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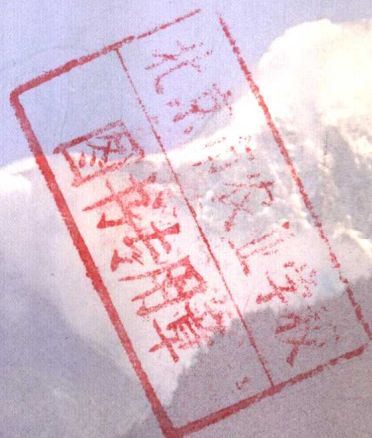




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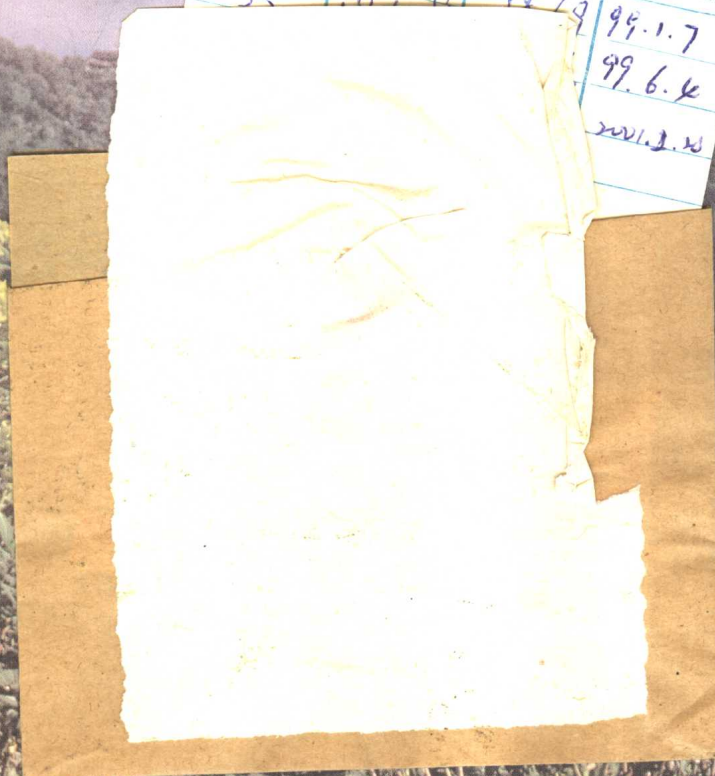


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中国是一个多山的国家,山区面积占国土总面积的 70%,其中高原占国土面积的 26%,地势为西高东低。最著名的是平均海拔 4000 米以上的青藏高原。高原上山岭、宽谷并列,湖泊星罗棋布,草地空阔。略成弧形的喜马拉雅山构成了青藏高原的西南边缘,是世界上最雄伟的山脉。位于中尼边界的珠穆朗玛峰海拔 8848 米,为世界第一高峰。由青藏高原向北跨过昆仑山、祁连山,向东跨过横断山,地势逐渐下降,形成中国地形的第二阶梯,这就是地面崎岖的云贵高原、沟谷纵横的黄土高原和地面起伏和缓的内蒙古高原。山脉随高原大体呈东西走向,由此构成中国地理区域的重要分界线和地形的基本骨架。

中国大多数高原景象万千,山连山,水连水,雄、奇、险、秀兼而有之。高原上不同纬度、不同海拔高度、不同地形和生长环境,分别生长着高山针叶林,高山灌丛和草甸,流石滩植被和冰缘植物等等,多种植物群落构成了一幅景象独特的高原风光,而千姿百态、艳丽多彩的高山花卉则是这旖旎风光的重要组成部分。无论在辽阔的山野、茫茫草甸,还是在荒漠冰缘,每当开花时节,各种山花竞相开放,争艳斗奇,给高原增添了无限生机。有人说,在高原看一天花,比在城市公园一生见到的花还多,此话的确不假。

在众多高山花卉中,当首推中国高山三大名花——杜鹃花(*Rhododendron*)、报春花(*Primula*)和龙胆花(*Gentiana*)。

杜鹃花(*Rhododendron*)人称“木本花卉之王”,起源于中生代白垩纪,中国西南横断山区是它的发祥地和最大的分布中心;全球共有杜鹃花 900 多种,其中 650 多种生长在中国。该属植物的生态环境比较复杂,因而种与种之间的形态和性状差别很大,仅就植株体积而言,矮小的高不足 10 厘米,匍匐生长在石岩上,如紫背杜鹃(*Rhododendron forrestii*);绝大多数是灌木和小乔木,如高山雪线以下成片生长的雅容杜鹃(*R. charitopes*)、美被杜鹃(*R. calostrotum*)等。它们大多高不过膝,但枝干健壮,根系发达,具有较强的抗风御寒能力;少数是大乔木,如云南省腾冲县高黎贡山区,生长着一片大树杜鹃(*R. protistum* var. *giganteum*)林,其中最大的一株树高 25 米,树龄 500 年,被誉为世界杜鹃花之王。

杜鹃花的颜色丰富多彩,花冠或粉、或红、或黄,或白中透绿,或粉中带黄,或红黄相间,万紫千红,美不胜收。有一种叫多趣杜鹃(*R. stewartianum*)的,其花蕾绽开后竟有六、七种颜色。由于高山花丛带的杜鹃花多为连片生长,盛花时形成几十平方公里的杜鹃花潮,由山麓涌向山顶,景象令人震撼。有的外国朋友不顾高龄攀上云南大理苍山,为的是饱览花海;还有的面对一眼望不到头的杜鹃花林,惊呼:“上帝啊,这就是我要寻找的天堂!”

报春花(*Primula*)为多年生草本,全球 500 余种,中国产 300 种左右,是世界报春花的分布中心。本书收录了具有代表性的报春花 19 种,它们产自青藏高原、云南西北部和四川西部的崇山峻岭。据专家们考察,报春花多生长在海拔 2500 -



4500 米的高山草甸、溪畔、沼泽和岩石缝；植株高 5—50 厘米不等；叶为基生，呈莲座状或贴近地面，花冠呈漏斗状或高脚碟状，花色十分美丽。由于生长环境的差异和种类的不同，从早春至仲秋都有报春花开放。在高山雪原，多数报春花成片生长，开花时节，五彩缤纷，清新幽香。有一种生长在海拔 3100—4700 米的白心球花报春(*P. atrodentata*)，花瓣粉红，凹进的花心镶嵌着一圈白环，白环中心为暗紫色，整个花冠优雅俏丽。又如高穗花报春(*P. vialii*)，特产于云南西北部 and 四川西部。从其种名不难看出，它的花序似穗，粗而长。有趣的是，在花蕾期，穗状花序殷红似火，花蕾由下至上逐层展开，初花粉红，当所有花蕾全部绽开后，随着时间的推移，整个花序由粉变白，并从下至上逐渐脱落，最后露出红色的花序轴。本种整个花期，数易其色，可谓奇特。由于报春花的花形别致，花色美丽，已引起植物学家和园林艺术家的浓厚兴趣，有些种已被他们从高山请进了园林，有的还作为盆花栽培，进入了家庭。

龙胆花(*Gentiana*)植物为一年或多年生草本，全属约 500 种，中国产 230 多种，大部分自然生长于海拔 2000—5000 米的高山地区，少数生长在低山平地。龙胆花的叶片为对生，花为腋生或顶生，花形呈钟状，颜色以蓝、紫、白居多，少数种为粉、淡绿色，其中蓝色龙胆花最美丽。有一种特产中国的大花龙胆(*G. szechenyii*)，花冠为筒状钟形，长 4.5—7 厘米，上部蓝色或蓝紫色，下部黄白色，具蓝色宽条纹，非常美丽，集生茎端的花朵，犹如蓝色彩球。相反，有的龙胆，植株小巧，株高仅 2 厘米，却能绽开出比它植株大 3 倍的花！在非常寒冷的高山草甸和流石滩上，有的龙胆垫状生长，花朵密集生长在一起，侧面看，不见叶片只见花，堪称花中怪杰。

以上所举，仅是高山花卉中的名种，实际上可作园林观赏植物的种类不下 5000 种，即使生长在海拔 3000 米以上的观赏植物也在千种以上，收入本书的观赏植物为 152 种，隶属 32 个科。它们中有 74 种为中国特产，多种为中国第二批保护植物，绝大部分很有特色。以菊科(*Compositae*)植物为例，本书介绍了 8 种菊科风毛菊属(*Saussurea*)植物，它们的外形没有一点人们通常见到的菊花的影子，有的形似莲蓬，有的形似狡兔，它们蛰居于海拔 5000 米左右的流石滩上，通体被覆着长长的白色或灰色茸毛，由于它们居住的环境终年积雪不断，所以人们干脆把它们叫作“雪兔子”。雪兔子是抗寒冠军，还是开放在地球海拔最高的花。

还有一类植物叫绿绒蒿(*Meconopsis*)，与罂粟(*Papaver semniferum*)同科，生长在海拔 3000 米以上的高山草甸、灌丛和流石滩中。绿绒蒿六、七月开花，花形酷似虞美人，端庄俏丽，花体硕大，色彩丰富，有红、粉、黄、白、蓝多种，其中尤以蓝色花最为雅致。如总状绿绒蒿(*M. racemosa*)生长着蓝色、淡蓝色花瓣，桔黄色花药，数朵花冠簇拥在茎上部，婷婷玉立，美如天仙。又如秀丽绿绒蒿(*M. venusta*)长着深蓝色花瓣，黄色花药，独花立于花茎顶端，长长的剑形绿叶像群星捧月般拥戴着花冠，在荒漠的高山草甸，尤显得美丽出众。有意思的是，但凡开蓝色花的绿绒蒿，其茎

和叶都长着针刺,花美极,但不易采摘。

从以上介绍不难看出,高山花卉的种与种之间,在性状和形态上差别很大,但它们在生态上却具有共同特征。

首先是它们的植株普遍矮小,这是由环境造成的。高寒地区自然环境严酷,即使盛夏也有飞雪,日夜温差很大,使得植物生长缓慢。由于长期以来对这种环境的适应,它们贴近地面生长,或以细密的分枝紧抱形成垫状,这样既可减少风暴的冲击,又能降低能量消耗。别看它们身材矮小,到了开花时节,却可以开放出大得与它们身材极不相称的鲜艳花朵。例如,有的植株微露地面,盛花时仅见花冠,不见植株;有的植株匍匐生长,成群连片,植株间几乎没有空隙,彼此挤在一起,盛花时一片灿烂景象。还有的植株贴近地面生长,有叶无茎,植物学家们称它们为“无茎植物”,一种名叫藏波罗花(*Incarvillea younghusbandii*)的植物即属此类,开花时节,诸多花簇拥在一起,花冠为紫红色或粉红色,冠管桔黄色,美丽异常。由于它植株极矮,根系发达,在海拔 5000 米左右的高山草甸中,不畏狂风暴雪,堪称御寒精英。

其次是高山植物的茎粗、叶厚、根系发达;茎、叶、根富含糖和蛋白质,有的含量甚至达到干重的 25%。不仅如此,粗壮的茎、叶还可以贮存空气。科学家曾横切千里香杜鹃(*R. thymifolium*)的叶子,在显微镜下观察,发现其内部有许多空隙,其中存有空气。原来高山空气稀薄,氧气不足,叶片自贮空气,犹如人带着氧气瓶上高山一样,可解决氧气不足的难题。至于高山植物根系发达,恐怕是普遍现象。高山上,尤其是青藏高原,除土壤丰厚的草甸外,大部分地方干旱贫瘠,砾石裸露,水分缺乏。对于多数为草本植物的高山花卉来说,要想在这严酷的环境中生存并度过寒冬,必须具有发达的根系。健壮根系深扎土中或砂石空隙中,大量汲取养分和水分,为植物生长提供充足营养,以利开花结实,这同时也为植物安全越冬做好了充分准备。

最后,是它们的花色美丽。高山花卉,千姿百态,五彩缤纷,使人眼花缭乱。长期以来,人们对高山花卉如此丰富多彩的花色感到不可思议。后来科学家们在研究中发现,高山上紫外线强烈,极易破坏花瓣细胞的染色体,阻碍核苷酸的合成,为了生存,花瓣体内自然产生大量尖胡萝卜素和花青素以吸收紫外线,保护染色体。研究证明,尖胡萝卜素可使花瓣呈现黄色,花青素则使花瓣显露红、蓝、紫色。也就是说,山越高,紫外线越强烈,花瓣体内上述两种物质越多,花瓣的颜色也就越丰富。由此人们终于明白,为什么高山上的野生花卉比城市公园里人工培育的花卉,其花色更艳丽多彩。

高山花卉是地球生物圈的重要组成部分之一,在维护生态平衡和自然环境方面起着重要作用;就其本身价值而言,也是人类赖以生存的物质财富的一部分。因此,了解高山花卉,保护并利用它们,对于改善人类生存空间、提高生活质量是不可



缺少的。以青藏高原可可西里和羌塘高原地区为例,那里仍有几十万平方公里的无人居住区,区域内的草原、草甸和荒漠中,生长着雪莲(*Saussurea* spp.)、红景天(*Rhodiola* spp.)、雪灵芝(*Arenaria* spp.)、虎耳草(*Saxifraga* spp.)、绢毛菊(*Soroseris gillii*)、矮葶苈(*Draba handelii*)等多种高山花卉和丰富的禾草(*Gramineae*)及莎草(*Cyperaceae*),这些极富营养的山花野草,繁育了大量的野生动物。在羌塘高原的美玛错、阿鲁错、鲁玛江冬错等无人区,科学家们近年在那里发现了现存数量极少的金色野牦牛的栖息地。在无人区的骆驼湖畔,5天内竟发现有8000多只藏羚种群向同一方向移动。高山花卉参加了生态系统的大循环,养育了牦牛、野驴、藏羚、高原兔、雪鸡等几十种野生动物。从新生代第四纪直到现在,青藏高原的花卉植物在实现高原多样的生物世界方面起了重大作用。

对人类来说,高山花卉也是可直接利用的物质财富。自古花药同源。中国人用草药治病,渊源流长,历史悠久。根据药源普查结果,中国有天然药用植物11146种,其中绝大部分是显花植物,其分布规律是,自东北向西南,种源逐渐增多,中国的大西南崇山峻岭是药用植物的天然宝库,高山花卉则是天然宝库的重要组成部分。例如本书介绍的水母雪兔子(*Saussurea medusa*),生于海拔3900—4800米的高山流石滩上,全草药用,药名雪莲,能治脾虚咳嗽、肾虚腰痛,甚至对月经不调、阳萎、崩带等症亦有很好的疗效,素有“雪山人参”之称。同科植物中的许多种均有不同的药用价值。癌症是当代令人生畏的顽症,人们发现,某些药用植物对此有比较理想的治疗作用,甘遂(*Stellera chamaejasme*)就是其中的一种。它生于海拔3500—4600米的山坡草地,分布较广。临床证实,甘遂作为中草药,对胃癌、肝癌、肺癌、甲状腺癌和乳腺癌等,有明显疗效。载入本书的152种高山花卉,近半数均为药用植物。我们可以毫不夸张地说,但凡人类疾病,都可在大自然中找到对症治疗的药用植物。

近半个世纪来,随着交通条件的改善和资源考察的增加,中国高山花卉资源越来越为人们所重视。华南、桂林植物园,昆明树木园对木兰科植物的引种;庐山、贵州植物园对杜鹃花科植物的引种;昆明植物园对茶花、多种高山花卉的引种;北京植物园对西藏花卉灌木的引种;如此等等,都已取得了可喜的成果。特别值得一提的是,甘肃榆中紫斑牡丹园主人陈德忠,自费租用卡车去青海、西藏,往返几千公里,在藏南海拔3500米处采集到高达2米、中国特有的大黄花牡丹,这种牡丹已在甘肃开花,并培育出一批实生苗,为繁荣中国牡丹花卉业做出了重要贡献。

中国高山花卉种质资源丰富,其中有许多是中国特有种。保护和珍惜花卉资源,用现代科学技术手段,诚心诚意地把花仙从深山幽谷请到人间,丰富人类生活,美化人类生存环境,是我们的共同愿望。

China is a country with many mountains. Indeed seventy percent of its total territory is mountainous, among which twenty-six percent consists of plateaus. Its terrain slopes downward from west to east. The most famous plateau is the Qinghai-Tibet Plateau at an average height of over 4,000 metres above sea level. It has many high mountains, wide valleys, vast lakes and boundless grasslands. The arc-shaped Himalayas, which border the Qinghai-Tibet Plateau on the southwest, comprise the most magnificent mountain range in the world. Mount Qomolangma at the border between China and Nepal at 8,848 metres above sea level is the world's highest peak. To the north of the Qinghai-Tibet Plateau are the Kunlun and Qilian mountains and to the south is the Hengduan Mountain Range. Below these ranges, the height of the terrain drops, forming the second level of China's slanting table territory — the Yunnan-Guizhou Plateau, the Loess Plateau and the Inner Mongolia Plateau. Mountain ranges run along these plateaus from west to east, forming the major demarcation lines for the geographical regions as well as the outline of the entire topographical map of the mainland of China.

The magnificent and beautiful plateaus of China lie at different latitudes and heights and display varying geographic features and environments. They are home to alpine conifer forests, alpine bushes, and a wide range of grasses and various plants. The different plant communities form many beautiful scenes unique to the plateau, with alpine flowering plants dominating the vast canvas of Nature's aesthetic montage. Whether endless mountain wilderness, outspreading grassland, or desolate glacial edgeland, whenever the season arrives, an infinite array of alpine flowers burst into bloom, transforming the plateau into a ravishing floral universe. Thus there are those who say: the variety of flowers you see on the plateau in one day outstrips what you see in city parks in a lifetime.

Among the many alpine flowering plants, the most famous are *Rhododendron*, *Primula* and *Gentian*.

*Rhododendron*, known the "King of Woody Plants", originated in the Mesozoic era of the Cretaceous period. The Hengduan Mountains in Yunnan and the eastern part of the Qinghai-Tibet Plateau are its birthplace and comprise its largest area of distribution. There are over 900 different kinds of *Rhododendron* on the globe, more than 650 kinds of which grow in China. Due to complex ecological conditions, different types of *Rhododendron* vary greatly in shape and form. The small ones, such as *Rhododendron forrestii*, are less than ten centimetres high, creeping over cliff faces. Most *Rhododendron* are frutex and little arbor, such as *R. charitopes* and *R. calostrotum*. Growing in large patches below the snow line on high mountains, they are just knee high, but have strong trunks, branches and roots and are very wind- and cold-resistant. Other *Rhododendrons*, by contrast, are giant trees. In the large forest of *R. protistum* var. *giganteum* in Gaoligong Mountain in Tengchong County, Yunnan Province, there is a giant tree, 25 metres high and 500 years old, which is known as "the King of *Rhododendron* in the World".

*Rhododendron* produces flowers of red, pink, yellow or white, though some, such as *R. sterwartinum*, have six or seven colours. As they grow in masses covering large areas on mountains, when they come into bloom, the mountains become a riot of colour, a vast sea of flowers stretching out over several dozen square kilometres. The sight draws countless tourists. Many foreign friends, even those of advanced age, climb Cang-

shan Mountain in Dali, Yunnan Province, to enjoy the sea of flowers. Facing the azaleas on the mountains, they exclaim: "Ah, so this is paradise!"

*Primula* is a perennial herb. About 500 different kinds have been identified, with 300 of them growing in China, the largest distribution of primula in the world. This album includes 19 representatives from the Qinghai-Tibet Plateau and the high mountains of north-west Yunnan and west Sichuan. *Primula* grows in alpine meadows, on river banks, in marshlands or in crevices and precipices between 2,500 and 4,500 metres above sea level. It ranges from 5 to 50 centimetres in height, has rosettes of basal leaves which may hug the ground, and produces brilliantly colourful tubular or bell-shaped flowers. *Primula* blooms from early spring to the middle of autumn. Most primula grow in patches, and when they are in bloom, the world is a blare of colour. *P. atrodentata*, which grows at 3,100-4,700 metres above sea level, has flowers with pink petals. The hollow centre of its flower is a white circle surrounding a smaller circle of dark purple. The whole corolla is extremely beautiful. *P. vialii*, growing only in northwest Yunnan and west Sichuan, has flowers with a thick, long upwardly tapering inflorescence. In the bud stage, these conical spikes are firey red; when the inflorescence blooms gradually upward, the colour turns pink, and by the time the whole spike is in full bloom, the entire inflorescence becomes white and the individual florets begin to fall off, revealing, finally, a red rachis. In the process the flower changes colour several times. With extremely colourful flowers, *primula* has aroused great interest in botanists and horticulturists, who have introduced some species from the high mountains into gardens. Some species have been planted in pots and entered people's homes.

*Gentian* is an annual or perennial herb. About 500 kinds of gentians are found in the world, more than 230 of which grow in China. Most of them grow in high mountain areas at 2,000-5,000 metres above sea level, although a few grow in low lands. *Gentian* has opposite leaves and axillary or terminal bell-shaped flowers. Most of its flowers are blue, purple and white, but some are pink and light green. Blue *Gentian* flowers are the most beautiful. *G. szechenyii*, for an example, is endemic to China. Its bell-like corolla, 4.5-7 centimetres long and light blue in colour, is very beautiful. Growing in large patches with a diameter of 60 centimetres, it has flowers on top of the stem like blue balls. Its thick roots strike into the earth as deep as 70 centimetres. But some other kinds of gentian are very small. Their stems are just match-stick thick and only two centimetres high, while the flowers are three times bigger than their stems. In the very cold alpine meadows and rocky places, some kinds of gentian grow in mats, their flowers clustering together. When you look at them from one side, you can only see their flowers.

The above-mentioned alpine plants are just a few examples. In fact there are at least 5,000 different types of ornamental plants in China, with over 1,000 growing in highlands at 3,000 metres above sea level. Included in this album are 152 different ornamental plants from 32 families. Among them 74 are endemic to China, and many are classified as second level state-protected plants. All of the plants have their own special features. Take *Compositae* for example. The eight *Saussurea* plants of *Compositae* introduced in this book do not look like the chrysanthemums we usually see. Some of them are shaped like lotus while others are like rabbits. Because they all grow on rocky snow-capped