Shouxin Zhang
Editor

Geological Formation Names of China (1866–2000)

中国地层名称 (1866–2000)

Volume 1

高等教育出版社
HIGHER EDUCATION PRESS

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Preface

My late teacher, Professor Yin Tsan-Hsun (Yin Zanxun), once said, "Everyone desires to be a great pioneer in a new field, or a pathbreaker in technical innovation. No one wants to bury himself in the laborious work of taking passages from so many books and doing tedious textual research to compile a reference book. But I believe that the compilation of reference books is a job to consume one's time to benefit others. This can smooth the way for others, why not go ahead with it?" (*The Random Talking of the Past*, 1988, China Ocean Press, 119).

Each country has developed its own code of stratigraphic nomenclature and produced catalogues of geological names, such as the Stratigraphical Lexicon (see *Lexique Stratigraphique International*, LSI), to maintain the scientific principle of a "unique" geological name and assume the Law of Priority. However, the lack of a comprehensive Chinese catalogue of geological formation names has led to confusion in the management of Chinese geological nomenclature, to difficulty in judging and preserving the Law of Priority, and hindered standardization and efficient administration.

1. The Development of Chinese Geological Formation Catalogue

It has taken a long time for a comprehensive catalogue of Chinese geological formation nomenclature to be developed, and this period can be divided into four stages.

Prior to the 1st National Stratigraphical Conference (1959)

Yungshen S. Chi, the late Chinese geologist, completed a 196 page English-language manuscript entitled *Chinese Geological Terminology, Geological Survey of China, Peking, March 1933*, which defined 627 geological formation names. References were presented at the beginning of the main body of the manuscript, and authors and the geological formation names they first used were annexed at the end. Formation names and references were collected up to the end of 1932. Though unpublished, the manuscript was the first comprehensive compilation of Chinese geological for-

mation names. J. Roger, a French geologist, subsequently entitled the manuscript *Lexique Stratigraphique de Chine* in 1963.

In 1947, Yin Zanxun invited Sheng Jinzhang to transcribe the 627 geological names in Yungshen S. Chi's manuscript onto portable cards. Sheng Jinzhang extracted the following categories from the manuscript: (i) Geographic names spelt in the Wade-Giles system of Chinese Romanization; (ii) Chinese names; (iii) Times; (iv) Standard locations; (v) Authors, dates and works; (vi) Lithology; and (vii) Thickness. Later, Yin Zanxun copied onto cards new geological names he found to supplement the original 627 geological terms. By June 1958 he had collected 2600 names, which were copied, printed and bound in a volume by Xu Daoyi, Zhang Shouxin, Yang Xingtai, Xie Cuihua and Shi Shunyao.

In early 1959, the Preparatory Committee of the National Stratigraphical Conference decided to produce a comprehensive reference book of Chinese geological formation names for the conference. The task was assigned to the Institute of Geology, Chinese Academy of Sciences. After two months of hard work, the final version was completed at the end of September 1959. A total of 2950 geological formation names were collected, 2632 of which having full records of sources and definitions which were listed in the main text, with the remaining 318 incomplete records presented as a supplement. This volume was the official conference document - File No. 138 titled "Corpus of Stratigraphical Terminology of China (Draft)" (ii+169) - and was edited by the Stratigraphical Department, Institute of Geology, Chinese Academy of Sciences, and printed by the Preparatory Committee of the National Stratigraphical Conference.

The following fascicules of *Lexique Stratigraphique International* relating to China were edited by Commission de Stratigraphie, Congrès Géologique International:

Volume III Asie,

Fascicule 1, Republique Populaire Chinoise [I, II (1964), III Complement (1971)], edited by J. Roger (French)

Fascicule 2b, Mandchourie-Manchuria (1956), edited by Uemura *et al.* (English)

Fascicule 4, Taiwan (Formose) (1957), edited by T.C. Biq *et al.* (English)

Many problems exist in the five books mentioned so far: academic mistakes; a non-Wade-Giles system of Chinese Romanization contrary to the international practice; and incorrect spellings. Moreover, Liaoning Province, Jilin Province and Heilongjiang Province in northeastern China, and Taiwan Province, were not considered as parts of the People's Republic of China, and many vestiges of Japanese cultural aggression remain in the books. All of these problems are objectionable to the Chinese people and will be detailed later. The compilation and publication of the Asian Volume also reminded us of the necessity and urgency of compiling a comprehensive catalogue of Chinese stratigraphical names.

The 1st (1959) and 2nd (1979) National Stratigraphical Conferences

The coining of Chinese stratigraphical unit names expanded almost daily due to the rapid development of geological research in China. It had been estimated that the total was greater than 4000 by the end of 1964. With increasing numbers of stratigraphical units, there were many problems with standardization. Geological

names must be coined and used to solve problems, and also be present to geologists with a consistent reference.

In February 1963, under the leadership of Yin Zanxun, researchers at the Institute of Geology, Chinese Academy of Sciences began to compile the *Stratigraphical Lexicon of China*. It was intended to comprise 14 volumes, which would be completed and published in succession due to the large volume of information. The series comprised: (i) Presinian; (ii) Sinian; (iii) Cambrian; (iv) Ordovician; (v) Silurian; (vi) Devonian; (vii) Carboniferous; (viii) Permian; (ix) Triassic; (x) Jurassic; (xi) Cretaceous; (xii) Tertiary; (xiii) Quaternary; (xiv) Others and Addenda. We decided to start from the seventh volume, the Carboniferous, and to prepare the second edition after all 14 volumes were published. We would then incorporate all 14 volumes into one book, and produce a completed Chinese Lexicon of Stratigraphy covering all the geological periods represented in China.

In February 1966, the *Chinese Lexicon of Stratigraphy (7)—Carboniferous* was published by Science Press (Beijing). However, the Cultural Revolution began in summer of the same year, and the project was aborted.

Afterwards, due to the influence of the *Chinese Lexicon of Stratigraphy (7)—Carboniferous*, geologists from a few Chinese provinces produced several local stratigraphical lexicons. For example, *Lexicon of Stratigraphical Names of the Western Qinling Mt.* (1981, *Regional Geology of Gansu*, vol.1, serial no.8, in Chinese) with more than 300 names, edited by Zhai Yupei, Cai Tiliang and Wei Dingxin, and consisting of preface, main body and index; *Liaoning Lexicon of Stratigraphy* (1985, *Bulletin of the Geological Society of Liaoning Province*, no.1, in Chinese) with 921 names, edited by Han Guang and Liu Xiaoliang and consisting of preface, editorial notes, main body, references and Chinese index; and the *Guizhou Lexicon of Stratigraphy* (1996, Guizhou Science and Technology Press, in Chinese), edited by Liu Yuzhou from the Regional Geological Survey of Guizhou Geology and Mineral Resources, and which consists of preface, contents, appendices, index to head words and references. Its body of text was arranged according to geological periods, and included the rock type, biology, chronological stratum unit, climate period and physiographic time. Some entries contained sectional drawings and description tables. However, many names in the three publications were from unpublished material which could not accurately reflect the features of local stratigraphy, causing inconvenience to users.

The 3rd National Stratigraphical Conference (2000)

After 1990, two detrimental events occurred in the history of Chinese stratigraphy. The first was the advent of the "Principle of Historical Priority". This priority was based on the original use of the stratigraphical name, but not on its publication. The priority was subscribed to the *Stratigraphical Lexicon of China,* which was organized and executed by the National Stratigraphical Commission of China and edited by the Editorial Committee of Stratigraphical Lexicon of China (late chief editor Cheng Yuqi, then the vice director of the National Stratigraphical Commission of China). ("In each volume, the selected items of the stratigraphical units, their creators and the dates of establishment all follow those used by their original authors

as far as possible. However, for quite a number of items within the stratal units, although the creators are listed, their original works are not accessible, or the original titles only appear in unpublished reports and documents. For such items, therefore, their original creators' articles are not or can not be listed in the 'References' of the volume". *Stratigraphical Lexicon of China*, Preface)

The second event was the "Double Standard in Priority of Stratigraphical Nomenclature". Unfortunately, not only did the National Stratigraphical Commission of China not correct the lopsided approach of the "Principle of Historical Priority", it also created the legal conditions for it. To legalize the Priority Principle, the Commission maintained a double standard for priority during the revision of stratigraphical nomenclature, which was evident in the *Chinese Stratigraphical Guide* (Revised Edition, 2001).

In addition, *The Lithostratigraphic Dictionary of China* (2000) edited by Gao Zhenjia, Chen Keqiang and Wei Jiayong, all spelt in *Pinyin*, assembled only 85 percent of all geological unit names, and had the same problem of the "Principle of Historical Priority".

After the 3rd National Stratigraphical Conference

Due to the inadequacies of the *Stratigraphical Lexicon of China* and *The Lithostratigraphic Dictionary of China*, and the need for Chinese stratum standardization, we undertook the independent compilation of a comprehensive catalogue of Chinese geological formation nomenclature. In 1997, I began to write the *Geological Terminology of China (1866–1965)*, and its Chinese edition was published by Science Press (Beijing) in 2001. With the financial support of the State Key Laboratory of Paleobiology and Stratigraphy (Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences), I finished *Geological Terminology of China (1966–2000)* (unpublished). To produce a comprehensive reference book, I have combined the two into one and entitled it *Geological Formation Names of China (1866–2000)*.

Geological Formation Names of China (1866–2000) is an up-to-date data-base of Chinese geological formation names. Chinese lexicons of the formation names used in the geological literature and on geological maps have been included. Furthermore, it is an important tool for critical revision of Chinese lithostratigraphy.

2. Several Important Concerns of the Book

Problems in Romanization of Geographical Components of Chinese Geological Formation Names

Thomas Francis Wade (1818–1895) was a British diplomat and Sinologist who formulated the Wade-Giles Spelling System. In 1842, Wade came to China with the British army and stayed for more than 40 years. In 1854, he was appointed customs commissioner in Shanghai. He returned to England in 1883. During his time in China, he wrote the Chinese textbook *Colloquial Chinese — A Progressive Course*. Wade attempted to capture the characteristics of the Chinese language by using Latin letters to spell Chinese characters, i.e. the Wade-Giles Spelling System of

Chinese Romanization. The system had been for a long time the most popular form of Chinese Romanization in the West, as well as in China, even after the official introduction of *Pinyin* in 1958 and its adoption in 1979.

The late Premier Zhou Enlai proposed in January 1958 that the Scheme for the Chinese Phonetic Alphabet should be used to transliterate Chinese personal and geographic names in external documents, books and newspapers. The scheme began to be used in all fields after the approval of the National People's Congress (NPC) in February of that year. In this book, we in general use *Pinyin* to spell Chinese personal and geographic names. However, as a technical reference book written in English for introducing Chinese geological formation names, we should state some additional editorial principles to assist readers to be familiar with the old-style spelling in consulting the literature: (i) We have not changed the headwords first published in the Wade-Giles Spelling System, to minimize the number of Romanized Chinese formation names. For example, Tsang Shan Group (苍山群) is not changed to Cangshan Group; the personal name Hsieh C Y (谢家荣) is not changed to Xie Jiarong. (ii) We adopt *Pinyin* for headwords not used in the Wade-Giles Spelling System, or for those without Romanized names when first published. For example, 测鱼组 is translated into Ceyu Formation; the personal name 陆宗斌 is translated into Lu Zongbin. (iii) We use *Pinyin* to transliterate the geographic names in Uygur, Mongolian and Tibetan languages. For example, 昌都 is written as Qamdo, not Changdu; 格尔木市 as Golmud City, not Ge'ermu City. (iv) We adopt local spellings in English newspapers and periodicals for geographic names in Hong Kong Special Administrative Region (HKSAR) and Taiwan Province. For example, we use Hong Kong instead of Xianggang; 嘉义 in Taiwan Province is spelt as Chiayi, not Jiayi. (v) We keep a few common spellings for Chinese geographic names used in overseas books, newspapers and periodicals to make it easy for foreigners to read. For example, 张家口组 is equivalent to Kalgan Formation, not Zhangjiakou Formation. (vi) To distinguish between Lü and Lu, and so on, ü used in *Pinyin* is not adopted in this book because it does not exist in the English language. For example, 略阳 is written as Lveyang, not Lüeyang or Lueyang, 吕村组 is written as Lvcun Formation, not Lücun Formation or Lucun Formation.

Some Political Concerns of the Book

Due to the long time frame over which Chinese geological nomenclature has been coined, some regions have quite different political backgrounds. For example, Taiwan became a Japanese colony after the Sino-Japanese war of 1894–1895, and was retaken by China in 1945. Three provinces in Northeastern China were invaded and occupied by the Japanese in 1931, and were also retaken in 1945. Hong Kong was invaded and occupied by the British in 1841 and became a UK colony. It was not until 1997 that China reassumed sovereignty over Hong Kong. Therefore, some references in this book include Manchukuo (伪满洲国), Manchuria (满洲), Kuantung Province, South Manchuria (南满关东省), Ryojun (旅顺), Formosa (台湾), Colonial Government (殖民地政府 (香港)), and so on. To show our respect to the original work of past geologists, and not to increase the number of Chinese formation names, I kept the original references unchanged and stated specific geographic

names which belong to the People's Republic of China.

Why Compile and Publish a Comprehensive Reference Book of Chinese Geological Formation Names in English?

One of the purposes of this book is to provide a comprehensive reference on Chinese geological formation names for those international geologists who have visited China, and for those who have not visited but wish to familiarize themselves with Chinese nomenclature.

Another purpose is to declare that Chinese geologists have different views to those of A. Salvador, the former Chairman of ISSC, who stated (1994, ISG, 3. B. 3, 19-20): "The name of a new stratigraphic unit should be unique. Therefore, before attempting to establish a new formal stratigraphic unit, the authors should refer to national, state, or provincial records of stratigraphic names to determine whether a name has been used previously. The many volumes of the IUGS LSI and other appropriate national or regional lexicons constitute valuable reference sources for most countries." Chinese geologists reject the value of the reference sources of the three fascicules in LSI (Volume III, Asie) edited and issued by the Sous-Commission du Lexique of CGI, Commission de Stratigraphie, for the following reasons:

(1) Mr. Dubertret, Chief Editor of LSI (Volume III, Asie), did not put two fascicules (Manchuria Fasc. published in 1956 and Taiwan Fasc. published in 1957) into the first fascicule of the People's Republic of China, but kept them as two different fascicules. This practice shows that Manchuria and Taiwan belong to Asia, not parts of the People's Republic of China, which interferes with Chinese sovereignty.

(2) It does not abide by the practices and regulations that "Spellings of a geographic name (or component of the name of a stratigraphic unit) should generally conform to the usage of the country that contains the geographic locality from which the name has been taken" on spelling of geographic names, in the first fascicule (1964, 1971) of LSI (Volume III, Asie). Almost all the entries in it have been changed to the French spellings. For example, Ashan (阿山) is changed to Acan; Aghchomaq (阿霍却马克) to Akhotsemak; Kuhsiangtnn (顾乡屯) to Housiandaun; Choukoutien Formation (周口店组) to Tchjooukooutien Formation. These changes are unacceptable, especially since they are contrary to common Chinese spellings. Chinese geologists do not recognize them.

(3) It does not abide by the practices and regulations that "The geographic component of a name should not be altered by translation into another language" on spelling of geographic names, in LSI Fascicule 2b. There are 214 entries in the LSI Manchuria Fasc., in which 80 geographic names have two kinds of Romanized modes (in common Chinese style and Japanese style, there are in total 160). Among the 80 geographic names with double Romanized spelling, 24 entries are in Japanese pronunciation and spelling, while the remaining 56 are listed as reference entries in the Japanese style. For example, according to Japanese pronunciation, Gongyuan (工源) in Liaoning Province, China, is translated into Miyanohar; Kuhsiangtun (顾乡屯) in Heilongjiang Province, China, into Kokyoton. In addition, four entries with obvious cultural aggression are Atung (or Atong) Series, Misaki Formation, Toyama Series and Onoda Stage, which were named after Japanese and Russian

names in memory of the officers and men killed in their aggressive wars in China. Furthermore, two entries, Daizan Formation and Honkoiki Beds, are pronounced and spelt in Japanese, without reference. All the above-mentioned are vestiges of Japanese cultural aggression, which will not be allowed to exist in the modern record of Chinese stratigraphic names.

(4) There are 368 entries in the Taiwan Fasc., with three kinds of errors: (i) There are 30 entries with informal stratigraphical names, and seven entries give two spellings with the same description, forming 14 independent entries; (ii) There are 152 entries using Japanese pronunciation and spelling; (iii) There are three entries with incorrect spellings, which are the Kurin Formation (芎林组), Niki Formation (二甲组), Goki Formation (五甲组). The Japanese invaders abolished Chinese language, customs and culture to completely dominate Taiwan in the period of aggression. After the July 7 Incident of 1937, Japanese colonialists launched a movement to make the people of Taiwan subjects of the Japanese emperor. In 1942, K. Ishizake, a Japanese geologist, edited "An Index to Formosan Stratigraphy" (*Trans. Nat. Hist. Soc. Formosa*, 32(220-226)), in which all of Taiwan's geographic names in Wikipedia are changed into Romanized Japanese pronunciation and spelling. In the Taiwan Fasc., more than half of Chinese place names are kept in Romanized Japanese pronunciation and spelling, for example, Arisan Beds (阿里山层) in Letter A; Beiron Conglomerate Formation (米崙砾岩组), and Byoritsu Beds (苗栗层) in Letter B. There are other samples. Erchiu (二甲) is translated into "Niki" (in Japanese pronunciation and spelling); Wuchiu (五甲) into "Goki"; Liukuei (六龟) into "Rokki", and so on. Such vestiges of cultural aggression must be eliminated from the record of Chinese geological names.

(5) There are no explanations (including authors, dates of publication and references) of sources for many Chinese geological names in the five books of the LSI (Volume III, Asie), which is distinctly unscientific. For example, in the Hsihsia Limestone, it is not indicated who, when and in which reference first used the geological name, nor the source of the name. The LSI presents distributions and features of the Hsihsia Limestone in ten provinces covering Yunnan, Guangxi, Guizhou, Sichuan, Hubei, Anhui, Zhejiang, Fujian, Jiangxi and Hunan, in south of China, but does not indicate the type locality of the Hsihsia Limestone — Hsihsia Mountain in Nanjing, Jiangsu Province.

(6) There are some errors in explanatory information for the name sources in three fascicules (in 5 books) of the LSI (Volume III, Asie).

These six arguments are the fundamental reasons why Chinese geologists hold a negative attitude towards the LSI.

The third purpose is to match the considerable growth of Chinese formation names in the last 50 years. According to my own survey of various Chinese publications, the number of formation names has nearly doubled from 1956 to 2000. The causes underlying this are varied. Without a doubt, the main reasons for the increase are the growth of lithostratigraphic knowledge of China, along with the introduction of many new names in the Geological Map of China (scale 1:200 000). Different schools of thought have also played an important role, due to different names being given to a single rock stratum.

Last but not least, the catalogue is compiled to address the "Principle of Historical Priority" and "Double Standard in Priority of Stratigraphical Nomenclature" adopted by the National Stratigraphical Commission, and minimize the negative impacts brought by the LSI (Volume III, Asie).

Shouxin Zhang (1927–2006)
Beijing May 2006

Acknowledgments

Initiative and innovation are not only essential to drive China's economic development, but also are the main factors in promoting China's overall competitiveness. The catalogue of Chinese geological formation names, edited by Chinese geologists for an international academic audience, will play an important role in the development of geology and stratigraphy in China, and will promote innovative research in related fields. Thus I suggested to Dr. Ding Zhongli, the Director of the Institute of Geology and Geophysics, Chinese Academy of Sciences, and submitted a Financial Aid Application to the State Key Laboratory of Paleobiology and Stratigraphy (Nanjing Institute Geology and Palaeontology, Chinese Academy of Sciences) to get their support in translating *Geological Formation Names of China (1866–2000)* into English. Fortunately, I was able to obtain aid from both institutions, giving me the chance to compile this great reference book.

It took almost two years to compile *Geological Formation Names of China (1866–2000)*, and it reflects the true creative labor of the editor. I would like to thank the following libraries and people for their dedication and contributions, without which this book could not have been completed:

National Library of China;
Library of Chinese Academy of Sciences;
Library of Institute of Geology and Geophysics, CAS;
Library of Institute of Vertebrate Paleontology and Paleoanthropology, CAS;
Library of Institute of Geology, China Earthquake Administration;
Library of China University of Geosciences (Beijing);
Library of Peking University, and libraries related to the geology.

I am also grateful to Mr. Chen Zhengxiong from China Higher Education Press for kindly running this publishing project and carefully copy-editing the manuscript.

I am indebted to my family, who have given me love and support throughout this project, and who have been chicken soup for my soul.

Notes on the Use of the Catalogue

1. The geological formation names of China and references in this catalogue are cited from literatures up to 2000. Most names are drawn from stratigraphic unit names given after the Chinese geographic names, which appeared in the books and periodicals that published in China or overseas from 1866 to 2000, and I keep a very limited amount of stratigraphic unit names given after the non-geographic names.
2. All entries in the catalogue are arranged in English alphabetical order.
3. The catalogue stresses that the name of a new stratigraphic unit should be unique.
4. The catalogue stresses that the proposal of the name of a new stratigraphic unit should base on the published material in recognized scientific medium.
5. The catalogue stresses that the derivation of the geographic component of the name should be explained.
6. The catalogue stresses that the priority in publication of a properly proposed, named and defined unit should be respected.
7. The catalogue stresses that the spelling of geographic component of the name of a stratigraphical unit should conform to the usage of the country that contains the geographic locality from which the name has been taken.
8. The catalogue stresses that the geographic component of a name should not be altered by translation into another language.
9. The catalogue stresses that stratigraphic units should not be limited by international frontiers and efforts should be made to use only a single name for each unit regardless of political boundaries.
10. A Chinese equivalent of the geological name is given in brackets after the Romanized name for those who are not familiar with the Chinese language to check against the corresponding Chinese name. While at the end of the book, Chinese Index of Geological Formation Names (arranged in *Pinyin*) is given for those who are familiar with the Chinese language to check against the corresponding Romanized name.
11. The quotation marks " " in the headwords indicate that the geographic names remain uncertain.

12. LSI = *Lexique Stratigraphique International.*
LSC = *Lexicon of Stratigraphy of China.*

13. An entry of the geological formation name consists of two parts, headword and explanation.

i. Headword

The headword is given in the Romanized form with Chinese characters in brackets. The place name (geographical proper name) in the entry is given in Wikipedia Phonetic Alphabet of place name, Chinese character and standard Chinese pronunciation, *Pinyin*, or *Pinyin* transliteration of pronunciation of ethnic minorities languages (confined only to the *Directory of Chinese Place Names*). The unit terminology in the entry is the English equivalent of Chinese term in order to make easy international exchanges, for example,

Hsihsia Limestone (栖霞石灰岩)

ii. Explanation

An entry is explained in 6 items labeled ①, ②, ③, ④, ⑤ and ⑥. Each item with its corresponding number is described separately as follows.

Item 1—① Gives other Romanized forms of the geographic name—Japanese and French spellings used in LSI, which are contrary to the international code of stratigraphical nomenclature, for example,

① Hsihsia Kalkstein, Chihsia Limestone (Grabau A W, 1923-1924), Chihsia Formation (Lee J S, 1930)

Item 2—② Shows the author, publishing year, and sources that conform to the publishing year of the name, for example,

② The term was introduced by Richthofen F von (1912, China, bd.III, 727, fig. 99), who vaguely applied it to a thick sequence of limestone (Frech F, 1911, in Richthofen's China, bd.V, 61, first appeared in a manuscript by Richthofen F von)

Item 3 — ③Tells the origin of the geographic name, for example,

③ Hsihsia Limestone was found in a small hill, Qixiashan (Hsi-hsia-shan, or Single Tree Hill), some 20 km east of Nanjing City, Jiangsu Province

Item 4 — ④Explains the stratigraphical features and meanings of key rocks, for example,

④ Lee J S, Chu S (1930, *Bull. Geol. Soc. China*, vol.9, 37-43) applied the term Chihsia Formation to include three limestones, named Huanglung Limestone, Chuanshan Limestone and Chinglung Limestone. Afterwards, Lee J S (1931, *Bull. Geol. Soc. China*, vol.10, 273-290) abandoned his former usage of the term and definitely redefined it as a formation beginning from his "lower lydite" and ending at his "upper lydite". The vague original name defined a series of limestone between two sets of clastic rocks (lower Wutung Quartzite or present Lungtan Formation), for dark gray thick chert limestone, with irregular chert bodies (after Richthofen F von's "profil durch den Hsi-hsia-shan and the Wu-kung-shan", 727, fig.99). It seems to correspond to the sum of the present Hochow Limestone, Laohudong Dolomite, Hunglung Limestone,

Chuanshan Limestone, Zhenjiang Limestone and the part of overlaid "lower lydite to upper lydite" (i.e. Lee J S's Chihsia Limestone, 1931).

Item 5 — ⑤Explains the geological age, for example,

⑤Early Carboniferous-Early Permian.

Item 6 — ⑥Explains other names (synonym) of the entry or another thing with the same name (homonym), and other existing problems and status, for example,

⑥ Roger J, the President of the Sub-commission on the Lexique (1964, LSI, vol.III, Asie, fasc.1, Republique Populaire Chinoise, I, 278-284) did not know the story of who, when, where and in which reference the Hsihsia Limestone was published and come to be what it was today. He explained the distribution and the characters of the Hsihsia Limestone in ten provinces covering Yunnan, Guangxi, Guizhou, Sichuan, Hubei, Anhui, Zhejiang, Fujian, Jiangxi and Hunan in south of China, hardly ever did he think of those of the naming locality Hsihsiashan some 20 km east of Nanjing City, Jiangsu Province. Lee J S (1931, *Bull. Geol. Soc. China*, vol.10, 273-290) abandoned his former usage of the term and redefined it as a limestone beginning from his "lower lydite" and ending at his "upper lydite" in Chuanshan Section. This Chihsia Formation (Lee J S, 1931) can not be correlated with the Hsihsia Kalkstein (Richthofen F von, 1912) in Qixiashan Section. Lee J S's Chihsia Limestone in Chuanshan Section is not the Hsiahsia Kalkstein but a "teratoma" of it. It is homonymous with the Hsihsia Kalkstein. Homonym: Qixia Basalt.

The above-mentioned six descriptions and their related six label numbers are fixed. That is, the label number will be listed only if the description exists, otherwise it will not appear.

Contents

A

Aba Formation (阿坝组)

②Compiling Group for Sichuan Regional Stratigraphic Scale, 1978, Regional Stratigraphic Scale of Southwest China: Sichuan Province, Beijing: Geological Publishing House. First appeared in a 1977 manuscript "The stratigraphic summary of Sichuan" by Integrative Research Team of Sichuan Bureau of Geology ③Aba Zang Autonomous Prefecture, west Sichuan Province ④Consists mainly of alternating beds of greyish black and grayish green slate, with interbeds of greyish mud-bearing slate, silty slate and thin-bedded marls ⑤Early Triassic.

Abag Formation (阿巴嘎组)

①Abag Basalt ②Compiling Group for Inner Mongolia Regional Stratigraphic Scale, 1978, Regional Stratigraphic Scale of North China: Inner Mongolia Autonomous Region, Beijing: Geological Publishing House ③Abag Banner, Inner Mongolia Autonomous Region ④Consists mostly of greyish white sandstone and an alternation of dark grey basalt and marls ⑤Pleistocene.

Abongshan Formation (阿布山组)

②Tibet Regional Geological Survey Team (Wu Ruizhong *et al.*), 1986, Explanatory Text for 1:1 000 000 Scale Geological Map: Gaize Sheet ③The hill of Abongshan, 90 km northeast of Shuanghu lake area, north Tibet Autonomous Region ④Consists mostly of red sandstone, conglomerate, and interbeds of marls ⑤Late Cretaceous.

Abor Formation (阿波尔组)

①Originally Abor Volcanics ②Brown J Coggin, 1912, A geological reconnaissance through the Dihong valley, being the geological results of the Abor Expedition, 1911–1912. *Rec. Geol. Surv. India*, vol.42, 231-253, pl.1 ③Abor in Siang district, eastern Tibet Autonomous Region ④Consists of basalt, volcano-clastic breccia and rhyotaxitic dacite etc. It is subdivided into Luotong Member (lower) and Jiku Member (upper) ⑤ Sinian-Cambrian.

Abuqiehai Formation (阿不切亥组)

①Abuqiehai Series ②Guan Shicong, Che Shuzheng, 1955, *Acta Geologica Sinica*, 35(2) ③ Abuqiehai valley located south of Gangde'er hill, in Zhuozishan Mountain area, Otog Banner, Ih Ju League, Inner Mongolia Autonomous Region ④Mainly composed of thin-bedded bamboo-leaf-like limestone, oolitic limestone, and an alternation of thick kidney limestone and shale, in lower part also with interbed of quartzose sandstone ⑤Cambrian ⑥Synonym of Hulusitai Formation.

Adula Formation (阿堵拉组)

②Yunnan Bureau of Geology and Mineral Resources ed., 1990, Regional Geology of Yunnan Province [Geological Memoirs of the Ministry of Geology and Mineral Resources of the People's Republic of China, (1) Regional Geology, no.21], Beijing: Geological Publishing House ③Adula, Tibet Autonomous Region ④Greyish