucida, extus atro-pilosa et arachnoidea ; intermedia 8–11 mm longa et basi 1–1·25 mm lata ; interiora plerumque linearia, 12–13 mm longa, basi plus-minusve 1 mm lata, margine ciliata, apice fasciculo pilorum instructa. *Receptaculi* setae albae, aciculares, plusminusve 5 mm longae. *Flosculi* numerosi albi ad eburnei, *c.* 1 cm longi, corollae tubo quam limbo breviore. *Staminum* antherae 4–4·5 mm longae, caudis subulatis 2·5 mm longis instructis ; filamenta 0·8 mm longa. *Cypselae* (*achaenia*) obscure brunnea anguste oblonga, glabra, angulata, usque ad 3·5 mm longa, 1–5 mm lata. *Pappus* uniseriatus, albus, ad 1 cm longus, plumosus.

GARWHAL : Niti (30° 46′ N, 79° 52′ E), 3500 m, *Strachey & Winterbottom 9*. *Falconer* s.n. (K).

KUMAUN : Kutti Yangti Valley, Byans, 3000–3600 m, 30 July 1886, *Duthie 5712*. Parbhu Gori Valley, 3500 m, 14 August 1900, *Duthie 24539* (K).

NEPAL : Marsiandi Valley, 3500 m, 'river shingles, flowers white, turning buff, stems pinkish, leaves grey-green, silver on reverse', 13 July 1950, *Lowndes 1189* (holotype in Herb. Brit. Mus.). Tarap Valley, 4100 m, 'marginal flowers pinkish purple, central flowers woolly white', 17 July 1966, *Shrestha 5411*. Dolpo, Tarap,

4100 m, 'on stony slopes ; flowers mauve, underside of leaf white', 18 July 1966, *Stainton 5554*.

This plant with nodding capitula and lyrate-pinnatifid leaves is allied to *S. deltoidea* C. B. Clarke – with which it has sometimes been confused – and *S. hypoleuca* Spreng. ex DC., but it is much smaller than either of these species, and does not exceed 30 cm in height. It may readily be distinguished from both by the cottony, not scabrid, nature of the upper surface of its leaves and by the flowering stems which spring from a rosette of basal leaves. It also resembles small scapose forms of *S. candicans* C. B. Clarke but the nodding capitula, tufted inner involucral segments and smooth achenes serve to distinguish it from that species.

The type-specimen (*Lowndes 1189*) was collected in Central Nepal at the extreme east (approx. 28° 35′ N 84° 12′ E,) of the known range of the species. The epithet *neglecta* refers to the first specimens having been collected more than a hundred years ago by Falconer, Strachey and Winterbottom.

SENECIO (COMPOSITAE)

Senecio kongboensis Ludlow, sp. nov. (Plate 33B ; Text-fig. 5.)

Herba perennis pumila 2–5 cm alta, caulibus e rhizomate fibroso erectis ramosis arachnoideis. *Folia* congesta, infima breve petiolata ad 1 cm longa, alata, reliqua sessilia ; lamina lanceolata vel lineari-lanceolata, usque ad 3 cm longa, 0·6 cm lata, supra glabra vel glanduloso-pilosa, subtus albo-arachnoidea, marginibus reflexis irregulariter denticulatis, nerviis secundariis non prominulis percursa. *Capitula* breve pedunculata vel subsessilia aliquot (5–25) in inflorescentia dense corymbiformi 2–4 cm lata disposita. *Involucri* squamae 12–13 lineares vel lineari-lanceolatae 6–7 mm longae, 0·5–1 mm latae glabrae acutae apice marginibusque obscure purpureae ceterum virides. *Bracteae* 5–6 aciculatae 4–5 mm longae. *Flores radii*

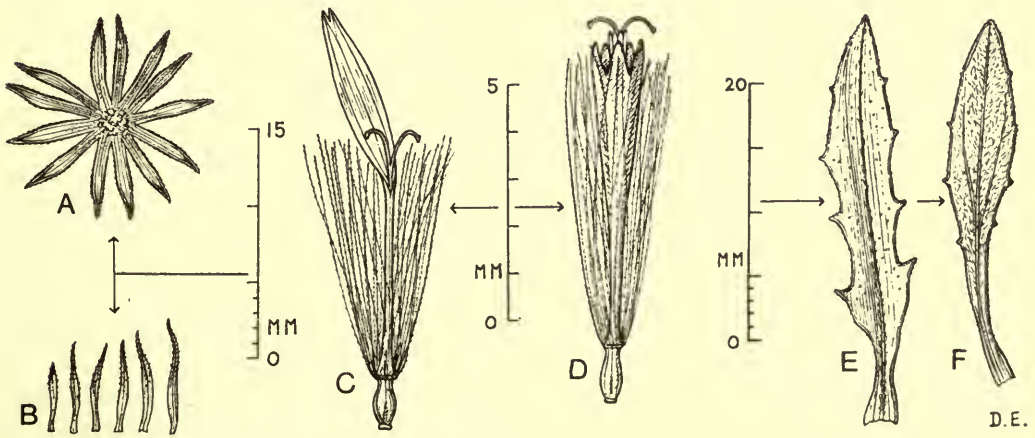

FIG. 5. *Senecio kongboensis* Ludlow ; A, involucre ; B, bracts ; C, ray floret ; D, disc floret ; E, F, basal leaves (all from *L S & E 14432*, holotype).

feminei ligulati plerumque 6–10 lutei, tubo gracilimo 3–4 mm longo, limbo plus-minusve 3 mm longo 0·5 mm lato, 1–2 (raro 3) nerves ; pappi setae gracilimae minute scabridae 5 mm longae. *Flores disci* 12–25 hermaphroditi omnes fertiles, tubo corollae cylindrico 5 mm longo, basi 0·25 mm lato, apicem versus 1 mm diametro, lobis usque ad 0·75 mm longis nigrescentibus. *Stamina* 5 ; antherae *c.* 1·5 mm longae, 0·15 mm latae ; filamenta gracilima 3 mm longa. *Cypselae* (*achaenia*) glabrae in statu immaturo 1·5 mm longae 0·75 latae.

S.E. Tibet : Budi Tsepo La (29° 27′ N, 94° 57′ E), 4000 m, 22 August 1947, 'involucre green tipped darker at apex, florets yellow, in wet scree', *Ludlow, Sherriff & Elliot 14432* (holotype in Herb. Brit. Mus.).

This dwarf species is closely related to *S. bracteolatus* Hook. f. and *S. thianschanicus* Regel & Schmalh. Its small capitula, however, are most nearly matched by those of *S. kawaguchii* Kitamura (in *Acta phytotax. geobot. Kyoto* **15** : 75 (1953)), of which *S. drummondii* Babu & S.N. Biswas in *J. Jap. Bot.* **46** : 23, fig. 1 (1971) is a synonym ; both were based on specimens collected near Lhasa. It differs from all these species in the very short 1–3 veined ligules of the ray florets and the black-tipped corolla lobes of the disc florets, and more especially by its dwarf stature and congested foliage and inflorescence.

DIAPENSIA (DIAPENSIACEAE)

Diapensia wardii W. E. Evans in Notes R. bot. Gdn Edinb. 15 : 233 (1927). (Plate 34B ; Text-fig. 6D–F.)

Diapensia wardii W. E. Evans was described from a fruiting gathering obtained by Kingdon-Ward on the Doshong La, south-eastern Tibet, in October 1924. In his 'A revision of the genus Diapensia' Evans (loc. cit.) remarked : 'Though the flowers are at present unknown, it may be predicted with confidence that, when found, they will prove to be practically sessile and to possess, normally, simple staminodes, as in the case of *D. himalaica*, Hook. f. et Thoms. and *D. purpurea*, Diels, the only other members of the genus inhabiting the same geographical area. The peduncles, it may be safely assumed, do not elongate until after fertilization of the flowers has taken place. They do not seem to differ, either in this respect or in their colour, from what is usual throughout the Section *Himalaicae*.'

This prediction has proved incorrect. Flowering plants obtained in south-eastern Tibet by Ludlow and Sherriff in 1936, and by Ludlow, Sherriff and Taylor, from the type locality, in 1938, and by Kingdon-Ward in Assam, also in 1938, have peduncles just as well developed as they are in *D. lapponica* L. In the field notes accompanying Kingdon-Ward's gathering from Assam, the flowers are said to be 'nodding on inch long stalks'. In *Ludlow & Sherriff 2346* (Plate 34B) the flowers are also nodding though the collectors do not mention this in their notes.

The stamens and staminodes in *D. wardii* are very distinctive (Fig. 6D–F). The loculi of the anthers, it will be observed, are divaricate and are placed end to end, almost in a straight line. In *D. himalaica* (Plate 34A ; Fig. 6A–C) they are merely divergent, and in *D. purpurea* they may be divergent or parallel (l.c. 217, Fig. 1).

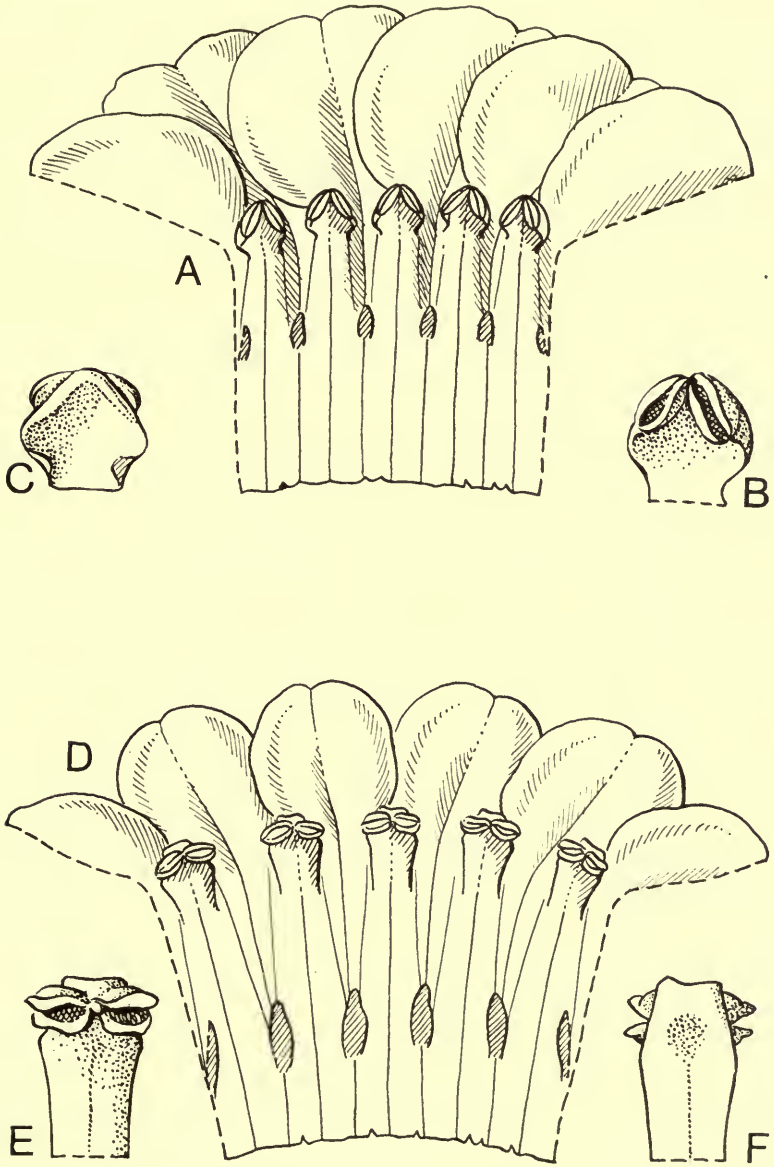

FIG. 6. *Diapensia himalaica* Hook. f. & Thoms. ; A, corolla opened out, ×4½ ; B, stamen, anterior view ; C, stamen, posterior view (all from *L S & T 4754*), ×4½. *D. wardii* W. E. Evans ; D, corolla opened out, ×4½ ; E, stamen, anterior view, ×9 ; F, stamen, posterior view, ×9 (all from *L S & T 5227*).

The staminodes in *D. wardii* are well developed, and are attached below the middle of the corolla tube and not above it as in *D. himalaica* and *D. purpurea*. In a fruiting gathering, *Ludlow, Sherriff & Taylor 6246*, made on 15 October 1938, the peduncles vary in length from 8 to 12 cm, measurements considerably in excess of those previously recorded.

Evans divided the four known species of the genus into two groups or sections based on their structural and distributional peculiarities as follows :—

'Sectio 1. *Lapponicae*. Flores sub anthesi normaliter pedunculis 1–1·5 cm longis suffulti ; staminodia nulla. Species unica (*D. lapponica* Linn.) Americae borealis, Europae borealis, Asiae borealis et Ins. Japoniae incola.

Sectio 2. *Himalaica*. Flores sub anthesi subsessiles, pedunculi tantum fructu maturescente elongantes ; staminodia normaliter 5 parva simplicia corollae tubum medium versus affixa, in speciminibus nonnullis numero reducta vel 0. Species tres, montibus sino-himalaicis circumscripti.'

In Section 1, he placed the circumpolar species *D. lapponica* L. ; the three remaining species, *D. himalaica* Hook. f. & Thoms., *D. purpurea* Diels and *D. wardii* W. E. Evans, he placed in Section 2, assuming that the flowers of the last-named species when found would be practically sessile. The flowers of *D. wardii*, however, have proved to be pedunculate at the time of flowering and hence the species should be included in section *Lapponicae*. But *D. wardii* also possesses staminodes, a character that places it in section *Himalaicae*. It thus has characters justifying its inclusion in both sections. In these circumstances, since the genus consists of only four known species, it seems unnecessary to divide this into sections. Evans's key to the species, which separates *D. wardii* from the others by its larger leaves, is, however, not affected by this. Since no account of the floral organs of *D. wardii* has so far been published, a description of these is herewith appended together with a list of gatherings made subsequent to the original discovery of the species in 1924 :

Flowers solitary, nodding, on crimson peduncles 1–3 cm long, 1 mm wide, at the time of flowering. *Bracts* 2 or 3, 5–6 mm long, 2–2·5 mm wide. *Calyx* 5-partite ; sepals glabrous, crimson, obovate or narrowly obovate, obtuse, 5–6 mm long, 2·5–3·5 mm wide. *Corolla* rich rose or wine red ; lobes 5, orbicular or rounded, 6–7 mm long, 5–6 mm wide ; tube 7·5–9 mm long, 4–5 mm in diameter. *Stamens* alternating with corolla lobes, inserted at throat of corolla tube ; filaments 1·75–2·25 mm long, 1·25–1·40 mm wide ; anthers divaricate ; staminodes 5, conical, 2 mm long, 0·5–0·75 mm wide, alternating with stamens, attached below middle of corolla tube. *Ovary* globose, glabrous ; style crimson, filiform 5–8 mm long, 0·5 mm wide, reaching the throat, occasionally extruded ; stigma faintly tri-lobed. *Capsule* globular, 2·5–3 mm long, 2·5–3 mm wide, trilocular ; seeds minute, numerous.

Assam : Poshing La (27° 32′ N, 92° 25′ E), 3500 m, 'A creeping plant forming mats, but not cushions like *D. himalaica*, on mossy rocks. Flowers rose pink, nodding on inch-long stalks, reaching 2 inches in fruit', 20 July 1938, *Kingdon-Ward 13950*.

S.E. Tibet : Karutura, Chayul Chu (28° 20′ N, 93° 02′ E), 4000 m, 'Corolla very bright wine red, filaments the same, anthers greenish, style bright rose, stigma green. In clumps growing under rhododendrons besides rocks in moss', 12 July 1936, *Ludlow & Sherriff 2346*. Bimbi La, Tsari District (28° 44′ N, 93° 10′ E), 3600 m, 'On steep scree', 15 October 1938, *Ludlow, Sherriff & Taylor 6346*. Doshong La (29° 29′ N, 94° 59′ E), 4100 m, 'Grows through moss in swamp either in open or under dwarf rhododendrons, corolla rich rose-pink (also broad flattened filaments), anthers, separated at apex of filaments, dull yellow. Peduncles and calyces light crimson', 13 July 1938, *Ludlow, Sherriff & Taylor 5227, 5227a*.

ANDROSACE (PRIMULACEAE)

Androsace nortonii Ludlow, sp. nov. (Plate 35 ; Text-fig. 7.)

Planta ex affinitate *A. limprichtii* Pax et Hoffm. a qua habitu minore, scapis pedicellisque pergracilibus, planta tota pilis albidis obtectis recedit.

Herba perennis caespitosa stolonifera, stolonibus glabrescentibus internodiis 0·5–2·5 cm longis cortice brunneo obtectis. *Folia* rosulata trimorpha sericeovillosa, pilis albidis usque ad 2·5 mm longis ; *folia externa* anguste elliptica, plusminusve 5 mm longa, 1·5 mm lata, brunnea ; *folia intermedia* lingulata ad lingulato-spathulata, 4–7·5 mm longa 0·75–2 mm lata, viridia, basi hyalina, apice obtusa ; *folia interna* petiolata ; lamina elliptica, 3·5–6 mm longa, 2–3 mm lata, viridis, apice obtusa ; petiolus 3·5–6 mm longus. *Scapus* 2–6 cm longus, 0·3–0·5 mm diametro, gracilimus. *Flores* in umbellis 2–6-floris terminalibus dispositi ; pedicelli 2–9 mm longi, filiformes pilosi. *Bracteae* lineares, 2–3·5 mm longae, villosae. *Calyx* cupularis, plusminusve 3 mm longus, dense pilosus, 5-lobatus, ad medium fissus, lobis anguste ovatis, trinerviis, apicem versus purpureis. *Corolla* rosea, 7–9 mm diametro, tubo 2·5–2·75 mm longo, 1·5 mm diametro, limbo profunde fisso, lobis late obovatis. *Stamina* tubo corollae inserta et in hoc inclusa ; antherae oblongae, 0·5 mm longae ; filamenta 0·3–0·4 mm longa. *Ovarium* plusminusve 1 mm longum, 1·4 mm diametro ; stylus usque ad 0·75 mm longus. *Capsula* ignota.

Nepal : Chhairogaon, north of Tukucha, 3500 m, 'on open hillside ; flowers pink', 31 May 1954, *Stainton, Sykes & Williams 832*. Thinigaon, Muktinath Himal, 4500 m, 'open stony slopes, flowers pink, leaves hairy', 23 June 1954, *Stainton, Sykes & Williams 1362* (holotype in Herb. Brit. Mus.). Jargeng Khola, 4250 m, 'flowers rose-pink, darker eye, sparingly on glacial flats on turf, and on open hillsides, often in shelter of dwarf shrubs', 21 June 1950, *Lowndes 1030*. Jargeng Khola, 4500 m, 'in coarse turf on open hillside ; leaves and rosettes silvery', 6 July 1950, *Lowndes 1140*. Shiar Khola, 4000 m, 28 May 1953, *Gardner 622*. Khola Kharka, 4100 m, 17 July 1949, *Polunin 1078*. Arun Valley, Barun Khola, north of Num, 4000 m, 12 June 1956, *Stainton 636*.

Tibet : Chog La, Karma Valley, 4500 m, Mt Everest Exped. 1922, 'stony soil', *Norton 247*.

A fragment of this attractive little plant was collected by Major E. F. Norton in the Karma Valley during the Mt Everest Expedition of 1922. When Handel-Mazzetti

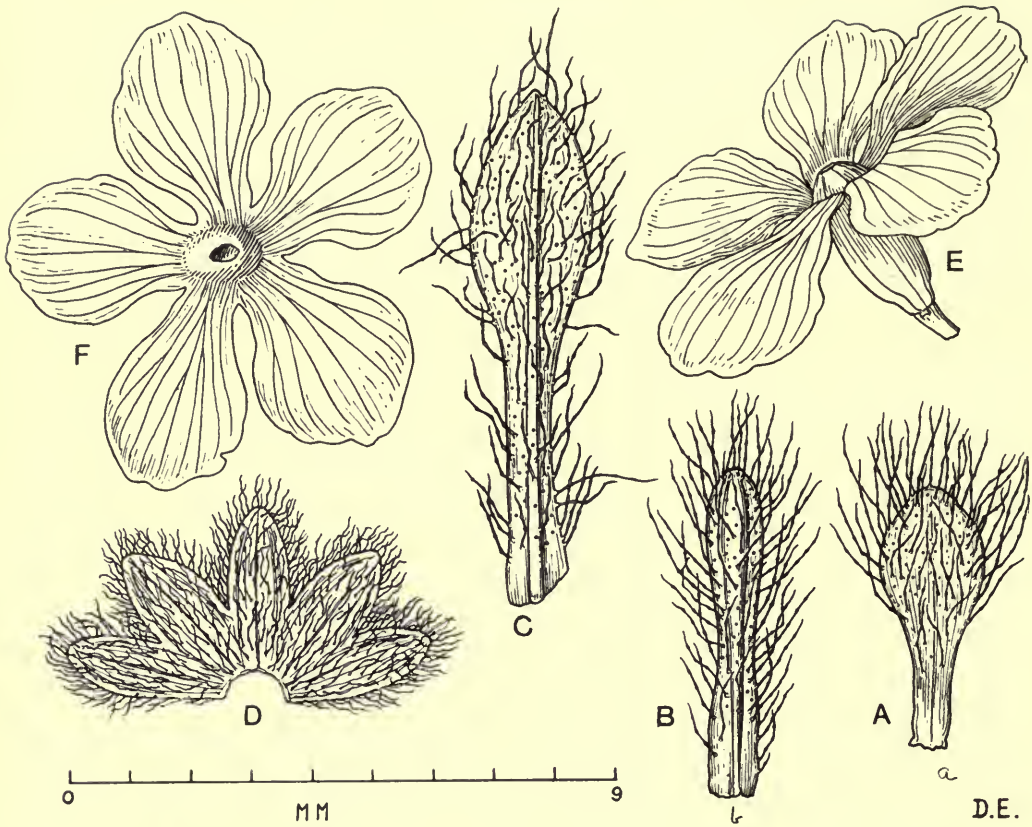

FIG. 7. *Androsace nortonii* Ludlow; A, outer leaf; B, median leaf; C, inner leaf; D, calyx opened out; E, corolla, side view; F, corolla from above (all from *S S & W 1362*, holotype).

examined it in 1927 he placed it in the series *Hookeriana* with *A. limprichtii* Pax et Hoffm. as its nearest relative. This seems to be its true position, but it differs from *A. limprichtii* in several particulars, the chief of which are its dwarf habit, its slender, almost filiform, scapes and pedicels, and the profuse white hairs covering the entire plant. From *A. villosa* L., to which it bears a superficial resemblance, it is at once distinguished by its trimorphic leaves.

CORYDALIS (PAPAVERACEAE)

[Mr Ludlow's notes on the following two species, having been inadvertently left apart from his other material, came to light after the paper 'New Himalayan and Tibetan Species of *Corydalis* (Papaveraceae)' by Ludlow and Stearn in *Bull. Br. Mus. nat. Hist.* (Bot.) **5** (2) (issued 14 February 1975) had been printed. *Corydalis brevicalcarata* Ludlow is accordingly to be added to the list of endemic Nepal species on p. 48 of that paper.]

Corydalis brevicalcarata Ludlow, sp. nov. (Plate 36 ; Text-fig. 8.)

Herba perennis, caespitosa, glabra, 10–20 cm alta. *Radix palaris* simplex, ad 9 cm vel ultra longa. *Caules* numerosi, ad 20 cm longi, e basi ramosi. *Folia basalia* 3–5 cm longa, 1–1·5 cm lata, ambitu oblongo, pinnatim 3–5 jugata ; pinnae subaequales, oppositae vel fere oppositae, infimae breviter petiolulatae, ceterae subsessiles vel sessiles, 6–8 mm longae, 5–6 mm latae, trilobatae, lobis iterum irregulariter trilobatis obtusis. *Folia caulina* basalibus similia. *Inflorescentiae* terminales et laterales, racemosae, 6–12-florae ; pedicelli graciles, ad 9 mm longi. *Bracteae* infimae interdum trilobatae, ceterae lanceolatae, integrae, *c.* 3 mm longae. *Flores* parvi, ascendentes, lutei. *Sepala* ovata vel oblonga, leviter dentata, *c.* 1·5 mm longa. *Petalum posticum* 8–9 mm longum (calcari incluso), ecristatum ; calcar conicum, 2–2·5 mm longum ; *petalum anticum* 6–7 mm longum, ecristatum ; *petala interiora* 6·5 mm longa (unguiculo 3 mm longo incluso). *Stamina* (synandria) 5 mm longa. *Ovarium* obovatum ; *stylus* gracilis, 2·5 mm longus ; *stigma* profunde fissum, V-forme, sine cornibus posterioribus.

Nepal : Bhurchula Lekh, near Jumla (29° 14′ N, 82° 07′ E), 3700 m, 'Growing in rock ledges over which water flows. Perianth yellow', 14 July 1952, *Polunin, Sykes & Williams 4684* (holotype in Herb. Mus. Brit.).

The small pinnate leaves with trilobed pinnae and the small yellow flowers, 8–9 mm long, with short tapering spurs only 2–2·5 mm long, whence the specific epithet, are the most obvious characters of this elegant little chasmophyte. An important character visible only on dissection is the V-shaped cleft of the stigma. The species must be very local in distribution as, despite the many wide-ranging expeditions made in Nepal, it seems to have been collected only once.

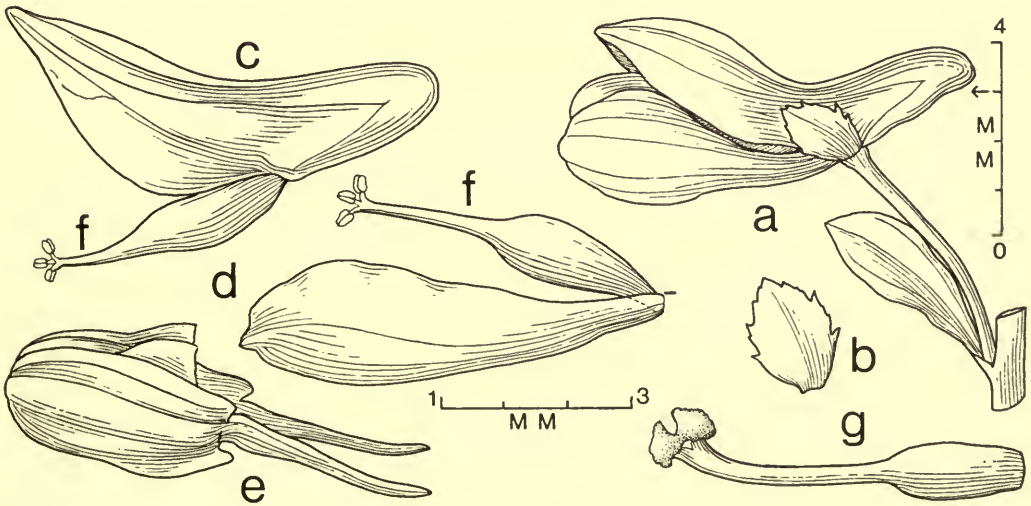

Fig. 8. *Corydalis brevicalcarata* Ludlow ; a, flower with bract ; b, sepal ; c, posticous petal ; d, anticous petals ; e, inner petals ; f, phalange with anthers ; g, gynoecium (*P S & W 4684*).

Corydalis sherriffii Ludlow, sp. nov. (Plate 37 ; Text-fig. 9.)

Herba perennis, erecta, subglabra, gracilis, 15–25 cm alta. *Caudex* brevis, praemorsus, reliquiis paucis foliorum marcidis ad 1 cm longis coronatus, radices filiformes emittens. *Caules* simplices, ad 25 cm alti. *Folia basalia* numerosa, longipetiolata, caule florifero multo breviora, 10–18 cm longa (petiolo 7–15 cm longo incluso) ; lamina pinnata, pinnis alternis vel oppositis trisectis (mediano interdum profunde bisecta) petiolulatis ; pinnulae lineares vel anguste lanceolatae, 1–2 cm longae, 2–5 mm latae, acutae, inconspicue trinerviae. *Folia caulina* 2, distantia, infimum brevipetiolata, superum subsessile vel sessile ; lamina irregulatim pinnata, pinnis bisectis vel trisectis, pinnulis eis foliorum basalium similibus sed minoribus. *Inflorescentia* terminalis, racemosa, congesta, 6–12-flora ; pedicelli graciles, ad 1 cm longi. *Bracteae* pinnatifidae, 0·6–1·5 cm longae. *Flores* ascendentes, malvini praeter petala interiora alba. *Sepala* decidua, semi-lunaria, margine lacerata, 1 mm longa. *Petalum posticum* 17 mm longum (calcari incluso), cristatum ; calcar rectum, 7·5 mm longum, glande nectarifera *c.* 3·5 mm longa ; *petalum anticum* 10 mm longum, cristatum ; *petala interiora* 8 mm longa (unguiculo 3 mm longo incluso). *Stylus* elongatus, 4 mm longus ; *stigma* rectangulare, papillis anterioribus 4, cornibus prominentibus 2.

Tibet : Kulu Phu Chu, near Paka (29° 15′ N, 94° 25′ E), 4500 m, 'Inner petals white, outer petals dark mauve. On open grassy ledges, steep rocky hillside', 27 July 1938, *Ludlow, Sherriff & Taylor 5969* (holotype in Herb. Mus. Brit.).

This species of south-eastern Tibet dedicated to George Sherriff (1898–1967) resembles in general appearance *C. rheinbabeniana* Fedde, described in 1924 from material collected by Harry Smith in Szechwan, but it is less robust with smaller mauve straight flowers, not orange and sigmoid as in *C. rheinbabeniana*, forming a small congested terminal raceme, and it has a fibrous and not tuberous root-system.

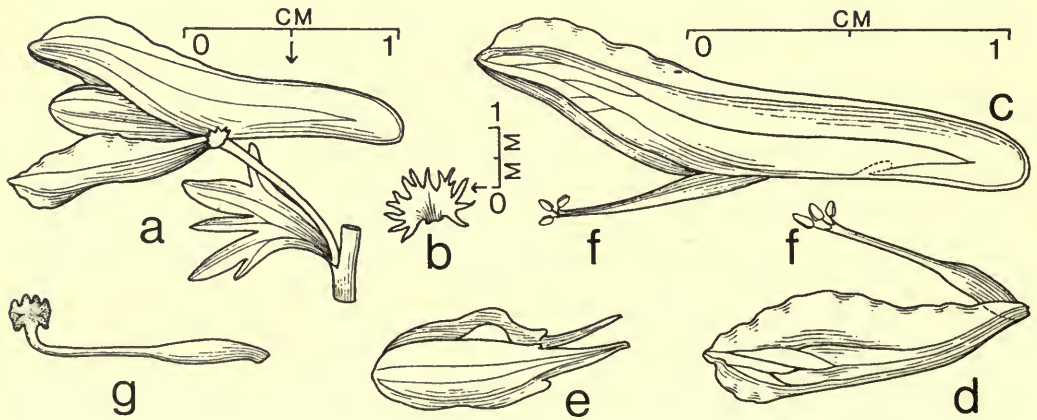

Fig. 9. *Corydalis sherriffii* Ludlow ; a, flower with bract ; b, sepal ; c, posticous petal ; d, anticous petal ; e, inner petals ; f, phalange with anthers ; g, gynoecium (*L S & T 5969*).

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PLATE 30

A (left) *Geum macrosepalum* Ludlow (*Ludlow, Sherriff & Hicks 19171* ; holotype).
B (right) *Geum elatum* var. *rubrum* Ludlow (*Polunin, Sykes & Williams 4419* ; holotype).


TYPE SPECIMEN
HERB. MUSEI BRITANNICI
MILLIMETRES
FLORA OF NEPAL


TYPE SPECIMEN
FLORA OF BHUTAN
No. 19171

PLATE 31

Haplosphaera himalayensis Ludlow (*Ludlow, Sherriff & Taylor 6087* ; holotype).

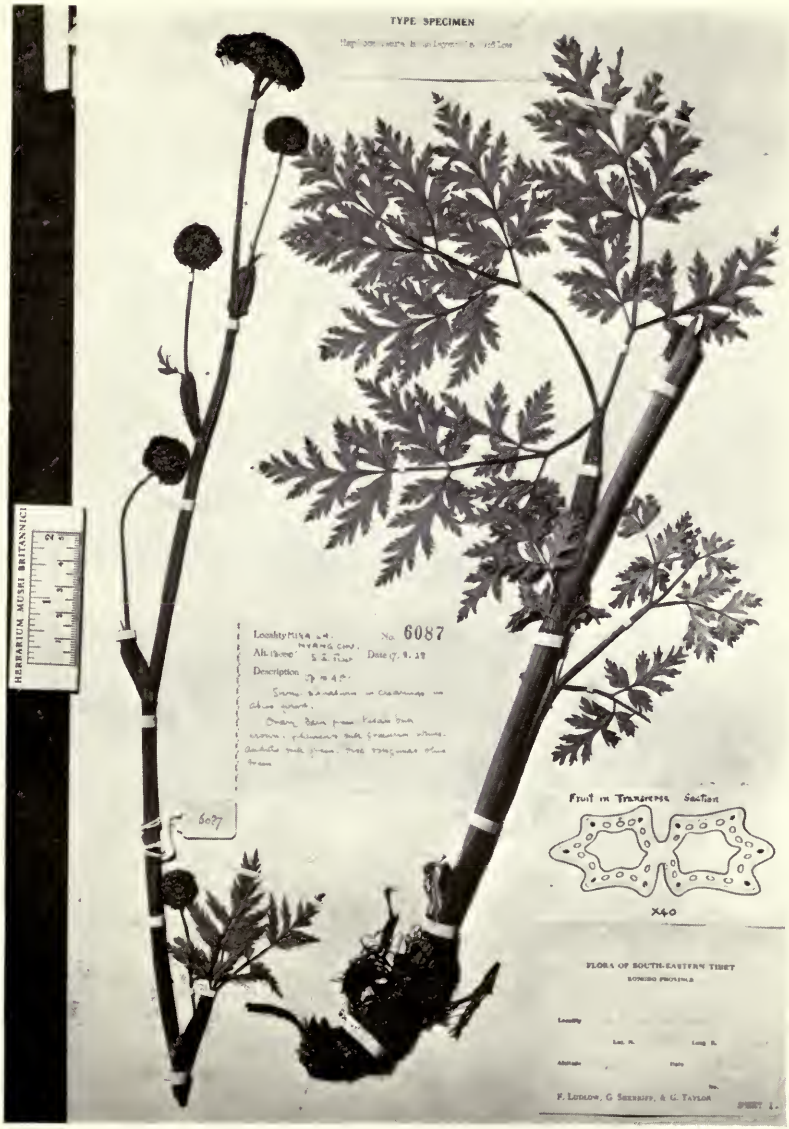
TYPE SPECIMEN
HERBARIUM MUSEI BRITANNICI
No. 6087
Fruit in Transverse Section
×40
FLORA OF SOUTH-EASTERN TIBET
F. Ludlow, G Sherriff, & G. Taylor

PLATE 32

A (left) *Cremanthodium bhutanicum* Ludlow (*Ludlow, Sherriff & Hicks 17177*; holotype).
B (right) *Cremanthodium campanulatum* var. *pinnatisectum* Ludlow (*Kingdon-Ward 9874*; holotype).

HERB MUSEI BRITANNICI
TYPE SPECIMEN
British Museum Expedition
BURMA-TIBET FRONTIER 1935-37
Capt. F. Kingdon-Ward
TYPE SPECIMEN
17177

PLATE 33

A (left) *Saussurea neglecta* Ludlow (*Lowndes 1189* ; holotype).
B (right) *Senecio kongboensis* Ludlow (*Ludlow, Sherriff & Elliott 14432* ; holotype).


TYPE SPECIMEN
FLORA OF
No. 14432
Date
Alt.
Loc.
Lat.
Long.
14432


BRITISH MUSEUM EXPEDITION TO NEPAL 1950
TYPE SPECIMEN
HERB. MUSEI BRITANNICI

PLATE 34

A (above) *Diapensia himalaica* Hook, f. & Thoms. (*Ludlow, Sherriff & Hicks 20629*).
B (below) *Diapensia wardii* W. E. Evans (*Ludlow & Sherriff 2346*).

PLATE 35

Androsace nortonii Ludlow (*Stainton, Sykes & Williams 1362* ; holotype).


1362

PLATE 36

A (left) *Corydalis brevicalcarata* (*Polunin, Sykes & Williams 4684* ; holotype).

B (right) *Corydalis sherriffii* Ludlow (*Ludlow, Sherriff & Taylor 5969* ; holotype).


HERBARIUM MUSEI BRITANNICI