GEORGE FORREST, V.M.H.

GEORGE FORREST, V.M.H.

Explorer and Botanist

who

by his discoveries

and

plants successfully introduced

has greatly enriched

our gardens.

1873-1932

THIS BOOK IS PUBLISHED BY

THE SCOTTISH ROCK GARDEN CLUB

WHOSE HONORARY SECRETARY IS

E. P. LAIRD, PINKHILL HOUSE, EDINBURGH, 12.

IT HAS BEEN ARRANGED BY AN EDITORIAL COMMITTEE

WHOSE MEMBERS ARE

R. E. Cooper

A. O. Curle, C.V.O.

W. S. Fair

The Scottish Rock Garden Club wishes to express its great sense of obligation to those, who, by co-operation and courteous permission, have allowed the extracts and illustrations from their publications to be reproduced in this book, since, without such assistance, the work would not have been possible. They are :—

The Council of the Royal Geographical Society.

The Council of the Royal Horticultural Society.

The Rhododendron Society.

The Editors of :—

Country Life; The Gardeners' Chronicle; The New Flora and Silva; The Journal of Horticulture; Rhododendron Species and their Hybrids.

Edinburgh, 1935

"In the morning—the sun
as it touches the tops
of the Mekong divide,
sends wide shafts of turquoise light
down the side gullies to the river
which seems to be transformed
to silver."

From the address to the Royal Geographical Society in 1908 by George Forrest

CONTENTS

¤

LIST OF ILLUSTRATIONS

INTRODUCTION.

THERE have been plant hunters innumerable from the earliest times, but it would be safe, if the matter of success were judged by the number of worthy introductions, to rank GEORGE FORREST as the greatest of them all.

His name is known in all parts of the globe, where gardens of temperate plants are kept, and has become invested with the glamour that attends those who shower blessings upon us. He died in harness, at work in his collecting field in Yunnan, S.W. China, and it is a matter of continual regret that he was unable to put on record the unique knowledge acquired from his observations.

His writings are few, and, in comparison with that of some other explorers, his output of printed matter is trifling.

The first public use of his pen, if observations on Gentians (1907) and Primulas (1908) in the Notes of the Royal Botanic Gardens, Edinburgh, are excepted, was to describe his experiences in Yunnan (Gard. Chron., 21st and 28th May, 1910). His more important writings are on his favourite plants, Rhododendrons and Primulas. His various contributions on the Rhododendrons of China are the work of a master of the subject, and the same standard prevails in the concise and well-nigh conclusive consideration of the world-wide range of the genus Primula, which, in collaboration with Sir Wm. Wright Smith, was presented to the Fourth Primula Conference in 1928.

As he amassed his collection (his total number of plants alone was over thirty-one thousand), he was reluctantly forced to the conclusion, that, only in the autumn of his life, when collecting was no longer possible, would he be able to devote time to their identification, and so, in a final survey, bring his labours to a fitting conclusion. This was, in fact, his expressed opinion, but—it was not to be.

Forrest had always felt the lure of a more northerly venture than he had ever made before in the hope of finding the geographical centre of the genus Rhododendron. He suspected this to be in a

cul-de-sac valley 60-70 miles long, ending in a barren reef of snow-capped mountains, which, to those who have been within 30 miles of them, seem to be of tremendous altitude. The valley lies a little short of the parallel of 30° on the Tibetan plateau. It is bordered on each side by a mountain range of 18,000–20,000 feet in height, and watered by a river that empties into the Mekong, just at the bend. So far as is known, Forrest died before his plans for reaching this spot had matured.

An official of the Zoology Department of the British Museum estimated, that, during the 5 or 6 years he was engaged in bird-collecting, Forrest added 90 new birds to the avifauna of Yunnan, 30 of which were new to science. He collected butterflies as well. Unique ethnographical and anthropological material is to be found in his writings and specimens are also to be seen in the cases of the Royal Scottish Museum in Edinburgh.

He received, in a way, more than his share of the buffets of fortune, but these merely served to mould a personality, character and presence, as fine as it is rare.

Where possible in this work, Forrest's own words have been used to describe plant associations, which only he can have seen, and also to indicate difficulties that lay in his path. His experiences at times, would have driven many men out of the country for good—glad to escape alive—and robbed others of their sanity.

In spite of trials and tribulations, Forrest persevered in his work over a period of twenty-eight years, revisiting the most troublous areas, as well as the adjacent regions, some of which were thus explored for the first time. He made, in all, seven expeditions.

The value of his work was primarily realised from the multitude of new species of the genera *Rhododendron*, *Primula*, *Nomocharis* and *Gentiana*, which came into cultivation from the seed of his first few expeditions.

After his return from the fourth expedition in 1917-19, the premier scientific associations expressed their recognition of the merits of his work, by the bestowal of certain honours.

Thus, in Britain, from the Royal Horticultural Society, he received the Victoria Medal of Honour in 1920, while, from America in the same year, the Massachusetts Horticultural Society awarded him the George Robert White Medal of Horticulture for " eminent

service in horticulture." The 88th volume of " The Garden " was dedicated to him in 1924, and in the same year, the Linnaean Society elected him a Fellow. As more and more treasures became available from successive expeditions, the Royal Horticultural Society (London) awarded him the Veitch Memorial Medal in 1927, while the 148th volume of Curtis's Botanical Magazine (1927) was dedicated to him.

The Loder Rhododendron Cup was inaugurated to encourage the study and the cultivation of Rhododendrons. The judges, who are chosen from the Royal Horticultural Society and the Rhododendron Society, have to consider the value, to horticulture, of the work of the recipient. In 1930 the Rhododendron Cup was awarded to Forrest.

It must remain for ever a matter of regret that he was not spared to carry out his professed intention, of putting into writing the varied and tremendous knowledge acquired, during the later years of his life.

As time progresses, and posterity is able to identify his huge collections and so gauge the full range of his accomplishments, other and further publications and tributes to his work will appear, but this small endeavour is offered on behalf of the Scottish Rock Garden Club in the nature of respectful, grateful and sincere remembrance of a fellow countryman, GEORGE FORREST.

* * * * * * *

The Scottish Rock Garden Club has established, as the premier award for plants exhibited at the Annual Shows, a medal which, with the full accord of Mrs. Forrest, is called the GEORGE FORREST MEMORIAL MEDAL.

GEORGE FORREST — THE MAN.

George Forrest was born at Falkirk on the 13th March, 1873, and from his earliest days he wandered about the countryside, along the *burns* and over the hillsides, as any country boy would, watching the birds, flowers, fish and butterflies. An inborn faculty of observation, was perhaps, unconsciously developing, and this was noticed and fostered by his brother, who was an enthusiastic naturalist.

After his schooling in Kilmarnock Academy, he went to work in a chemist's shop.

Plants have other properties than mere beauty, and their association with cures of bodily ills and the mysteries thereof would appeal strongly to one who had already gleaned in Nature's workshop. Incidentally, the experience so acquired was to have its application in later years, in lands—at that time—of mystery, far across the sea.

In the pursuit of the necessary studies to become an " apothecary " (!) he made a collection of plants, drying, labelling and mounting them, as is the practice for *herbaria*.

A feature of such a hobby as collecting is the increasing interest created, and the urge of endeavour to seek the unobtrusive and rarer specimens to augment the collection. These are strong, character-forming influences, particularly so for one, who, by observations of the homes of the flowers of his own country, was absorbing knowledge which was to prove, later, of great value to him.

It can be understood that life in Kilmarnock, and work in a chemist's shop would become irksome to a young man, developing in such a manner. No doubt, also, his emoluments were meagre so that it is not surprising that, when a small legacy was left to him, he succumbed to the lure of travel and went to see relatives in Australia.

In that country it was almost inevitable that such a man should take part in the pursuit of that elusive and tantalising objective—gold. Here he did the work of a typical pioneer, battling with nature in the raw, which tended to strengthen that sturdy frame and hardy nature. One has only to read the many stories of life in the goldfields to realise what this meant, and many are the men who broke under the strain.

Forrest managed to survive and even obtained a small measure of success, for he has been heard to tell of the discovery of at least one sizeable nugget.

Part of his Australian sojourn was spent on a sheep farm—a life which, in some ways, can be as hard as that of the goldfields. From Australia he journeyed to South Africa and returned to his homeland in 1902.

It has been said that the turning-point in his career occurred when he was fishing on Gladhouse Loch, Tweedsdale. While sheltering from a shower underneath a bank, he observed the corner of a stone coffin or *cist* projecting from the gravelly slope of a *tumulus* nearby. On examination he found there was a human skeleton inside. Desiring further information he went to the Antiquarian Museum in Queen Street. One can almost picture the traveller, as he was, even then, listening with avidity to an authority upon the subject. Probably this would be the first of many meetings, during which casual mention of his own experiences and travels, and his appreciation of the lure of the open spaces, would almost inevitably prompt the enquiry as to whether he liked that life.

Be that as it may, he came into contact with Professor Bayley Balfour, the Regius Keeper of the Royal Botanic Garden at Edinburgh, and was given what has been called a " meagre post in the Herbarium," which he accepted until something better came into view.

There was little, however, in the work, to satisfy his need for bodily activity, and even there he disdained the use of so small an amelioration of an office worker's comfort as a stool. So he walked daily to and from his work, six miles each way, and supplemented this by tramping the countryside at week-ends, indulging in fishing and shooting. Like every nature lover and dweller in the wide open spaces, he was unhappy in crowds.

So we find him, at the age of thirty, a short, sturdy, deep-chested man, who preferred to clothe himself in country garb rather than in that of the city and who wore the air of knowing what he was going to do and of the quiet confidence of doing it, stamped on his face and bearing. His innermost sense of determination made him a trifle harsh-featured, but, although he did not suffer fools gladly, he had a keen sense of humour and a rich fund of anecdote—a good companion under the open sky in the best meaning of the term.

His daily interest was among vast numbers of plants from every part of the world, and so, becoming thus equipped, it would almost seem that his life had been guided by the gods themselves.

* * * * * * *

To the man came his hour.

* * * * * * *

His chief, always keen to foster enthusiasm where plants were concerned, was in touch with Mr. A. K. Bulley of Neston, Cheshire, and as a result of their collaboration, Forrest was offered the chance of going abroad in the quest for plants.

In passing, it is of interest to note that Forrest was not the only man launched on plant hunting by Mr. Bulley, and that the latter's interest in botanical exploration and plant introduction is maintained to the present day.

The expenses of such expeditions as those undertaken by Forrest are very great, and his subsequent trips were supported by a group of prominent horticulturists.

The various collections of plants made by the French missionaries, David, Soullié and Delavay, in south-west China, from which the scientists in Paris, including M. Franchet, had described such quantities of new and interesting plants, showed that area to be a land of promise and so, thither, the plant hunter went in 1904.

The association of Forrest and Professor Bayley Balfour was unique. He enjoyed the enthusiastic support, advice and encouragement of his old chief, as well as his collaboration in identifying the specimens. The joint work of the two men insured to the collector, prompt and technical recognition of his work that is denied to many such men, while, to the botanist, it provided the main interest of the latter years of his active life.

It constitutes as brilliant a chapter as is to be found in the history of botanical discovery, and had a peculiar advantage in that it was personal.

His colleague, who had been knighted for his eminence in the field of botany and was now Sir Isaac Bayley Balfour, died in 1922, but his successor, Professor (now Sir) Wm. Wright Smith, carried on the co-operation with the collector ; a co-operation which had become a tradition of the Royal Botanic Garden at Edinburgh.

Consider the circumstances, and observe the man.

* * * * * * *

He had no experience of collecting plants, other than by his own hand, in his own land and he had no knowledge of any countries but those inhabited by English-speaking people, yet, he went to China and acquired a high degree of proficiency in Chinese, a notoriously difficult language.

He trained selected men from his Chinese coolies to be magnificent assistants in this, to him, new work, and he returned to his field, again and again, over a period of twenty-eight years, progressing from one fresh success to another, to become the outstanding man in his profession, with a standard for work that will, with very great difficulty, be surpassed.

The Chinese are a race famed for their patience—who worship their ancestors and live their lives in accordance with the traditions thereof—a slow, peaceful, courteous and inscrutable, yet essentially honest and hard-working people.

Does it not seem that the characteristics of this white man who came among them—determination, honesty and unconsciousness of any hardship or inconvenience until the work was done—would appeal and make a close human, aye, more than human, contact with the Chinese ? Such a contact is not only the ideal, but also the essential basis for good administration and colonisation.

With innate sympathy, Forrest brought his medical knowledge to the benefit of these people in western China. Apart from treatment of everyday complaints, he imported lymph for innoculating thousands of people against that dread plague of the East, small-pox. He gave time and money to alleviate their sufferings in time of flood and famine, and his understanding and sympathy and help not only enabled him to reap his harvest of treasure in the fields of plants, birds, mammals, and insects, but also won for him the respect of, and influence among, all classes in Western China.

Who, not knowing the trials of a plant hunter, can realise the details which must be successfully woven to culminate in a good seed harvest ? Recipients in this country may be pleased or not at the amount of seed, gratified or resigned at the percentage of germination, and, saddened, enraged or entranced at the value of the plants when they flower. Having got a good thing, do they realise to the full what its possession has entailed ?

At the commencement, Forrest, going forth into China, had to calculate the gear of all kinds which would be required. He had then to get it, and pack it for facile handling with every conceivable means of transport. He had to consider from the vagueness of maps and what little indication he obtained from the tickets on the dried specimens (the only available evidence of the flora), the range of the plants in the area. The flora of the countryside had to be summed up, and his speculations as to its treasures proved by actual foot-slogging up hill and down dale, by precipice, wood and stream.

On these " hikes " he would be accompanied at first by an interpreter (since he could not speak to his men) and one or two of the more intelligent coolies. He would have to use all his powers of persuasion to overcome any reluctance on the part of his porters and guides to accompany him on proposed visits to obscure regions which they considered difficult of access, because of the lack of tracks and inhospitable for the rigorous, climatic conditions, or the customs of the people, and finally to meet their insistence on the poverty of the region—often a conclusive argument for the abandonment of a trip—by arranging for their food and comfort.

In spite of any inconveniences, such as cold and driving rain, heavy going, and such drawbacks as biting ants, and bloodthirsty leeches, he would have to keep his men enthusiastic through the good offices of a similarly sodden, tired and bitten interpreter, and gradually develop in them a comprehension of the work he was anxious to get done. Not only would he have to control his own temper, but also to watch and combat any tendencies to discouragement and consequent desertion " en masse " of his men. Having got their eyes opened, so to speak, he would have to inspect the spoils of their initial and independent essays in plant collecting and keep good-tempered, and profess enthusiasm, even when only scraps and rubbish were produced.

One would need to sit with a small child, running about in a field, and to receive the odd and futile bits of leaves, twigs and flowers, whose discovery makes the little one so happy, to realise this part of the training of a native collector.

When a good plant is discovered it has to be marked down for later seed collection, and perhaps in the day's ramble the precise locality may not be remembered! Search has to be made for sufficient plants to yield ultimately a good fat packet of seed in harvest. (One irascible patron has been known to say, " What's the use of sending me half a tea-spoonful of seeds ? I want a pound or two.")

And this harvesting! Winds may blow and all the seed be shed before one's arrival; or it may not be ripe, and the plants will have to be watched while one eye strains to the heavens and prayers are offered that impending snow will delay its descent. The wretched plants may set only a few seeds, or the innumerable parades of voracious insects and animals may decide that fruiting spikes are the only items of the herbage that appeal to them.

After the harvest is collected in the field and transported to camp, with, perhaps, only the loss of " *n* " per cent. through the spaces of the bamboo basket, there comes the cleaning of it. Little the partly-trained and casual native recks that seed not fully ripe will suffer if finished off to a healthy brown over the camp fire, or that chaff is not seed, or that Rhododendron seed, for instance, is not chaff, since it lifts in the wind.

One can imagine one's most imperturbable acquaintance getting ruffled under these circumstances, especially if the significance of the little bits of paper (collector's numbers) is misunderstood and they are carefully picked out and put indiscriminately in a heap or thrown in the fire. Very much more so is this the case if one be physically weary and more than a little depressed through scouring hillsides in a rarified atmosphere and living for months on crude camp cooking of the barest necessities of food.

One season of this work would be enough for most people, but Forrest loved it, and trained his men to love it and look forward to a repetition of it in the following years with gradual improvements until life became bearable.

He worked alone, and the effect of living under these trying

conditions with only native peasantry for company must be experienced to be fully realised.

Forrest found relief in the later years, when, having trained his men, it was not necessary for him to spend so much time amid the discomforts of the field. He could make his headquarters for part of the season in a house in a village, secure in the knowledge that the ability of his trained men would ensure success, but the haunting spectre of doubt can never be far away when one lives and roams amid mountains and their tempests, with their checks and trials.

Photo by George Forrest
Courtesy of The New Flora and Silva

FORREST'S CAMP ON THE LICHIANG

Photo by George Forrest

Forrest's men were equipped for collecting in all its branches.

The country traversed by Forrest in his explorations in China lies almost entirely between the lines of 29° and 24° north latitude and 98° and 101° east longitude. Only on one occasion, his first expedition, did he proceed any further east, and then he reached Yunnan-fu which lies between 102° and 103° east longitude.

The main fields will be found on the map to lie in a square with concave sides connecting the towns of Bhamo, Atuntze, Muli and Yunnan-fu with Tengyueh, his main base, in the south-west corner of it, at 25° N. by 89° 30′ E.

Bhamo is in the north of Burma at 24° 15′ N. by 97° 15′ E., while Myitkina is about eighty odd miles further north.

The Irrawaddy-Salwin divide stretches northward through the province of Tsarong in which Atuntze is situated at 28° 30′ N. by 98° 50′ E. The Mekong river lies to the east of the Salwin and the divide of those two rivers as well as that of the Irrawaddy and Salwin loom large in his areas and discoveries.

The Yangtze river runs southward almost parallel with the Mekong from the line of latitude 32° N. to 27° N. and then makes a big double bend of seventy miles or so before swinging to the east along the line of 26° 30′ N.

Muli lies to the north-east of the most north of the Yangtze bends at 28° 15′ N. by 100° 40′ E., and Forrest explored the traverse of the Yangtze through the Chungtien plateau with amazingly successful results. The town of Chungtien is situated at 27° 50′ N. by 99° 45′ E. approx.

The Lichiang range stretches southwards along the east side of the Chungtien plateau, from Feng-kou on the right bank of the Yangtze, forty miles south of Muli, to Talifu in the vicinity of the big lake, Ghi Shan, a few miles south-east of the junction of the lines of 26° N. lat. and 100° E. long. Trips were made from Tengyueh and Talifu. South-east by east from Talifu and in a direct line eastwards from Tengyueh at a distance of four degrees or about two hundred and fifty air miles from the latter town (but how much more on foot !) lies Yunnan-Fu at 102° 40′ E. and 25° N., the farthest point reached eastwards.

" It is only when the traveller, scratched, bruised and with torn clothes, emerges . . . on to some open terrace, high above (the river) and finds . . . the tents pitched and . . . hot water ready for a bath, that he begins to think that exploring the Salwin is a game worth the candle." GEORGE FORREST.

At the outset of his career as a plant collector Forrest, as has been stated, was engaged by Mr. Bulley, of the firm of Messrs. Bees, Ltd., Liverpool, in 1904, to explore the higher plateaux and mountain ranges of north-west Yunnan and south-east Tibet, for the purpose of collecting seeds of new and rare alpines.

" Yunnan was entered from the frontier of Burma, N.E. of Bhamo, the course followed being the caravan trade routes through Tengyueh and Yung-chan-fu to Talifu." *

The first year was spent mostly in travelling, gaining knowledge of the country, peoples and languages. Owing to that, collecting was not organised on such a scale as later.

Owing to the late date of his engagement—May—travelling via Rangoon and Bhamo, Upper Burma, it was well on in August ere he reached Talifu, which city, as the largest and most central in the north of the province of Yunnan, he had decided to use as his principal base whilst working the mountains to the west and north.

From Talifu the road to the north was taken and a journey made of several months' duration, during which travelling via Lichiangfu, the Yangtze valley and the Kari Pass, a point as far north as 28° 30′ was reached in the Mekong valley and a site fixed upon there as a base for exploration in the following year.

From the Chino-Burmese frontier to Talifu is fully twenty days continuous travel, but, though the region traversed is for the greater part mountainous, some portions attaining an altitude of fully 10,000 feet, lying so far south and west, it is not of such elevation as to yield a flora sufficiently hardy for introduction to this country.

In November he returned to Talifu and early in December returned over the Mao-Niu Chang Pass to Chungtien ; then down the Chungtien plateau to the Yangtse and south to Talifu. Thus,

* " Rhododendrons-Millais," 1917.

though much was done during this part of the journey in collecting botanical specimens, seeds of only a very few species were obtained.

During the following two years, several journeys were made into the extreme north of the province, and for a considerable period collecting was carried on in Tibetan territory on and beyond the western boundary of the Mekong valley, in latitude 27°-29° N. " Also most of the country west and directly north of Talifu, that which formed the hunting ground of the famous Père Delavay, embracing the valleys enclosed by them, were systematically searched by myself and a number of native collectors in my employ. On those ranges, besides securing a large number of new species of both horticultural and botanical interest, I was fortunate enough to obtain seeds of many of the horticultural gems contained in the collections of Père Delavay, Père Soulié and other members of the mission to which they belonged." *

These mountains bear a flora which, apart from its intense botanical interest, is composed of those natural orders and genera most rich in plants of horticultural and economic value.

However, besides the natural difficulties which face the collector in these regions he has continuously to battle with the more or less active hostility of the local Chinese authorities, and also, on and over the Tibetan frontier with that of the Lamas, who, to serve their own purposes, oppose, as far as lies in their power, the entrance of any European, for any object whatsoever, to the country under their jurisdiction.

" In instance of this, in the summer of 1905, during my second season on the Mekong-Salwin dividing range, in lat. 28°-29° N., I narrowly escaped with my life. After exceptional hardships, extending over a period of twenty-three days, and many hairbreadth escapes, I managed to get down the river to safety, but at the loss of all my collections, and personal belongings."

" I reached Talifu in safety, but in a shockingly weak condition about the end of August, and was met there by my friend, Consul G. L. Litton, who partially re-fitted me for my work." †

After a few days' resting at Tali, Forrest and Litton set out to return to Tengyueh, arriving there in the last week of September.

* " Rhododendrons-Millais," 1917.

† A full account is given under " Perils of Plant Collecting."

Eight days later saw them off on a journey of exploration in the Upper Salwin, when an unknown stretch, of fully one hundred miles, of the Salwin valley, in lat. 27°-28° N., with one or two of the passes on the enclosing ranges, was explored. A most interesting botanical collection was secured, but, as most of the region is, more or less sub-tropical, seeds of few species were collected.

" On our return to Tengyueh late in December we were both much run down, and, most unfortunately, Mr. Litton succumbed to the hardships we had experienced, dying of blackwater fever on January 9th, 1906." ‡

" After his death I spent a few weeks in Tengyueh recuperating and making arrangements for another season in the north. Late in March I set out, and, travelling by easy stages, reached Lichiang-fu about the middle of May, establishing a base for the season about two days north of the city on the eastern flank of the huge snow range which bears the same name as the city. It is that range which diverts the course of the Yangtze, forming the great loop in the river known as the Yangtze Bend. *

" With a large and competent staff of native (Mossoo) Tibetan collectors I worked assiduously for several months with splendid results. The southern portion of the eastern flank of the Lichiang range, latitude 27°-28° N., was systematically searched, and a most rich and varied collection of alpines secured, with seeds of many of the most beautiful species. The above range is fully fifty miles in length, and attains an altitude of fully 20,000 feet.

" However, unfortunately, I had the poison of the much-dreaded Salwin malaria in my blood, and, after a vain struggle, collapsed towards the end of August. For some days previously I had received warnings from my symptoms of what to expect, and had accordingly made arrangements in the event of sudden illness, for my best men to continue the work and secure the season's harvest. I may mention my expectations of them were more than realised. They worked excellently, only a few plants marked down being lost, and I have much reason to be grateful to them.

" My illness was of so serious a character I had to return to Talifu, placing myself in the hands of Dr. Clark of the China Inland

‡ Extracts of the account of this trip are given in " Geographical Explorations."

* " Rhododendrons-Millais," 1917.

Mission, there, who strongly urged my immediate return home. However, I feared more the loss of the season and remained. Fortunately, after several weary and painful months I slowly, partially recovered. In the interim a constant service of runners were bringing in spoil from my northern base nine days from Tali, and eventually I had the satisfaction of closing the season and the first three years' expedition most successfully." *

The first expedition lasted from 1904-1906 and on this, specimens numbering 1-5498 were obtained. Particulars of these numbers are given in " Notes R.B.G., Edin., Vol. VII., 1912-13.

In 1910 he returned to his old base on the Lichiang Range and for the season continued the work so favourably begun in 1906, working the more northern part of the Lichiang Range, as well as part of the western flank. The result of that journey, amongst many other good things, was a great haul of Rhododendrons, a good percentage being new species. Seed of nearly all was secured. Also, farther north, were found immense forests of conifers, the dominant species being *Larix tibetica.*

During the same season he had once again a number of collectors engaged on the Tali Range. In 1911 he returned home. Specimens collected number from 5499-7401.

" Early in 1912 I once more entered Yunnan by the same route, but, owing to the revolution of 1911, many areas of the province were in a state of unrest, so the Consuls prohibited travelling beyond Tengyueh. Having been warned in Rangoon of this possibility, I had had word sent on to the villages north of Lichiang-fu, calling on my collectors to meet me at the frontier, so, on my arrival in Tengyueh, I was well-equipped, and though much hampered by the conditions imposed, spent a highly profitable season. Unfortunately, the political unrest apparent in other districts spread to Tengyueh, and eventually assumed such a serious attitude towards foreigners that, towards the middle of September, I was forced, by orders from the Consul, to retire across the frontier into Burma. Travelling by Sadou, I went to Myitkyina, and from there to Bhamo, where I remained a few weeks until permission was granted to recross the frontier. Most of my men had accompanied me to Burma, and from Bhamo I despatched them by twos and threes to their

* " Rhododendrons-Millais," 1917.

base in the Tengyueh valley, to continue collecting and secure the season's harvest of seed, so that really little was lost by the break in our work. Towards the end of October I myself returned.

" In 1913 I was permitted to strike farther north, and once again continued work on the Tali and Lichiang Ranges, but with a very much increased staff which admitted of much expansion in the matter of country covered. Also, I left a few men behind at Tengyueh with instructions to explore the Shweli valley as far as the hills of the headwaters, as well as the Shweli-Salwin divide from 25° to 26° N. The Tali group extended their range to the western flank of the Tali mountains, including the Yangpi and Hsiakuan valleys; they also collected on the ranges south of Tali, which enclose the headwaters of the Red River, Ming-hua Ting being their base there. Eastwards also they went from Tali, two to three days east of the Tali Lake to the Ghi Shan in the basin of the Yangtze.

" From my own base north of Lichiang we worked in an ever-extended semi-circle, E., N., and W., crossing the Yangtze at several points and touching on the Szechuan frontier. The Chungtien plateau and surrounding mountains at lat. 27° 30′ to 28° 15′ N. and long. 99° 30′ to 100° 20′ E. was thoroughly worked, as well as many of the broken ranges focussing down towards that area; and the ranges forming the watershed between the Yangtze and Mekong systems. A splendid haul of *herbaria* and seeds was secured.

" In the first week of December I set out on my return to the Burmese frontier with the spoil, but was again held up by trouble, this time at Talifu. There, the day I entered the city, the local soldiery, some 3000 troops, mutinied, shot down their officers when on morning parade, and captured the city. I was kept prisoner for fully three weeks, and forced, along with my friend the Rev. Mr. Hanna, to act as medical attendant to the wounded of the troops, in constant danger of our lives. Fortunately assistance arrived in time, loyal troops were hurried up from the provincial capital, Yunnan-fu, Tali being stormed and after much bloodshed, retaken on the 24th December. Order being once more restored, I proceeded on my journey to Tengyueh, picked up my collections there, and despatched the whole to England.

" 1914 was a repetition of the previous year. With a base slightly farther north, and a still greater number of collectors, ex-

ploration was pushed farther and farther north and north-west until I had reached a point as far as that touched in 1905. I did not, however, attempt to work farther eastwards, for, from a journey made in May and June in which I reached a point east of Yungning, inside the Szechuan frontier, and on the range forming the watershed between the Litang-ho and Yangtze, I discovered the country to be most barren, in fact, mostly a dry area, by reason of the huge mass of snow mountains of the Lichiang Range acting as a rain screen during the summer or monsoon season. Around Yungning many species of botanical interest were secured, but few of any horticultural value. As soon as the Yangtze was crossed, clays and slates composed the strata, taking the place of the limestones of the W. and N.W. and bearing a correspondingly poor flora.

" Some portions of the Mekong-Yangtze divide, such as that area named the Bei-ma-shan were found to bear an exceedingly rich flora, almost, if not equal to, that of the richest regions of the Mekong-Salwin divide. During the season an exceptionally large number of valuable alpines were secured.

" The total for the whole of these expeditions is 13,600 spp., this, exclusive of some 1200 species lost at Tsekou in 1905." *

In 1917, 1918 and 1919 he returned to the country which was partly tapped previously, and, using Tengyueh as a base, explored the land to the north, north-east, and east. In a way, these may be considered the most eventful of his expeditions, for during them he found plants of *Rhodo. giganteum*, a single specimen of which measured 79 feet in height and spread its branches for a distance of 40 feet. The trunk of such a giant, measured at 5 feet above the ground, had a girth of 7 feet 9 inches. A cross section in the Museum of the R.B.G., Edinburgh, shows 280 annual growth rings.

Whole hillsides with silvery-grey appearances when seen from a few miles distance proved to have the effect caused by inconceivable stretches of *Rhododendron Traillianum* upon them.

A plant with the most unique colour of all, the well-known *Rhododendron Griersonianum*, was discovered.

He reported the existence of colonies of Rhododendrons growing happily under bog conditions where pot holes with several feet depth of foetid vegetation dispersed a greasy scum over a sloppy black peat.

* " Rhododendrons-Millais," 1917.

The fact that such species as sanguineum, saluenense, campylogynum, Forrestii and trichocladum were found in such places may serve to indicate the amount of bad cultivation they will survive (perhaps) in this country.

In these few years he found on the Mekong-Salwin divide and on mountains bordering the Chungtien plateau, a wealth of Rhododendron never suspected before and which he was quite unprepared for, these plants being the dominant feature above a certain altitude between the latitude of 27° 40′ and 29° N.

He suggested as a main factor for the prolificity of species, the soil resulting from the geological formation of these areas wherefrom the soil washed down resembled the China clay of Cornwall, but although limestone, it is more probably magnesium limestone than the chalky soil of the Downs.

His pronouncements upon the perfect growth of Rhododendrons upon limestone completely upset all preconceived ideas of the cultivation of the members of this genus and stimulated his colleague, Professor Balfour, to researches and pronouncements upon the means whereby this association of plant and soil was possible.*

The spoil of the fourth expedition was specimens numbering 13599-19333. Details of the field tickets are to be found in the hand-book issued to patrons :—

Determination of the species of Rhododendron 13762-16102 (1917).

Determination of the species of Rhododendron 17819-18548 (1919).

Herbarium records 13599-19333 (1917-19). (Rhododendrons not included).

In 1921-22 further exploration into this promising area was carried out, driving into the extreme north-west (Yunnan), the south-west of Tsarong, and reaching northwards to 28° 50′ N.

Again his expectations were exceeded, for on the watershed between the Salwin and the Faron (Kiu-chiang) an even greater wealth of Rhododendrons was discovered.

He ventured into unexplored territory bounded roughly by the lines of 26° 20′–27° 10′ N. and 99° 18′–100° E. long., and went to see again in the early spring of 1921 plants of *Rhododendron giganteum*

* See " Gard. Chron.," Vol. 82, p. 427 (1927), and " Rhododendrons-Millais," 1924.

in its only known habitat at that time.

The specimens of the fifth expedition were Nos. 19334–23258. Details are to be found in " Notes, R.B.G., Edin., Vol. XIV., 19334–23258 (1921–22) :—

Determination of species of Rhododendron 19335–21056 (1921).

Determination of species of Rhododendron 21059–23025 (1922).

During 1923 a collection of material was made by his men and produced specimens Nos. 23402–23617.

On his sixth expedition which was made in 1924–25, Forrest collected about Tengyueh and to the north-west of the town on the Shweli-Salwin divide (in latitudes 25° 12′ to 25° 40′) further north-west to the Htawgaw, Hpimaw, and Chimili passes and to the N'Maikha-Salwin divide (latitude round about 26° to 26° 30′) and on the Mekong-Yangtze and the Mekong-Salwin divides (latitudes 27° to 27° 30′).

On these trips he reached his farthest northern as well as eastward limit of exploration in 1924. The specimens number 24000-27833. For details see the handbooks issued by Forrest's patrons :—

Rhododendrons collected by G. F., 24009–26157 (1924).

Some further details of seeds collected by G. F., 24073–26161 (1924).

Some plants, shrubs and trees collected by G. F., 26201–27736 (1925).

Rhododendrons collected by G. F., 26247–26492 (1925).

During 1929 his men collected material for the numbers 27834–28361 which can be included in the spoil of the next expedition conducted by Forrest himself.

The vicissitudes of his previous experiences may have been affecting him after the passage of years, for we read in the Gardeners' Chronicle of 28th July, 1928, that " Mr. George Forrest is progressing satisfactorily after an operation."

In November, 1930, he journeyed out again for the seventh time to his fields with the same intention expressed at his departure for the previous two expeditions that " this was to be his final run," " he had had enough and it was about time he stopped," etc., together with smiling hints on his plans after the return.

Usually he went alone for his collecting, but on this trip he was accompanied by Major Lawrence Johnston, a well-known Gloucestershire horticulturist, but at almost the last post of civilisation Major

Johnston was taken ill and had to remain behind.

During his absence there were the usual extracts from his letters passing round, and he appeared to be making a good clean-up of his field as though he really intended this to be his last trip. His specimen numbers on this trip mounted from 28362 to a grand total of 31015 !

As the season progressed the reports became more and more satisfactory. In one of the last letters received from him he said: " Of seed, such an abundance, that I scarce know where to commence, nearly everything I wished for and that means a lot. Primulas in profusion, seed of some of them as much as 3–5 lbs., same of Meconopsis, Nomocharis, Lilium, as well as bulbs of the latter. When all are dealt with and packed I expect to have nearly, if not more than two mule loads of good clean seed, representing some 4–500 species, and a mule-load means 130–150 lbs. That is something like 300 lbs. of seed. . . .

" If all goes well I shall have made a rather glorious and satisfactory finish to all my past years of labour."

In the middle of January, 1932, word came through from the Foreign Office of the death, on 5th January, of Mr. Forrest.

Subsequently it was ascertained that he had almost completed the packing of the harvest and was out with his gun for the day. The party was about four miles from the Consulate of Tengyueh when he called for his men to come and help him. They rushed to him, but, as they arrived, he became unconscious, and never spoke again.

His men were the sole witnesses of his departure to fields Elysian. Their final tribute was a wreath of white roses, the mourning colour of China.

His first friends in the field, he lost through Tibetan savagery. His next friend, Consul Litton, died at his post and lies in the burial ground at Tengyueh.

It is a happy thought that Forrest lies with him in that little burial ground overlooking the Salwin Divide, the country they both knew and in which Forrest himself laboured so long, so happily and so well.

The world deplores the loss of such a man, but Scotland mourns a son.

* THE PERILS OF PLANT COLLECTING

By GEORGE FORREST.

Few realise the great hardships and dangers which have to be faced in order to secure new plants for cultivation in Europe. In the warmer regions there is danger from miasma, fever, animals and snakes. Not infrequently too, the collector has to seek his specimens among savage or semi-civilised peoples, who, in most instances, strongly resent his intrusion into their midst ; thus seldom a year passes without toll being exacted in one way or another.

I will describe an incident I experienced whilst plant-collecting in Western China. In the N.-W. corner of the Chinese province of Yunnan, where China, India and Tibet meet, and by the banks of the great Mekong river, at an elevation of 5,000 feet, was the French Catholic mission station of Tzekou. It is a country of mighty rivers ; there, in a single degree of longitude, are four of the mightiest in the world, the Yangtze or River of Golden Sand, the Mekong, the Salwin and the Irrawaddy ; and of vast mountain ranges which tower up between the parallel rivers to far above the limit of eternal snow, which, at that latitude (28° N.) is about 17,000 feet. The narrow valleys, broken by cross ridges and great spurs, are cut off from each other by difficult and dangerous passes, closed for half the year by snow. The great rivers, which flow through funnel-like gorges, are quite un-navigable ; the upper Mekong can only be crossed by bridges consisting of a single rope composed of split bamboos, across which passengers are slung, trussed up with leather thongs like chickens ready for the spit. Numerous tribes, nearly all of Tibetan origin, have settled and built their huts among the valleys and ridges. The diversity of customs, languages and religions in this little-known corner of the world is truly remarkable ; like the slopes of the Caucasus, it might be called the country of the hundred nations. Here and there in the folds of the mountains the Lamas of the yellow sect have established huge *gombas*, or lamaseries, and, by a combination of force and fraud, have become the real masters of the country ; they terrorise the poverty-striken and superstitious peasantry, and pay little or no regard to the nominal sovereignty of the Celestial mandarins.

* Reproduced by the courteous permission of the Editor of " The Gardeners' Chronicle," May, 1910.

In the summer of 1905 I found myself collecting in these mountains, my headquarters being with the hospitable and venerable chief of the Tzekou mission, Père Dubernard. He first settled at Tzekou when Napoleon III. was at the height of his power, and he had never left the country since. The region was unsettled, the Lama world around had been disturbed by the British invasion of Lhassa in 1904 (Col. Younghusband's Expedition), and still more rudely shocked by the attempt of the Chinese to establish themselves at Batang, a small town on the great road from Szechuan to Lhassa. These circumstances led to a rebellion of the Batang Lamas, and the murder, with all his followers, of a high Chinese official at Batang in March of that year. At the same time, the French missionaries stationed there, with all their converts, were killed, and the mission stations destroyed.

The trouble was not long in spreading south to Atuntze, a small Chinese-Tibetan trading station, situated on a terrace high above the left or east bank of the Mekong, and only two and a half days' journey from Tzekou, which nestled under the cliffs close to the right bank of the Mekong, in latitude 28° N. Chinese officials and troops were sent to Atuntze in April to restore order, but it is needless to add they only made confusion worse confounded, and in a few days they were completely hemmed in. Rumours and counter-rumours poured into the mission at Tzekou day by day, adding to the difficulty of our situation, and the terror of the native Christians. It soon became clear that the Lamas meant business and were determined to pay off old scores of jealousy against the missionaries, who had endeavoured for so many years, not without success, to deliver the people from the moral and material chains of Lamaism.

[Nevertheless, assisted by a number of well-trained and faithful Lissoo followers, under the greatest difficulties, I continued collecting, amassing dried specimens of nearly 1,000 species of plants, besides a large quantity of seeds and bulbs, and numerous photographs of plants *in situ*.*]

Even our friends among the Tibetans fell away from us or proved false. The mission house was indefensible, and, if defensible, we had no one to defend it save two aged French priests and myself.

* Reproduced by the courteous permission of the Editor, " The Journal of Horticulture," January, 1912.

Therefore, when on the evening of July 19 the news came that the town of Atuntze had fallen, that the Chinese troops had been wiped out almost to a man, and that the Lamaseries were all up and concentrating their forces to attack Tzekou, immediate flight became necessary.

The rising moon that night saw us making our way by a narrow and dangerous track along the right bank of the Mekong, the two Fathers on their mules and myself and the little band of native Christians on foot ; on our left roared the Mekong in furious flood, on our right rose the great Mekong-Salwin dividing range. We hoped to reach the village of Yetche, 30 miles to the south on the left bank of the river, where there was a friendly chief and some Chinese troops ; but, unfortunately, as in the dark we passed the Lamaserie of Patong, owing to a noise made by some of our party, we were detected, and a shrill signal whistle was sent across the river to warn the countryside of our escape. Early next morning, at the next village, we were told that the enemy, by executing a forced march, had crossed the river to the south, and had raised the people therein thus cutting off our retreat. The local headman, a drunken and treacherous rascal, found many excuses to delay our flight, and thus we lost more valuable time. Eventually we got away from him, and proceeding early in the forenoon we reached a height to the south of the village. From this point we had a clear and extensive view looking to the north, and saw a great column of smoke rising in the still morning air over the site of Tzekou. Then our last hope of escape left us and we knew the enemy was hot on our track. Descending from the height into the next cross valley, I was for pushing on as long as we had strength left to do so, hoping that we might be able to break through to the south before the enemy had time to form a complete cordon around us. However, after the sight of the destruction of their home, the last vestige of spirit seemed to leave my two companions ; they became utterly despondent and began to make preparations for the worst, insisting on making a stop by the side of the stream in the valley for the double purpose of holding a meeting with our followers, and taking some food. So dangerous was the situation that, whilst my companions were engaged at their devotions, I left them and ascended a small auxiliary spur to reconnoitre. To the north I had a clear view of the crest of the ridge we

had descended, and had not long to wait ere my expectations were realised. Suddenly there appeared a large number of armed men running at full speed in Indian file along the path we had just traversed. I gave the alarm at once and immediately all was confusion, our followers scattering in every direction. Père Bourdonnec became completely panic-stricken, made his way across the stream, by a fallen tree, and, despite my attempts to stop him, rushed blindly through the dense forest which clothed the southern face of the valley. However, escape in that direction I was sure would be impossible, as our delay had given the enemy time to mature their plans and close in on us; the Père had not covered a couple of hundred yards ere he was riddled with poisoned arrows and fell, the Tibetans immediately rushing up and finishing him off with their huge double-handed swords. Our little band, numbering about 80, were picked off one by one, or captured, only 14 escaping. Ten women, wives and daughters of some of our followers, committed suicide by throwing themselves into the stream, to escape the slavery and worse, which they knew awaited them if captured. Of my own 17 collectors and servants only one escaped.

The valley in which we were surrounded was a rift in the hills some four miles long by one and a half broad, closed to the east by the Mekong, and to the west by the dividing range, while to the north and south were high ridges occupied by the enemy, and thickly clothed with pine and mixed forests. When I saw all was lost I fled east down a breakneck path, in places formed along the faces of beetling cliffs by rude brackets of wood and slippery logs. On I went down towards the main river, only to find myself, at one of the sharpest turns, suddenly confronted by a band of hostile and well-armed Tibetans, who had been stationed there to block the passage. They were distant about a hundred yards, and sighting me at once gave chase. For a fraction of time I hesitated; being armed with a Winchester repeating rifle, 12 shots, a heavy revolver and two belts of cartridges, I could easily have made a stand, but I feared being unable to clear a passage before those whom I knew to be behind me arrived on the scene. Therefore I turned back, and after a desperate run, succeeded in covering my tracks by leaping off the path whenever I rounded the corner. I fell into dense jungle, through which I rolled down a steep slope for a distance of two

hundred feet before stopping, tearing my clothes to ribbons, and bruising myself most horribly in the process. I then got behind a convenient boulder and made every preparation for a stand should they succeed in discovering my ruse, which I never doubted but they would. Fortunately, however, they did not find me, and, presuming I had continued my course up the valley, rushed past my hiding place. There I lay till night fell, when I attempted to escape south but, after toiling up 3,000 feet of rock, and through forest and jungle, I found a cordon of Lamas, with watch-fire and Tibetan mastiffs, which precluded all hopes of escape in that direction, and, as daylight approached, I had to return to my hiding place by the stream. The following eight days and nights were hopeless repetitions of the first; the days were spent in hiding in the most convenient spot I could find at dawn, the nights in trying to elude the watchfulness of my enemies and get away south.

[One story has been heard of which the authenticity need not be doubted concerning this hunt.

Forrest was hiding amid the scrub of the stream edge when he saw a group of his pursuers offering a most tempting target. In what he reckoned was to be the last stand for his life he was considering how to pick them off one by one with his rifle when something else attracted his attention. It seemed to be the figure of Père Dubernard farther up the hillside waving him to proceed farther down the stream. This he did and so escaped detection for that time, but the wonder was that the Reverend Father had been slaughtered three days before.]

For that time, a period of nine days, all the food I had consisted of two dozen ears of wheat and a handful of parched peas, which I providentially found where they had been dropped by a fugitive or some of the Lamas. During some of these days I was kept continually on the move, tracked and hunted like a wild beast by the Lamas and their Tibetan adherents, who thirsted for my blood. On the second day I was forced to discard my boots to avoid leaving distinctive trails, burying them in the bed of the stream; another day I had to wade waist deep for a full mile upstream to evade a party who were close on my heels; once a few of them came on me suddenly and I was shot at, two of the poisoned arrows passing through my hat; another time my hiding place was discovered by a Tibetan

woman, one of many who had been sent out to track me down. Once as I lay asleep under a log in the bed of the stream, exhausted by my night's fruitless journey up the mountain side, I was awakened by the sound of voices, and a party of 30 Lamas in full war paint crossed the stream a few yards above me. Armed as I was I could have shot down most of them, but, though enraged as I was at the time, I held myself in check, as I knew that to fire but one shot would be to bring a hornet's nest about me. My only chance was to keep still.

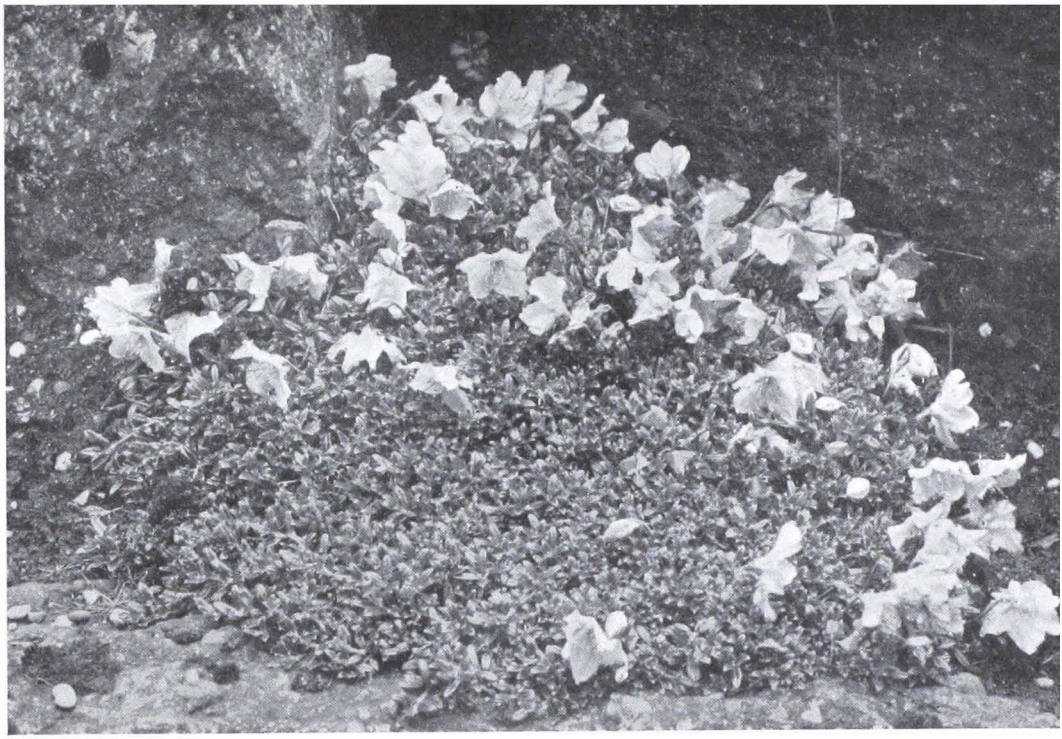
At the end of eight days I had ceased to care whether I lived or died—my feet swollen out of all shape, my hands and face torn with thorns, and my whole person caked with mire. I was nearly dead through hunger and fatigue, and on the evening of the eighth day and morning of the ninth was quite delirious for a time. Then I knew the end was near, and determined to make one more bid for life. In the valley there happened to be two small villages of four to six huts each, peopled by Lissoos, a sub-tribe of Tibetans, and I decided on holding up one of these, to force the inhabitants to give me food. This plan I carried out on the evening of the ninth day. Fortunately, instead of opposing me, the people proved friendly. The one and only food of these people consists of parched barley, or wheat coarsely ground ; it is called " tsaniba." This they offered me, and having but little self-control, after such a long starve, I partook of it ravenously, in fact to such an extent that I almost died of the effects. As it was, to add to my trials, I brought on inflammation of the stomach, from which I suffered for many months. The headman of the village proved one of the best friends I ever had, and at once commenced making arrangements to smuggle me out of the country. After four days spent in restful hiding, we descended the valley until we reached its junction with that of the Mekong. Here we were met by the headman of a village situated there, and he informed us that though the majority of the rebels had returned north, there were still many powerful bands scouring the countryside in search of me ; in fact, one had spent the previous night in his village. He suggested we should go into hiding until after sunset, when he would send out some of the native hunters to escort us to a farmhouse a few miles distant, where we could spend the night in peace ; then, on the following day, with guides he would send to me, I was to ascend west to almost the summit of the dividing range, and

Courtesy of Country Life

ASTER FORRESTII

Photo by
George Forrest

THE
WATERFALL AT
TENG - YUEH



Courtesy of Country Life

RHODODENDRON RADI(

Courtesy of
Country Life

OMPHALOGRAMMA
ELEGANS

striking south we should skirt the troubled region and thus reach safety. This plan we eventually carried out, but the misery of all is entirely beyond my powers of description. It was the middle of the rainy or summer season, and I soon found myself in the thick of the worst downpour Yunnan had known for a generation. Up and up we climbed, struggling through cane-brakes, cutting our way through miles of Rhododendrons, tramping over alps literally clothed with Primulas, Gentians, Saxifrages, Lilies, etc., for these unknown hillsides are a veritable botanist's paradise, till we reached the snow-fields on the backbone of the range, at an elevation of from 17,000 to 18,000 feet. We had no covering at night ; no food but a few mouthsful of parched barley, and the rain and sleet fell in such deluges that to light a fire was impossible. On reaching the summit we turned south, travelling in that direction for six days, over glaciers, snow and ice, and tip-tilted, jagged, limestone strata, which tore my feet to ribbons. On reaching this point, we hoped we had got beyond the danger zone, and commenced our descent eastwards towards the Mekong. Down, down we went, over sharp, jagged rocks and through bamboo brakes, until we reached the inhabited zone at about 9,000 feet, and here, to put the finishing touch to my misery, I seriously hurt one of my feet. Round most of the villages, the inhabitants are in the habit of placing on the paths around their maize fields what they name " panji." These are sharpened and fire-hardened pieces of bamboo of 12 to 18 inches in length ; they are buried in the ground fully three-quarters of the full length, the sharpened end being upwards, and covered loosely with soil or leaves. In approaching one of the villages by an exceptionally muddy path, I unfortunately stepped on one of these " panji." Had I been in a normal condition of health, I might possibly have had strength enough to have thrown myself back in time, but I was so weakened by the experiences I had passed through and by exposure, that I simply fell forward on it ; the spike, fully an inch in breadth, passing between the bones of my foot and protruding a couple of inches from the upper surface. I suffered excruciating agony for many days, and it was months before the wound healed completely.

Finally, we arrived on the right bank of the Mekong opposite the large village of Yetche. The chief of this village was a friend of mine. My troubles then were almost over. This excellent man

came across the river, at great risk to himself, bringing clean cotton cloths for me, besides a large quantity of food, such as pork, eggs, chicken and cakes, and at last I got what I required even more than those, a change of clothing, a good wash and a night's rest.

As bands of Lamas were still prowling about near Yetche, disguised as a Tibetan and accompanied by my faithful guides and others, I continued my course down the right bank of the river, till four days later, I arrived opposite the little Chinese-Tibetan township of Hsias Wei Hsi, where Chinese troops were stationed. After much delay, everyone, even there, being panic-stricken, I managed to get some of the people to come down and assist me over the single rope crossing the river at that point, and on reaching the town found another missionary (Père Monbeig) who had also escaped from a station in the west. He and the Chinese officials welcomed me as one returned from the dead, and a few days later, he and I, accompanied by an armed escort of 200 Chinese soldiers, commenced our journey south to the nearest city—Talifu—which we reached in safety in the course of 19 days.

Later, I received from the military mandarin, named Li, a detailed account of the death of my two companions. As I mentioned, I saw Père Bourdonnec shot down ; later the body was disembowelled, beheaded and quartered.

Père Dubernard escaped for two days, but was eventually run to earth in a cave farther up the valley. His captors broke both arms above and below the elbow, tied his hands behind his back, and in this condition forced him to walk back to the blackened site of Tzekou. There they fastened him to a post and subjected him to most brutal mutilation ; amongst the least of his injuries being the extraction of his tongue and eyes and the cutting off of his ears and nose. In this horrible condition he remained alive for the space of three days, in the course of which his torturers cut a joint off his fingers and toes each day. When on the point of death, he was treated in the same manner as Père Bourdonnec, the portions of the bodies being distributed amongst the various lamaseries in the region, whilst the two heads were stuck on spears over the lamaserie of the town of Atuntze.

I was reported dead for almost three weeks, but, fortunately, though there seemed no reason to doubt the authenticity of the in-

formation, the news was withheld from England for a time by the Consuls and the authorities at the Foreign Office, on the chance that I might have escaped ; thus my family mourned my loss for only a week.

Although escaping with my life, I lost everything I possessed, all my camp equipment, amunition and guns, cameras, stores ; in fact, my all with the exception of the rags I stood in, my rifle, revolver and two belts of cartridges.

What was much more serious, I lost nearly all the results of a whole season's work, a collection of most valuable plants numbering fully 2,000 species, seeds of 80 species, and 100 photographic negatives. It is difficult to estimate the value of such a loss ; coming from an entirely unexplored area, probably one of the richest in the world, there was undoubtedly a very large percentage of new species. I had sent scraps of specimens home in my letters, and about a dozen of those, or one-third of the number, proved to be new species.

GEOGRAPHICAL EXPLORATION WITH MR. LITTON.

(G. FORREST—1908.) *

The death of Consul Mr. Litton before he could present an account of the 1905 expedition to the Upper Salwin, to the Royal Geographical Society, of which he was a Fellow, thrust upon Forrest the onus of presenting Litton's paper to that Society. Forrest's words in1 908, when doing this, indicate what manner of man he was.

" The journey was distinctly made under the leadership of Mr. Litton."

" The paper is a joint composition of Mr. Litton and myself. The paper as submitted is changed in some respects, necessarily, owing to his death, but I am especially anxious that my friend's major share should not be ignored."

The journey was made with two objects, the first to discover whether the Salwin and Irawadi dividing range formed a distinct geographical and ethnographical boundary between north-west Yunnan and south Upper Burma, the second to explore that portion of the Salwin valley lying between 26° and 27° 30′ N. lat.

They left Teng-Yueh on 11th October on their way to Pien-ma, suffering delays of days at a time from deluges (one of sixty hours), landslips, broken bridges and other results of the weather.

Pien-ma and Tsu-yu-ho are two villages nominally subject to the Chinese headman of Teng-keng, on the Salwin, but situated to the west of the divide, which is claimed as the British eastern frontier.

" Having heard all about Pien-ma politics, we moved east over the Irawadi-Salwin divide by the lonely but beautiful Pien-ma Pass, where the swollen waters caused us much trouble. From the village of Ku-tan we turned north, and on October 30 reached the village of Lu-chang, the residence of a semi-Lissoo chief, where Mr. Litton had camped in April. This we intended making our base for exploration further north.

" From Lu-chang we sent back the baggage animals and proceeded on foot for three marches northwards—32 miles by the track, but only about 14 as the crow flies. The path leads up and down over a series of ridges descending from west to east down to the Salwin from the N'Maikha divide. To negotiate these ridges

* Reproduced from the " Geographical Journal," September, 1908, by the courteous permission of The Royal Geographical Society.

Photo by George Forrest
Courtesy of The New Flora and Silva

RHODODENDRON RACEMOSUM
Growing on a hillside in Yunnan

Courtesy of
Country Life

OMPHALOGRAMMA
VINCIFLORUM

Courtesy of
Country Life

IRIS
FORRESTII

is a trial of strength to the traveller's legs. Thus, starting from Lu-chang, at 6,400 feet, there is a steep drop of 3,300 feet to the Salwin in 4 miles ; then follows an ascent of 4,000 feet, through grass and pine forests to the top of the ridge, 800 feet above the scattered village of Mao-chao (14 miles from Lu-chang), which, like Lu-chang, amongst its log and bamboo huts boasts one tiled house, the so-called *yamen*, the residence of the hereditary native chief. From Mao-chao there is a rough track which, after some steep ups and downs, plunges down 1,500 feet to a tropical jungle of palms and lianas, through which runs one of the mountain torrents which are the only tributaries of the upper Salwin. Then a precipitous climb of 900 feet, through cultivated patches, leads to the ridge of Shih-pai-li-ti (6,700 feet, 10 miles from Mao-chao). Between Shih-pai-li-ti and Pei-pa (8 miles) there is an even steeper gully, the bottom of which is 2,000 feet below the level of the ridges.

" In all this country the villages are scattered along the opener sections of the ridge tops, or on natural terraces in the mountains at from 5,000 feet to 7,000 feet. About 7,000 feet to the top of the divide the country is too steep and rocky, and the forest too dense, to admit of villages or cultivation ; below 5,000 feet the country is too malarious, but every village has its patch of rice-fields 2,000–3,000 feet below it by the banks of the Salwin, whither the inhabitants descend to sow and reap much as they did in the time of Marco Polo.

" One and a half miles distant from Pei-pa, but 1,300 feet below it in altitude, is Cheng-ka. Here there is a large open bay in the hills at 3,400 feet, admitting of irrigation for some hundreds of acres of paddy land ; the people are thus able to live near their fields, and are in a comparatively flourishing condition, possessing flocks of goats and droves of swine. Cheng-ka, like all the villages along this part of the Salwin, occupies a site commanding splendid views. Far below, the river can just be seen ; beyond it to the east rise the vast and varied slopes of the Salwin-Mekong divide, dotted with maize-fields and villages ; while behind, to the west, tower the sharp ridges and forest-clad heights of the Irawadi parting. The inhabited or temperate zone of the range, say from 5,000 feet to 7,000 feet is thickly cultivated with maize ; and groves of pine, oak and flowering shrubs, with hedgerows, covered in autumn with clusters of trailing lilac-rose coloured Crawfurdia, pleasantly diversify the view.

" As Cheng-ka is the farthest point north where the authority of the Chinese chiefs is more than a myth, I may here give some account of the inhabitants of that section of the Salwin (25° 50′ to 26′ 30′ N.) which belongs to these hereditary *Tu-ssu*, or chiefs.

The people are all Lissoo, but with a strong admixture of Chinese blood. The men dress in Chinese fashion, but the women, while adopting the Chinese cotton cloth, retain the petticoat and profuse decoration of head, bracelets, necklaces and armlets, which is so characteristic of the true Lissoo garb. Few of them can speak any Chinese except the chiefs and their families. The people hardly go beyond their own villages and seem to live quiet happy lives, only disturbed by the occasional difficulty of getting food, and by the trouble and petty exactions which attend the work of collecting the chief's tribute, or house-tax of half a tael per year. The usually peaceable condition of this portion of the valley is no doubt partly due to the general absence of interference by the Chinese mandarins, which is owing to the fact that the country is too poor to be worth squeezing.

The upper Salwin as far as Cheng-ka had previously been visited by one European, namely, Mr. Litton ; beyond, as far as 27° 30′ N., all was *terra incognita.*

" Starting from Pei-pa on November 2nd, and passing through the Cheng-ka paddy fields, we descended by a rough track through uninhabited and almost uncultivated country to the ruined guard-house of No-li-ka (7 miles) and then a scramble through high grass and jungle brought us down to the mid-day halt at a sandy bay by the waters of the Salwin, which here flows at an altitude of 3,400′ ; the altitude at the suspension bridge, lat. 25° N., is 2,700′, a little south of lat. 27° N. it is 4,000′ while at Kion-ra, in lat. 28° N., Père Genestier of Tsekou gives it as 4,900′. In this section of its course, the Salwin at low water varies from 90 to 130 yards in breadth and is of great depth. There are no falls, but between 26° 15′ N. and 27° N. there are constant rapids, at some of which the river is contracted to 80 yards. The volume of water in the rains is enormous ; we found unmistakable signs of the river having risen, in August, 1905, over 40′ above its November level. In the fine season the water is intensely cold. From a point above 27° 30′ N. down to Teng-keng the river is confined, not indeed between precipices, but between a series of steep

ridges falling down in endless succession both from the Mekong and Irawadi divides to the Salwin. In many places these ridges have a final sheer drop to the river of 500 to 1000', so steep that it is impossible to pass along their base.

" The basis of the rock formation of the upper Salwin is limestone and the strata of the higher slopes are tipped up so as to point to the sky. There are other evidences of cataclysms and volcanic activity to be found in the boulders strewn along the banks, among which, gneiss, marble and quartz are to be found at every turn. It is said that the Salwin valley is the result of erosion. I think this improbable ; but the geology of all this most interesting region demands a competent man of science to describe it.

" Animal and bird life along the upper Salwin is conspicuous by its absence—an important matter for the traveller, who cannot count on replenishing his larder with game. On the other hand, the river banks at a low altitude, and where wholly sheltered from the north winds, have an almost tropical climate, and vegetable and insect life is both vigorous and troublesome. Creatures with inconveniently long legs plunge suddenly into one's soup ; great caterpillars in splendid but poisonous uniforms of long and gaily coloured hairs arrive in one's blankets with the business-like air of a guest who means to stay. Ladybirds and other specimens of *Coleoptera* drop off the jungle down one's neck, whilst other undesirables insert themselves under one's nether garments. The light in the tent attracts a perfect army of creatures which creep, buzz, fly, crawl and sting. Scissor insects make the day hideous with their strident call, and the proximity of Lissoo coolies introduces other strangers, of which *Pulex irritans* is by far the least noxious. The mere act of walking in this country is a work of much physical exertion. The villages under the Chinese chiefs have a laudable custom of cutting out their roads every year after getting in their harvest, but in the country north of Cheng-ka constant feuds between neighbouring villages prevent this useful work ; the paths are narrow tracks choked with the luxuriant growth of the previous rains, slippery and lop-sided, and as often as not leading along the brink of a precipice. In some places we had to haul ourselves over boulders by pendant branches, or scramble along the face of the cliffs by notches in the rocks, more suitable for monkeys, Lissoos, or other creatures gifted with more

prehensile feet than a European.

" Poisonous-looking scarlet fruits hang from the overarching jungle ; lianas and tree-roots trip up the unwary traveller ; if he catches the nearest plant to save himself, the chances are that it is a stinging nettle of the size of a laurel, and poisonous in proportion. In some places, especially around maize-fields, the natives provide a further diversion in the shape of " *panji* " or hard pieces of sharp-pointed bamboo, which are driven into the ground amongst the grass, and will, if trodden upon, pierce even through a leather boot and deep into the foot. It is only when the traveller, scratched, bruised and with torn clothes, emerges on to a quiet sandbank by the river, or on to some open terrace high above it and finds the camp fire lighted, the tents pitched, and a pailful of hot water ready for a bath, that he begins to think that exploring the Salwin is a game worth the candle.

" But the scenery of the upper Salwin can never be forgotten by anyone who has wondered at it in the rich sunshine which prevails after the autumn rains have given way to the first touch of winter. The great variety of rock formation, the abundant forests and vegetation, and the diversity of light effects between the summits of the ranges (at 10,000 to 13,000') and the abyss in which the river flows produce a vast panorama of ever-changing beauty. In the morning, the sun, as it touches the top of the Mekong divide, sends wide shafts of turquoise light down the side gullies to the river, which seems to be transformed into silver. The pines along the top of the ridges stand out as if limned by the hand of a Japanese artist. In the evening all the wide slopes of the Mekong side are flooded with red and orange lights, which defy photography and would be the despair of a Turner. The traveller whose fortune it has been to explore the great rivers of this, our north-east Indian frontier will admit that the Salwin, while it is inhospitable, difficult and barbarous, far exceeds in natural beauty all the valleys of the sister rivers, the Yang-tzu, the Mekong or the Irawadi.

" Continuing our march from the sandbank below No-li-ka (7 miles from Pei-pa) we toiled up a steep slope to the terrace and village of Shih-chi-de, 1,500 feet above the river ; here we had a good reception from the Lissoo, deputations from several villages round about offering us small presents of eggs and rice. Every one seemed to know who Mr. Litton was, and it was evident that the fair treat-

ment which the porters and others employed by the party during the spring had received, had been passed along and had had an excellent effect on the natives of the valley. From Shih-chi-dé northwards the people were clad in the Lissoo style, and few or none could speak Chinese.

" On November 5th we continued at about 1,500′ above the river, with a series of limestone peaks to the west on the left of us. On clearing the top of the ridge to enter the gully of Mi-wo, we found ourselves confronted by a deputation of warriors armed with huge crossbows, and headed by the local " ni pa " (prophet or medicine man). He produced a paper scrawled over with rude imitations of Chinese characters, and declared that he had received instructions from heaven to go and kill somebody, and that he thought the headman of Cheng-ka was the most suitable person, but he desired our advice. We strongly recommended him to go home and see to the grinding of his maize crop."

They passed small villages called Mi-wo, in its narrow gulley, Tu-mo and Hsia-ku-de.

" Along the road we met a number of warriors hastening to follow the prophet to Cheng-ka . . .

" Several of them left the war path to escort us on our way and after seeing a twelve shot repeating Winchester rifle fired, desired our alliance and assistance in the projected raid on Cheng-ka."

From the top of a rise the travellers looked across a precipitous valley to the peak of Yako. " This is a great tooth of limestone, 9,400 feet high, rising sheer from the river bank. It forms a conspicuous landmark as far off as Mao-chao. At its south base flows a considerable mountain stream, to which we had to descend by a breakneck track from Ta-wo-dé. The slopes of the descent were clad with masses of the trailing Crawfurdia referred to above.

" We crossed the Yako stream at 4,500 feet, a descent of 2000 feet from Ta-wo-dé, by a rickety bridge, consisting of a single undressed sapling thrown across, slung on strips of cane, with a banister of pieces of liana. Then a climb by a rude ladder up the face of a cliff brought us to the half-dozen houses which formed the village of Yako. This march was through country wild in the extreme, the lower slopes of the hills being covered with long grass, while above towered an immense variety of limestone crags and peaks, rising up

towards the Irawadi divide."

They proceeded on their way to Ku-tou-wa-dé where there is a single rope bridge across the stream.

" These single rope bridges of the upper Salwin are far more difficult to cross than the double ropes of the Mekong, by which the passenger always starts from a higher level than that at which he lands on the other side and is thus rapidly carried across by his own weight and with little or no exertion. On a single-rope bridge however, after having been trussed by cords on to a runner, it is necessary to haul one's-self across hand over hand ; as one is tied with face to the sky and back to the water, this is a difficult operation. As the Salwin ropes are made of very roughly twisted cane, there is always the chance that the whole affair will break in the middle, and the certainty in any case that one will arrive on the opposite side with hands full of painful splinters off the rope.

" Since leaving Hsia-ku-dé, we found that the country increased in wildness every march, and the inhabitants in squalor, poverty and barbarism."

They had unexpected and unwanted experiences of seed collecting.

" The vegetation in that part of the country is almost as great a nuisance as the insects. Every sort of seed attaches itself to one's person ; some are provided with hooks, others with natural gum, others pierce the skin or work down under one's socks. An hour's march leaves the traveller caked with the seeds of enough plants to form the material of a work on the methods of the natural dispersal of flora."

They came to a stream over which they decided to transport the whole party to the left bank.

" Meanwhile the people of the village on the right bank, where we were camped, had heard of our arrival, and came down to see us, and a wild lot they were. It then appeared that there was a feud about this rope bridge between the two villages on the right and left banks respectively, each party claiming that the right and profit of assisting travellers across belonged to them alone. We offered to give an equal present to both parties, but when our friends from the left bank returned with the runners, we saw at once we were in for a serious disturbance. The right-bank party was led by a bullying savage, who

shouted that the left-bank party should not help us across. The lefts had rashly left their arms on the other side, but proceeded to tie up one of our loads for the passage ; whereupon the leader of the rights whipped out a poisoned arrow and shot it from his bow over our heads, into the river—a sign, like Mr. Snodgrass taking off his coat, that he was about to begin. As we were all crowded together on a narrow path, near a tree to which the rope bridge was secured, and the bellicose Lissoo was about to draw his bow again with an arrow in it which might find a billet in the body of any of us, the situation was critical. Mr. Litton and I at once rushed him, and I fired several shots from my Winchester repeater over his head at a boulder on the other side of the river. The effect of seeing the bullets smash against the stone at such a distance was immediate, and then, through our interpreters, we told the man and his friends, that if they made a show of stringing their bows again, the next bullet would find a resting place in some of their carcases."

Then, having safely crossed the stream " we pitched our camp together with our friends from Lo-ma-di who expatiated on the savagery of the low people who lived on the right bank and promised a hearty reception at their own village next day."

Next day from a small plateau in the midst of paddy fields of the village of Lo-ma-di they saw a most interesting view which helped to solve one of the objects of the expedition.

" As far as the eye could reach which was as far as lat. 27° 40′ N., we at the time being in lat. 26° 55′ N., we could trace the almost direct north-and-south course of the river, and the succession of ridges falling down from the high ranges to the river from the east and west divides, in a manner so regular as to suggest the ribs of a vast skeleton. This view showed conclusively that there is no plain or open valley in this section of the Salwin, as was supposed, and that the character of the country for a long distance to the north of us was the same as that through which we had just passed.

" The attentions of the crowd at Lo-ma-di became so embarrassing that we resolved to push on into the mountains. Marching south-east by an excellent path through oak scrub, we halted for the mid-day meal at the hamlet of Ji-Ji, situated at 7,200 feet on an open shoulder of a wide ridge commanding extensive views down the mountain ranges to the south.

" The men of Ji-Ji were at war with their neighbours, and, indeed we watched the progress of the fight during our tiffin. The *causa teterrima* was the theft of some ' pao-ku ' i.e., maize, and a whole army corps, consisting of some fifty warriors, had been mobilized. These fellows, with their grotesque ornaments of silver, deers' horns, pebbles, and cowries, their blackened faces, their flowing hempen robes, their war-bows 5 feet long, their war-swords 5 feet long and their broad ox-hide shields 5 feet high, moving in a line beyond their village, presented an image of the ' pomp and pride and circumstance ' of war. The enemy occupied a position higher up on the hill, and a fierce bombardment of opprobrious epithets was maintained, but neither side got further than swearing and stringing bows until the time arrived for the afternoon meal, when the combatants dispersed to their respective homes, from which we judged their wars resembled those of Tweedledum and Tweedledee, ' who felt that they must fight for half an hour, and then have tea.'

" Ji-Ji was the last village on the path leading up to Mekong-Salwin divide, which we now determined to cross.

" The pass is a bare wind-swept *col*, approached by a rocky path from an open alp at 10,500 below which is bamboo brake and pines, at 12,500 feet above the level of the sea and was 20 miles from the Salwin.

" Unluckily mist was being blown along the ridge, and this obscured our view, but several bare limestone peaks were seen rising 1000 to 2000 feet above the pass. The men were all benumbed by the intense cold, and at the first sheltered spot, some 500 feet below the summit, we lit a roaring fire of bamboos, and enjoyed, so far as the drifting mist allowed us, an immense view of the Lichiang and Tali prefectures beyond the Mekong.

" Camp was made in a wood near Houtzu-ngai (anglice-Monkey Cliff—note the onomatopoeic character of the name) over 5,000 feet above the Mekong after a march of 15 miles.

They turned south, struck an excellent high level road and found themselves in Minchia whence ' Ying-pan bazaar could be seen across the river far below us.'

Some of the Lissoo porters were sent down to the bazaar " while, we, having observed some paddy fields, varied with patches of scrub, which foreshadowed *Phasianus elegans*, went out to forage with the

ANDROSACE SPINULIFERA

Courtesy of Country Life.

RHODODENDRON REPENS

Photo by George Forrest

RHODODENDRON GIGANTEUM

The name of Rhododendron giganteum is based on the colossal proportions the plant attains. This can be appreciated from the size of the trunk of a plant which the collector's men are seen cutting up. The age of a museum specimen has been calculated from the annual growth rings to approximate 250 years.

guns, and secured a welcome addition to our larder of six brace of fine pheasants. Our men came back in the evening not more than reasonably drunk and laden with supplies. We were therefore in a position again to face the terrors of the foodless Salwin, and the headman of Pu-mu-tou volunteered to guide us up to the divide by a different pass from that by which we had come, on condition that we would not expect him to approach any of the villages of those terrible wild Lissoo.

" This part of the upper Mekong differs widely from the Salwin valley in the same latitude. Instead of sharp crags and cliffs of limestone, dense semi-tropical jungles, extensive forests, and wild Lissoos with their poisoned arrows, we viewed a peaceful scene of wide, bare, cultivated slopes of clay or disintegrated sandstone, shelving down in terraces to the river below. The basin of the Mekong at this point is twice the breadth of the Salwin, though the altitude of the latter river is 1,000 feet less. The people like the scenery, are altogether less wild, than on the Salwin.

" From Pu-mu-tou we ascended a spur, through oak scrub and over grassy slopes, rising in the day's march from 7,400 feet to 10,500 feet on the slope towards the Salwin divide. At this altitude there was a superb view of all the great ranges of north-western Yunnan east of the Mekong, from Talifu to the borders of Tibet. Most of these north-western Yunnan panoramas are dominated by the glittering snow-mountain of Lichiang ; and from the altitude we had reached, Mr. Litton saw, for the first time, the peak which I described to him after my return from my journey down the Chung-tien plateau. He estimated the height as being very near to what I put it down as, 22,000 feet. It forms the end of that part of the Lichiang range which extends up the eastern side of the plateau to the north of the Yang-tzu river. It is unknown and unmapped.

" After an intensely cold night on the mountain-side at 10,500 feet, we proceeded, on November 19th, up the pass, which for the first time was traversed by European feet. The path, after topping a spur, lay through pine woods deep in snow, and then over a frozen black marsh surrounded by tall sombre firs, whose dark green foliage stood out against the snowy slopes of the pass and the deep blue sky above. Then an ascent through Rhododendron scrub, and over a bare down, where we passed a number of wild Lissoo going down to

the Mekong to barter for salt, brought us to the summit of the pass, 12,300 feet.

" Here a surprise awaited us, for the view to the west was perfectly clear, and the whole of the great Salwin-Irawadi divide was spread out before us. From a little below the pass this range could be followed to the north as far as the eye could reach, until, at a distance of about 100 miles from where we stood, and in approximate lat. 28° 30′ N. it was merged in a huge range of dazzling snow-peaks, trending west-wards. This range is doubtless the east source of the Irawadi, and forms the divide between it and the Zayal, the Brama-putra system.

" The upper slopes of the Salwin-Irawadi divide, which we saw spread out before us, resemble a vast wall. The trend of the range is most regular from north to south, and there are no very conspicuous peaks. The average height of the summits in this latitude, 26° 55′ N., would be probably 12,500 feet to 13,000 feet. There was practically no snow on it in November.

Below the wall-like ridge which forms the backbone of the range, limestone spurs, crags and precipices in bewildering confusion fall down to the Salwin. It was easy to see why the upper slopes of the range are uninhabited, and why this mountain barrier is an ethnographical boundry between the Lissoo and Kachin races."

After scares of alarming news of murder, fighting and riot they reached the rope bridge at their old camp at Ku-tou-wa-de only to find the scares groundless but " what was more alarming was the serious inroads of fever among our little party, exhausted by the labours of a flying march ; two very bad cases had to be carried on the backs of two of our coolies, and our stock of drugs was soon exhausted. Luckily, we got through without the loss of a single life, and by forced marches returned to the base camp near Lu-chang on December 1st, in good spirits, if in ragged clothes.

" We ultimately discovered the truth of the disorders at Cheng-ka. It appeared that our friend the prophet at Mi-wo, whom we had met on the warpath on our way up the Salwin, had not taken our advice to go home and pound his maize. A number of the young men of Mi-wo, Hsia-ku-de and the surrounding villages, some of whom had escorted us and endeavoured to inveigle us into an entangling alliance, finding, ' in these hot days the mad blood stirring,' had raided the

Cheng-ka paddy plains, with a view of capturing the Sawbwa's uncle, who, however escaped in time across the Salwin. The raiders thereupon speared one of his poor relatives, and—a far more serious offence, broke into the princely piggeries and did bloody execution on the porkers therein. They then camped and celebrated a Homeric feast. The Lao-wo chief hearing of the horrid disaster which had befallen his uncle's pigs, hastened across the Salwin, and the neighbouring headman of Lu-ku and Mao-chao also came to the rescue. It appears that the raiders were caught drunk, and three or four killed, while the rest dispersed. Finally, the unusually energetic Yung-Lung official (sub-prefect) from beyond the Mekong, seven mountainous stages distant, hurried on the scene with a dozen men, the nucleus of the 3,000 of whom we had heard and took up a defensive position at Cheng-ka. The news of this so alarmed the Hsia-ku-de and Mi-wo folks that they deserted their villages which Lao-wo claims, but which do not recognize his authority. Lao-wo endeavoured to levy double tribute from Hsia-ku-de, whereupon the Hsia-ku-de headman lifted twelve of Lao-wo's cattle. Lao-wo retaliated by kidnapping the headman's son and seizing his salt. Then the prophet began hearing noises, and even a prophetess appeared near Hsia-ku-de. We ourselves had dealings with this dirty Cassandra ; she conferred on us a small pig and a charm, in return for eight two-anna pieces and a silver bangle. Thus the trouble grew, after the usual manner of a frontier case where there are no British officers to settle it.

" Before returning from Cheng-ka to Teng-yueh, we had, on November 26th, moved camp to 9,200 feet up a grassy ridge above the Irawadi divide at this point. From our camp above Pei-pa we toiled up some steep slopes, which were clothed with large patches of virgin forest and bamboo brake, varied by grassy downs.

" On reaching 11,000 feet we saw before us a bare wall of limestone crags which forms the Irawadi divide, but, as usual in the complicated formation of this range, the ridge up which we had climbed did not go straight to the top, but turned off in a northerly direction, being cut off by a stream from the main range. The track followed a line parallel to the divide. It was a mere goat-path and very difficult in places where it crossed some slippery cliffs. After a long march of five and a half hours from camp, or eight and a half

from Pei-pa, we plunged into a pine forest, thence into a bamboo brake, and crossed the stream which divided us from the final arete, a stony upland leading to a *col* of 13,000 feet between two lofty crags of limestone. This pass above Pei-pa is uninhabited, and only used by a few scattered Lissoo householders living on the upper part of the Irawadi slope, and occasionally by salt porters. It is too wild and difficult to be a regular line of communication even for coolie traffic. It is called the Chi-mi-li pass.

" Having concluded this final bit of exploration, we returned without mishap to Teng-yueh, which we reached on December 13th."

* * * * *

It is regrettable that owing to limitations of space, the " Remarks on the Lissoo Tribe of the Upper Salwin " (op. cit) which follow cannot be set out in full here as they are distinctly worth-while reading from the entertaining manner in which anthropological facts pertaining to the distribution of the people, their lives, cultivation and weapons are set out.

Courtesy of
Country Life

PRIMULA
SECUNDIFLORA

Courtesy of
Country Life

GENTIANA
SINO-ORNATA

PRIMULA LITTONIANA
Growing naturally in China

Photo by George Forrest

Courtesy of
Country Life

ALLIUM
YUNNANENSE

NOTES ON CERTAIN FORRESTIAN INTRODUCTIONS.

The full list of plants introduced into cultivation in this country as a result of the Forrestian explorations has yet to be compiled and it is wellnigh impossible to make a selection of such introductions which would meet with general acceptance. The mention of one plant naturally brings others to mind, and the character of any one plant, or type of plant, appeals in varying degree to different observers and cultivators.

There are, however, certain groups, which have general appeal and there are also certain plants which draw favourable mention from the collector. Notes on such as these seem worthy of record.

As an instance of this, concerning Nomocharis, the writings of Reginald Farrer in his own inimitable style are the best known and quoted concerning this genus, but the credit of introducing Nomocharis into cultivation must be given to George Forrest.

He had collected in the 1904-6 expedition, material from which *N. saluenensis*, *N. Souliei*, *N. leucantha*, and *N. lophophora* were ultimately described as well as material of one previously described species, *N. Mairei*.

Under Professor Balfour's initiative, the Royal Garden at Edinburgh became the home of work with material of *Nomocharis* in Britain. As a result *Nomocharis leucantha* was flowered in this country in 1914, from material collected in 1906 and 1910, down to 1917-18-20-21, on the eastern flank of the Tali Range where it was growing in grassy situations on the margins of pine forests.

In 1910-13 he collected specimens of *Nomocharis leucantha*, *N. lophophora*, *N. Souliei*, and *N. aperta*, all named from his material as well as of *N. pardanthina* and *N. Henriei*, two previously described species. As a result of those gatherings there was shown, at the R.H.S. Hall in London, on the 6th June, 1916, a flowering plant of *N. pardanthina* which had been raised from seed No. 5816, collected in 1910.

Later, in 1918, he collected material from which yet another species was described by his colleagues in Edinburgh, *N. euxantha*.

Over fifty gatherings of Nomocharis were made, and perusal of Vol. XV of the Notes of the Royal Botanic Garden, Edinburgh, and Vol. XXVII, part III, Transactions of the Botanical Society

of Edinburgh will give details of Forrest's observations on his collections of these species as inscribed on his " Field Tickets."

The most striking revelations in Primula character appeared when he collected material, in 1906, of *P. Forrestii*, a plant with a woody root stock about a yard in length, which hung from limestone cliffs in pine forest on the eastern flank of the Lichiang range, (No. 2117), and also material of a Primula growing in moist mountain meadows at 10-11,000 feet, bearing upright, foot-long spikes of fragrant blue flowers which emerged from scarlet bracts. This striking plant (No. 2655) found in August, 1906 was named after his friend, Consul Mr. Litton, *Primula Littoniana*.

Gentiana sino-ornata was first discovered by Forrest in 1904 in E.N.W. Yunnan where it was collected at 14,000-15,000 feet. It was not, however, until a later collection in 1910 that the plant was introduced, flowering for the first time at Edinburgh and Ness, in 1912. When the first plant flowered, it was named, by Forrest, *G. ornata*, but was subsequently designated *G. sino-ornata* by Professor Balfour in the Trans. Bot. Soc. Vol. 27, 253.

The natural habitats of *G. sino-ornata* are generally moist, alpine meadows and the borders of streams.

Of the many thousands of plants that Forrest collected, this will always remain as one of his finest introductions, not only as a garden plant, but as one of the finest of a beautiful genus.

It has been found that plants from one region in Yunnan, such as the meadows or the mountain-sides are not all equally hardy when introduced into this country. As a consequence certain groups of plants have been successfully established in quite different parts of Britain. Whatever may be the cause of this, and conjecture arraigns soil, exposure and climate (range of temperature and rainfall) as the main controlling factors, the following facts have emerged.

The species of Meconopsis, Primula, and the dwarfer Rhododendrons seem to have thriven best, so far, in the cool climate of the south and east of Scotland, whereas the best specimens grown in cultivation of many of the introduced trees and shrubs, including the large-leaved Rhododendrons are to be found in the more congenial climates of the south of England and Ireland.

Forrest's use of the term " suitable for alpine gardens " (vide p. 64) is apt to be misunderstood in some parts of this country, where

it is followed by references to plants which are neither sufficiently hardy, nor of a suitable size for such gardens.

In connection with the trees and shrubs, which loom so large in any garden, and the collector's comments upon them, it is interesting to note that Forrest considered, at one time, that the Magnolias were one of the finest groups of shrubs for horticultural purposes, giving special mention to *M. conspicua* and *M. Delavayi*.

Splendid plants of *Catalpa* were found by him to be in cultivation generally over the province of Yunnan, where they formed trees 50-80 feet in height, and having a hard, durable, yellow timber which was much in demand for domestic purposes. Other good timber trees, incidentally, utilised by the Tibetans, are *Populus tibetica* and *P. lasiocarpa*, said to be common forest trees on most of the ranges north and west of lat. 26° N.

Those delightful early-flowering bushes, the Viburnums, range from the Himalayas into China, as varying forms of *V. venosum*. Forrest considered *Pieris Forrestii*—an ally of *P. formosum*—to be the showiest of that genus, and the most attractive of privets to be *Ligustrum ionandrum*.

The largest flowered honeysuckle, the Chinese honeysuckle, *Lonicera Braceana* he found bearing trusses of overpoweringly-scented blooms, each about 3 inches long. This plant grows to perfection in the Rhododendron House, Royal Botanic Garden, Edinburgh.

Of those beautiful flowering shrubs, *Styrax*, he gave the palm to *S. shweliense* and *S. langkongensis*, and found quite a few species of that charming family *Enkianthus*.

Buddleia Forrestii, which he records as delighting in country of limestone formation, is a noticeable addition to that genus which he also augmented by the introduction of *B. Fallowiana*.

He collected a Jasmine with light crimson flowers, the tubes of which are a much richer shade, *J. Beesianum*. Also what he considered to be the finest birch of all. It is the variety of *Betula Delavayi* which has been named after him.

That handsome spruce, *Abies Delavayi*, was introduced into cultivation from seed collected by him in 1922.

The species of the genus *Pyrus* of which *P. yunnanensis* is the finest, give place, apparently, on the higher alps of Yunnan to those

of the genus *Sorbus*, the most admirable of which is *S. Wilsoniana.*

Daphne aurantiaca is frequently mentioned in his writings, and also a member of another race, which grows in the Rock Garden at Edinburgh—the tea plant—*Thea Forrestii.*

The holly-leaved spindle, *Euonymus ilicifolia*, is favourably mentioned for making a compact and ornamental mound of glossy leaves, while what he considers to be the most strikingly beautiful tree of the frontiers, uprising to sixty feet in height, with delicately-coloured foliage, and bearing clusters of deep crimson fuschia-like flowers, is a species akin to *Rhodoleia Championi.*

These are only a few, and the names of many times as many more will spring into mind. It is felt however, that few people will cavil at the appended list, the plants of which have been chosen not only for their distinctive beauty but also for the comparative ease with which they may be cultivated.

TREES AND SHRUBS.

Abies Delavayi, Abies Georgei, Acer Forrestii, Buddleia Fallowiana, Clematis chrysocoma, Gordonia chrysandra, Osmanthus Delavayi, Pyrus Harrowianus, Rhododendron Forrestii, R. Griersonianum, R. hippophaeoides, R. impeditum, R. lacteum, R. muliense, R. racemosum, R. radicans, R. repens, R. saluenense, R. tephropeplum.

HERBS.

Adenophora Bulleyana, A. coelestis, A. Forrestii, Allium Beesianum, Allium yunnanense, Androsace Bulleyana, Androsace spinulifera, Anemone glaucifolia, A. rupicola, A. vitifolia, Aster Delavayi, A. Forrestii, A. staticifolia, Codonopsis Meleagris, Cyananthus Delavayi, Cyananthus incanus v. leiocalyx, Delphinium likiangensis, Delphinium tatsienense, Dracocephalum bullatum, D. Forrestii, D. Isabellae.

Gentiana sino-ornata, Gentiana stragulata, Hemerocallis Forrestii, Hemerocallis nana, Incarvillea grandiflora v. brevipes, Iris chrysographes, Iris Forrestii, Meconopsis integrifolia, Nomocharis aperta, N. Mairei v. leucantha, N. saluenensis, Omphalogramma elegans,

Omphalogramma vinciflorum, Paraquilegia microphylla, Potentilla Delavayi, Primula Forrestii, P. Littoniana, P. malacoides P. nutans, Roscoea cautleoides, Senecio plantaginifolius, Trollius yunnanensis, Vaccinium Delavayi.

*NOTES ON THE PLANTS OF NORTH WEST YUNNAN.

By GEORGE FORREST.

The flora of North-west Yunnan is so rich and varied, the area so extensive, the mountain and river systems so complicated that it is a matter of no small difficulty to select one portion in illustration of the whole. The region explored during seven or eight years' journey in the province, is essentially alpine, and, though shrubs do not bulk so largely as in others from central China, my collections hold a greater number of herbaceous perennials admirably suited for alpine gardens.

The region includes the watersheds of the mid-Salwin, Mekong and Yangtze ; those watersheds are broken into an indescribable chaos of subsidiary ranges and spurs, many of them bearing species which are purely local. Much of the area is still unknown or at least unmapped.

It is a marvellous country, planned on Nature's grandest scale, prodigal in flora and fauna, rich in minerals ; for gold, silver, galena, copper, iron, and coal are found on every side. Numerous tribes, nearly all of Tibetan origin, people it, settled in the valleys and on the ridges as far south as lat. 25° N., the diversity of whose customs, languages, and religions is truly remarkable. Like the slopes of the Caucasus, the region might be called the country of the hundred nations, and is worthy of the most thorough exploration by competent ethnologists.

All of the principal ranges, which fall away from the Tibetan plateau, and enclose those three great rivers, run due south as far as mid-Yunnan, at which point the divergence eastwards of the Yangtze causes a break in the regular contour of the country.

As is now known, the formation of those ranges is a hard grey magnesian limestone, and that possibly accounts in great measure for the exceptional richness and high development of the vegetation. Only in the principal and deepest valleys—the Salwin, Mekong and Yangtze—are other strata exposed in places, and in descending to those one immediately leaves the most interesting flora behind.

* Extracted and reproduced by the courteous permission of the Council of the Royal Horticultural Society from the R.H.S. Journal, 1915 and 1916.

In the higher valleys, above 6,000 feet, and the still higher plateaux, the soils consist of heavy reddish clay marls, gritty limy-clays and loams, and lime silts and cements. Quite a number of those valleys, even at an altitude of 9,000 feet, show signs of having been at some period the sites of extensive lakes ; evidence, in the shape of deep, extremely durable and barren lacustrine deposits, being abundant.

On the rolling downs, which are characteristic of the country in the centre, east, and south-east of the province, the clay marls and heavy loams are general ; in the opposite direction, north-westwards, the farther one travels the more evident is the limestone, till, north of lat. 26° it becomes dominant.

Entering China from Bhamo, there is an easy ascent of 130 miles to Tengyueh, where an altitude of 5,500 feet is attained. That district, though geographically in the basin of the Irrawaddy, may be considered as the commencement of the great Yunnan plateau which descends from the Eastern Himalayas and gradually loses itself in Szechuan and Yunnan.

Around Tengyueh the country is volcanic, hot springs abound, and there are numerous lava-beds, each many miles in extent, the overflow of extinct volcanos. On those beds the richest flora is established, but the region is almost subtropical and there is therefore small hope of anything from the locality proving altogether hardy with us here. True, there is at times as much as sixteen degrees of frost registered, and occasional slight falls of snow, but during the winter the atmosphere is extremely dry, and that nullifies the effects of the cold.

This volcanic belt can also be traced by many species peculiar to it, such as *Ilex Pernyi*, *Eremurus chinensis*, forms of *Lilium Brownii*, giant Lobelias, *Primula malacoides*, and many lovely species of the families Liliaceae, Scitamineae, and Orchidaceae.

The country between Tengyueh and Talifu, fully 200 miles in extent, is a rolling plateau, rising in parts to nearly 11,000 feet, and intersected by the deep valleys of the Salween and the Mekong and and their tributaries. The summits of the ridges are more or less densely clothed with pine and mixed forests, especially on their northern aspects, thinning out to heavy thickets of shrubs on their lower slopes. In the shadier and drier situations *Rhododendron*

Viali Fr. and *R. formosum* are seen to perfection ; in the more open places, forms of *R. Fortunei.*

Many species of Clematis abound, the most common being *Clematis Armandi*, *C. fasciculiflora*, *C. nutans*, forms of *C. montana* and, in the driest and sunniest situations, the beautiful *C. chrysocoma*, than which, with its soft rose-coloured flowers, and golden, glistening foliage, none is more beautiful. One of the finest new species found is *C. Forrestii* Smith. This is a scandent shrub of 20 to 30 feet in height. The foliage is finely cut and ornamental, the flowers pendulous on long pedicels in axillary clusters of five to six. Each is nearly an inch in diameter, the perianth a soft, creamy yellow, with anthers and filaments a brilliant shade of rose-magenta. The combination reminds one of the coloration of *Anemone pulsatilla.* It is as striking a species in fruit as in flower, the achenes being densely clothed in heavy glistening hairs.

On the more open hillsides are a multitude of dwarf shrubs, the principal genera represented being *Rubus*, *Dipelta*, *Viburnum*, *Spiraea*, *Philadelphus*, *Deutzia*, *Styrax*, *Illicium*, *Ligustrum*, *Berberis*, *Coriaria*, *Buddleia*, *Benthamia*, *Kerria*, *Camellia*, *Magnolia*, *Hydrangea*, *etc.* One of the most striking species is *Dichroa febrifuga*, with its deep purple-blue flowers and indigo-coloured berries.

Much of the grassland, especially where marshy or moist, for the duration of the season is ablaze with a wealth of herbaceous plants, such as Anemones, Primulas, Gentians, *Corydalis*, *Pedicularis*, Spiraeas, Senecios, Potentillas, and Asters.

On the highest limestone peaks of the Shweli-Salween divide, which is the most prominent range on the route from Tengyueh to Tali, a flora is found much akin to that of the Lichiang and higher ranges in the extreme north-west. To take Rhododendron alone, such species as *R. Souliei*, *R. sulfureum*, *R. crassum*, *R. bullatum*, *R. trichocladum*, *R. neriiflorum*, *R. campylogynum*, and *R. lacteum var. macrophyllum* are common to both ; as well as many shrubs of other genera, and numerous alpines.

The Tali range, in the Mekong basin and within this volcanic area, is one of the most prolific of the west. For forty miles it forms the western bulwark of the Tali valley, enclosing the beautiful lake called Erh-hai. Owing to its great bulk acting as a rain-screen, the rainfall on the western flank is greatly in excess of that on the eastern

side. As a result the vegetation on the west is much more luxuriant and of quite a different character. Though on both flanks there is a decided pine belt from about 10,000 to 12,000 feet, the spurs and ridges on the east, from their bases to the higher alps, are mostly of a pastoral character with the arborescent vegetation confined to the gulleys and lateral valleys. On the west the vegetation is principally arborescent, so dense in places as to be almost impenetrable ; it attains a much greater altitude and is carried right to the base. That part of the range has never been explored to any extent, and, judging by the results of two short and hasty journeys in 1906 and one in recent years, the collections of which are so far undetermined, it carries many interesting and new species. During these journeys were found the following : *Buddleia myriantha*, a shrub of 10 feet allied to *B. variabilis* but with deeper-coloured blooms ; a new *Berberis* named *B. centifolia*, an excellent rock shrub of 2 to 5 feet with charming yellow blooms, and an interesting new species of *Diapensia*, *D. Bulleyana*, also a rock shrub and peculiar in having bright yellow flowers instead of the normal purple red. *Leptodermis glauca* a dwarf shrub of 2 feet in height with beautiful lavender flowers was also re-discovered. There, also, in moist, open situations, amongst scrub, was found the beautiful *Pieris Forrestii* with its pure waxy-white fragrant blooms. On the cliffs the dominant shrub was *Rhododendron crassum*, its large white fragrant blossoms showing most freely. Many fine herbaceous plants were secured ; in the shady gorges, the damp moss-covered boulders and cliffs bore many terrestrial orchids, such as *Pleione Delavayi*, with purplish-rose flowers marked a deep crimson, *P. grandiflora* with snow-white blooms, blotched a deep crimson lake ; and a remarkably fine new species *P. Forrestii* having orange-yellow blooms laced and marked deep brown. The colouring of the last is unique, the precocious flowers arising from the deep green moss having all the appearance of a yellow crocus at first sight. A new genus of Orchidaceae was also discovered, typified by *Bulleyia yunnanensis*.

As the western slopes of the Tali range are approached the character of the flora changes, becoming distinctly more alpine. *Rhododendron ciliicalyx* in many places covers the hillsides with masses of blooms and there, also, is found a very tall-growing and free-flowering form of *Rhododendron racemosum*.

At the extreme southern point of the Tali range the route turns north, leading through the Tali valley, between the base of the mountain and the beautiful lake on the east. The altitude of the plain is 6,500 feet, only 1,000 feet more than Tengyueh, but, lying so much to the east and north, and with the proximity of such a huge range, the climate is more rigorous. The winter is quite severe; for at least four months of the year, the snows descend to about 1,000 feet above the valley, occasionally even that is coated for days, and the atmosphere is dry and frosty. In summer the rainfall is fairly heavy, though there is no excessive heat.

The range stretches north and south for some seventy miles, and, with the exception of one or two small peaks, rises to a uniform height of about 14,000 feet. In the north it tapers off into the numerous broken ranges which form the eastern watershed of the Mekong. The eastern flank of the range is scored from base to summit with numerous deep gorge-like lateral valleys, almost all of which carry a flora peculiar to themselves. The lower slopes have been denuded of timber, even brushwood, by the inhabitants of the valley for domestic purposes; the middle slopes are heavily clothed with mixed and pine forests, whilst the gorges are almost closed with a dense undergrowth of shrubs.

This area was the scene of Père Delavay's labours, and will always be associated with his name.

The cliffs, ridges, and the higher alps are the homes of many fine species of Primula. In the valley itself *P. malacoides* flowers to perfection, both in the open and the shade, during the coldest term of the year. Along the base of the range, the banks of every stream and the margins of every marsh are brightened with the velvety crimson flowers of *P. Poissonii*. On the lower slopes and in the gullies, humus covered rocks and ledges of shady cliffs are clothed with *P. sino-Listeri* and masses of bright green foliage, and delicate rose-coloured blooms of *P. membranifolia* whilst at a higher altitude, and in like situations is found an equally graceful rock species, *P. yunnanensis*, Fr., At 10,000 feet, in the shadier thickets the beautiful *P. septemloba*, Fr. is one of the commonest plants, while 1,000 and 1,500 feet higher, on the margins of the pine forests, *P. serratifolia*, Fr., with its pendulous, orange-lined, yellow blooms, is found.

About the same altitude, on dry exposed rocks, is found the beautiful new species of the Bullatae Section, *Primula coerulea*. This is one of the rarest species met with in the province. Here also, on the dry rocky slopes, growing amongst limy grit at the base of the cliffs, is the most beautiful species in my opinion, of all known Primulas, *P. spicata*, Fr. None can compare with this species in airy gracefulness or in rich colouring, the azure blue flowers forming a wonderful contrast to the silvery farina with which the plant is coated. The scapes are so slender that they seem scarce able to bear the weight of the relatively large flowers, which the slightest current of air sets trembling and swaying, much in the manner of some of the Campanulas.

On the highest alps of all grow two of the most interesting species, *Primula bella*, Fr., which forms moss-like masses of minute crisped foliage, studded over with large, deep-rose blooms, borne on delicate scapes only an inch in height ; and *P. Delavayi*, Fr., the most southern member of that curious group of which, as yet, only four species are known to exist, the *Omphalogramma* Section. *P. Elwesiana* is the representative from the Himalayas ; the others, *P. Franchetiana* and *P. vincaeflora*, are found north of Tali, on the Mekong and Lichiang ranges respectively. *P. Delavayi* is the least interesting and beautiful of the three, but is unique in having the margins of the corolla lobes heavily fringed. *P. amethystina*, Fr., and *P. brevifolia* Forrest, two lovely species of the Soldanelloid type, with deep purple-blue flowers are met with on the same meadows as the above. Two further excellent species of the same section, both showing the beautiful contrast in colour seen in *P. spicata*, are natives of the more southern portion of the range. These are *P. nutans* Fr. and *P. penduliflora* Fr. ; both are in cultivation from seed secured in 1913-1914. Besides all those lovely species of Primula, the Tali range is the home of numberless plants of intense interest, both botanical and horticultural. There, Père Delavay first discovered *Paeonia lutea*, and, no doubt, the seed which produced the specimens now in cultivation, came from there, though, since that time, the species has been found much further north.

The real wealth of the area is centred in the Rhododendrons.

On both flanks of the range, in common with all the mountains of north-west Yunnan, above the pine belt there is a distinct zone of Rhododendron forest, commencing first as isolated specimens among

the outlying groups of conifers, and then as dense thickets 20 to 40 feet in height, composed of such species as *Rhododendron taliense*, *R. fictolacteum*, *R. anthosphaerum*, *R. Beesianum*, *R. rubiginosum*, *R. irroratum*, and the true *R. lacteum*, with its huge trusses of beautiful canary-yellow blooms. Again this belt gradually gives way to dwarf species and forms of the R. *intricatum* group which carpet the upland pasture with their fragrant foliage and purple flowers, dominating large stretches of the alps to the exlcusion of all other vegetation.

Most of the finer species of the genus discovered by Delavay are indigenous to the range ; in the gullies and gorges one comes on them at every turn, either as solitary specimens or in groups, sheltered and supported by a jungle of mixed scrub and cane. In shady places, such species as *R. neriiflorum*, and *R. haematodes* eclipse everything in beauty with their cherry-coloured and deep crimson blooms, whilst again, beneath their shade, is found the dwarfest of all known species from the region, *R. campylogynum*, only a few inches in height, with pendulous, dark plum-purple, bell-like corollas. *R. brachyanthum* is another dwarf with dull greenish-yellow flowers of similar shape and substance. *R. bullatum* is also partial to shade, and is found in company with the above, but is never so abundant though more widely distributed. It is a real rock shrub, and its large fragrant white blooms are most ornamental.

Other species, growing more in the open, are *R. ciliicalyx*, with flowers white, flushed rose on exterior, and *R. crassum*, both as rock plants. *R. racemosum*, *R. oleiifolium*, *R. microphyton*, *R. trichocladum*, *R. rigidum*, and *R. aureum* are, more or less, grassland plants, and are found in open and drier situations.

At higher altitudes, forming open thickets and even forests, are found the taller species, as *R. Delavayi*, *R. irroratum*, *R. decorum*, *R. taliense*, *R. yunnanense*, *R. rubiginosum*, and *R. cyanocarpum*, whilst highest of all, carrying the genus up to the extreme alps, is *R. sulfureum*, and many delightful forms and species of the *R. fastigiatum* and *R. intricatum* groups. Since the days of Père Delavay's collecting many excellent new species have been added to the list, as *R. dichroanthum* Diels, with large, deep red-orange blooms ; another species, as yet un-named, with large compact trusses of canary-yellow flowers, a tree species after the style of *R. Wightii* ; *R. Beesianum*, *R. Balfourianum*, *R. prostratum*, *etc.*

Most species of Rhododendron are in greatest luxuriance and perfection of bloom in April and May, and are seen to best advantage in some of the lower and more sheltered passes ; one such *col* named the Sungkwei Pass, is on the divide between the Lang-kong and Hoching valleys, three days journey north of Talifu. Of 11,000 to 12,000 altitude, it is a comparatively shallow depression, a broad cleft running almost east and west on the summit of the divide, two miles in extent by half a mile in breadth. The centre is occupied by a small lake, with open pasture on both sides for a short distance up the slopes. From the margins of this pasture to the tops of low hills, about 1,000 feet higher which enclose the pass on the south, is Rhododendron forest. The foreground is occupied extensively by matted masses of innumerable colour forms of *R. intricatum*. Behind are thickets of *R. chartophyllum*, in a variety of shades, forming a colour belt from deepest lavender to almost white. From there to the verge of the pasture on the summit of the pass is an impenetrable forest of tree Rhododendrons, 20 to 45 feet in height, of such species as *R. lacteum*, *R. Bureavii*, *R. irroratum*, *R. vernicosum*, *R. fictolacteum*, etc., with a dense undergrowth of dwarf bamboo. On the hills forming the northern side of the pass is open forest of lichen-clad evergreen oak trees 50 to 90 feet in height, and interspersed with them, numerous superb specimens of *R. fictolacteum* and others.

Recently there has been much discussion regarding lime and Ericaceous plants, especially as applied to the cultivation of Rhododendrons. As already mentioned, most, if not all, of the mountain ranges of west and north-west Yunnan are solely limestone formations, and it is on those the greater number of Rhododendrons are found. I am not in a position to give a decided opinion, but this I can state positively, that most of the Rhododendrons I have collected in that region grow directly in, or on, pure limestone. Many of the smaller shrubs, such as *R. neriiflorum*, *R. floccigerum*, *R. sanguineum*, *R. bullatum*, *R. ciliicalyx*, *R. crassum*, *R. yunnanense*, *R. aureum*, *etc.*, and the dwarf species, *R. campylogynum*, *R. brachyanthum*, *R. trichocladum*, and forms of *R. intricatum*, have their roots embedded in the crevices of the limestone rocks or cliffs, or in the limy rubble at their base ; whilst the taller tree species though with more or less of a bed of humus for support, have their smaller roots similarly placed.

Even the lower-level species, such as *R. rigidum*, and forms of *R. racemosum*, *etc.*, are seen at their best when in a soil largely composed of limestone rubble, or a strong, red limy marl. From these points it is natural to conclude that, in some form, lime must be absorbed by the plants, and is therefore necessary for their best development.

The country between Talifu and Lichiang, though mountainous to a degree, is, nevertheless, a dry area. This is probably caused by the huge bulk of the Tali range acting as a rain screen in the S.W. The plains are well irrigated by streams which mostly have their origin beneath the mountains, but on the alps, long barren stretches of limy grassland are frequent.

As one travels north of Tali the scenery increases in grandeur, many peaks of the higher ranges being capped with perpetual snow, especially those of the Lichiang system. This range north of the Yangtze, is more contracted and rugged, forming the eastern boundary of Chungtien plateau. The peak of Lichiang is some 20,000 feet in height, but in the Haba range, the name of the extension north of the Yangtze, there are peaks exceeding that, flanked by enormous glaciers. In 1913-14 I collected there, and amongst other things secured fully forty new species and forms of Rhododendron, the majority rock and cliff shrubs of dwarf form.

The contour of the Lichiang peak is, however, quite distinct from all others in the region. Rising gradually from a southern base of 8,500 feet, at the foot of which is a large lake called Lake-La-hsi, in an air-line of some twenty miles is the summit.

The main streams irrigating the lower levels of the valley, and which originate on the mountain flanks, disappear at the base, re-appearing towards the centre of the plain. Owing to this, the northern portion is of a most barren nature. The vegetation is mostly xerophytic, consisting chiefly of a stunted form of evergreen spinous-leaved oak. The herbaceous vegetation consists principally of many species of the least succulent grasses. There are many large stretches covered, to the exclusion of all else, with *Spenceria ramalana*, a striking plant when growing in masses, a few dwarf *Anemone*, *Gentiana*, *Pedicularis*, *Campanula*, *Ainsliea*, *Leontopodium*, *Anaphalis*, *Arabis*, various Umbellifers, Asters, Dracocephalums, several *Saussureae*, the most interesting being *S. romuleifolia*;

Oxyria sinensis, *Lactuca napifera*, and a very dwarf form of *Androsace spinulifera* Fr. In the last the scapes are only 2 to 4 inches in height, whilst the foliage is reduced to extremely spinous scales forming a ball-like rosette.

However, the bleakness and barren nature of the plain, is compensated by the prodigality of the mountain. From the base to the limit of vegetation at 17,500 feet, the range in its whole extent of fully fifty miles is one huge natural flower garden. The extreme height of the range is almost 20,000 feet ; there is therefore about 3,000 feet of perpetual snow.

From 8,500 to 10,500 feet there is a belt of arborescent vegetation, rich in trees and shrubs of many of the finer genera, as *Tilia*, *Acer*, *Prunus*, *Sorbus*, *Cotoneaster*, *Philadelphus Meliosma*, *Deutzia*, *Berberis*, *Lonicera*, *Euonymus*, *Buddleia*, *Hydrangea*, *Jasminum*, *Helwingia*, *Wikstroemia*, *Leptodermis*, *Clematis*, *Lespedeza*, *Piptanthus*, *Bauhinia*, *Gaultheria*, *Vaccinium*, and many of the lower-level Rhododendrons.

Just south of the highest point the range is cleft in two for fully half its breadth by a stupendous gorge, the upper end of which is formed by a series of precipices falling from the extreme height of the main peak to 10,000 or 11,000 feet. The entrance to the gorge, about a mile and a half in breadth is flanked by cliffs 3,000 to 4,000 feet sheer, gradually rising towards the upper end. In length it is about six miles. From the main peaks several glaciers fall into it, huge moraines almost dam it at several points, and all along the base of the flanking cliffs are continuous and extensive screes fed by the debris from the limestone cliffs above.

The floor of the valley is clothed by forest of Conifers and the conifer belt extends from 10,500 feet to fully 14,000 feet. Much of this forest is being engulfed by the scree debris. In the forest and by the stream are a multitude of fine shrubs. The dwarf *Vaccinium fragile* is in abundance on the forest margins, its beautiful foliage and pink flowers showing to great advantage. It fruits freely, and the purple-black berries are the principal food, during the season, of the common pheasant of Yunnan, *Phasianus elegans*.

In the more open forests and glades some of the finer lower level herbaceous plants are found as *Incarvillea brevipes* and *I. lutea*, *Anemone rupicola*, and *A. demissa*, *Roscoea cautlioides*, *Strobilanthus*

versicolor, *Aconitum Forrestii*, *A. transsectum*, *A. brevicalcaratum* and *A. venatorium*, *Polygonum lichiangense*, *Cypripedium luteum*, *C. tibeticum*, *and C. margaritaceum*, *Delphinium Delavayi*, *D. Bulleyanum* and *D. yunnanense*, *Hemerocallis sp.*; and a number of *Lilium*, including *Lilium Thomsonianum*, *L. giganteum*, *L. Delavayi* and *L. ochraceum*.

Many portions of the eastern flank of the range are weathered away to a series of gigantic graduated cliffs, every ledge a gleaming patchwork of colours, but, alas ! quite inaccessible. Portions of those, explored at great hazard, yielded such spoil as *Primula Forrestii*, *P. lichiangensis*, *P. rufa* and *P. kichanensis*, *Campanula crenulata* and *Dracocephalum bullatum*.

On the moister meadows along this belt, and in the shadier openings of the forests, are the homes of such lovely plants as *Primula Bulleyana*, *P. Beesiana*, *P. Wardii*, *P. vincaeflora*, *P. Littoniana*, and *P. pulchella*. Of *Meconopsis* are found *Meconopsis Delavayi*, *M. Forrestii*, *M. concinna*, *M. venusta* and *M. integrifolia*. In the most boggy situations, *Rheum Alexandrae* grows; and on the ledges of limestone cliffs and the stoniest situations on the open slopes, the beautiful *Daphne aurantiaca*. This is one of the most free-flowering of all shrubs of North-West Yunnan.

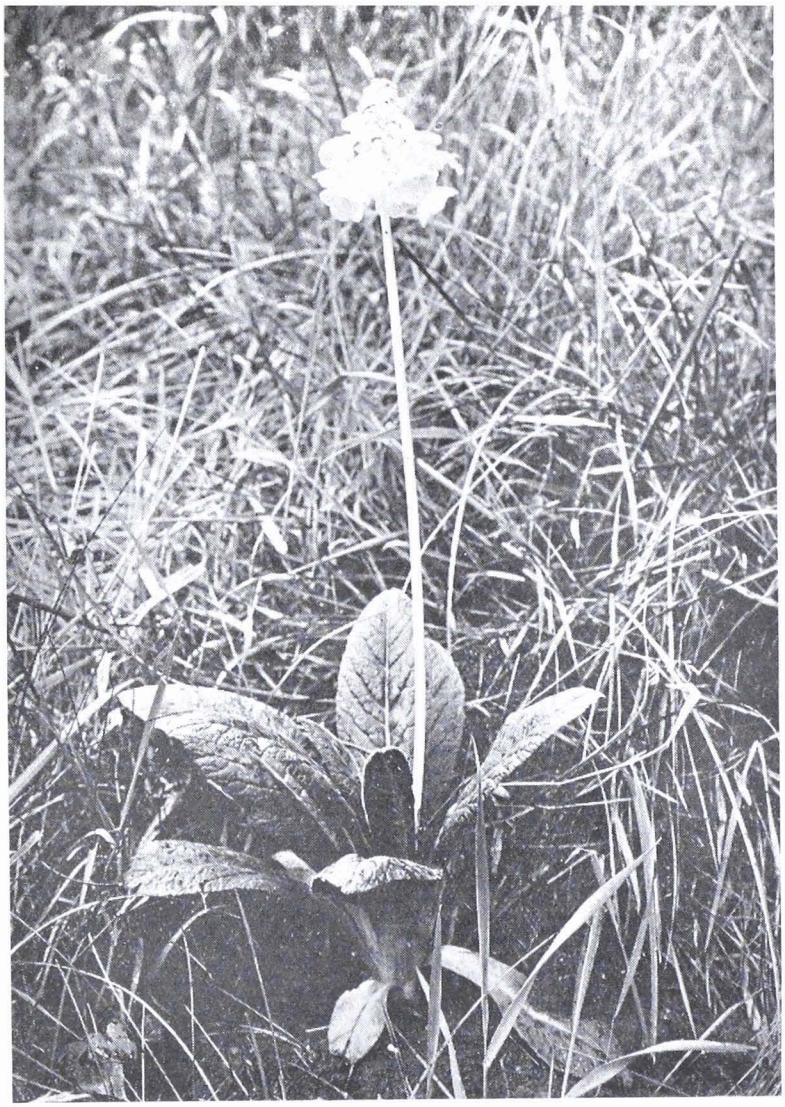
The cream of the flora, however, is on the alpine pastures and the many and enormous screes which lie from 14,000 feet to the limit of the vegetation. There is seen a wealth of species, possibly equalled, but nowhere surpassed, in any of the regions of Yunnan hitherto explored.

On the higher alpine meadows, from the summits of the cliffs to the verge of the snows, is an indescribable wealth of bloom, the colour-scheme changing from month to month as the seasons advance. Most of the species being gregarious, absolute sheets and carpets of colour are the result. *Trollius*, *Anemone*, *Primula*, *Gentiana*, *Cremanthodium*, *Cyananthus*, blue and yellow, *Corydalis*, *Meconopsis*, *Pedicularis*, *Phlomis*, *Aster*, *Parnassia*, *Saxifraga*, *Orchis*, *Roscoea*, *Delphinium*, *Oxygraphis*, *Plectranthus*, *Salvia*, *Cerastium*, *Incarvillea*, *Morina*—these are only a few of the many genera represented, as well as *Ericaceae* and many peculiar species of *Rhododendron*. Two of the finest, seeds of which were secured in 1913 are the magnificent *Dracocephalum Isabellae* and the equally beautiful *Anemone glaucifolia*.

Photo by George Forrest

PRIMULA FORRESTII

"Pendulous. From dry shady crevices of limestone cliffs on the Lichiang Range. May 1906. No. 2117 G.F." The prolongation of the main stem is a feature which earmarks this species as unique in its family.



Courtesy of
Country Life

PRIMULA
NUTANS

Courtesy of
Country Life

TROLLIUS
YUNNANENSIS

The former is a new species 14 to 18 inches high, with foliage resembling that of *D. tanguticum*, but with very much larger blooms. Those are 2½ inches in length, of a rich shade of velvety bluish-purple, and freely produced. *Anemone glaucifolia* is a plant of from 18 to 24 or even 30 inches, and was first collected by Delavay many years ago and described by Franchet. The leaves, which are pinnate, form a dense basal rosette, and, as with all other parts of the plant, are densely coated with a silvery down. The flowers are 2 to 2½ inches in diameter, and range in colour from the clearest blue to shades of purple. It is a glorious plant!

But even to enumerate the best of the species seen would require much time. Of Primulas alone over forty find their homes there. In two seasons I collected seeds of fully eighty species on that and the neighbouring ranges.

Of Primulas, all of which are meadow plants, there are *P. pseudo-sikkimensis*, *P. secundiflora*, *P. sinopurpurea*, *P. pinnatifida*, *P. sonchifolia*, *P. brevifolia*, *P. incisa*, *P. gracilenta*, *P. florida*, *P. Giraldiana*, *P. calliantha*, and the wonderful *P. dryadifolia*, Fr.

Of *Compositae*, there are many fine *Lactucae*, all scree plants such as *Lactuca Souliei*, with ruddy brown foliage and brilliant blue flowers. *Crepis rosularis*, with deep golden heads and *C. umbrella* with larger and lighter coloured ones are also scree plants of similar habit. *Cremanthodium* is another genus represented by a number of beautiful forms, the finest being *C. nobile*, with golden-yellow fragrant blooms 3 to 4 inches in diameter. *C. campanulatum* has dull deep crimson flowers, whilst those of *C. rhodocephalum* are grey-pink and rose. Of *Aster* the finest is a half-shrubby species, *Aster stenolius* Fr., the ray florets of which are bright purplish-blue, with, orange-coloured disc florets. Each head is almost two inches across, and I have counted as many as three hundred on one plant! It is a rock plant. *A. Delavayi* is another fine, but biennial species, with very large flower-heads. *A. brachytrichus* is a woodland species with very richly coloured blooms; and on highest alps is found the beautiful dark-flowered dwarf, *Aster lichiangensis*. *Saussureae* are legion.

Of *Ranunculaceae*, several fine species of *Delphinium* are found, one a superb plant of 12 to 18 inches, with numerous large, pale-blue fragrant flowers. The finest cliff plant of the whole range belongs

also to that order, i.e., *Isopyrum grandiflorum* Fisch. It is a real gem, though of extremely slow growth, a cliff alpine, only to be seen in the most inaccessible chimneys and clefts. One plant, photographed with the utmost difficulty was 18 inches across and bore over ninety blooms, each 1½ inches in diameter. The colour of the foliage is glaucous-green, the flowers pale purplish-blue, anthers and nectaries bright orange.

The finest Crucifer is also a cliff plant, *Solms-Laubachia pulcherrima* Diels. It is a cluster plant with highly-coloured glossy, leathery foliage, and large flowers of the clearest turquoise-blue. Unfortunately it is also of slow growth.

Saxifragae are rampant on every cliff, scree, and stony meadow, brightening the dullest spots with their orange and golden blooms. One splendid new species, a cushion plant named *S. pulchra*, has rose-coloured petals and silvery grey-foliage. Many other new species were found on the range.

Campanulaceae is well represented by several new *Codonopsis* and many new *Adenophora*. *Campanula crenulata* Fr., with its deep black-indigo bells is on every ledge and humus-covered boulder.

Innumerable fine-flowered species of *Pedicularis* colour these alps red and yellow during the summer months, whilst in the autumn blue is dominant in the scheme from the many Gentians and Swertias flowering there.

Of alpine dwarf *Rhododendron* there are many ; *R. adenogynum*, *R. cephalanthum*, *R. lignosum*, *R. Sargentianum*, *R. cuneatum*, *R. oreotrephes*, *R. intricatum*, *R. prostratum*, *R. rupicolum*, and a large number as yet un-named. *R. rupicolum* is a new species of the *intricatum* set, having blooms of the deepest shade of purple-crimson, the exact colour of plum-juice. *R. prostratum* grows at the greatest altitude of all, fully 16,000 feet. The name indicates its habit ; the foliage is small, slightly bullate, glossy and highly-coloured ; the blooms, produced freely, are relatively large, 1½ inches in diameter, a rich crimson, with darker markings.

The Haba mountains farther north-west form part of the system culminating in the north of the Chungtien plateau. They are of even greater altitude than the others so far met with and on the way to Atuntze those mountains are crossed by one of the highest passes in the province called the Bei-ma-shan, fully 16,000 feet high. For

eight months of the year from October to May, it is closed by snow. The summer is therefore very short, but, despite that, the flora is wonderfully rich and quite distinct. It was explored by me to some extent in 1913, and again in 1914, with excellent results, but as yet only a few of the new species have been dealt with. On that range *Rhododendron Wardii*, a grand species 14 to 20 feet in height, with bright yellow flowers, was first found in July, 1913, as well as many others equally beautiful, such as *R. uvarifolium*, *R. Roxieana*, with rose-pink blooms, and *R. Clementinae* with white and rose flowers. Several new *Buddleiae* were added notably *B. caryopteridifolia*, two species of *Betula*, and the interesting little *Vaccinium modestum*, a pretty dwarf species with the habit of a *Pyrola*. Another fine shrub is *Euonymus ilicifolius*, an evergreen with broad, dark-green, prickly foliage, identical with that of an ordinary holly, with inconspicuous flowers, but striking white and red fruits. One especially fine new species secured is *Ostryopsis nobilis*, a shrub of 6 to 12 feet, a most interesting addition to a genus hitherto monotypic. As a foliage plant it should take first rank amongst cultivated shrubs. It is of compact habit, the leaves are large, very broadly ovoid with base cordate, deeply bullate, dark glossy green above, the under surface heavily felted with a dark cinnamon-brown tomentum, with which the petioles and young shoots are also clothed. Several other new species of *Berberis* were collected, the three principal being *B. leptoclada*, a densely foliate rock species, of compact habit, 2 to 4 feet high, with pretty glaucous leaves, pale yellow flowers, and coralline fruits. *B. leucocarpa* is taller, 5 to 8 feet, but of good habit and a free flowerer, and distinguished by having pure waxy-white fruits. *B. Jamesiana is* of somewhat similar habit and has red fruits.

Herbaceous plants were legion, many old friends being seen, and a large number of novelties added. As on other ranges, Primulas rank first in numbers and beauty, such lovely plants as *P. szechuanica*, with yellow flowers, *P. Wardii*, with blooms in many shades of rose-lavender, and *P. Franchetiana*, with its large trumpet-shaped purple and yellow corollas, forming masses on every moist meadow. The well-known *P. Poissonii*, common to every range in the province, I never saw in such perfect beauty as there. Of new species were secured :—*P. aemula*, a fine plant with stout scapes of 2 to 2½ feet, bearing many whorls of bright yellow blooms. The corollas have

reflexed lobes, are fleshy, with an enamelled sheen on the exterior. *P. chionantha*, a noble species of the *Nivales* section, with fleshy foliage, numerous scapes 14 to 30 inches high, producing many whorls of large, pure white, fragrant flowers. *P. florida*, a charming small species of 6 to 14 inches, with blue or rose flowers, dark green, finely-cut leaves, the under surface of which as well as other parts of the plant are densely coated with silvery farina ; a beautiful species of the *Capitata* class, *P. sphaerocephala*, and others as yet unpublished.

Several new *Meconopsis* were also found : *M. concinna*, *M. venusta*, *M. speciosa*, *M. impedita*, and *M. eximia*.

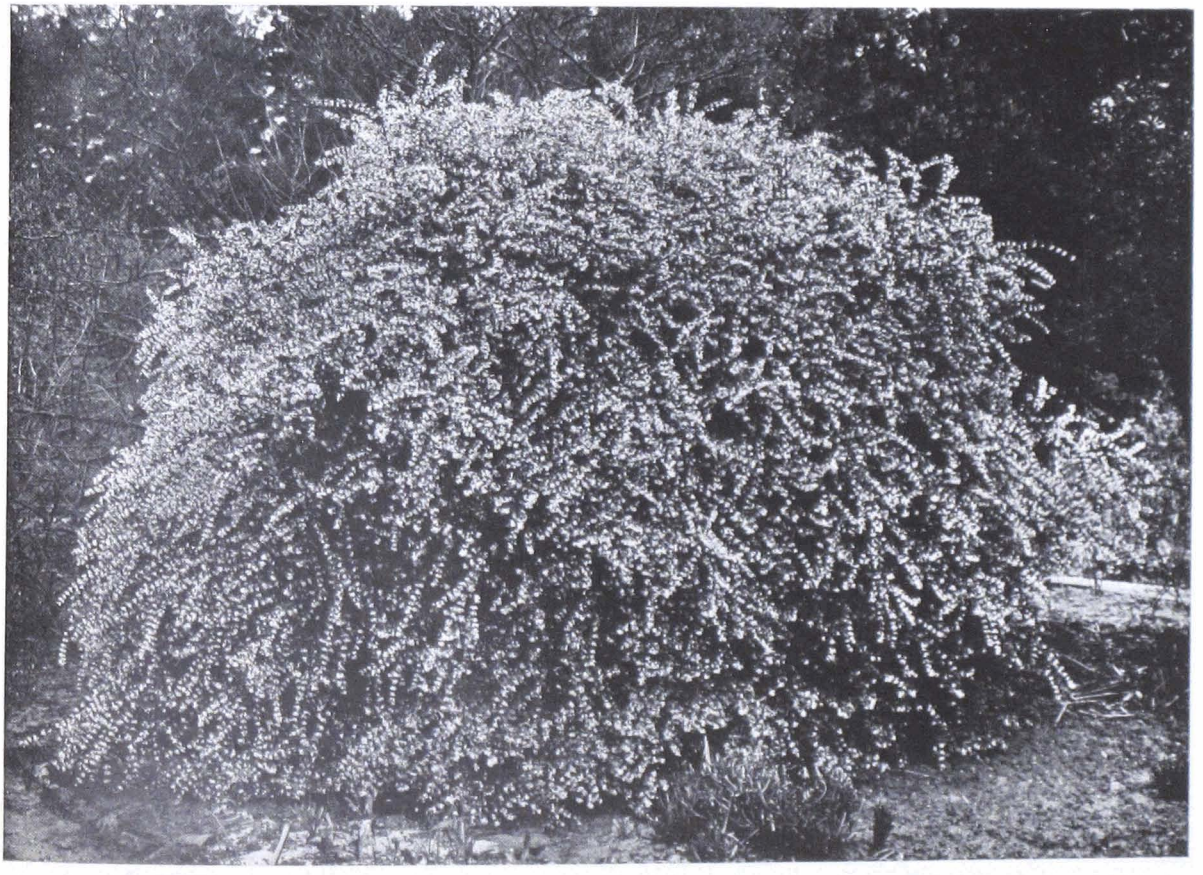
The lovely *Lilium apertum v. tibetica*, with deep maroon-coloured, fragrant, pendulous blooms, and the equally beautiful *Nomocharis pardanthina*, with widely-spread, satiny-white, purple-spotted perianths, are there on every meadow ; by the side of every stream and marsh *Pedicularis*, of the *Siphonantha* section, with their long tubular corollas of brilliant red and orange-yellow, form masses of the richest colouring. Every step one takes treads a beautiful or interesting plant to earth ! On the stony meadows and screes are innumerable species of *Saussurea*, many of them real gems, close cushion plants with silvery-coated foliage and flowers of the most lovely shades of rose, purple-blue and magenta. Gentians bulk largely in the autumn flora, the finest of all *Gentiana heptaphylla*.

This huge range acts as a rain-screen, consequently the ranges eastwards towards Mili are more or less barren in comparison.

Again, far to the west is another wonderfully prolific region, the Mekong-Salwin divide, south of Dokerla, one in which I spent some time in 1905, and which I hope yet to explore more thoroughly. All the collections of that year were lost completely through the upheaval caused by a local rebellion of Lamas of the Upper Mekong. From what I saw then and collected, I should say it is by far the richest area of any yet known. Specimens of a few new species were saved from the wreck, such as *Rhododendron gymnanthum*, *R. Stewartianum*, *R. chasmanthum*, and the beautiful and curious *R. Forrestii*. This last is a most interesting shrub, with large fleshy flowers of a deep blood-crimson shade. It has the habit of ivy ; attached by roots on the under surface of its stems it covers almost perpendicular cliffs and boulders with its bullate glossy foliage. The leaves are very small, broadly ovate and highly coloured ; the blooms pendulous, produced

Courtesy of Country Life.

DRACOCEPHALUM FORRESTII



Courtesy of Country Life.

OSMANTHUS DELAVAYI

Courtesy of
Country Life

MECONOPSIS
INTEGRIFOLIA

Courtesy of
Country Life

NOMOCHARIS
SALUENENSIS

singly in the axils. On those mountains was first discovered *Meconopsis speciosa*, one of the finest of the genus.

Somewhere north-west of there, north of lat. 29° and west of long. 98°, will probably be found the greatest concentration of the genus *Rhododendron*, and possibly the same might be said of *Primula*, for my experience during eight years spent in the region is that as one goes farther north-west the number of species is continually added to.

In such a short account it is impossible to give more than the merest sketch of the finer groups. The country teems with new species, even in the central and southern regions. Much of the province is yet unexplored ; in the north and north-west only the veriest fringe has been touched. There a great harvest awaits the first in the field, a harvest of horticultural novelties, which, satiated as we almost are by the many fine things introduced in recent years from Western China, will astonish us.

MAJOR PUBLICATIONS AND REFERENCES TO PLANTS COLLECTED BY GEORGE FORREST

Notes, Royal Botanic Garden, Edinburgh.
Vol. IV., No. 17 (1907), 69-81, plates 12-19.
" Gentianaceae from Eastern Tibet and S.W. Yunnan " (G.F.).
Vol. IV., No. 19 (1908), 213-238, plates 26-43.
" Primulaceae from Western Yunnan and Eastern Tibet " (G.F.).

Geographical Journal, Sept. 1908, pp. 239-266.
" Journey on Upper Salwin, Oct.-Dec. 1905," with eight illustrations and map.

Gardeners' Chronicle, various, by G.F.
Vol. XLV. (1909), 419.
Vol. XLVII. (1910), 12, 27, 44, 58, 343.
Vol. XLVII. (1910), 325-6 and 344. " The Perils of Plant Collecting." G.F.

Notes, Royal Botanic Garden, Edinburgh.
Vol. VII., 1912-13.
" Plantae Chinenses Forrestianae " *Diels*, including a numerical catalogue of all plants collected in 1904, 5 and 6, Nos. 1-5099, with the species also listed, both in their natural orders and alphabetically.

Gardeners' Chronicle, various, by G.F.
Vol. L. (1911), 51, 130, 208, 242, 391, 470.
Vol. LI. (1912), 85, 320.
Vol. LI. (1912), 291-292, " Rhododendrons in China " (G.F.).

Journ. Hort., Vol. LXIV. (1912), 34-36.
" Plant Collecting in Western China " (G.F.).

Journ. R.H.S., Vol. XLI., 2 (1915), 200-208.
" The Flora of N.W. Yunnan and E. Tibet " (G.F.).
Vol. XLII., 1 (1916), 39-46.
" Notes on the Flora of N.W. Yunnan and E. Tibet " (G.F.).

Notes, Royal Botanic Garden, Edinburgh.

Vol. VIII. (1913-14-15).

" Plantae Chinenses Forrestianae."

Celastraceae—*Loesener*, Pirolaceae—*Andres*, Cyperaceae—*Kükenthal*, Lespedeza — *Schindler*, Asclepiadaceae *Schlechter*, Orchideae—*Rolfe*, Geranium—*Knuth*, Pedicularis—*Bonati*, Indigofera — *Craib*, Crassulaceae—*Hamet*, Labiatae—*Dunn*.

Diagnoses specierum novarum in herbario Hortii Regii Botanici Edinburgensis cognitarum I.-CL., Aeschynanthus chorisepala—*Orr*.

Vol. IX. (1915-16).

Primula—*Balfour*, Beesia—*Balfour & Smith*, Diagnoses CLI.-CCL, Rhododendron—*Balfour*.

Rhododendrons and their Hybrids, *Millais* (1917).

Gardeners' Chronicle, Vol. LXII. (Sept. 1917), p. 105.

Letter, dated 2/5/1917, from George Forrest at Talifu to Dr. Keeble, Director of the R.H.S. Gardens, Wisley.

Gardeners' Chronicle, Vol. LXII. (Oct., 1917), p. 165.

Letter from George Forrest at Shiemalatsa Tsedjrong, Upper Mekong, N.W. Yunnan. " The house of a tibetan farmer, an old friend of mine, in 1905."

Notes, Royal Botanic Garden, Edinburgh.

Vol. X. (1917-18). Diagnoses CCLI.-CCCC.

Rhododendron—*Balfour*, Gesneraceae—*Craib*.

Vol. XI. (1918-19). Diagnoses CCCCI.-CCCCL.

Rhododendron—*Balfour*, Pseudotsuga—*Craib*, Gesneraceae—*Craib*, Abies Delavayi—*Craib*.

Vol. XII. (1919-20-21).

Maddenii Series of Rhododendron—*Hutchinson*, Rhododendron—*Balfour*, Diagnoses CCCCLI.-D, Styraceae—*W. W. Smith*.

Vol. XIII. (1920-1922).

Primula and Omphalogramma—*Balfour*, Rhododendron—*Balfour*, Sedum—*Praeger*, Pedicularis—*Bonati*, Diagnoses DI.-DL., Orchids—*W. W. Smith*, Diagnoses spec. nov. I. and II.

Journ. R.H.S. (1924), Vol. XLIX., 1, 25-36.
" Exploration in N.W. Yunnan & E. Tibet " (G.F.).

Notes, Royal Botanic Garden, Edinburgh.

Vol. XIV. (1923-24). " Chinese species of Tsuga "—*Downie*. Osmanthus Forrestii—*Rehder*, New Primulaceae—*Forrest & Smith*, Plantae Chinenses Forrestianae, Nos. 19334-23258. Catalogue of the plants (excluding Rhododendron) collected by G.F. during his fifth exploration of Yunnan and Eastern Tibet, in the years 1921-22.

Rhododendron, 2nd Series by Millais, 1924, pp. 16-27.

Notes, Royal Botanic Garden, Edinburgh.

Vol. XV. (1925-1927).
" Nomocharis—*Evans*, Omphalogramma—*W. W. Smith*, Chinese Rhododendrons—*Tagg*, Reevesia—*Anthony*, Vacciniaceae—*Evans*, Primulaceae—*W. W. Smith & Forrest*, " Additional species of Primula from the Burma-Tibet Frontier "—*W. W. Smith & Kingdon Ward*, Androsace—*Handel-Mazetti*.

Vol. XVI. (1928-1932).
Primulaceae—*W. W. Smith & Forrest*, Lysimachia—*Handel-Mazzetti*, Magnoliaceae—*Dandy*, Allium—*Airy Shaw*, Viola—*Beeker*, Codonopsis—*Nannfeldt*, Androsace — *Handel-Mazzetti*, Rhododendron — *Tagg*, Wendlandia—*Cowan*, Gordonia—*Cowan*.

Vol. XVIII. (1933-34).
" Plantae Chinenses Forrestianae," Coniferae—*Orr*, Diagnoses DLI.-DCXIII., " Ilex Distribution in Himalayas & China "—*Comber*.

From a photograph in the possession of Mrs George Forrest

"... THE HUNTER, HOME FROM THE HILL"—*R. L. S.*

Courtesy of
Country Life

HEMEROCALLIS
FORRESTII

Courtesy of Country Life

ALLIUM BEESIANUM

By the courtesy of the Rhododendron Society the following special references are given from their Notes :—

Vol. I., Part III. Page 145. Chinese Rhododendrons, Introduction of, by Professor Bayley Balfour, F.R.S.

Part IV. Page 204. Some Large-Leaved Rhododendrons, by Professor Bayley Balfour, F.R.S.

Vol. II., Part I. Page 3. Rhododendrons discovered recently in China, a Lecture on, by George Forrest.

Part IV. Page 147. Rhododendrons of 1921 and 1922 and some Trees and Shrubs of Yunnan, a lecture on, by George Forrest.

Part IV. Page 200. Contour, Climate and Distribution (with map), illustrating the Chinese Expeditions of Messrs. Wilson, Forrest & Kingdon Ward, prepared by E. H. Wilding.

Part V. Page 241. Notes contributed by H. F. Tagg, F.L.S.—Numerical Index to Collectors' Field Numbers of the Burma-Chinese Rhododendrons of the Grande Series. Identified Specimens of the Scabrifolium Series in the Herbarium of the Royal Botanic Garden, Edinburgh. Some New Descriptions. Rhododendron calophytum, *Franch.* Rhododendron Bodinieri, *Franch.*

Vol. III., Part I. Page 29. Notes contributed by H. F. Tagg, F.L.S.—Numerical index to Rhododendrons of the Grande Series collected by Mr. George Forrest, 1924.

Part. II. Page 77. Notes contributed by H. F. Tagg, F.L.S.—Numerical index to Rhododendrons of the Grande Series collected by Mr. George Forrest, 1925. List of determinations of Rhododendrons of the Sub-series Boothii. List of specimens, with notes on the Distribution of the Rhododendrons of the Falconeri Series. List of specimens with notes on the Distribution of the Rhododendrons of the Fulvum Series. List of Determinations of the Rhododendrons of the Sub-series Haematodes.

Part III. Page 161. Notes contributed by H. F. Tagg, F.L.S.—New species and varieties of Asiatic Rhododendrons. An enumeration of the specimens of the Rhododendrons of the Forrestii Sub-series. Notes on the Distribution and Determinations of the Rhododendrons of the Souliei Sub-series. An enumeration of the specimens of the Rhododendrons of the Martinianum Sub-series.

Printed in Great Britain by
Stoddart & Malcolm, Ltd., Edinburgh