贡嘎山植被

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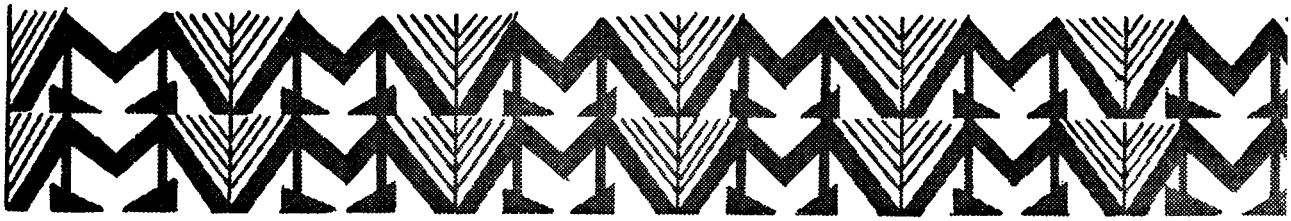

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前　言

贡嘎山地区位于我国西南部著名的横断山系的东北段，四川省甘孜藏族自治州康定、泸定、九龙县以及雅安专区石棉县境内，区内山势雄伟壮丽，现代冰川发育，高山地带终年冰雪覆盖。主峰海拔7556米，高耸于四周冰峰雪岭之上，被称为“蜀山之王”，不仅是青藏高原东部边缘地区和横断山系的第一高峰，也是世界上著名的高峰之一。

贡嘎山地区地处青藏高原和四川盆地的过渡地带，自然条件复杂，垂直带谱完整，植物种类、植被类型和资源植物十分丰富。1979—1981年期间，中国科学院成都生物研究所对贡嘎山地区进行了多次植被考察，考察范围大致东以大渡河为界，南达田湾河，西沿力丘河经瓦灰山到鸡丑山，北至川藏公路。考察中搜集了大量的植被资料，同时还采集了大量的植物标本。

根据考察结果和有关资料，编写出《贡嘎山植被》一书。全书共分五章：第一章，自然环境概述；第二章，植物区系特点；第三章，主要植被类型；第四章，植被地理规律；第五章，植被的利用和保护。本书可进一步为合理利用和保护该地区的植物资源以及自然景观等方面提供科学依据。

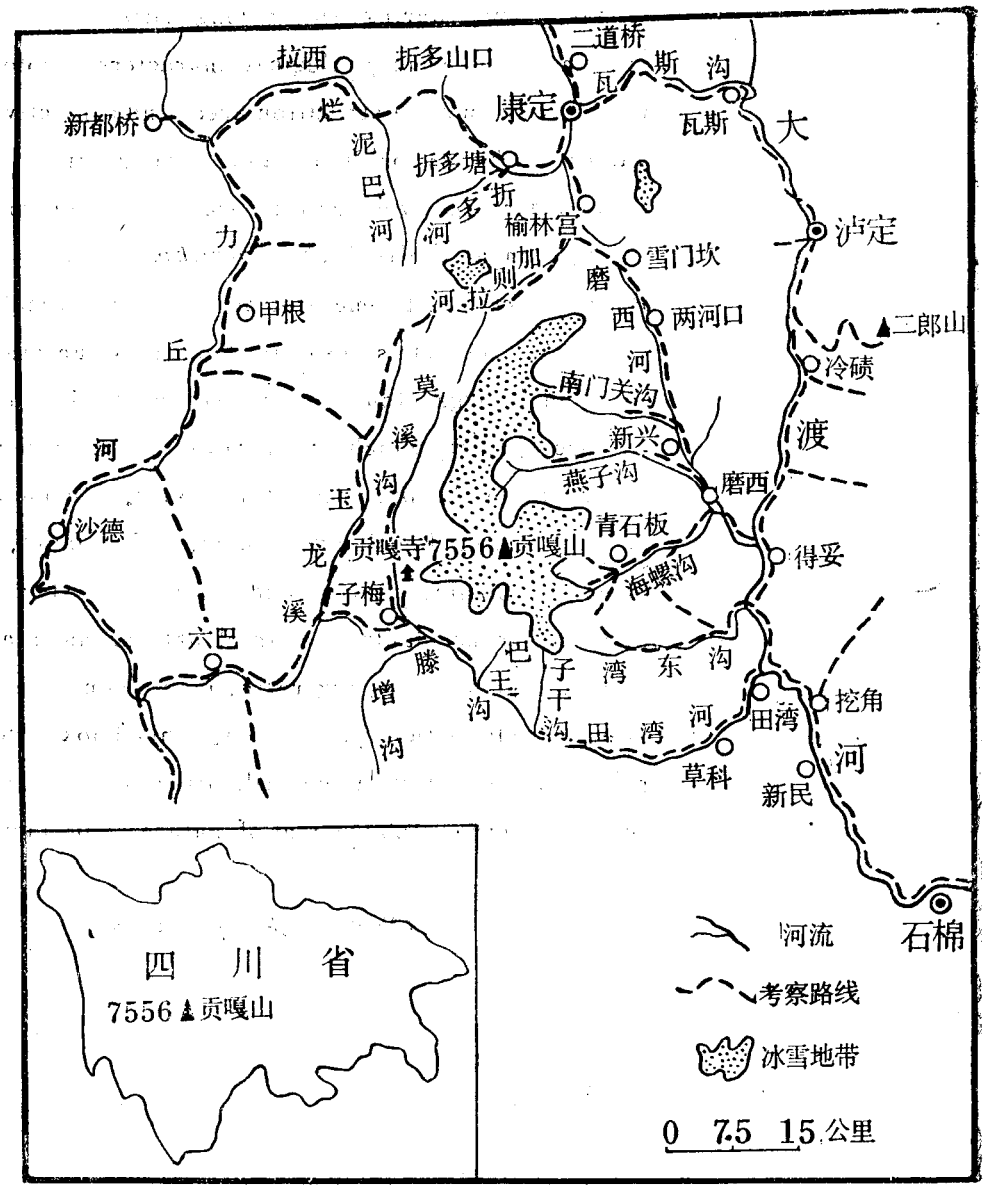
先后参加野外考察的有刘照光、胡孝紘、邱发英、陈庆恒、魏泰昌、倪炳炽、杨启修、印开蒲、吕荣森、王清泉、刘志安、乔永康、侯伟、朱亚平、毕建平、周蓉生、刘永兴、李攀忠、高奇才、洪家烈、戢泽发、黄志中，泸定县商业局何万祥、四川省自然资源研究所陈洪等同志。

考察工作得到甘孜藏族自治州以及康定、泸定、九龙、石棉等县有关单位的大力支持。中国科学院成都地理研究所、中国科学院植物研究所、中国科学院西北高原生物研究所、中国科学院华南植物研究所、中国科学院昆明植物研究所、江苏省植物研究所、四川省林业科学研究所、四川大学等单位提供了有关资料和帮助鉴定了部分标本。鉴定标本和提供资料的有胡文光、胡琳贞、张泽荣、许介眉、赵振镛、赵良能、陈守良、王文采、金存礼、汤彦承、杨汉碧、罗健馨、郎开永、陈少卿、溥发鼎、周邦楷，孔宪需、高宝莼、杨云祥、李宗秀等同志。郑碧君同志参加了室内资料整理工作。在此，我们一并表示谢意。

由于野外考察工作条件限制，资料搜集还不够完善，加之我们业务水平所限，书中错误难免，敬请有关单位和读者批评指正。

著　者

1983年12月24日



贡嘎山地区植被考察路线图

Summary

Chapter I The Outline of the Natural Environment

The Gongga Mountain is located on the southeast fringe of the Qing-Zang Plateau and in the middle of the Great Snowy Mountain range of the Hengduan Mountain system, with its main peak being 7556 meters above the sea level. According to geotectology, it is located on the west fringe of the mutual contact zone between the Qing-Zang Plate and Yangtze Plate. Its strata are very complex and geomorphic patterns are deeply influenced by plate tectonics. The east and west slopes differ greatly. The east slope is seriously dissected to become the landforms of high, steep mountain ridges and deeply incised valleys, between which the altitudinal differences are at least 6466 meters, and primarily consists of paleozoic hypometamorphic rock and ancient magmatic rock. The west slope is a part of the Qing-Zang Plateau and forms a wide valley lan-

dscape with rolling mountains to a great extent except some high mountains and deep valleys. The west slope primarily consists of slightly-meta morphic rock of the Triassic Period.

The Gongga Mountain is situated in subtropical zone and belongs to subtropical monsoon climate. But the great mountain ridges towering to the troposphere influenced and changed the atmospheric circulation, so a distinctive climatic type has formed. The annual range of temperature of the east slope is great, daily range small, precipitation rich, humidity relatively high, cloud and fog a lot, sunshine a little and wind not strong. There are a lot of south wind and sou theast wind all the year round. The annual range of temperature of the west slope is small, daily range great, precipitation less than that of the east slope, humidity relatively low, fine days many, cloud and fog a little and sunshine much. The climate vertical zones of both east and west slopes is apparent based on those above.

Due to the differences between the east and west slopes in climate and vegetation, the soil types of the areas are complicated and various. The soil texture is generally loose and rough. The soil contains much rudaceous and arenaceous metasome, barysilite and melanotekite, but a little clay. This shows that the soil development of the Gongga Mountain Region is relatively young. The soil vertical zonation of the east and west slopes is apparent. In this region there are mainly

juvenile soil of alpine "rock stream", alpine meadow soil, subtropical podzolic soil, mountain gray-brown earth, mountain brown earth, mountain brown-cinnamon soil and mountain yellow-brown earth.

Chapter II The Characteristics of the Flora

Based on the preliminary study, in the Gongga Mountain Region vascular plants are found about 2500 species in 869 genera and 185 families, of which about 120 species in 51 genera and 29 families belong to pteridophytes and about 2380 species in 818 genera and 156 families belong to seed plants.

According to geographic distribution, the genera of pteridophytes are primarily tropical and subtropical and account for more than 60 % of all the pteridophytes.

The areal types of seed plants are complex. There are mainly 105 genera belonging to pantropical distribution and making up 12.8% of the total of seed plants; 26 genera belonging to the Old World tropical distribution and making up 3.2%; 21 genera belonging to tropical distribution of Asia and Oceania and making up 2.4%; 32 genera belonging to tropical distribution of Asia and Africa and making up 3.9%; 38 genera belonging to tropical distribution of Southeast Asia and making up 4.6%; 193 genera belonging to north temperate distribution and making up 23.6%; 50 genera belonging to the Old World temperate distribution and making up 6.1%; 26

genera belonging to north and south temperate disjunct distribution and making up 3.2%; 49 genera belonging to international disjunct distribution between East Asia and North America and making up 6%; 123 genera belonging to East Asia distribution and making up 15%; and 33 genera belonging to endemic distribution of China and making up 4%. Those above show that tropical and subtropical plants take an important place in the Gongga Mountain Region, but temperate plants are much more abundant.

The floristic characteristics of the Gongga Mountain Region are chiefly shown as follows:

(1)The old origin of the floristic composition; Monomorphic and oligomorphic genera are rich. 39 monomorphic genera are found and take up 4.7% of the total of seed plants. 115 oligomorphic genera are found and take up 14%. Original types are rich morphologically, such as polycarpellary *Cercidiphyllaceae*, *Magnoliaceae*, *Eupteleaceae*, and *Ranunculaceae*. The plants originating from the Tertiary Period are found abundant, such as *Lycopodium*, *Osmunda*, *Hicriopferis*, *Pinus*, *Picea*, *Keteleeria*, *Abies*, *Tsuga*, *Cunninghamia*, *Populus*, *Salix*, *Carpinus*, *Alnus*, *Betula*, *Lithocarpus*, *Quercus*, *Platycarya*, *Pterocarya*, *Juglans*, *Corylopsis*, *Acer*, *Rhododendron*. Up to now many plants mentioned above are still the dominants or edificatos forming the vegetation of the Gongga Mountain Region. There are many disjunct distribution types, which 91 genera belong to and make up 11.1% of the total of seed

plants. Among them the genera belonging to the international disjunct distribution between East Asia and North America are the most in number and make up 53.8% of the total belonging to the disjunct distribution in the region. All mentioned above prove that the floristic composition of the Gongga Mountain is of old origin; (2) The apparent differentiation and abundant endemic species. These that belong to temperate and north temperate zone in the Gongga Mountain region and adjacent areas are *Abies*, *Picea*, *Salix*, *Acer*, *Saxifraga*, *Corydalix*, *Primula*, *Pedicularia*, *Saussurea*, *Gentiana*, *Polygonatum*, *Rhododendron*, *Aster*, *Kobresia* and so on. They have gathered, differentiated and multiplied there, so endemic species are very abundant. At the same time, in the region we can see not only the variation from the primary type to advanced one, but also some links in the chains of the evolution and the identity of the opposites in the contradiction between origin and differentiation. The Gongga Mountain Region is very rich in tropical and subtropical genera, but poor in species and many of those are only found on the areal fringe; (3) Complex geographic composition and apparent replacement phenome non. It is very common that the plants different in geographic composition wonderfully grow togather in the same community. The admixture of the different geographic composition of mountain vertical zone is closely related to the historical development, besides the complicated environme-

ntal conditions. Though the plants different in geographic composition are apparently mixed in the Gongga Mountain Region, the replacement phenomenon of the close-breeding species on the horizontal and vertical zones is also very clear. This is another important feature of the flora of the Gongga Mountain Region.

Chapter III The Main Types of the Vegetation

The complex natural conditions of the Gongga Mountain Region certainly give variety to the plant communities. Meadows, bushes and forests form the stabilized vegetation types under the different conditions of the natural environment. The main plants of coniferous forests are *Abies squamata*, *A. forrestii*, *A. georgei*, *A. fabri*, *Picea balfouriana*, *P. balfouriana var. hertella*, *P. likiangensis*, *P. brachytyla*, *Pinus densata*, *P. yunnanensis*, *Keteleeria evelyniana*, etc. and constitute formations respectively. These are the main formations found in broad-leaved forests, such as *Cinnamomum longepaniculatum*, *Phoebe chinensis*, *Cyclobalanopsis oxyodon*, *C. glauca*, *Lithocarpus cleistocarpus*, *Osmanthus yunnanensis*, *Quercus pannosa*, *Q. aquifolioides*, *Q. gilliana*, *Q. longispica*, *Q. variabilis*, *Q. ariffithii*, *Betula utilis*, *B. Platyphylla*, *Populus davidiana*; These are the main formations in bushes, such as *Sabina pingii var. wilsonii*, *Rhododendron telmateium*, *R. intricatum*, *R. flavidum*, *R. thymifolium*, *R. cephalanthum*, *R. phaeochrysum var. agglutinatum*, *Salix sclerophylla*, *Quercus monimotricha*; And these are the main formations in the herbaceous communities, such as *Kobresia*

pygmaea, *K. cuneata*, *K. prattii*, *k. setchwanensis*, *Potentilla leuconota*, *Festuca ovira*, *Spenceria ramalana*, *Allium prattii*.

This book uses formation as the most basic unit for description and presents 69 main formations or units analogous to formation. Each formation briefly states geographic distribution, natural environmental conditions, vegetation stratification, specific composition, succession syndynamic and so on.

Chapter IV The Geographic Laws of the Vegetation

The Gongga Mountain is located in subtropical zone. The representative type of the vegetation of horizontal zone is primarily evergreen broad-leaved forest consisting of *Fagaceae*, *Lauraceae* and so on. The heating effect of the föhn and the influence of the southwest monsoon and southword jet stream of the westerlies in the deeply incised valleys of the Dadu River and Yalong River make the valley bottoms arid and hot, dry and wet seasons clear. Under the conditions above, *Acacia sp*, *Opuntia monacantha*, *Pistacia weihmannifolia*, *Osyeis wightioma*, *Ajania potaninii*, *Heteropogon contortus* have developed well there and form bushes and grass thickets. The specific composition belongs in the classification of tropical and subtropical zones.

Due to the great altitudinal differences of the Gongga Mountain, biological climate varies with the increasing altitude and the vertical distribution laws of the vegetation are very clear.

The vertical vegetation patterns of the east slope can be classified as evergreen broad-leaved forest belt (below 2200m.), mountain mixed coniferous and broad-leaved forest belt (2200-2500m.), subalpine coniferous forest belt (2500-3600m.), alpine bush and meadow belt (3600-4600m.) and open vegetation belt of alpine "rock stream" (4600-4900m.). These of the west slope can be classified as subalpine coniferous forest belt(3000-4000m.), alpine bush and meadow belt (4000-4600m.) and open vegetation belt of alpine "rock stream" (4600-5100m.). Each belt has a relevant vegetation type. There are no obvious mixed evergreen and deciduous forest belt and deciduous and broad-leaved forest belt on the east and southeast slopes of the Gongga Mountain.

Chapter V The Utilization and Conservation of the Vegetation

Based on the investigation data and specific composition of the Gongga Mountain, Region, 34 species have been preliminarily selected and decided as precious and rare plants. Of them 19 species belong to the important plants protected by the state and make up 26% of the total of the plants protected by Sichuan. Some of the precious and rare plants belong to the species originating before and after the Tertiary Period, and are of the ancient and isolated original types of higher plants, and some belong to the new types differentiated due to the frequent vicissitudes of

climate, etc. during the strong new tectonic movement. The morphological characters, ecological environment, distribution areas and protective values of the 34 precious and rare plants are described respectively and so are the 3 ancient trees, such as *Ginkgo biloba*, *Cunnighamia lanceolata*, *Phoebe chinensis* and some precious and rare animals extant on the east slope of the Gongga Mountain.

The Gongga Mountain is extremely rich in resource plants, which are more than 1500 species according to the preliminary statistics. We have mainly analysed medicinal plants, oil plants, aromatic plants, starch and gelatinous starch plants, fibrous plants, tannin plants, ornamental plants, plants containing resin, plants containing vitamin, edible fungi and so on. This book also proposes the reasonable utilization of the resources and the establishment of nature sanctuaries.

（钟盛先　译　李朝銮　校）

目　录