

A contribution to the knowledge on the lichenological exploration of the greater Tibetan region with a special focus on the impact of Austrian scientists or explorers

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Abstract: The influence of six Austrian (or Austrian-born) scientists/explorers, namely three lichenologists (Alexander ZAHLBRUCKNER, Josef POELT and Walter OBERMAYER) and three collectors of lichens (Heinrich HANDEL-MAZZETTI, Joseph ROCK and Anton GEBAUER) on the knowledge on lichens from the greater Tibetan region is outlined. The contributions of some further lichenologists or botanists, of which substantial collection from the Tibetan region are housed in the herbarium GZU (Graz, Austria), are briefly discussed and a list of more recent papers dealing with lichens from the named region is presented.

1. Introduction

It should be noted in advance, that the term “greater Tibetan region” is used here in the sense of the area of the former “bod chen” [Tibetan for “Big-Tibet”]), which encompasses the three former provinces of ancient Tibet: 1) Ü-Tsang (i.e. central and western parts of the province Xizang, including the northwestern regions of Ngari and Changthang); 2) Amdo (i.e. most parts of the province Qinghai, including the Tibetan Autonomous Prefectures of Haibei, Huangnan, Hainan, Golog, Yushu and Haixi, and including the Tianzhu Tibetan Autonomous County in the province of Gansu); 3) Kham (i.e. eastern Xizang, northern Yunnan and western Sichuan, including Gyarong, Diqing [Dêqên] Tibetan Autonomous Prefecture and the Muli Tibetan Autonomous County). Some further regions with ethnic Tibetan populations (or with Tibetan influenced cultures) are also included, e.g. mountain areas just south and southwest of the Hengduan Shan, northern parts of Bhutan and Sikkim, the Tawang District (in the Indian state Arunachal Pradesh), the Khumbu, Langtang, Dolpo and Mustang districts/regions in Nepal, and, in the westernmost part, the areas of Spiti and Lahaul (part of the Indian state of Himachal Pradesh), Ladakh and Zaskar (part of the Indian State of Jammu and Kashmir), and finally Aksai Chin (disputed border area between China and India). The above circumscribed territory is illustrated in figure 1.

As shortly outlined by OBERMAYER (2004a), a major part of the Tibetan area is covered by the Tibetan Plateau with its huge surrounding mountain systems of the Himalayas (in the south and southwest), the Karakoram (in the northwest), the Kunlun Shan (in the north), the Qilian Shan (in the northeast) and the Hengduan Shan (in the southeast). The latter (Hengduan Shan means “traverse cutting mountains”), sometimes also named as “southeast Tibetan fringe mountains” comprises (as defined by TANG 2015: 2–7), from southwest to northeast, the Gaoligong Shan, the Nu Shan, the Yunling, the Daxue Shan, the

Qionglai Shan and the Min Shan (note: “shan” and “ling” means “mountain(s)” in Chinese). All of these are mainly north-south trending mountain chains separated by deep gorges formed by the famous rivers Irrawaddy, Salween, Mekong and Yangtze (Cháng Jiāng), and – in the very east – by the Nyag Chu (Yalong Jiang) and the Dadu He (the latter two are tributaries of the river Yangtze).



Fig. 1: Greater Tibetan region. – Creative Commons Public License (File: Tibetischer Kulturraum Karte 2.png; slightly modified).

A brief history of Tibet (as circumscribed above) is given here (see e.g. KOLLMAR-PAULENZ 2014): The kingdom of Tibet was established at the beginning of the 7th century and the country (with an often strongly shifting of boundaries) was several times occupied by Mongols (starting with an incursion of troops in 1240) and Chinese (e.g. the invasion of Lhasa by troops of the Mandschu dynasty between 1720 and 1723). In 1903, English forces (headed by Francis YOUNGHUSBAND) entered Tibet and captured its capital town Lhasa in 1904. After a further occupation by Manchurian troops in 1910 and its withdrawal one year later, the Dalai Lama declared Tibet’s independence in February 1913. Finally, in 1950, the “People’s Liberation Army of China” invaded eastern Tibet and soon afterwards, the whole country was annexed by the People’s Republic of China.

With respect to biogeographical classification, the Tibetan area belongs to the Palearctic realm/ecozone (which is part of the Holarctic realm). Within this floristic realm, the area is part of the Central Asian floristic region (inclu-

ding the West- and Central-Tibetan floristic provinces) and of the Sino-Jap-
onic floristic region (including the East Himalayan and Xikang-Yunnan floristic
provinces). In the utmost east, a finger-like part of the Irano-Turanian floristic
region (with its West Himalayan floristic province) also belongs to the cited
area (the classification follows MIEHE et al. 2016: 141, Fig. 8.3).

Concerning lichens, the greater Tibetan region was rather poorly studied,
with the exception of its south-easternmost parts. The difficult access to all
areas with steep mountains at the edge of the Tibetan plateau (Himalayas, Ka-
rakoram Range, Hengduan Shan; especially to regions above the timber line
at 4,500 m a.s.l.) and the former near inaccessibility of the forest-free Tibetan
Plateau itself led to the fact, that only few people made substantial collections
in the region. Five of them came/come from Austria and thus, the present
paper gives an overview of the contributions of these scientists/explorers to li-
chenology of the region. Heinrich HANDEL-MAZZETTI, Joseph ROCK and Anton
GEBAUER were collectors of lichen material (mainly in the Hengduan Shan
area), two others (Josef POELT and the author of the present paper) perfor-
med both collecting and scientific treatments of lichens from the Khumbu and
Langtang region and the Karakoram Range (POELT), as well as the Hengduan
Shan region and the south east Tibetan Plateau (OBERMAYER). In addition, the
work of the Austrian lichenologist Alexander ZAHLBRUCKNER – with respect to
the named area – is outlined. Although never having visited Tibet or southwest
China himself, ZAHLBRUCKNER took over the scientific treatment of the lichen
collections of HANDEL-MAZZETTI, ROCK and GEBAUER. A brief summary of the
biography and the contributions to lichenology (with special focus on newly
described taxa) of all named individuals is given below. It is supplemented by
a list of further collectors, of which more extensive lichen materials from the
greater Tibetan region is stored in the herbarium GZU and by a review of more
recent lichenological papers from the area.

2. Materials and methods

In order to avoid excessive synonymy and to facilitate searching, all the pre-
pared lists of lichens given below use the original names published by the cited
authors. Current names can be found under MycoBank (<http://www.mycobank.org/>). Geographical and historical facts are taken from several sources, e.g.
<https://de.wikipedia.org/wiki/Tibet>, TANG (2015: 2–7) and KOLLMAR-PAULENZ
(2014). The following herbaria are cited in the text with their acronyms only:
B (Botanischer Garten und Botanisches Museum Berlin-Dahlem, Universität
Berlin, Germany), E (Royal Botanic Garden Edinburgh, Scotland, U.K.), GZU
(Institut für Pflanzenwissenschaften, Karl-Franzens-Universität Graz, Aus-
tria), HMAS (Chinese Academy of Sciences, Beijing, China), KUN (Kunming
Institute of Botany, Chinese Academy of Sciences, China), M (Botanische
Staatssammlung München, Germany), STU (Staatliches Museum für Natur-

kunde Stuttgart, Germany), TUR (Herbarium Centre for Biodiversity, University of Turku, Finland), US (Smithsonian Institution, Washington, U.S.A.), W (Naturhistorisches Museum Wien, Austria), WU (Abteilung für Botanik und Biodiversitätsforschung, Universität Wien, Austria). The term “China” is used for the state “People’s Republic of China”. – Taxa starting with the Greek letters Chi (X), Phi (Φ), Psi (Ψ), “Rho” (P) and Theta (Θ) (transliterated as “ch”, “ph”, “ps”, “rh” and “th”) are abbreviated with both given letters.

3. Austrian (or Austrian-born) scientists/explorers

3.1. Heinrich HANDEL-MAZZETTI (Fig. 2B)

Biographical data are excerpted from various sources, e.g. JANCHEN (1940), VIERLE (1998 and <http://www.paeon.de/h1/schneider/vierle/05.html>), <http://plants.jstor.org/stable/pdf/10.5555/al.ap.person.bm000337165> and from http://www.paeo.de/h1/hand_maz/pioneer/04biography.html.

Heinrich (Raphael Eduard “Freiherr [Baron] von”) HANDEL-MAZZETTI (* 19 February 1882 in Vienna, Austria; † 1 February 1940 in Vienna, Austria), was an Austrian botanist and skillful mountaineer with a particular interest in exploring the flora of southwestern China. He was born in Vienna and obtained his doctorate at the botanical institute of the University of Vienna, where he had become a pupil of the Austrian botanist Richard von WETTSTEIN. In 1903, HANDEL-MAZZETTI was hired as a tutor at the botanical institute, in September 1905, he was promoted to teaching assistant, and, in 1907, he was awarded the doctor’s degree on the base of a “monograph on the genus *Taraxacum*”, which – interestingly – was regarded by some scientific contemporaries as “extremely poor”. HANDEL-MAZZETTI’s early botanical travels took him to Turkey (1907), the historical region of the former Herzegovina (1908) and the Mesopotamian/Kurdish region (1910). In 1912, his employment as an assistant at the University of Vienna had come to an end, and, at the same time, he was invited to serve as a botanical guide for Archduke Franz Ferdinand of Austria on a tour through the Dolomites. One year later (and due to the influence of his Ph.D. adviser WETTSTEIN), HANDEL-MAZZETTI got the opportunity to accompany an expedition of the Austro-Hungarian Dendrological Society to Western China. HANDEL-MAZZETTI’s participation was financed by the “Academy of Sciences” (see below). He had started his Expedition to southwest China together with his Austrian compatriot from the Dendrological Society, Camillo Karl SCHNEIDER (in December 1913), with whom he spent almost 7 months in Yunnan. After a visit to the famous botanist George FORREST (who had resided near Lijiang for three years), their paths went separate ways in the summer of 1914, just as the First World War broke out. While SCHNEIDER stayed together with FORREST for three months and finally went to the United States in 1915, HANDEL-MAZZETTI continued his plant collecting expeditions in northern Yun-

nan and southern Sichuan until June of 1917. Then he moved to the Chinese provinces Guizhou and Hunan and finally returned to Austria in 1919. Back in Vienna, he resumed his job as an assistant at the Botanical Institute of the University, where he was obliged to take up teaching responsibilities, for which he definitely felt no inclination. Thus, in spring of 1923, HANDEL-MAZZETTI took up employment at the Museum of Natural History as a scientific assistant and two years later he was promoted to the post of a keeper of the herbarium. Triggered by heated disputes with the head of the Museum Karl von KEISSLER, which were said to have had escalated to a brawl, HANDEL-MAZZETTI was compelled to take early retirement (at the age of 49!) in the summer of 1931. – Note, that for some years, HANDEL-MAZZETTI even was forbidden to enter the Museum. – On 30 January 1940, after leaving the Botanical Institute and in trying to cross the street (“Rennweg”), HANDEL-MAZZETTI was knocked down by a German military vehicle and died two days later from an embolism caused by severe lung injuries. All through his life, HANDEL-MAZZETTI remained unmarried. His excursions (including transport costs for bringing home his botanical collection and costs for printing a geographical map) were financed by the “Academy of Sciences” with 54,500 Austrian Crowns, corresponding to a value of c. 11,000 US Dollar (in 1914).

It is of interest, that HANDEL-MAZZETTI met both Joseph ROCK and Anton GEBAUER, two other important Austrian lichen collectors of the south-east Tibetan area, who are discussed below. Additionally, he received a visit from the Swedish botanist Karl August Harald (“Harry”) SMITH in 1921, who, one year later, collected plants and lichens on almost the same route as HANDEL-MAZZETTI did in 1914/1915. While part of SMITH’s lichen collection was scientifically treated by Alexander ZAHLBRUCKNER (see below), HANDEL-MAZZETTI himself published on several plant genera at the base of SMITH’s specimens (see e.g. HANDEL-MAZZETTI 1938).

A further interesting aspect is, that besides HANDEL-MAZZETTI, three other very famous “plant hunters” lived for some (or even many) years in Yunnan almost solely for the purpose of collecting new plants: The Austro-American Joseph ROCK (see below), the Scotsman George FOREST (*1873, †1932; see above) and the famous French missionary Jesuit and botanist Père Jean Marie DELAVAY (*1834, †1895; see below).

The following eleven lichen taxa were named in honour of HANDEL-MAZZETTI, eight of them by Alexander ZAHLBRUCKNER. Interestingly, all these eponyms (except one) honour only HANDEL-MAZZETTI’s paternal surname (note that “Mazzetti” was the family name of his mother): *Acarospora handelii* (described by Julius STEINER), *Blastenia handelii*, *Buellia handelii*, *Diploschistes steppicus* var. *handelii-mazzettii* (described by Israel REICHERT), *Graphis handelii*, *Ionaspis handelii*, *Lecanora handelii* (described by Julius STEINER), *Lecidea handelii*, *Rinodina handelii*, *Sporopodium handelii* and *Verrucaria handelii*.

HANDEL-MAZZETTI's southeast Asian collection comprises altogether more than 13,000 specimens, which did not arrive in Vienna until three years after his return. The scientific treatment of the samples was performed by several scientists and the results were published under the title "SYMBOLAE SINICAE, Botanische Ergebnisse der Expedition der Akademie der Wissenschaften in Wien, nach Südwest-China 1914/1918" (see HANDEL-MAZZETTI [editor] 1929–1936). It consists of 7 parts (I. algae, II. fungi, III. lichens, IV. musci, V. hepaticae, VII. pteridophyta, VII. anthophyta [the latter issued in five "Lieferungen"]). The "anthophyta"-part was treated by HANDEL-MAZZETTI himself and includes more than 8,000 taxa, with over 1,300 new descriptions (including 35 new genera). Alexander ZAHLBRUCKNER took over the lichenological part of HANDEL-MAZZETTI's collection, consisting of roughly 850 samples (for further details see below under "Alexander ZAHLBRUCKNER"). Most of HANDEL-MAZZETTI's collections are stored in the herbaria W and WU, with some duplicates in other big herbaria, e.g. in US (a search in the database of the latter herbarium revealed the presence of 134 lichen specimens collected by HANDEL-MAZZETTI, three specimens collected by Anton GEBAUER and 22 specimens collected by Joseph ROCK).

3.2. Joseph Rock (Fig. 2A)

Biographical data are excerpted from various sources, e.g. SUTTON (1974), BELL (1983), <http://www.josephrock.net/2010/>, https://de.wikipedia.org/wiki/Joseph_Francis_Rock, and https://en.wikipedia.org/wiki/Joseph_Rock.

Joseph (Franz ["Francis"] Karl) ROCK (* 13 January 1884 in Vienna, Austria; † 5 December 1962 in Honolulu, Hawaii), was an Austro-American linguist, ethnologist, geographer and botanist. He was born in Vienna and emigrated to the United States in 1905, where he gained U.S. citizenship in 1913 (prior to that he was an Austrian "citizen" up to the age of 29). After spending two years in several parts of the United States (e.g. New York, Waco [Texas] and San Francisco), ROCK moved to Hawaii, where he began to explore the flora of the island and thus was regarded later the "...father of Hawaiian botany...". Based on his own extensive collections, he established the first Hawaiian herbarium in 1911, where he served as its first curator until 1920. Starting with the years 1920/21, Joseph ROCK was sent to Asia as a plant collector by the US Department of Agriculture. Being very successful, he soon received additional funds from the National Geographic Society for further fieldtrips in Yunnan and for a longer period. Besides thousands of samples of seeds for gardening purposes, he subsequently collected about 60,000 herbarium samples out of which 10,000 originate from the area of northern Yunnan and southwestern Sichuan (up to the border of Xizang). Joseph ROCK even had his own house in Nguluko (=Yuhu), a village near Lijiang (in Yunnan), until he was deported in 1949. Back to Honolulu, the famous scientist died 13 years later. Note that

ROCK once even met HANDEL-MAZZETTI, when the former made a short visit to Vienna in the winter of 1933/34. In her biography of ROCK, Stephanie SUTTON (1974) states how “...they sat together in the dining room at the “Hotel Sacher” over a “Natureschnitzel” and conversed amiably...”.

Seven lichens are named in honour of Joseph ROCK, all of them described by Alexander ZAHLBRUCKNER: *Graphis rockii*, *Lecanactis rockii*, *Parmelia rockii*, *Phaeotrema rockii*, *Pleurotrema rockii*, *Pyrenula rockii* and *Usnea rockii*.

The main part of the south-east Asian lichen collections of ROCK was scientifically treated by ZAHLBRUCKNER (1934) and comprises 80 specimens (80 taxa, 15 taxa described as new). Most of the specimens were collected either in the Jade Dragon Mountains (“Yulong Shan” or “Mount Satseto”) in North-Yunnan or in the “Muli-Kingdom” in South-Sichuan. Smaller parts of ROCK’s lichen collection were additionally cited in ZAHLBRUCKNER (1930), with 21 specimens (16 taxa, 2 taxa described as new), and in the exsiccata series “Lichenes rariores exsiccati” (17 taxa) and “Cryptogamae exsiccatae” (2 taxa). (For a more detailed information see below under “ZAHLBRUCKNER”).

3.3. Anton GEBAUER

Biographical data are excerpted from various sources, e.g. GEBAUER 1914a–c, https://www.wien.gv.at/wiki/index.php/Anton_Karl_Gebauer and <http://kulturportal-west-ost.eu/biographien/gebauer-anton-karl-2>.

Anton (Karl) GEBAUER (* 16 June 1872 in Horní Benešov, Czech Republic [at that time Austrian Silesia], † 30 May 1942 in Velden am Wörthersee, Austria) was an Austrian gym teacher, ethnographer and explorer. In 1883, he left his hometown of Horní Benešov (“Bennisch”) and attended the “Staatsgymnasium” in Olmütz (Czech Republic) where he interestingly also acted as a choirboy (“Sängerknabe”). After having completed the college of education in 1892 in Troppau (now Opava, Czech Republic), the former capital city of “Austrian Silesia”, GEBAUER moved to Vienna and was employed as a primary-school teacher. Later he successfully finished the teacher training at the university and was employed as a gym teacher for secondary schools. GEBAUER became famous mainly due to his ethnographical works regarding the so called Shan-States of the former “Farther India”. His travels/expeditions took him to Egypt, Syria, Turkey and India. In 1914, GEBAUER tried to reach the core area of Tibet, starting his expedition in Northwest-Burma (in Bhamo). Having had arrived at Dêqên (which is close to the current border of Yunnan and Xizang), Chinese officials – at that time being in armed struggle with Tibetan resistance fighters – prevented him from entering Tibet. After reentering Burma, the First World War broke out and GEBAUER was interned by the English in camps in Darjeeling and Ahmednagar up to the year 1919. Back in Austria (all his valuable collections also arrived safely in Vienna), he

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worked again as a schoolmaster and retired in 1922. Two years later he moved to Velden (Carinthia) where he died in 1942. Interestingly, Anton GEBAUER met HANDEL-MAZZETTI in 1914 in Lijiang (in Yunnan), just after his unsuccessful attempt to reach Tibet (see above).

Anton GEBAUER's lichenological collection (47 specimens, representing 31 taxa), which originates from almost the same area as HANDEL-MAZZETTI's collection, was scientifically treated by ZAHLBRUCKNER (1930). The description of *Parmelia homogenes* var. *vestita* is based on GEBAUER's collection (see below under "Zahlbruckner").

3.4. Alexander ZAHLBRUCKNER (Fig. 2C)

Biographical data are excerpted from various sources, e.g. REDINGER (1933), KEISSLER (1941), GRUMMANN (1974), PIŠÚT (2002), KÄRNEFELT (2009) and KÄRNEFELT et al. (2010). A complete bibliography was compiled by LISICKÁ (1988).

Alexander ZAHLBRUCKNER (* 31 May 1860 in Svätý Jur [named "St. Georgen" in the former Austro-Hungarian Empire] near Bratislava, † 8 May 1938 in Vienna) was an Austrian botanist with a special focus on lichens. He was the grandson of the famous botanist Johann ZAHLBRUCKNER, a private secretary of the Archduke Johann ("John") of Austria. In 1883, Alexander ZAHLBRUCKNER received his doctor's degree at the University of Vienna (Faculty of Philosophy). The subject of his doctoral thesis was "new additions to the knowledge of lenticels". Starting as a volunteer at the botanical department of the "Naturhistorisches [Hof-]Museum", ZAHLBRUCKNER soon became a permanent staff member and was appointed as a "First-Class-Custodian" in 1912. Between 1918 and 1922 – the year of his retirement – ZAHLBRUCKNER held the high office of "director of the museum's botany department".

During his lifetime, ZAHLBRUCKNER visited many European herbaria and botanical institutes, e.g. Munich, Zurich, Lucerne, Berne, Lausanne and Konstanz (in 1891), Geneva (in the years 1896, 1901 and 1927), Dresden, Berlin and Hamburg (in 1902), Munich (in 1908), Brussels, Frankfurt am Main, Warsaw and Berlin (in 1910), and the Swedish cities of Gothenburg, Falköping, Stockholm and Uppsala (in 1920).

ZAHLBRUCKNER is regarded as one of the most important scientists working on lichens (see e.g. GRUMMANN 1974, PIŠÚT 2002, and discussion below), and was even named by Albert HERRE (a famous American lichenologist and disciple of ZAHLBRUCKNER) as the most eminent and foremost lichenologist since NYLANDER and ACHARIUS, respectively (see GRUMMANN 1974: 13). The high tribute paid to ZAHLBRUCKNER by scientific colleagues is also documented by the number of described taxa based on his name: One genus (*Zahlbrucknerel-*

la, see below) and thirty-four taxa of fungi on species level and below (most of them lichen-forming) are named in honour of him: *Acarospora zahlbruckneri*, *Arthothelium zahlbruckneri*, *Aspicilia zahlbruckneri*, *Buellia zahlbruckneri*, *Campylothelium zahlbruckneri*, *Catillaria zahlbruckneri*, *Claudopus zahlbruckneri*, *Corella zahlbruckneri*, *Cyphelium zahlbruckneri*, *Dermatocarpon zahlbruckneri*, *Epichloë zahlbruckneriana*, *Heppia zahlbruckneri*, *Lecanactis zahlbruckneri*, *Lecanora zahlbruckneri*, *Lecanora zahlbruckneriana*, *Lecidea zahlbruckneri*, *Leptosphaeria zahlbruckneri*, *Lobaria zahlbruckneri*, *Parmelia zahlbruckneri*, *Peltigera zahlbruckneri*, *Pertusaria zahlbruckneri*, *Pestalotia zahlbruckneriana*, *Phaeographina zahlbruckneri*, *Phyllosticta zahlbruckneri*, *Physcia amoena* f. *zahlbruckneri*, *Placynthium asperellum* subsp. *zahlbruckneri*, *Sirococcus zahlbruckneri*, *Sticta zahlbruckneri*, *Thelidium zahlbruckneri*, [*Tichothecium zahlbrucknerellae*; this epithet reflects the species' parasitism on its host genus *Zahlbrucknerella*], *Umbilicaria zahlbruckneri*, *Usnea zahlbruckneri*, *Verrucaria zahlbruckneri*, *Winteria zahlbruckneri*.

Note, that the genus *Zahlbrucknera* (described by Heinrich Gottlieb REICHENBACH) belongs to the plant family Saxifragaceae and is named after the botanist Johann ZAHLBRUCKNER, the grandfather of Alexander ZAHLBRUCKNER (see also HERTEL 2012). Interestingly, the same genus name (*Zahlbrucknera*), given by Albert HERRE in honour of Alexander ZAHLBRUCKNER, was later found to be a homonym of REICHENBACH's name, which led HERRE to publish *Zahlbrucknerella* as a replacement name for his *Zahlbrucknera*.

Although Alexander ZAHLBRUCKNER was interested in several groups of phanerogams (his name appears as author in roughly 250 new taxa of higher plants, many of them belonging to the Campanulaceae), his scientific focus was on lichenized fungi. His early papers on lichens deal with areas in Bosnia-Herzegovina and the Austrian provinces of Upper and Lower Austria and Styria. ZAHLBRUCKNER's lichenological contributions to the latter three Austrian provinces (11 publications) are summarized in TÜRK & POELT (1993) and TÜRK & HAFELLNER (2010). In tribute to ZAHLBRUCKNER's work, Ivan PIŠÚT (2002) referred to Alexander ZAHLBRUCKNER as the "...author of two historical milestones in lichenology...". These two major works, with an immense impact on lichenology at that time, were firstly the famous "Catalogus lichenum universalis" (ZAHLBRUCKNER 1921–1940), an extremely useful compilation of lichenological literature (arranged by species) and secondly, his famous systematic outline of all lichenized fungi in ENGLER and PRANTL's (ENGLER's resp.) "Die natürlichen Pflanzenfamilien" (ZAHLBRUCKNER 1903–1908, 1926a). But, with respect to the knowledge on East Asian lichens, there exists a third historical milestone in lichenology, namely ZAHLBRUCKNER's lichenological part in "Symbolae Sinicae" entitled as "Lichenes (Übersicht über sämtliche bisher aus China bekannten Flechten)" (ZAHLBRUCKNER 1930). The following paragraph a) summarizes the results of the named publication and is supplemented by notes on some other publications of ZAHLBRUCKNER dealing with lichens from the Tibetan area in a broad sense [paragraphes b) to e)].

a) Lichenes. Übersicht über sämtliche bisher aus China bekannten Flechten [Lichens. An overview on all hitherto known lichens from China] (Zahlbruckner 1930):

This paper of ZAHLBRUCKNER, just mentioned above as a “milestone in Chinese Lichenology” (at least regarding the first part of the 20th century), contains 281 newly described taxa (out of c. 1,050 specimens). Most of the type material was collected in the greater Tibetan region of North Yunnan and Southwest Sichuan by HANDEL-MAZZETTI (252 new taxa out of 850 specimens), by Joseph ROCK (2 new taxa out of 21 specimens), and Anton GEBAUER (1 new taxon out of 47 specimens), respectively. A few samples of Harry SMITH (11 specimens belonging to 7 taxa) and of George FORREST (4 specimens belonging to 3 taxa) were additionally cited. Only the collections of CHUNG (with 26 new taxa out of 129 specimens) originate from a different region, namely the province Fujian [“Fukien”] in southeast China. Note that for unknown reasons, the numbers of new taxa cited below differ slightly from those mentioned by ZAHLBRUCKNER (1930: 1–2).

The following list contains all newly described taxa, published by ZAHLBRUCKNER (1930). All not separately marked taxa were collected by HANDEL-MAZZETTI; # = collected by GEBAUER [see above], + = collected by ROCK [7 lichens are named after ROCK; see above], * = collected by CHUNG [4 lichens of the genera *Graphis*, *Lecidea*, *Parmentaria* and *Pyrenula* are named after him, using the epithet “chungii”].

Acarospora (sect. *Pleopsidium*) *discurrens*, *Alectoria* *sulcata* f. *vulpinoides*, *Allarthonia* *yunnana*, *Allarthothelium* *sparsum*, *Anaptychia* *speciosa* f. *endocrocea*, *A.* s. f. *subtremulans*, *Anthracothecium* *chrysophorum**, *A. fraternale**, *A. speciosum*, *Anzia* *leucobatioides* f. *hypomelaena*+, *Arthonia* *leioplacella*, *A. lopingensis*, *A. schoepfiae*, *Arthopyrenia* (sect. *Acrocordia*) *amaura*, *A.* (sect. *Mesopyrenia*) *extensa*, *Arthothelium* *fecundum*, *Bacidia* (sect. *Eubacidia*) *celtica*, *B.* (s. E.) *inconstans*, *B.* (s. E.) *inconstans* f. *coerulata*, *B.* (s. E.) *juvunda*, *B.* (s. E.) *leprophora*, *B.* (s. E.) *lopingensis*, *B.* (s. E.) *manhaviensis*, *B.* (s. E.) *nigrosticta*, *B.* (s. E.) *spermatophora*, *B.* (sect. *Weitenwebera*) *hunana*, *B.* (s. W.) *wuliensis*, *Biatorrella* *bambusarum*, *Blastenia* *amoena*, *B. handelii*, *B. modestula*, *B. setschwana*, *B. yunnana*, *Bombyliospora* *sinensis*, *Buellia* (sect. *Eubuellia*) *cervinoplaca*, *B.* (s. E.) *disjecta*, *B.* (s. E.) *effundens**, *B.* (s. E.) *endolateritia*, *B.* (s. E.) *handelii*, *B.* (s. E.) *hilaris*, *B.* (s. E.) *keteleeriae*, *B.* (s. E.) *leproplaca*, *B.* (s. E.) *polita*, *B.* (s. E.) *punctata* f. *globulans*, *B.* (s. E.) *punctata* f. *subpersicina*, *B.* (s. E.) *subannulata*, *B.* (s. E.) *subarmeniaca*, *B.* (s. E.) *subarmeniaca* var. *huiliensis*, *B.* (s. E.) *yunnana*, *Buelliastrum* *crassum*, *B. tenue*, *Calicium* *sinense*, *Caloplaca* (sect. *Eucaloplaca*) *cervina*, *C.* (s. E.) *chrysophora*, *C.* (s. E.) *cupreorufa*, *C.* (s. E.) *delicata*, *C.* (s. E.) *ionaspidea*, *C.* (s. E.) *ochrotropa*, *C.* (s. E.) *polytropoides*, *C.* (sect. *Triophthalmidium*) *triloculans*, *Catillaria* *sorediantha**, *C. yunnana*, *Cetraria* *sanguinea* var. *inactiva*, *Chiodecton* (sect. *Byssophorum*) *mucorinum**, *Collema* *substipitatum*, *Gonolecania* *tetrapla**, *Graphina* (sect. *Aulacographina*) *galactoderma*, *G.* (s. A.) *lecanactiformis*, *G.* (sect. *Chlorographina*) *isabellina*, *G.* (s. C.) *olivascens*, *G.* (s. C.) *verruculina**, *G.* (sect. *Eugraphina*) *alpestris*, *G.* (s. E.) *symplocorum*, *G.* (sect. *Solenographina*) *hunanensis*, *G.* (s. S.) *plumbea**, *G.* (sect. *Thallolooma*) *roridula*, *G.* (s. T.) *roridula* var. *platypoda*, *Graphis* (sect. *Aulacogramma*) *chungii**, *G.* (s. A.) *chungii* var. *oligospora**, *G.* (sect. *Aulacographis*) *lussuensis*, *G.* (sect. *Eugraphis*) *bifera*, *G.* (s. E.) *bifera* var. *cinerea*, *G.* (s. E.) *castanopsideis*,

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G. (s. E.) *handelii*, *G.* (s. E.) *lopingensis*, *G.* (s. E.) *manhaviensis*, *G.* (s. E.) *multibrachiata*, *G.* (s. E.) *oligospora*, *G.* (s. E.) *pinicola*, *G.* (s. E.) *setschwanensis*, *G.* (s. E.) *zonatula*, *G.* (sect. *Hemichromatium*) *elegantula*, *G.* (sect. *Mesographis*) *thaeae*, *G.* (sect. *Solenographa*) *connectens*, *G.* (s. S.) *hunana*, *G.* (s. S.) *sapii*, ***Gyalecta*** (sect. *Secoliga*) *alutacea*, ***Haplodina*** *alutacea*, *H. corticola*, *H. microcarpa*, ***Heppia*** *applanata*, ***Huillia*** *alpina*, *H. insularis*, ***Ionaspis*** *alpina*, *I. handelii*, *I. sinensis*, *I. yunnana*, ***Lecanora*** (sect. *Aspicilia*) *albocretacea*, *L.* (s. A.) *anamyloides*, *L.* (s. A.) *caesiororida*, *L.* (s. A.) c. f. *oxydascens*, *L.* (s. A.) *cinereopolita*, *L.* (s. A.) c. f. *albidior*, *L.* (s. A.) c. f. *major*, *L.* (s. A.) *disculifera*, *L.* (s. A.) *d.* var. *dealbata*, *L.* (s. A.) *dissecta*, *L.* (s. A.) *dschungdiensis*, *L.* (s. A.) *galactotera*, *L.* (s. A.) *ochromelaena*, *L.* (s. A.) *subimmersa* subsp. *asiatica*, *L.* (s. A.) s. subsp. *umbrinascens*, *L.* (s. A.) *superposita*, *L.* (s. A.) *tesselans*, *L.* (sect. *Eulecanora*) *byssulina*, *L.* (s. E.) *cancriformoides*, *L.* (s. E.) *chrysocardia*, *L.* (s. E.) *distracta*, *L.* (s. E.) *griseomurina*, *L.* (s. E.) *heterocarpina*, *L.* (s. E.) *hyaliza*, *L.* (s. E.) *irridens*, *L.* (s. E.) *lemokensis*, *L.* (s. E.) l. f. *infumata*, *L.* (s. E.) *microphaea*, *L.* (s. E.) *setschwana*, *L.* (s. E.) *yenpingensis**, *L.* (sect. *Placodium*) *callichroa*, *L.* (s. P.) *chondroderma*, *L.* (s. P.) *ch.* var. *placodizans*, *L.* (s. P.) *oleosa*, *L.* (s. P.) *terretiuscula*, ***Lecidea*** (sect. *Biatora*) *acarocarpa*, *L.* (s. B.) *bacculans*, *L.* (s. B.) *galactochrysea*, *L.* (s. B.) *haematommoides*, *L.* (s. B.) *hunana*, *L.* (s. B.) *leprothalla*, *L.* (s. B.) *loseana*, *L.* (s. B.) *loudina*, *L.* (s. B.) *oligospora*, *L.* (s. B.) *polyasca*, *L.* (s. B.) *rivulosa* var. *orientalis*, *L.* (s. B.) *setschwanensis*, *L.* (s. B.) *tapetiformis*, *L.* (sect. *Eulecidea*) *caloplacoides*, *L.* (s. E.) *cervinopungens*, *L.* (s. E.) *chondrospora*, *L.* (s. E.) *dallangensis*, *L.* (s. E.) *glaucosarca*, *L.* (s. E.) *habana*, *L.* (s. E.) *henrici*, *L.* (s. E.) *lividonigra*, *L.* (s. E.) *ochropolia*, *L.* (s. E.) *peltata*, *L.* (s. E.) *planiformis*, *L.* (s. E.) *rosaceocinera*, *L.* (s. E.) *schitakensis*, *L.* (s. E.) *subaenea*, *L.* (s. E.) *tuberculans*, *L.* (s. E.) *yunnana*, *L.* (sect. *Psora*) *handelii*, *L.* (s. P.) *macrophylla*, ***Leptopterygium*** *gracilentum*, ***Lopadium*** *affine**, *L. citrinum*, *L. melaleucum* var. *aeruginascens*, *L. m.* var. *orientale*, *L. tonkiense*, ***Maronea*** *rubra*, ***Microglæna*** *rosacea*, ***Microthelia*** *fumosula*, *M. minutula*, ***Mycoporum*** *subpomaceum*, ***Nephroma*** *sinense*+, ***Ochrolechia*** *chondriocarpa**, ***Opegrapha*** (sect. *Euopegrapha*) *subclausa*, ***Oropogon*** *loxensis* f. *endoxanthus*, ***Pannaria*** *adpressa*, ***Parmelia*** *austrosinensis*, *P. daliensis*, *P. d.* f. *tardiva*, *P. homogenes* var. *vestita*#, *P. hunanensis*, *P. mesotropa* var. *compactior*, *P. monachorum*, *P. plumbeata*, *P. rhododendri*, *P. setschwanensis*, *P. subtinctoria*, ***Parmentaria*** *chungii**, *P. obtecta**, ***Peltigera*** *venosa* var. *yunnana*, ***Pertusaria*** *albovelata*, *P. bambusetorum*, *P. effigata*, *P. gracilentula*, *P. multipuncta* var. *colorata*, *P. sanguinolenta*, *P. setschwanica*, *P. subrosacea*, *P. s.* var. *evolutior*, *P. s.* var. *octospora*, ***Phaeographina*** (sect. *Epiloma*) *pluviisilvarum*, *Ph. lecanographa* var. *pleiospora**, *Ph. fukienensis**, *Ph. mirabilis**, ***Phaeographis*** (sect. *Chondrothecium*) *wukangensis*, *Ph.* (sect. *Coelogramma*) *pruinifera*, *Ph.* (sect. *Hemithecium*) *silvicola*, *Ph.* (sect. *Phaeodiscus*) *heterochroides**, *Ph. heterochroa**, *P. heterochroa* f. *subunicolor**, *P. lidjiangensis*, ***Phlyctis*** *schizospora*, ***Phylloporina*** (sect. *Segestrinula*) *aenofusca*, *Ph.* (sect. *Ulvella*) *triseptula*, ***Physcia*** *setosa* f. *exornatula**, *Ph. s.* f. *sulphurascens*, ***Physma*** *pergranulatum* (ad inter.), ***Polyblastia*** *sinoalpina*, *P. subvinnosa*, ***Porina*** (sect. *Sagedia*) *sinochlorotica*, *P.* (s. S.) *vicinata*, ***Pseudopyrenula*** *quintaria*, ***Psoroma*** *sinensis*, ***Psorotichia*** *sinensis*, ***Pyrenula*** *chondrina**, *P. chungii**, *P. cuprescens*, *P. hunana*, *P. manhaviensis*, *P. nebulosa**, *P. pertusarina**, *P. quercuum*, *P. schutschensis*, *P. tunicata*, ***Pyxine*** *subolivacea*, ***Rhizocarpon*** *cinereocaesium*, *R. gracile*, *R. g.* var. *sanguineum*, *R. ischnothallum*, *R. leprosulum*, *R. sinense*, ***Rinodina*** *cornutula*, *R. globulans*, *R. handelii*, *R. heterospora*, *R. setschwana*, ***Sporopodium*** *albonigrum*, *S. handelii*, ***Staurothele*** *chlorospora*, *S. kwapiensis*, *S. microlepis*, *S. muliensis*, *S. ochroplaca*, *S. sinensis*, *S. s.* f. *obscurata*, *S. s.* f. *pallelescens*, ***Strigula*** *fibrillosa**, ***Verrucaria*** *aethiobolizans*, *V. arboricola*, *V. bella*, *V. caesiocinerata*, *V. cataleptoides* var. *sinensis*, *V. compaginata*, *V. cupreocervina*, *V. funebris*, *V. parmigera* var. *sinensis*, *V. subtropica*, *V. yunnana*, *V. handelii*.

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b) Neue Flechten. – XI [New lichens – XI] (Zahlbruckner 1932a):

The cited paper includes the description of two new taxa from the greater Tibetan region. 1. *Thrombium cercosporum*: The type comes from the northwest Tibetan Aksai Chin Plateau, near the lake Sarigh Jilganag K l. Zahlbruckner quotes Emil Trinkler as the collector, a German geographer and explorer of Asia, who was the leader of the “German Central-Asia Expedition (1927–1928)”. The description was printed in an issue of the journal “Annales Mycologici”, which was published on 15 September 1932. Two weeks later, an identical protologue of the species appeared in “Repertorium specierum novarum regnis vegetabilis”, but Zahlbruckner stated another collector, namely Walter Bosshard (see below under c). – 2. The new genus *Chaudhuria* (now *Heterodermia* sensu stricto; see Mongkolsuk et al. 2015) was established at the base of the new species *Chaudhuria indica* (collected by G.L. Chopra in Darjeeling). – Note that 10 additional new taxa, described in the cited publication come from the Chinese province Fujian [“Fukien”], all of them collected by Chung (see above).

c) Botanische Ergebnisse der Deutschen Zentralasien-Expedition [Botanical results of the German expedition to Central-Asia] (Zahlbruckner 1932b):

Zahlbruckner reports a few lichen samples collected by the Swiss photographer and journalist Walter Bosshard, who was a participant of the expedition in 1927 and 1928 (named above) to the “Aksai Chin Plateau”. Zahlbruckner listed 6 taxa, out of which *Glypholecia tibetica* (Hugo Magnusson was cited by Zahlbruckner as author), was new for science. For the second “newly” described taxon (*Thrombium cercosporum*) see above under b).

d) Nachtr ge zur Flechtenflora Chinas [Additions to the lichen flora of China] (Zahlbruckner 1934):

This paper of Zahlbruckner deals with a collection of Joseph Rock (see above) consisting of about 80 taxa, 15 of which (13 species, 2 formae) are described as new, which are:

Bacidia (sect. *Eubacidia*) *melanocardia*, *B.* (s. *E.*) *nigra*, *Diploschistes ocellatus* f. *isabellinus*, *Graphis* (sect. *Mesographis*) *rockii*, *Lecidea* (sect. *Biatora*) *djagensis*, *Parmelia* (sect. *Irregularis*) *muliensis*, *P.* (sect. *Sublinearis*) *leiocarpodes*, *P.* (s. *S.*) *subcremea*, *P.* (s. *S.*) *yalungana*, *P. yunnana* f. *subnuda*, *Pertusaria* (sect. *Lecanorastrum*) *fecunda*, *P.* (s. *L.*) *margaritacea*, *P.* (s. *L.*) *phaeosporina*, *P.* (s. *L.*) *substerilis*, *P.* (sect. *Porophora*) *haematina*.

e) Specimens from the Hengduan Shan and adjacent regions, issued in two exsiccata-works:

The following lichen taxa, collected by Joseph ROCK (19 taxa) and by HANDEL-MAZZETTI (13 taxa) in the border area of northern Yunnan and southwestern Sichuan, were issued in the exsiccata series “Lichenes rariores exsiccati” (see ZAHLBRUCKNER 1902–1931 [comprising the numbers 1–288] and ZAHLBRUCKNER & REDINGER 1933–1936 [comprising the numbers 289–385]) and in “Cryptogamae exsiccatae” (e.g. ZAHLBRUCKNER [in KEISSLER] 1924, 1926b; SZATALA [in PETRAK et al.] 1948).

LR = Lichenes rariores exsiccati; CE = Cryptogamae exsiccatae; * = collected by HANDEL-MAZZETTI, + = collected by Joseph ROCK; the abbreviation of the exsiccata and the corresponding number are given in parentheses:

**Acroscyphus sphaerophoroides* (CE2844), +*Alectoria acanthodes* (LR321), **A. sulcata* (CE2766), +*A. sulcata* (LR320), +*Anaptychia hypoleuca* (LR313), **A. leucomelaena* var. *multifida* (LR263), +*A. leucomelaena* var. *multifida* (LR263b), +*A. speciosa* var. *esorediata* (LR360), +*Anzia leucobatoides* f. *hypomelaena* (LR314), **Arthopyrenia extensa* (LR253) +*Cetraria collata* f. *nuda* (LR322), *Cladonia gracilis* var. *aspera* (LR285; collected by indigenous people), **Graphina* (sect. *Eugraphina*) *symplocorum* (CE2952, ISOTYPES), +*Graphis rockii* – (LR324, ISOTYPES), +*Lecanora flavovirens* var. *subaeruginosa* (LR351), +*Nephromopsis delavayi* (LR317), +*Lobaria meridionalis* (LR318), **Opegrapha subclausa* (LR258), **Oropogon loxensis* (LR266), **Parmelia cirrhata* (CE1044b), +*P. cirrhata* (LR319), +*P. daliensis* f. *tardiva* (LR323), **P. hypotrypa* (LR278), +*P. hypotrypa* (LR278b), +*P. hypotrypa* f. *balteata* (LR312), **Pilophorus acicularis* (CE2842), +*Stereocaulon tomentosum* (CE1655c), +*Sticta henryana* (LR316), +*S. nylanderiana* (LR315), +*S. nylanderiana* (CE3665), **S. platyphylla* (CE2751), **Usnea mollis* (LR251).

Note, that some taxa with a low exsiccata number, but with the addition “b”, “c” or “d”, often have been published much later than the number might suggest (e.g. numbers 263b and 278b were issued in the “addenda” of “Lichenes rariores exsiccati 289–385” or number 1655c was included in the “addenda” of “Cryptogamae exsiccatae 3641–3670”). Note also that prior issues of ZAHLBRUCKNER’s exsiccata comprise some additional lichen specimens of ROCK’s collection, mainly from Hawaii, e.g. *Physcia picta* (122), *Stereocaulon proximum* (137), *S. mixtum* (138), *Teloschistes flavicans* f. *glabra* (139). And finally note, that funnily, and as is the case with *Thrombium cercosporum* (see above under b)), the taxon *Graphis rockii* was described twice by ZAHLBRUCKNER in the same year (even with an identical protologue), namely in ZAHLBRUCKNER’s “Nachträge zur Flechtenflora Chinas” and in his exsiccata series “Lichenes rariores exsiccati” (the latter probably being the earlier one; citations see above).

3.5. Josef POELT (Fig. 2D)

Biographical data are excerpted from various sources, e.g. GRUMMANN (1974), HERTEL (1995), BRESINSKY (1995), HERTEL & OBERWINKLER (1996), HERTEL, NIMIS & VĚZDA (1996), MAYRHOFER, HAFELLNER & SCHEUER (1996), KÄRNEFELT (2009) and KÄRNEFELT et al. (2010). – As the cited papers and especially Hannes HERTEL's contribution (this book, HERTEL 2018) give very detailed information on many aspects of POELT's life (including his expeditions to Asia), only a strongly abridged version of his curriculum vitae is presented here, with focus on his field trips to Asia.

Josef POELT (* 17 October 1924 in Pöcking, Germany, † 3 June 1995 in Graz, Austria) was an German/Austrian botanist (with a focus on bryophytes, fungi, and most particularly lichens), who worked as an assistant and a curator in the botanical garden and the “Botanische Staatssammlung” in Munich (1951–1965), as a full professor at the “Freie Universität” in Berlin (1965–1972), and finally as a full professor in botany at the “Karl-Franzens-Universität” in Graz (1972–1995). In connection with his professorship in Graz, POELT acquired the Austrian citizenship in addition to his German one. At the “Institut für Botanik” in Graz, POELT established both a lichenological workgroup and the solid base of a large collection of lichens and lichenicolous fungi. (Note, that the herbarium was later much expanded by his students Helmut MAYRHOFER and, in particular, Josef HAFELLNER [and many of their students]).

During his lifetime, POELT participated in several scientific expeditions to many parts of the world (this book, HERTEL 2018), three of which took him to the Central Himalayas (1962, 1986) and the Northwest Himalayas including the Karakoram Range (1991), respectively. POELT's first Himalaya expedition in 1962 headed towards the Solu-Khumbu region at the southern flank of the Mount Everest (Tibetan: Chomolungma), from which already PAULSON (1925) had reported several lichens. This region in Nepal is populated mainly by the Tibeto-Burman ethnic group of Sherpas, which immigrated about 500 years ago from the Tibetan region Kham. In 1986, on his second Himalaya expedition, POELT went to the Langtang region (in Central Nepal, close to the border with Tibet), which is populated mainly by the Tibeto-Burman ethnic group of the Tamang (who show close relationships to Sherpas and Tibetan in a narrow sense). Finally, in 1991, POELT explored the “Karakoram-West Tibetan Plateau alpine steppe” (southwest parts of Karakoram Range, including Deosai plateau), an area which is populated by Balti people, which are said to descent from Tibetan Khampas (the Balti language is a western archaic Tibetic language).

The high praise by the scientific community for POELT is highlighted by the long list of eponyms honouring Josef POELT (for detailed data see HERTEL & OBERWINKLER 1996 and HERTEL 2018; most of the taxa have been excerpted from “MYCOBANK Database”). Unless otherwise stated, all taxa are liche-

nized or lichenicolous fungi (* name given because of the superficial resemblance of the new genus with a taxon that already contained POELT's name):

Genera (8): *Josefpoeltia*, *Poeltia* (liverwort; the same name given for an ascomycete is a nomen illegitimum), *Melanotopelia** *Poeltiaria* (ascomycete), *Poeltidea*, *Poeltiella*, *Poeltinula*, *Topelia*, *Topeliopsis**. – Species (44): *Alectoria poeltii*, *Androcymbium poeltianum* (Colchicaceae), *Arcyria poeltii* (myxomycete), *Athelia poeltii* (basidiomycete), *Bahianora poeltii*, *Bourdotia poeltii* (basidiomycete), *Bovistella poeltii* (basidiomycete), *Brachiolejeunea poeltii* (liverwort), *Buellia poeltii*, *Collema poeltii*, *Corynotheca poeltii* (moss), *Erysiphe poeltii* (ascomycete), *Fulgensia poeltii*, *Fuscidea poeltii*, *Gyalideopsis poeltii*, *Involucrocarpon poeltii*, *Jungermannia poeltii* (liverwort), *Lecania poeltii*, *Lecanora poeltiana*, *Lecidea poeltii*, *Lichenodiplis poeltii*, *Lichenopuccinia poeltii*, *Lithogyalideopsis poeltii*, *Melanelia poeltii*, *Melanohalea poeltii*, *Naeviella poeltiana* (ascomycete), *Nardia poeltii* (liverwort), *Pannaria poeltii*, *Paraparmelia poeltii*, *Penium poeltianum* (desmid), *Phellinus poeltii* (basidiomycete), *Physcia poeltii*, *Plagiochila poeltii* (liverwort), *Punctillum poeltii* (ascomycete), *Rinodina poeltiana*, *Rinodina poeltii*, *Schroeteria poeltii* (basidiomycete), *Squamarina poeltii*, *Thelotrema poeltii*, *Toninia poeltii*, *Trichothelium poeltii*, *Velutipila poeltii* (hyphomycete), *Verrucaria poeltiana*, *Xanthoria poeltii*.

Whereas most of POELT's Khumbu collection of 1962 is stored in the herbarium M, his many thousands of specimens from the Langtang area (1986) and the Karakorum range (1991) are housed in the herbarium GZU. The following (a–c) deals with all lichenological results based on his three collections. (Note that most recently, POELT's scientific output – with respect to the Himalayas and the Karakoram Range – has been briefly outlined by MIEHE et al. (including SØCHTING) 2016. The paper also includes a list of important lichenological works from the Himalayas with special focus on those from Nepal).

a) Scientific results of POELT's Khumbu expedition in 1962, published in the series "Flechten des Himalaya":

In 1962 (March to August), Josef POELT participated in a field trip to the Khumbu region in East-Nepal. The expedition was part of a project, entitled "Forschungsunternehmen Nepal Himalaya", which was initiated by the German herpetologist Walter HELLMICH (Munich, Germany; see HERTEL 2018). As mentioned above, POELT's Khumbu collection is housed in the herbarium M with some duplicates in GZU. The lichenological results of the expedition were published under the series name "Flechten des Himalaya" and under the collective title (or, if regarded as journal, as the journal title) "Khumbu Himal", "Ergebnisse des Forschungsunternehmens Nepal Himalaya" respectively. The following list gives an overview of all genera (or otherwise related taxa) treated in the publication series "Flechten des Himalaya", sorted after the consecutive numbers [1–17] of the series. Newly described taxa (39) are mentioned separately. Note, that 34 taxa were described by POELT as author or coauthor (an asterisk [*] is used, if POELT is neither author nor coauthor of the paper where specific genera and/or new taxa are treated).

1. *Lecanora*, lobate taxa (POELT 1966a; 6 new taxa: *L. amorphia*, *L. himalayae*, *L. tschomolongmae*, *L. helmichiana*, *L. sherparum*, *L. rubina* var. *australis*). – 2. *Ochrolechia* (POELT 1966b; 5 new taxa: *O. bryophaga*, *O. glacialis*, *O. margarita*, *O. rosella* f. *sorediascens*, *O. yasudae* var. *corallina*). – 3. *Stereocaulon** (LAMB 1966). – 4. *Candelaria* and *Candelariella* (POELT & REDDI 1969; 6 new taxa: *Candelariella grimmiae*, *C. himalayana*, *C. nepalensis*, *C. sorediosa*, *C. vitellina* var. *glacialis*, *Candelaria sphaerobola*). – 5. *Alectoria** (including *Bryoria* and *Sulcaria*) (BYSTREK 1969; 3 new taxa: *Alectoria poeltii**, *A. perspinosa**, *A. variabilis**), – 6. *Physcia* (including *Phaeophyscia*), *Physciopsis* and *Physconia* (POELT 1974; 9 new taxa: *Physcia endococcina* var. *khumbuensis*, *Physcia endococcinodes*, *Ph. e.* var. *megalospora*, *Ph. e.* var. *stellata*, *Ph. hispidula* subsp. *primaria*, *Ph. h.* subsp. *limbata*, *Ph. lygaea*, *Ph. nepalensis*, *Ph. pyrrophora*, *Physciopsis granulata*), – 7. *Baeomyces** (JAHNS & SEELEN 1974). – 8. *Anaptychia** (KUROKAWA 1974). – 9. *Cladonia** (des ABBAYES 1974). – 10. *Leptogium*, sect. *Mallotium** (MITCHELL 1974). – 11. *Dimerella* and *Pachyphiale* (VÉZDA & POELT 1974; 1 new taxon: *Pachyphiale himalayensis*). – 12. *Chaenotheca* and *Coniocybe** (SCHMIDT 1974; 2 new taxa: *Chaenotheca nepalensis**, *Ch. granulosa**). – 13. *Lasallia* (FREY & POELT 1977). – 14. *Umbilicaria* (POELT 1977a; 5 new taxa: *U. decussata* var. *rhizinata*, *U. indica* var. *nana*, *U. nanella*, *U. nepalensis*, *U. trabeculata*). – 15. *Dermatocarpon* and *Solorina* (POELT 1977b). – 16. *Ioplaca* (POELT 1977c; 1 new taxon as new genus and species: *Ioplaca sphalera*). – 17. “Additions and summary” (POELT 1977d) deals with additional 15 lichens, e.g. *Lecanora chondroderma*, *L. somervellii* and several taxa of *Heterodermia*. It presents a map of all main collecting sites of Josef POELT in the Khumbu region and contains a list of all 50 (at that time) newly described taxa of lichens, which were mainly based on POELT’s collection. Beside the very important publication of Hannes HERTEL (Munich), which deals with rock inhabiting lichens of Central, East and South Asia (HERTEL 1977) and in which POELT’s Khumbu-collection was the base for newly described taxa (*Lecidea bella*, *L. khumbuensis*, *L. bucculenta*, *L. himalaica*, *L. molybdochroa* and *Lecidella dimelaenophila*), there are several other papers in which POELT’s valuable specimens from the Khumbu region were published as type (or paratype) material, e.g. in DEGELIUS 1974 (*Collema nepalense*, *C. poeltii*), HERTEL 1975a (*Lecidea poeltii*), HERTEL 1975b (*Lecidea fuscoatra* var. *indecora*, *L. haerjedalica* var. *gyrodisca*) and ESSLINGER & POELT 1991 (*Parmelia masonii*, paratypes; see Fig. 12B of the present paper).

b) Scientific results of POELT’s Langtang expedition in 1986 and his Karakoram expedition in 1991, published in the series “Beiträge zur Kenntnis der Flechtenflora des Himalaya” (including some additional results of his earlier Khumbu field trip).

POELT’s “Langtang expedition” took place in 1986 (22 August to 29 September) and was organized by Georg and Sabine MIEHE (Marburg, Germany). Most of the specimens (collected by POELT and the married couple MIEHE) originate from the “Langtang National Park” in Nepal, which was established in 1976. A photograph of Josef POELT (taken by Georg MIEHE) sitting in front of his tent, studying lichens with his hand lense and obviously paying no attention to his bleeding wounds on his leg (caused by terrestrial leeches) is illustrated in the present volume by HERTEL (2016, Fig. 28; see caption there). Independently the same photo was pictured by MIEHE et al. [including SØCHTING] (2016, Fig. 8.37). Note, that in 2007, a further excursion to the Langtang Area

yielded 1,300 lichen specimens, which are partly housed in the herbarium E (its scientific output was summarized in the paper just cited).

POELT's "Karakoram expedition" in 1991 (26 June to 23 July), also organized by his friends Georg and Sabine MIEHE, took them to the Baltistan region (named also as "Little Tibet") in the northern part of Kashmir (in Pakistan), where they visited the Haramosh Range (up to the foot of the Chogo Lungma Glacier), the Rakaposhi Range (up to the foot of the Hinarche Glacier), and the Eastern Deosai Plateau. The scientific results of the expedition are scattered in several publications of POELT (and coauthors), in the series "Beiträge zur Kenntnis der Flechtenflora des Himalayas" (see below) and in several papers of other authors starting with the year 1992.

The following list gives an overview of all genera (or otherwise related taxa) treated in the cited publication series "Beiträge zur Kenntnis der Flechtenflora des Himalaya", sorted after the consecutive numbers [1–10] of the series. Newly described taxa (50) are named separately, all of which were described by POELT as author or coauthor. Note, that the *Caloplaca* paper (listed below under number 7) includes a remarkable total of 36 new taxa (and additionally 5 "provisional" new names):

1. Gyalectoid and foliicolous lichens (VĚZDA & POELT 1988; 4 new taxa: *Gyalidea testacea*, *Gyalideopsis megalospora*, *G. nepalensis*, *Tapellaria saxicola*). – 2. *Bryonora* (POELT & OBERMAYER 1991; 3 new taxa: *B. castanea* var. *euryspora*, *B. pulvinar*, *B. p.* var. *microspora*). – 3. *Lecanora somervellii* (OBERMAYER & POELT 1992; see Fig. 9A of the present paper). – 4. *Xanthoria* and *Teloschistes* (POELT & PETUTSCHNIG 1992). – 5. *Protoparmelia* (POELT & GRUBE 1992; 3 new taxa: *P. badia* var. *nectans*, *P. effigurans*, *P. gesamia*). – 6. *Tephromela* (POELT & GRUBE 1993a; 3 new taxa: *T. glacialis*, *T. siphulodes*, *T. s.* var. *adnata*). – 7. *Caloplaca*, *Fulgensia* and *Ioplaca* (POELT & HINTEREGGER 1994 ["1993"]; 36 (!) new taxa: *Caloplaca ahmadiana*, *C. atratulata*, *C. aureosora*, *C. borealis* var. *oligosperma*, *C. cerina* var. *swatica*, *C. cerinopsis*, *C. cirrochroopsis*, *C. cupreobrunnea*, *C. cupulata*, *C. cyanotrophica*, *C. dickoreana*, *C. exsecuta* var. *aphanes*, *C. farinosa*, *C. heterospora*, *C. isabellina*, *C. juniperi*, *C. lecidellae*, *C. lobulascens*, *C. lypera*, *C. maura*, *C. microsporella*, *C. ochroplaca*, *C. pachythallina*, *C. phoenicopta*, *C. praeruptorum*, *C. procerispora*, *C. psammophila*, *C. reducta*, *C. rinodinae*, *C. rinodinopsis*, *C. sancta*, *C. saxicola* var. *chamaeleon*, *C. scrobiculata* var. *ignea*, *C. sororicida*, *C. stipulata*, *C. ulcerata*; 5 taxa described as "at interim": *C. baltistanica*, *C. karakorina*, *C. pachycheila*, *C. phloginopsis*, *C. satparae*). – 8. *Lecanora*, subgenus *Placodium* (POELT & GRUBE 1993b). – 9. *Sagma* (GRUBE & POELT 1993b; 1 new taxon as new genus and species: *Sagma potentillae*). – 10. *Sporastatia* (GRUBE & POELT 1993a).

c) POELT's "Notes to the list of lichens of the Langtang area":

A list of roughly 280 lichen taxa was presented by POELT (1990) as an attached (and commented) list in the doctoral thesis of Georg MIEHE (1990) dealing with vegetation ecology in the Langtang area. As the list (with the German title "Zur Liste der Flechten des Langtang-Gebietes. Bemerkungen von J. POELT") often has been overlooked by lichenologists, the taxa treated are cited below. Note, that POELT often used quotation marks to indicate that

the status of the cited taxon is somehow unclear or the taxon has to be described later.

Agonimia tristicula, *Alectoria ochroleuca*, *A. sarmentosa*, *Amygdalaria aeolotera*, *Anaptychia bryorum*, *Arthrorhaphis citrinella* var. *alpina*, *A. c.* var. *citrinella*, *A. citrinella* coll., *A. vacillans* var. "jungens", *Aspicilia "crocea"*, "*Bacidia*" sp., *Baeomyces pachypus*, "*Biatora*" sp., *Bryonora castanea* coll., *B. curvescens*, *B. "lithophila"*, *B. "pulvinar"*, *B. rhyparhiza*, *B. stipitata*, *B. yeti*, *Bryoria confusa*, *B. perspinosa*, *B. poeltii*, *B. tenuis*, *B. variabilis*, *Buellia "crassul"*, *B. geophila* coll., *B. "praesignis"*, *B. punctata*, *Caloplaca "granuligera"*, *C. tetraspora*, *Candelaria* spp., *Candelariella "farinosa"*, *C. grimmiae*, *C. himalayana*, *C. nepalensis*, *C. soresiosa*, *C. vitellina* var. *glacialis*, *Carbonea vitellinaria*, *Catapyrenium cinereum*, *C. daedaleum*, *Catillaria* sp., *Cetraria ambigua*, *C. "coronata"*, *C. delavayi*, *C. ericetorum* coll., *C. everniella*, *C. "fruticum"*, *C. hepatizon*, *C. hypotrachyna*, *C. isidioidea*, *C. islandica*, *C. laeteflava*, *C. laevigata*, *C. laureri*, *C. leucostigma*, *C. melaloma*, *C. nepalensis* var. "endocrocea", *C. nigricans*, *C. oakesiana*, *C. pallescens*, *C. strachyi*, *C. "thamnophora"*, *C. wallichiana*, *Cetrelia cetrarioides*, *C. chicitae*, *C. isidiata*, *C. olivetorum*, *C. sanguinea*, *C. sinensis*, *Cladia aggregata*, *Cladonia alinii*, *C. amaurocraea*, *C. arbuscula* subsp. *beringiana*, *C. cervicornis* subsp. *verticillata*, *C. ciliata* var. *tenuis*, *C. coccifera* coll., *C. conoides*, *C. corymbosa*, *C. corymbescens*, *C. delavayi*, *C. fenestralis*, *C. furcata*, *C. gracilis* coll., *C. "pseudobacillaris"*, *C. pseudodigitata*, *C. pyxidata*, *C. pyxidata* coll., *C. ramulosa*, *C. rangiferina*, *C. squamosa* var. *squamosa*, *C. s.* var. *subsquamosa*, *C. squamosissima*, *C. yunnana*, *Cladopyxis "inversa"*, *Coccocarpia erythroxyli*, *Coelocaulon aculeatum*, *Collema* spec.div., *Coriscium viride*, *Dimelaena oreina*, *Dimerella diluta*, *Diploschistes muscorum*, *Evernia mesomorpha*, *Everniastrum cirrhatum* (see Fig. 12A of the present paper), *E. "intermedium"*, *E. nepalense*, *E. rhizodendroideum*, *E. sorocheilum*, *Gyallecta* sp., *Gyalidea scutellaris*, *Gyalideopsis megalospora*, *Haematomma* sp., *Halecania* sp., *Heterodermia albidiflava*, *H. awasthii*, *H. boryi* subsp. *boryi*, *H. coronata*, *H. dactyliza*, *H. dissecta* coll., *H. hypocaesia*, *H. obscurata*, *H. podocarpa* coll., *H. pseudospeciosa*, *H. rubescens*, *H. togashii*, *Hymenelia* sp., *Hypogymnia delavayi*, *H. hypotrypella*, *H. physodes*, *H. vittata*, *Icmadophila ericetorum*, *Lecanora chondroderma*, *L. "cotoneastri"*, *L. himalayae*, *L. muralis*, *L. pallida*, *L. polytropa*, *L. somervellii*, *L. subfusca* coll., *L. teretiuscula*, *Lecidea advena*, *L. bella*, *L. "kobresiae"*, *L. "Langtang"*, *L. russula* coll., *L. coll.*, *Lecidella wulfenii*, *Lecidoma demissum*, *Lepraria* cf. *neglecta*, *Leprocaulon pseudoarbuscula*, *Leptogium arisanense*, *L. asiaticum*, *L. burnetiae*, *L. delavayi*, *L. pedicellatum*, *L. trichophorum*, *Lobaria isidiosa*, *L. kurokawae*, *L. pseudopulmonaria*, *L. pulmonaria*, *L. retigera*, *L. retigera* coll., *Maronea* sp., *Megaspora verrucosa*, *Menegazzia terebrata*, *Nephroma helveticum*, *N. isidiosum*, *Normandina pulchella*, *Ochrolechia glacialis*, *O. margarita*, *O. trochophora*, *O. yasudae* var. *corallina*, *Ophioparma ventosa*, *Pachyphiale himalayensis*, "*Pachyora*" sp., *Pannaria poeltii*, *P. praetermissa*, "*Pannaria*" sp., *Parmelaria thomsonii*, *Parmelia dodapetta*, *P. elegantula* coll., *P. meizospora*, *P. sp.* (ex aff. *neodiscordans*), *P. rhabdiformis*, *P. revoluta* coll., *P. rudenta*, *P. scytophylla*, *P. setschwanensis*, *P. sinuosa*, *P. soresdia*, *P. subaurulenta*, *P. wallichiana*, *Parmotrema austrosinense*, *P. eunetum*, *P. habaianum*, *P. grayanum*, *P. nilgherrense*, *P. reticulatum*, *P. sanctae-angelii*, *P. tinctorum*, *Peltigera canina* coll., *P. didactyla*, *P. dolichospora*, *P. lepidophora*, *P. neckeri*, *P. neopolydactyla*, *P.* (aff.) *pindarensis*, *P. polydactylon*, *P. praetextata*, *P. rufescens*, *Pertusaria* cf. *alpina*, *P. bryontha*, *P. "humivaga"*, *P.* cf. *ocullata*, *Phaeorrhiza nimbosea*, *Physcia endococcinodes*, *Ph. hispidula* coll., *Ph. hispidula* subsp. *exornatula*, *Ph. h.* subsp. *hispicula*, *Ph. h.* subsp. *primaria*, *Ph. stellaris*, *Physconia* cf. *farrea*, *Ph. muscigena*, *Placidopsis pseudocinerea*, *Platismatia erosa*, *Porpidia hydrophila*, "*Pseudobryonora*" sp., "*Psora*" sp., *Psoroma hypnorum*, *Pycnothelia papillaria*, *Pyxine nilgiriensis*, *Ramalina* spec.div., *Rhizocarpon badioatrum* coll., *Rh. geographicum* coll., *Rh. kansuense*, *Rh. macrosporum*, *Rh. superficiale*, *Rhizoplaca chrysoleuca*, *Rinodina arnoldii*,

R. cinnamomea, *R. conradi*, *R. mniaraea*., *R. "styposora"*, *R. sp. 1*, ***Saccomorpha icmalea***, "***Sagema potentillae***", ***Sarcogyne simplex***, ***Siphula ceratites***, ***Solorina bispora***, *S. crocea* coll., ***Sphaerophorus fragilis***, ***Sporastatia testudinea*** (see Fig. 4B of the present paper), ***Stereocaulon foliolosum***, *S. glareosum*, *S. himalayense*, *S. leprocauloides*, *S. myriocarpum*, *S. piluliferum*, *S. tomentosum*, ***Sticta henryana***, *S. nylanderiana*, *S. platyphylloides*, *S. weigelii*, ***Strigula elegans***, ***Sulcaria sulcata***, *S. virens*, ***Tephromela "siphulodes"***, ***Thamnolia subuliformis***, *Th. vermicularis* s.str., ***Thrombium*** cf. *epigaeum*, ***Thyrea*** sp., "***Toninia***" sp., ***Trapeziopsis flexuosa***, ***Umbilicaria decussata***, *U. indica*, *U. nepalensis*, *U. thamnoides*, *U. virginis*, *Usnea* spp. div., ***Verrucaria*** spp., ***Xanthoria elegans***.

d) Some further results based on POELT's Asian lichen collection published elsewhere:

A paper on cyanotrophic taxa of *Bryonora* (POELT & MAYRHOFER 1988) includes the new taxa *B. selenospora*, *B. reducta* and *B. rhypariza* var. *cyanotropha* collected in the Langtang area, and another publication, dealing with a soil inhabiting *Parmelia* (ESSLINGER & POELT 1991) contains the new description of *Parmelia masonii* (based on specimens of the Langtang and Khumbu region). Further Himalaya- and Karakoram-collections of POELT are mentioned in several other papers, e.g. in a treatment of *Catapyrenium* by BREUSS (1998), in a taxonomical revision of the *Caloplaca saxicola* group (GAYA 2009), or in several papers on lichenicolous fungi (CALATAYUD et al. 2013, HAFELLNER & CALATAYUD 1999).

3.6. Walter OBERMAYER (Fig. 5A)

Abridged curriculum vitae (for a more detailed information see KÄRNEFELT et al. 2010): * 1960 in Friesach (Austria); commercial academy in Treibach Althofen (1975–1979); in 1980 start of the study of biology at the University in Graz (Austria), completion of the "Teacher Accreditation Program" (1986), doctors degree (1990); since 1990 assistant at the botanical institute of the University in Graz and curator of the lichen collection in GZU. – Two field trips to the Tibetan region in 1994 (organized by Georg and Sabine MIEHE, with Bernhard DICKORÉ, Ubbo WÜNDISCH and Achim BRÄUNING as further lichen collecting participants [see below under chapter 4]; almost three month) and in 2000 (self-organized; about five weeks). The locations of the two field trips are illustrated in OBERMAYER (2004a); all specimens (roughly 7,500; including c. 350 lichenicolous fungi) of the two expeditions are housed in the herbarium GZU. In order to get an impression of the landscape (including local people) and of several typical lichens of the area, some photos are added in the present paper (see figs. 6–15).

The lichenological results of my two Tibet-expeditions can be split into three parts: a) an extensive and annotated list of (partly rare) selected species of the region, b) the issue of Tibetan lichens specimens in the two exsiccata

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series “Lichenotheca Graecensis” and “Dupla Graecensia Lichenum”, and c) further publications with a focus on the study of lichen taxa on the species or genus level. Some additional papers of other authors, using my lichen collection as a base for describing new taxa or as reference material is given under d).

a) Additions to the lichen flora of the Tibetan region” (OBERMAYER 2004a):

The publication deals with 110 taxa based on 711 lichen specimens. Numerous cited taxa were new findings for the greater Tibetan region. The paper gives a literature-based overview on prior knowledge of lichens from the area and contains two maps picturing the collecting sites of the two cited expeditions. The paper includes the following taxa (* lichenicolous fungi):

**Abrothallus peyritschii*, *Acarospora bohlinii*, *A. nodulosa* var. *reagens*, *A. schleicheri* (see Fig. 15D of the present paper), *Acrosyphus sphaerophoroides*, *Alectoria ochroleuca*, *Allocetraria ambigua*, *A. flavonigrescens*, *A. globulans*, *A. sinensis*, *A. stracheyi*, *Anamylopsora pulcherrima*, *Arthonia cinnabarina*, *A. glebosa*, *A. vinosa*, *Arthrorhaphis alpina* var. *alpina*, *A. a.* var. *jungens* (see Fig. 11B of the present paper), *A. cf. grisea*, *Brigantiaea purpurata*, “*Buellia*” *lindingeri*, *Caloplaca ammiospila*, *C. var. cerina*, *C. c. var. chloroleuca*, *C. c. var. muscorum*, *C. cirrochroopsis*, *C. cf. exsecuta*, *C. grimmiae*, *C. irrubescens*, *C. jungermanniae*, *C. scrobiculata*, *C. tetraspora*, *C. triloculans*, *C. cantholyta*, *Clavitimela aglaea*, *C. armeniaca*, *Carbonea vitellinaria*, *Catolechia wahlenbergii*, “*Cetraria*” *xizangensis*, *Chrysothrix candellaris*, *Ch. chlorina*, *Cyphelium tigillare*, *Dimerella isidiata* (see Fig. 8C of the present paper), *Epilichen glauconigellus*, *E. scabrosus* (see Fig. 10B of the present paper), *Euopsis pulvinata*, *Fuscopannaria leucophaea*, *F. leucosticta*, *F. cf. poeltii* (see Fig. 13B of the present paper), *F. saltuensis*, *Gyalecta foveolaris*, *Haematomma rufidulum*, *Heppia cf. conchiloba*, *Hypocenomyce scalaris*, *Hypogymnia flavida* (see Fig. 5B of the present paper), *H. hypotrypa*, *Icmadophila ericetorum*, *Immersaria athroocarpa*, *Ioplaca pindarensis*, *Japewia tornoensis*, *Lecanora argopholis*, *L. perpruinosa*, *Lecidea tessellata*, *Lecidoma demissum*, *Megalospora tuberculosa*, *M. weberi*, *Megaspora verrucosa*, *Multiclavula mucida*, *Nephromopsis komarovii*, *N. morrisonicola*, *N. yunnanensis*, *Normandina pulchella*, *Ochrolechia glacialis*, *Omphalina umbellifera*, *Pannaria conoplea*, *P. emodi*, *P. lurida*, *Parmelia masonii*, *Pilophorus cf. acicularis*, *Polychidium stipitatum*, *Protothelenella sphinctrinoidella*, *Pseudocyphellaria crocata*, *Psilolechia lucida*, *Pyrrhospora elabens*, *Rinodina terrestris*, *Sarcogyne clavus*, *Siphula ceratites*, *Solorina crocea*, *S. crocea* s.l., *S. bispora*, *S. octospora*, *S. saccata*, *S. spongiosa*, *Solorinella asteriscus*, *Sporastatia testudinea*, **Stigmidium arthrorhaphidis*, *Strangospora moriformis*, *Teloschistes flavicans*, *Thamnolia subuliformis*, *Th. vermicularis*, *Tremolecia atrata*, *Tuckermannopsis chlorophylla*, *Tuckneraria laureri*, *T. pseudocomplicata*, *Umbilicaria hypococcina*, *U. virginis*, *U. yunnana* (see Fig. 8B of the present paper), *Vulpicida pinastri*, *Xanthoria contortuplicata*.

b) Tibetan lichen specimens, issued in the following exsiccata series

(O. = OBERMAYER; # = exsiccata-number of the issued taxon):

Lichenotheca Graecensis: Fourteen collections (i.e. 280 specimens) of lichens from Tibet and adjacent regions have been distributed in the exsiccata “Lichenotheca Graecensis”:

Acarospora schleicheri (O. 1995, #21), *Acrosyphus sphaerophoroides* (O. 2001a, #162), *Allocetraria globulans* (O. 2001a, #165), *Cetraria laevigata* (O. 1996a, #45), *Dermatocarpon minutum* (O. 1996a, #47), *Heterodermia hypoleuca* (O. 1998a, #105), *Lethariella cladonioides* (O. 2001a, #175), *Lobaria “parapulmonaria”* ined. (O. 2006a, #293), *Nephroma helveticum* (O. 1997a, #89), *Nephromopsis morrisonicola* (O. 2002a, #207), *Ophioparma handelii* (O. 1997b, #70), *Oropogon orientalis* (O. 1998a, #111), *Pannaria emodi* (O. 1999a, #144; originally issued as *P. rubiginosa*), *Pseudocyphellaria crocata* (O. 1999a, #150), *Usnea longissima* (chemotypes) (O. 2001a, #180).

Dupla Graecensia Lichenum: Thirty-nine collections (i.e. 195 specimens) of lichens from Tibet and adjacent regions have been distributed in the dwarf-exsiccata “Dupla Graecensia Lichenum”:

Acrosyphus sphaerophoroides (O. 2003, #202), *Allocetraria flavonigrescens* (O. 2003, #204; O. 2004b, #332), *A. globulans* (O. 2003, #205), *A. stracheyi* (O. 2004b, #333), *Arthrorhaphis alpina* var. *jungens* (O. 2003, #210), *Bryonora stipitata* (O. 1999b, #39; see Fig. 13A of the present paper), *Caloplaca flavorubescens* (O. 2004b, #341), *Candelariella reflexa* (O. 2003, #222), *Cladonia crispata* var. *cetrariiformis* (O. 2001b, #111; leg. DICKORÉ), *C. stellaris* (O. 2001b, #112), *Coccocarpia erythroxyli* (O. 1999b, #52), *Dimerella isidiata* (O. 1998b, #7; O. 2003, #239), *Epilichen scabrosus* (O. 1998b, #9; O. 2003, #242), *Hypogymnia flavida* (O. 1998b, #11 as *H. hypotrypa*; O. 2002b, #159; O. 2003, #252), *H. flavida* – isotypes (O. 2002b, #160; leg. Mc.CUNE), *Icmadophila ericetorum* (O. 2003, #253), *Lasallia pertusa* (O. 2002b, #161), *Lecanora geophila* (O. 2001b, #124), *Lethariella cashmeriana* (O. 2002b, #165 and #166), *L. flexuosa* (O. 2002b, #167; see Fig. 11A of the present paper), *Lobaria orientalis* (O. 2006b, #446), *L. “pseudoisidiophora”* ined. (O. 2007, #524), *L. retigera* (O. 2009, #636), *Megalospora sulphurata* var. *s.* (O. 1998b, #15), *Melanelia exasperata* (O. 2003, #269), *Nephromopsis morrisonicola* (O. 2006b, #451), *Physconia americana* (O. 2011, #765; leg. Miehe), *Solorina simensis* (O. 2001b, #138; see Fig. 10A of the present paper), *Sticta sublimbata* (O. 1998b, #28), *Thamnolia vermicularis* s.str. (O. 1999b, #94), *Tuckneraria laureri* (O. 2002b, #192; O. 2003, #320; O. 2006b, #479), *Umbilicaria yunnana* (O. 1999b, #98).

c) Further publications of the author based on his two Tibet expeditions
(sorted after the treated taxa):

Arthrorhaphis (OBERMAYER 1996d) and its parasites (HAFELLNER & OBERMAYER 1995), *Aspicilia tibetica*, new taxon (SOHRABI et al. 2010), *Buellia centralis* and new chemotypes of *Dimelaena oreina* (OBERMAYER et al. 2004), cetrarioid lichens with usnic acid (RANDLANE et al. 2001), cetrarioid lichens with globose ascospores (SAAG et al. 2002), *Culbersonia nubila* (OBERMAYER et al. 2009), *Hypogymnia hypotrypa* and *H. sinica* (McCUNE & OBERMAYER 2001), *Lecanora teretiuscula* (OBERMAYER & KANTVILAS 2003), *Lethariella* (OBERMAYER 1996b, 1997d, 2001c), *Menegazzia* (BJERKE & OBERMAYER 2005), *My-*

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coblastus fucatus group (SPRIBILLE et al. 2011), *Platismatia erosa* (OBERMAYER & RANDLANE 2012), *Pleopsidium discurrens* (OBERMAYER 1996c), *Psora altotibetica*, new taxon (Timdal et al. 2016), *Pyxine limbulata*, *P. microspora* and *P. soreciata* (OBERMAYER & KALB 2010), *Sulcaria sulcata*, new substances (ELIX et al. 1999, 2000, 2003) and new chemotypes (OBERMAYER & ELIX 2003). – Carotenoids in lichens (CZECZUGA et al. 1996). Pictures of Tibetan lichens (OBERMAYER 1997c; the paper shows a picture of *Lethariella flexuosa* and lists lichens, which were collected at extreme altitudes, e.g. *Lecanora polytropa* with its parasite *Cercidospora epipolytropa* and *Carbonea vorticosa* [see also HAFELLNER 1987: 359 and HERTEL 1977: 317]).

d) Description of new taxa and/or citation of location data by other lichenologists, based on my Tibet-collections from 1994 and 2000:

Acarospora schleicheri (CREWE et al. 2006), *Allocetraria ambigua*, *A. flavonigrescens*, *A. globulans*, *A. madreporiformis* and *A. sinensis* (NELSEN et al. 2011), *Arctomia teretiuscula*, HOLOTYPE (JØRGENSEN 2003), *Arthonia clemens* [parasitic on *Rhizoplaca chrysoleuca*] (SANTESSON 1998), *Calicium abietinum*, *glaucellum*, *indicum* [PARATYPES], *lenticulare*, *trabinellum*, *viride* (TIBELL 2006), *Caloplaca anularis* (VONDRAK & MAYRHOFER 2013), *Fuscopannaria albomaculata*, HOLOTYPE (JØRGENSEN 2004b), *F. cyanogranulata*, HOLOTYPE (JØRGENSEN 2007), *F. dispersa*, PARATYPES (JØRGENSEN 2000), *F. hirsuta*, HOLOTYPE (JØRGENSEN 2004b), *F. obtegens*, HOLOTYPE (JØRGENSEN 2007), *F. saltuensis*, HOLOTYPE (JØRGENSEN 2000), *Hypogymnia austerodes*, *capitata* [PARATYPE], *H. hengduanensis*, *H. hypotrypa*, *H. laccata*, *H. pruinosa*, *H. subarticulata*, *H. thomsoniana*, *H. vittata* (WANG L.-S. & MCCUNE 2014), *Lethariella cashmeriana* (CRESCO & al. 2007), *Nephromopsis morrisonicola* (THELL et al. 2005), *Pannaria emodi*, PARATYPES (JØRGENSEN 2001), *Pleopsidium discurrens* (REEB et al. 2007), *Protopannaria corticola*, HOLOTYPE (JØRGENSEN 2007), *Psoroma tenue* var. *boreale* (JØRGENSEN 2004a), *Stereocaulon coniophyllum*, *foliolosum*, *intermedium*, *myriocarpum* (HÖGNABBA 2006), *Tuckneraria* cf. *pseudocomplicata* (THELL et al. 2002, 2004, 2005, 2007), *Xylographa pallens* (SPRIBILLE et al. 2014).

4. Other, non-Austrian (or not Austrian-born) collectors of lichens in the greater Tibetan region, of which specimens are stored in the herbarium GZU (Graz, Austria)

Specimens of lichens from the greater Tibetan region are housed in many herbaria all over the world. Regarding the whole state of China, a table with relevant herbaria is given by J.-C. WEI (1991). Two important Chinese herbaria with valuable lichen material from Tibet are the herbarium HMAS in Beijing, with important collections dating from the 20th century, and the herbarium KUN in Kunming with a rapidly increasing lichen collection (especially from the Tibetan fringe mountains) dating from the present century. The latter houses many lichens, collected on the occasion of the “IAL Field Meeting in Yunnan 2002” (for further details of the meeting see below under chapter 5).

Regarding Austrian lichen herbaria, three of them house lichenised (and lichenicolous) fungi from the Tibetan area, namely the herbaria W and WU in Vienna (with the valuable collection of HANDEL-MAZZETTI, who mostly prepared duplicates for both herbaria) and the herbarium GZU in Graz. This latter houses the collections of Josef POELT from his Langtang and Karakoram expeditions (many thousands of specimens), my own samples (see above under 3.6.) and some extensive collections from the following people:

Georg MIEHE (born 1952 in Rockenhausen, Germany, professor for biogeography and biodiversity research in Marburg, Germany; see Fig. 4A) is best known for his numerous field trips in the Tibetan Plateau, the Himalayas and the Karakoram, starting with the year 1976. In addition to his vast collections of vascular plants, he and his wife Sabine also collected lichens (especially from vegetation study plots) of which several thousand specimens are housed in the herbarium GZU. It is of interest that Georg MIEHE, who has started to study geography, German philology, history, geology and botany in Mannheim (Germany), completed part of his geography studies in Graz in the years 1973 and 1974. Sabine MIEHE (Fig. 4A) has dual citizenship (of Austria and Germany) due to the Austrian nationality of her father and thus could also be regarded as “Austrian lichen collector” (for further biographical data on Sabine and Georg MIEHE see HERTEL 2012). As already mentioned above, Georg and Sabine MIEHE undertook two excursions together with Josef POELT (see above) in 1986 (Langtang area, Nepal) and 1991 (Baltistan range, Pakistan) and one excursion with me in 1994 (area between Chengdu and Lhasa). POELT honoured his friends with two lichen taxa, one species named *Protoparmelia gesamia* and one genus named *Sagema*, both taxa described together with Martin GRUBE (POELT & GRUBE 1992, 1993b). The first two letters of the given names (Sabine and Georg) and of the family name (MIEHE) were creatively formed into anagrams for the new epithets. Regrettably, the new taxon *Lethariella mieheana* (OBERMAYER 1997d), with which I kindly thanked Georg for the well organized expedition to Tibet in 1994, had to “descend into synonymy” of *L. sinensis* (see OBERMAYER 2001c). Beside Georg and Sabine MIEHE, some further German scientists made substantial collections of lichens from the greater Tibetan region, and part of their specimens are housed in the herbarium GZU (see Fig. 5A): a) **Bernhard DICKORÉ** (Munich), one of the leading experts on phanerogams in High Asia, was honoured by POELT (and HINTEREGGER) with the taxon *Caloplaca dickoreana*. b) **Ubbo WÜNDISCH**, a student of Georg MIEHE, collected lichens for the purpose of phytosociological studies both during the Tibet-expedition in 1994 (see above under “Walter OBERMAYER”), and for his diploma thesis (WÜNDISCH 1997) dealing with the Langtang area (in which a list of lichens is included). Most recently, one of his collections is listed under the paratype material of the new species *Leucodermia borphyllidiata* (see MONGKOLSUK et al. 2015). c) **Achim BRÄUNING**, professor for physical geography in Erlangen, who was also participant of the

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named excursion, deposited his lichen collection in the herbarium STU. d) Finally, a variable number of specimens from the Tibetan area of the following collectors are also stored in GZU (incomplete list): **ERICH ALBERTSHOFER** (Ladakh area 1975; Sikkim 1978), **Ulrich KIRSCHBAUM** (Kali Gandaki area 1979), **Vera KOMARKOVA** (South Tibet 1986), **Alesch KUNAVER** (Nepal, Makalu; one of his specimens, collected at 7,400 m, probably still holds the world record for altitude of a lichen collection; see HERTEL 1977, HAFELLNER 1987, and see above under 3.6.c; for biographical data see HERTEL & SCHUHWERK 2010: 162, footnote), **Vladimir N. MIKHALENKO** (Northwest Tibet, east of Aksai Chin, 1992), **Thomas PEER** (Nanga Parbat Massif 1990), **Udo SCHICKHOFF** (Kashmir, Astor valley 1993), **Tone WRABER** (Nepal, Makalu; he was member of the Yugoslavian Himalaya Expedition in 1972, headed by **Alesch KUNAVER** – see above).

5. A list of further selected (mostly recent) papers regarding lichens in the greater Tibetan region

Note that the following lists focuses on lichenological papers from the Tibetan regions in the Chinese provinces Xizang, Yunnan and Sichuan. Publications from other portions of the greater Tibetan region (e.g. Himalaya ranges of India and Nepal) are only cursorily mentioned.

In the last two decades, the lichenological contributions of mainly Chinese scientists to the southeast Tibetan fringe mountains (Hengduan Shan area of the provinces Yunnan and Sichuan) strongly increased, whereas the current state of progress regarding the province Xizang (Tibet Autonomous Region) with its vast open range of alpine grasslands is still almost lacking.

Up to now, there exist only a few floristic papers which give an (though fragmentary) overview on the lichen diversity of the province Xizang, e.g. J.-C. WEI & JIANG (1986; 194 taxa cited), J.-C. WEI (1991; 260 taxa cited) and OBERMAYER (2004a; 110 taxa cited, but the paper includes specimens from the Hengduan Shan, see below). The reason for the small number of lichenological publications for that area is – of course – the small number of lichenologists who visit the region, which is (as already stated in the introduction) caused by the difficult access to the plateau and by the challenges of altitude sickness. This is confirmed by a summary of collectors regarding the whole of China (presented by J.-C. WEI 1991: 1–10), where one can see, that up to the early 1960s, only a handful of collectors are mentioned for Xizang. Specimens of these collectors of Tibetan lichens were cited by HUE (1898, collector: DAVID), FUTTERER (1903, collector: himself), PAULSON (1925, collector: SOMERVELLE) and ZAHLBRUCKNER (1930, collector: FOREST; 1932a, collector: TRINKLER[?]; 1932b, collector: BOSSHARD). – Annotation: Hannes HERTEL (in litt.) drew my attention to a further collector of Tibetan lichens, namely Albert

TAFEL, whose collection from the years 1905 to 1908 got lost due to a fire in the herbarium B. Some duplicates of his collection are stored in the herbaria M and TUR (see HERTEL 1977: 164 and TAFEL 1914). – Between 1966 and 1976 several Chinese expeditions to the “Qinghai-Xizang Plateau” revealed some further lichen material from the “Tibet Autonomous Region” resulted in a few more papers published up to the early 1990’s, e.g. J.-C. WEI & CHEN (1974) and J.-C. WEI & JIANG (1980, 1981, 1982, 1986).

By contrast, the Hengduan Shan area of the provinces Yunnan and Sichuan (and some closely adjacent regions) benefitted from a more comprehensive lichenological study starting in earnest in the last decades of the 19th century with two papers of the lichenologist Auguste Marie HUE, entitled “Lichenes Yunnanenses” (HUE 1887, 1889). In HUE’s first paper, all new descriptions were written by William NYLANDER, whereas the second publication contains new descriptions from both NYLANDER and HUE. The data from the two papers were based on collections from the Jesuit friar and botanist Pierre Jean Marie DELAVAY. DELAVAY, born in 1834 in France (close to the Swiss border) was sent to China in 1867, where he stayed near Kunming (Yunnan) until his death in 1895. He collected unbelievable 200,000 specimens and was honoured with 13 fungal epithets, five of which belong to lichenized ascomycota (*Cetrelia delavayana*, *Cladonia delavayi*, *Leptogium delavayi*, *Nephromopsis delavayi* and *Parmelia delavayi*). Further reports of lichen taxa (mainly from DELAVAY’s Yunnan-collection and that of P. FARGES) were added by HUE in his short series “Lichenes Extra-Europaei” (HUE 1898, 1899, 1900, 1901) in which some very well-rendered lichen drawings are also shown. Almost 30 years after HUE’s contributions, Robert PAULSON (1928) published a further paper from the named region with the title “Lichens of Yunnan” dealing with 42 taxa.

Due to the comprehensive publication activities of the lichenologists Li-Song WANG (and coworkers) at the University in Kunming, and of Jiang-Chun WEI (and coworkers) in Beijing, the number of papers with a lichenological content, as it were, “exploded” in the last two decades. Many of them are named in the lists below, which contains papers mostly published after 1989. [Note that a summary of earlier Chinese lichenological literature – between 1955 and 1989 – was already presented by CHEN 1989]. The published lichen data are partly based on specimens, which have been collected on the occasion of the “IAL Field Meeting in Yunnan 2002”: This lichenological field trip was organized by Li-Song WANG (Institute of Botany, Kunming, China; figure 3A right side), who was the leader of the excursion, Jiang-Chun WEI (Key Lab of Systematic Mycology & Lichenology, Institute of Microbiology, Chinese Academy of Sciences, Beijing, China; Fig. 3C) and Bruce McCUNE (Oregon State University, USA; Fig. 3A left side). Information regarding the excursion can be accessed via the home page of the Natural History Museum, University of Oslo. It contains also a preliminary list of lichens from the collecting area, dealing with about 600 taxa, 225 of which were new for

China (see APTROOT et al. 2003). A beautiful illustrated book named “Lichens of Yunnan in China” [regrettably written in Chinese only] was presented by Li-Song WANG (2012). The following lists (a–e) contain lichen literature organized by general topic: a) Recent papers focusing on taxonomy of lichens or lichenicolous fungi (using morphological and/or molecular methods):

Alectorioid lichens (*Alectoria*, *Bryocaulon*, *Bryoria*, *Oropogon*, *Pseudephebe*, *Sulcaria*; WANG, L.-S. & HARADA 2004), *Alectoria* (WANG, L.-S. et al. 2015), *Allocetraria* (WANG, R.-F. et al. 2013, 2015a, 2015b), *Amygdalaria* and *Porpidia* (ZHANG et al. 2015), *Anaptychia* (CHEN & WANG 1999, LIH et al. 2010), *Anzia* (LIANG et al. 2012, WANG, X.-Y. et al. 2015), *Aspicilia* and *Circinaria* (HUO et al. 2014), *Cyphelium* (SINGH & SINGH 2014), *Baeomyces* (CAO et al. 2013), *Boreoplaca* (DAVYDOV & WEI 2009), *Bryobilimbia* and *Porpidia* (HU et al. 2014), *Bryoria* (WANG, L.-S. & HARADA 2001, WANG, L.-S. et al. 2003, 2012), *Bulbothrix* (ZHANG et al. 2016), *Bulbothrix* and *Relicina* (CHEN, L.-H. et al. 2009), Calicioid lichens (TITOV 2001, 2000), *Canoparmelia* (LIU et al. 2014); *Carbonea*, *Lecidea*, *Lecidella* (ZHANG et al. 2010, ZHANG et al. 2012), *Cetrelia* (CHEN, L.-H. et al. 2006), *Cladonia* (STENROOS et al. 1994, AHTI et al. 2002, 2007, 2015, AHTI & UPRETI 2004), *Clauzadeana* and *Miriquidica* (ZHAO et al. 2015), *Collema* (LIU & WEI 2003, 2009), *Everniastrum* (JIANG & WEI 1989), “gyalectoid” lichens (*Coenogonium*, *Dimerella*, *Gyalectidium*, *Gyalidea*, *Gylideopsis*, *Ramonia*; THOR & VĚZDA 1984), *Heterodermia* (CHEN 2001, CHEN & WANG 2001), *Hypogymnia* (WEI, J.-C. & BI 1998, WEI, X.-L. & WEI, J.-C. 2005, 2012, WEI, X.-L. et al. 2010, McCUNE 2011, 2012, McCUNE et al. 2012, McCUNE & WANG 2014), *Hypotrachyna* (CHEN, J.-B. et al. 2003b), *Kroschia*/*Fuscopannaria* (LIU et al. 2015), *Lecanora* (LÜ et al. 2009, 2012, WANG, H.-Y. et al. 2013b), *Leptogium* (WANG, H.-Y. et al. 2010, LIU & GUAN 2012), *Leucodermia* (the former *Heterodermia boryi/leucomelos* group: MONGKOLSUK 2015), *Lichenomphalia* (XIAO et al. 2005), *Lobaria* (CORNEJO et al. 2009, CORNEJO & SCHEIDEGGER 2015), *Melanelia* (CHEN & ESSLINGER 2005, WANG, H.-Y. et al. 2009, MENG et al. 2010), *Melanelixia* and/or *Melanohalea* (WANG, H.-Y. et al. 2008, ZHAO et al. 2009, DU et al. 2010, SUN et al. 2010), *Miriquidica* (ZHAO, X. et al. 2013), *Nephroma* (TIAN et al. 2011, WANG, H.-Y. et al. 2013a), *Nephromopsis* (CHEN & GAO 2001), *Ochrolechia* (JIA et al. 2008, GAO & REN 2012), *Ophioparma* (KHARE et al. 2010), *Parmelina* (NELSON et al. 2012), Parmelioid lichens (*Bulbothrix*, *Canomaculina*, *Everniastrum*, *Hypotrachyna*, *Myelochroa*, *Parmelinella*, *Parmelinopsis*, *Parmotrema* and *Remototrachyna*; WANG, S.-L. et al. 2000, WANG, S.-L. et al. 2001, CHEN, J.-B. et al. 2003a, DIVAKAR et al. 2010, CRESPO et al. 2010, CHEN 2011), *Parmotrema* (CHEN, J.-B. et al. 2005, DEL-PRADO et al. 2011), *Peltigera* (STENROOS et al. 1994), *Pertusaria* (REN et al. 2009, ZHAO et al. 2014, REN & ZHAO 2014, REN 2014, 2015), *Physconia* (CHEN & HU 2003), *Pilophorus* (WANG, X.-Y. et al. 2010, 2011), *Placopsis* (GAO & REN 2012); *Porpidia* (WANG, X.-Y. et al. 2012); *Pseudephebe* (WANG & McCUNE 2010), *Pyxine* (GU & CHEN 2003), *Ramalina* (OH et al. 2014); *Rhizocarpon* (ZHAO, Z.-T. et al. 2013, WANG, W.-C. et al. 2015a, 2015b), *Rhopalospora* (LING et al. 2013), *Staurothele* (HARADA & WANG 2006a), *Stereocaulon* (HUANG & WEI 2004, Huang 2010), *Sticta* (TAKAHASHI et al. 2004), *Thelidium* (HARADA & WANG 2006b), *Umbilicaria* (WEI & JIANG 1993), *Usnea* (SHUKLA et al. 2014a, Zhu et al. 2015), *Varicellaria* (REN & LI 2013). – Lichenicolous taxa of different genera are cited by e.g. CALATAYUD et al. (2013), GRUBE et al. (1995), HAFELLNER (1987), HAWKSWORTH et al. (2010), NAVARRO-ROSINÉS et al. (2009) and ZHURBENKO (2013). A “First checklist of lichenicolous fungi from China”, which includes many taxa from the Tibetan area was published by HAWKSWORTH & COLE (2009).

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b) Selected papers dealing with lichen floristics:

APTROOT et al. 2003, HARADA & WANG 2004, HUR et al. 2005, LI, S. et al. 2007, 2013, WEI, X.-L. et al. 2007, WANG, L.-S. et al. 2008, WANG, L.-S. 2012, LI, S. et al. 2013 [Ailao Shan, somewhat south of the tibetan influenced area], APTROOT & SPARRIUS 2016 [pictures of lichens]. – Particular specimens have also been issued via several exsiccata series, e.g. in “Lichenes minus cogniti exsiccati” (KASHIWADANI 2000, 2002, 2005, 2007, OHMURA 2011, 2014). – A nice booklet has been published by means of a calendar, with many good pictures of lichens, including a photo of a “golden monkey” feeding on *Bryoria*, *Usnea* and *Parmelia*, or a picture of a bird nest built of thalli of *Rimelia cetrata* (see WANG, L.-S. et al. 2010).

c) Selected papers regarding ethnolichenology:

WANG, L.-S. et al. 2001, WANG, L.-S. & HARADA 2008, WANG & QIAN 2013, YU et al. 2013, Shukla et al. 2014b, CRAFT 2015. A paper regarding lichens as potential source for substances against viruses, bacteria or fungi: WEI, X.-L. et al. 2008.

d) Selected papers (out of a some dozens of publications) reporting lichens as diet for snub-nosed monkeys (genus *Rhinopithecus*):

XIANG et al. 2007, GRUETER et al. 2013, LI, D. et al. 2013.

e) Selected papers on distributional data on Tibetan lichens from bordering regions:

India and Sikkim in general (AWASTHI 1986, 1991, 2007, SINGH & SINHA 2005, 2010, RAI & UPRETI 2014), Indian province Nagaland (SINGH & SINHA 1994), Nepal (BANYA et al. 2010, MIEHE et al. [including SØCHTING] 2016), Bhutan (SØCHTING 1999 [see Fig. 3B]), APTROOT & FEIJEN 2002, Chinese province Xinjiang (ABBAS & WU 1998, ABBAS et al. 2001).

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Fig. 2: Austrian (or Austrian born) scientists who collected (and/or worked on) lichens in the Tibetan region. **A)** Josef ROCK. **B)** Heinrich HANDEL-MAZZETTI. **C)** Alexander ZAHLBRUCKNER. **D)** Josef POELT. – The pictures come from the following sources: ROCK (public domain), HANDEL-MAZZETTI (reproduction right acquired from, ÖNB/Wien Bildarchiv Pf 34.897:C [1]'), ZAHLBRUCKNER (by courtesy of Johannes HINTERBERGER,), POELT (Louise LINDBLOM, Bergen, Norway).

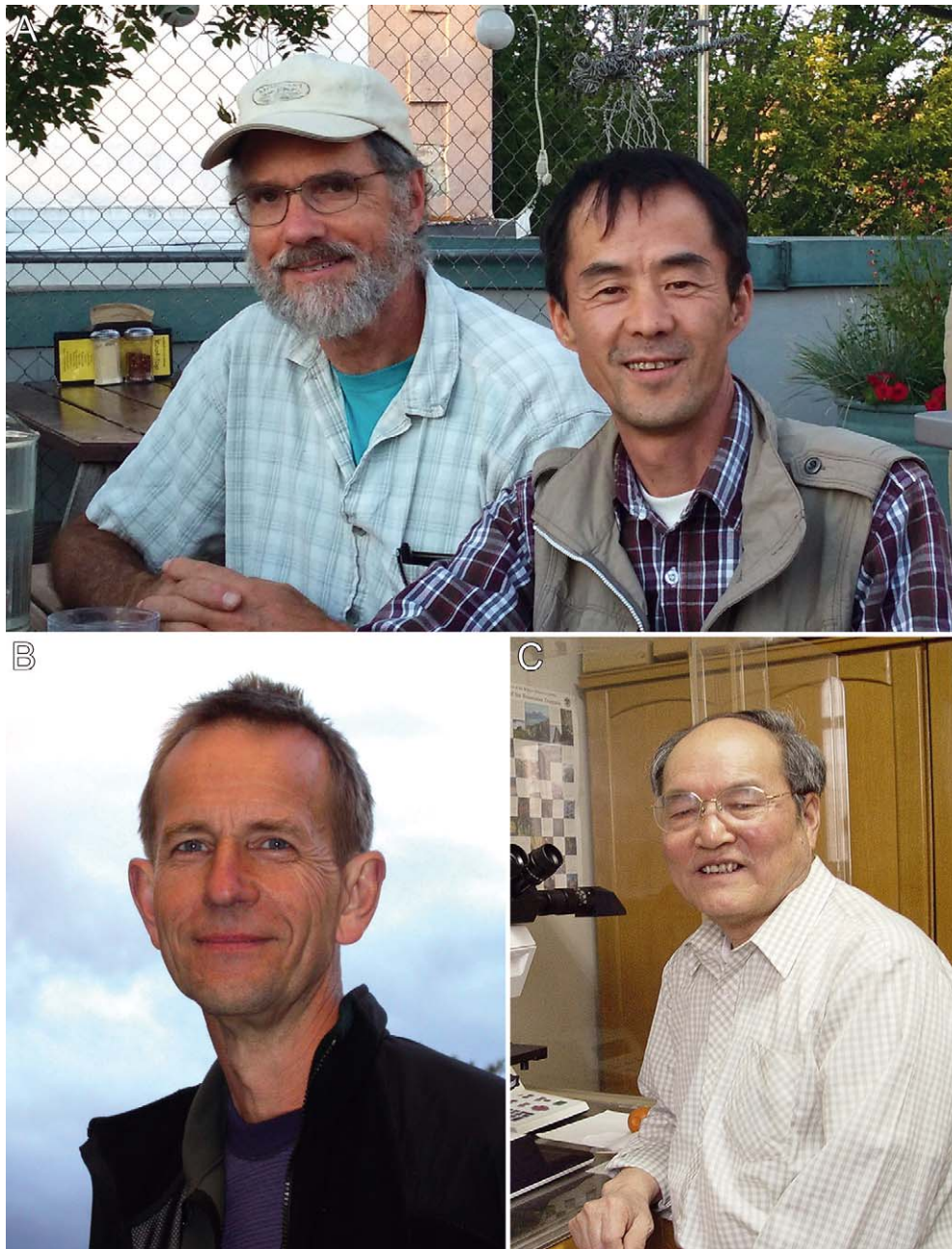


Fig. 3: Lichenologists who have focused on lichens from the Tibetan region. **A)** Bruce McCune, Oregon State University, USA (left) and Li-Song Wang, Institute of Botany, Kunming, China (right). **B)** Ulrich Søchting, Department of Biology, University of Copenhagen, Denmark. **C)** Ji-ang-Chun Wei, Key Lab of Systematic Mycology, Lichenology, Institute of Microbiology, Chinese Academy of Sciences, Beijing, China. – Photos kindly provided by the depicted individuals.

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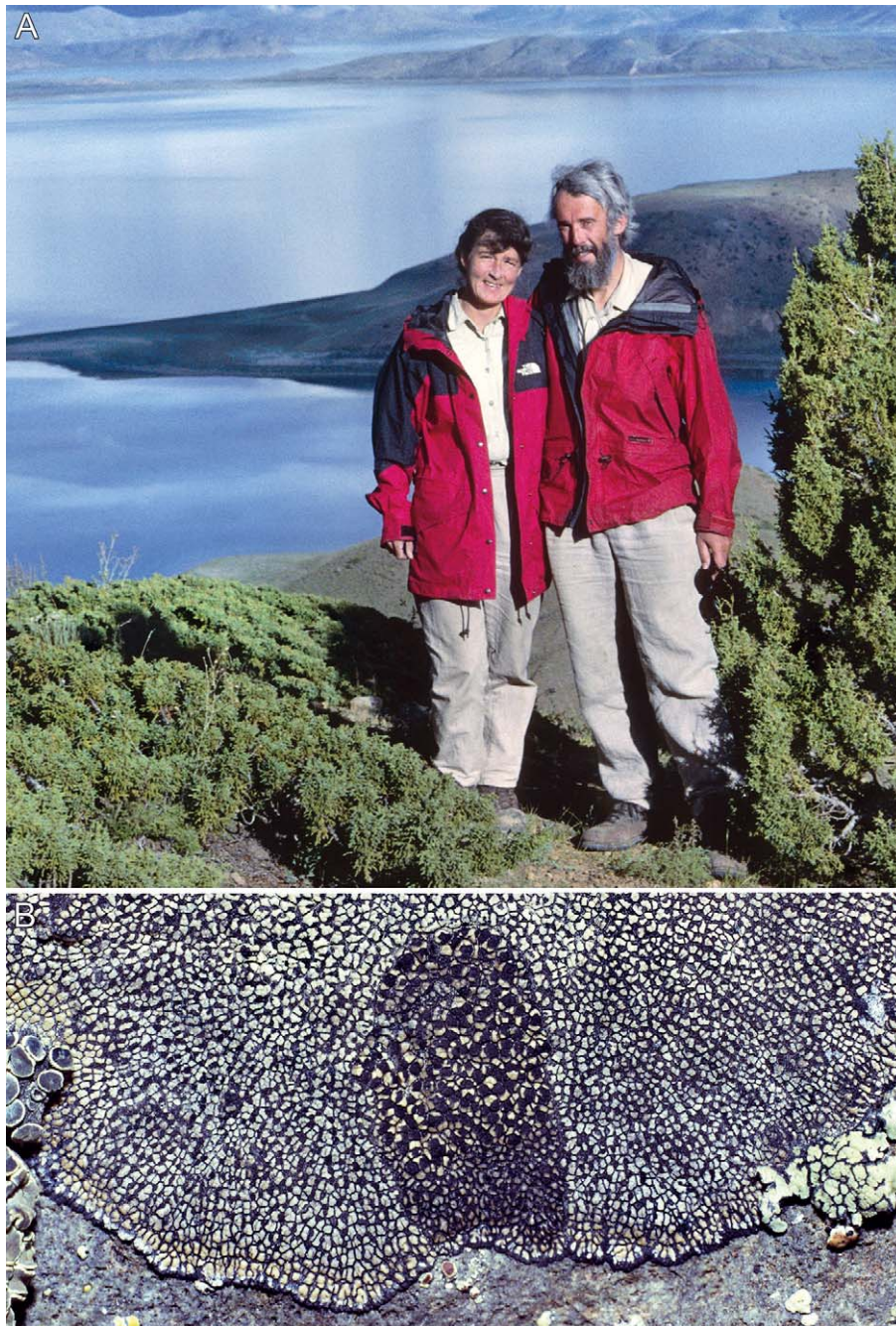


Fig. 4: **A)** Georg and Sabine MIEHE, two important collectors of Tibetan vascular plants (and lichens), near Yamdrok Lake (Yamzho Yumco) c. 70 km southwest of Lhasa, with *Juniperus tibetica* on the right-hand side of the photo (from the year 1998; photo kindly provided by the married couple MIEHE). Important lichens collected by the Miehes are housed in the herbarium GZU (Graz, Austria). **B)** Genotypes of *Sporastatia testudinea*, photographed in 1994 near the above mentioned lake.



Fig. 5: **A)** German/Austrian/Tibetan participants of an expedition to Southeast-Tibet in 1994 (near a glacier area at about 4,600 m, 35 km southwest of Mainling [in the Tsangpo valley]). First row (from left to right): Ubbo WÜNDISCH, Bernhard DICKORÉ, Otsu TSEWANG. Second row (from left to right): Georg MIEHE (leader of the expedition), Walter OBERMAYER, Achim BRÄUNING, Armin SCHRIEVER, Barbara ZAHNEN. **B)** *Hypogymnia flavida* (forma 'balteata'), photographed and collected near the above pictured place.



Fig. 6: **A)** Main glacier of the north side of the Gyala Peri (7,294 m, just north of the Great Bend of the Yarlung Tsangpo River) at about 3,700 m (c. 29°54'10"N, 94°52'40"E), at that time (in 1994) still advancing. **B)** *Lobaria isidiosa/pseudopulmonaria* lineage (wet, pictured in the field), a typical lichen of the forests along the glacier.

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Fig. 7: **A)** Sand dunes in the Tsangpo valley in 1994. **B)** Mountain range near Litang (in 2000) with taxa of the vascular plant genera *Microula* (blue) and *Pedicularis* (yellow and reddish).

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Fig. 8: Tibetan lichens (pictures taken in the field). **A)** *Stereocaulon* cf. *massartianum* (c. 28°57'40"N, 93°13'50"E, in 1994). **B)** *Umbilicaria yunnana*, the only epiphytic *Umbilicaria* (c. 30°00'30"N, 94°58'35"E, in 1994). **C)** *Dimerella isidiata* (c. 30°00'55"N, 101°51'32"E, in 2000)



Fig. 9: Tibetan lichens (pictures taken in the field). **A**) A mixture of *Pleopsidium* cf. *flavum/discurrens* (right) with flat, “marginate” apothecia and *Lecanora somervellii* (left), with strongly convex apothecia (c. 28°18’N, 90°57’E, in 1994). **B**) Esorediate taxon of the genus *Placopsis* with apothecia and one big central cephalodium (smaller cephalodia are partly from some neighbouring thalli; c. 28°57’40’’N, 93°13’50’’E, in 1994).



Fig. 10: Tibetan lichens (pictures taken in the field). **A)** *Solorina simensis*, similar to *S. saccata*, but differing by a cyanobacterial photobiont and thus bluish-brown when wet (c. 29°52'40"N, 102°20'15"E, in 2000). **B)** *Epilichen scruposus*, parasitic on *Baeomyces* cf. *placophyllus* (c. 30°18'00"N, 99°33'10"E, in 2000).



Fig. 11: Tibetan lichens (pictures taken in the field). **A)** *Lethariella flexuosa* (c. 29°34'15"N, 100°18'55"E, in 2000), showing partly flattened branches with a typically ridged surface (intermixed with the white *Thamnolia vermicularis*). **B)** *Arthrorhaphis alpina* var. *jungens* (c. 29°34'15"N, 100°18'55"E, in 2000) always growing on compact soil.



Fig. 12: Tibetan lichens (photographs from herbarium specimens taken by Tamara DIRNBERGER. **A**) *Everniastrum cirrhatum*, with apothecia (c. 29°34'35"N, 101°59'56"E, in 2000). **B**) *Emodanelia masonii* (originally described by ESSLINGER and POELT as *Parmelia masonii*, in honour of the famous American lichenologist Mason HALE), chemotype with three fatty acids only (c. 29°03'N, 93°57'E, in 1994).



Fig. 13: Tibetan lichens (photos taken from herbarium specimens). **A)** *Bryonora stipitata* (c. 29°34'15"N, 100°18'55"E, in 2000), described by Josef POELT. The specimen shows the typical white pseudocyphellae on the thallus and on the margins of the apothecia (partly with deposit of sand grains). **B)** *Fuscopannaria poeltii* (29°03'N, 93°59'E, in 1994) described by Per Magnus JØRGENSEN in honour of Josef POELT. The specimen (determined by JØRGENSEN) is characterized by its typical white rimmed lobe tips (which are embedded in the black cottony prothallus) and the hairy base of the apothecial margin.



Fig. 14: Tibetan horse festival near Litang in 2000. A) Tibetan horseman trying to reach the white Khatas (tibetan ceremonial scarves which symbolize purity and good fortune) while riding his Tibetan pony. B), C) Tibetan women (most probably from the counties Nyarong or Litang) wearing their typical jewelry (golden and silver hair pieces, coral necklaces with amber and turquoise).



Fig. 15: **A), B)** Tibetan women, pictured near Litang (August 2000), using typical Buddhist prayer beads (malas, or “Tibetan rosary”) and Tibetan prayer wheels (or Mani-Chos-“Khor”). **C), D)** Rectangular cavities in the soil (near Litang), which are caused by the cutting out of sods, are quickly colonised by several higher plants (*Antennaria*, *Gentiana*, *Leontopodium*, *Microula*, etc.) and crustose lichens, e.g. the pictured yellow *Acarospora schleicheri* (parasitic on white thalli of *Diploschistes muscorum*).

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