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Vegetationsbilder aus dem Schwarzwald. by K. Muller; Die Vegetation des Schwarzeswaldes. by K. Muller

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aquatic and marsh flora; and to a number of other localities, the accounts of which include many interesting notes, especially regarding the boreal-alpine and Pontic vegetation. In summarising these excursions, Preuss points out that the members had examined three distinct types of coast vegetation; several types of moor, including the interesting relict boreal-alpine flora; two types of Pontic steppe vegetation; and five examples of West Prussian woodland vegetation.

(III, IV) Bock describes briefly the flora of a mixed oak and pine wood near Bromberg, which includes many rare species; his lists comprise bryophytes and fungi in addition to vascular plants. He urges that this should be acquired as a nature reserve, as does Conwentz in his account of the yew woods of West Prussia.

(V) Abromeit's account of the vegetation of East Prussia is accompanied by an excellent map showing the limits of the more interesting species, especially those of the boreal-alpine and Pontic groups. In the introduction he deals with the topography and climate, with general descriptions of the lakes and moors. The greater part of the paper is occupied by detailed accounts of the woodland, meadow, moorland, and aquatic formations, and interesting data are given as to the various plants which find their northern, southern, eastern and western limits respectively in this province, and as to the relations between the East Prussian flora and that of the surrounding regions, with special reference to the Pontic species of which the majority occur in the south of the province.

VEGETATION OF THE BLACK FOREST

(I) **Müller, K.** "Vegetationsbilder aus dem Schwarzwald." (*Vegetationsbilder herausgegeben von Karsten und Schenck*, Reihe 9, Heft 6—7.) Jena (Fischer), 1912, 12 plates, 16 pp. text; price M. 8.

(II) **Müller, K.** "Die Vegetation des Schwarzeswaldes." *Ber. d. deutsch. bot. Ges.*, **30**, 1912, *Generalvers.-Heft*, pp. 45—60, 1 plate, 7 text-figures.

The well-known wooded mountain range, situated in S.W. Germany in Baden and Würtemberg, and owing its name to the dark foliage of its fir trees, is about 90 miles long from north to south and 18 to 30 miles broad; towards the south and west it falls steeply towards the Rhine valley, to the east it slopes gradually to the limestone plateau of Swabia, and on the north it is bounded by the Pfingst valley between Karlsruhe and Pforzheim. The mountain is composed almost entirely of granite and gneiss, overlaid in the northern portion by Bunter sandstone, and passing eastwards into the Bunter sandstone and the Muschelkalk which indeed form the phytogeographical eastern boundary of the Forest. It is divided by the deep transverse Kinzig valley into two main portions, northern and southern, and the latter is again divided by the Höllen valley, so that we have northern, central, and southern divisions. The two latter show considerable geological and botanical contrasts with the northern division; they consist almost entirely of granite and gneiss and have heights of 1200—1500 m., while the northern division consists chiefly of sandstone and its greatest height is 1160 m. The northern portion, owing to the low mineral content of the sandstone substratum, has a poor and uniform vegetation as compared with the rich and varied flora of the middle and southern portions.

The position of the Black Forest, in the heart of Europe, accounts to a large extent for the presence in its flora of alpine, northern, southern (Pontic), and Atlantic forms which have found here a congenial settling ground during their migrations. (1) A rich alpine flora occurs in the southern region, in areas formerly covered by glaciers, whereas the northern region, which has been little glaciated, has few alpine species; the numbers of alpine and subalpine flowering plant species found in the southern, middle, and northern regions are 46, 19, and 10 respectively. (2) Of northern species there are but few—*Ledum palustre*, *Woodia hyperborea*, the mosses *Mnium cinctidioides* and *Splachnum ampullaceum*, etc.; probably many former northern forms have disappeared. (3) Pontic and South European species are also few, in striking contrast with the richness in these forms of the Swabian Jura on the east and the Kaiserstuhl on the west of the Black Forest; the most frequent Pontic forms in the Forest are *Carlina acaulis* and *Vincetoxicum officinale*. (4) The Atlantic group, however, is well represented, not only in number of species (over 20) but especially in that of individuals. This is easily understood from the distinctly oceanic character of the climate—wide areas of the Forest have an annual rainfall of

over 140 cm. (rising to 180 cm. in the higher regions) and thus a precipitation which elsewhere in Central Europe is reached only in Alpine districts, while the average air temperature is several degrees higher than usual for its latitude.

The types of vegetation in the different regions of the Black Forest are sharply marked off from each other, especially if one ascends from the western side. The main regions distinguishable are (1) the vineyard or cultivated region up to 400 m., (2) the hill region up to 1200 m., and (3) the subalpine region.

(1) Apart from its cultivation, the vine grows wild in the woods at the foot of the mountain, though now somewhat rare; cherry, plum, and other fruit trees play an important part in this region, while the originally planted sweet-chestnut (*Castanea vesca*) has spread widely in the western valleys and slopes and often forms small woods—frequently in association with beech and oak. On the south-west near Bâle the box grows luxuriantly in woods on limestone, and this lower region is also characterised by the abundance of ivy.

(2) The greater part of the Forest, however, lies in the mountain region, more than half of which is covered with woods, especially of the silver fir (*Abies pectinata*) which up to about 800 m. is the dominant tree on the entire western side—above this height it becomes less abundant, but extends to a height of about 1100 m. The beech is frequent and usually grows with the fir, which in places it has ousted; it reaches a greater elevation (about 1250 m.) and often grows in storm-exposed situations. The spruce (*Picea excelsa*) is less conspicuous in the lower parts of the hill region but in the upper parts it is the most abundant tree of all, and on the eastern slopes it is the sole forest-forming tree. Pine woods are less frequent, and occur chiefly on the sandstone. In the *Abies* and mixed woods on the south and west, holly is abundant, usually forming under-wood but sometimes pure woods with trees 8 or 9 m. high, and extending to an elevation of over 1000 m.; on ridges this plant occurs only on the western side, evidently because the eastern side is exposed to greater cold in winter. In open places in the hill region there grow in large quantity a number of Atlantic species like *Sarothamnus scoparius*, *Digitalis purpurea*, *Galium saxatile*, *Centaurea nigra*, etc.

Owing to the high rainfall and the resulting richness in moisture—the Forest is the source of the rivers Danube, Neckar, Murg, Kinzig, Elz, Enz, and Wiessen, and even in hot summers few of the smallest streamlets run dry—there is a luxuriant herbaceous vegetation in the wooded ravines, including especially tall and robust herbs like *Prenanthes purpurea*, *Lunaria rediviva*, *Polygonatum verticillatum*, *Aruncus sylvestris*, *Circaea alpina*, *Equisetum sylvaticum*, many ferns, etc. The author also describes the vegetation of the higher meadows; the rock flora (including interesting bryophytes such as *Moerkia hibernica*); the lakes, especially those on the south of the Forest, with abundant *Isoëtes echinospora* and *I. lacustris* (the former usually at the upper end of the lake and the latter near its outflow); and the moors. The latter fall into two series—trough-moors (*Muldenmoore*) in the south, dating back to the Glacial period, and plateau-moors of much later origin on the almost horizontal sandstone ridges in the north. Besides plants common to both moor types (*Sphagnum* spp., *Andromeda polifolia*, *Scheuchzeria palustris*, *Eriophorum vaginatum*, *Scirpus caespitosus*, *Carex pauciflora*, *Vaccinium* spp., etc.), certain Alpine forms are more or less sharply limited to the southern portion (*Eriophorum alpinum*, *Lycopodium inundatum*, etc.) and boreal forms to the northern portion (*Ledum palustre*, *Empetrum nigrum*, etc.). Of the trees found on the moorland, *Pinus montana* plays the chief rôle, while *P. sylvestris*, *Betula verrucosa*, *B. pubescens*, etc., are also present. The mountain pine shows dense branching of its rootlets to form nest-like masses about 1 cm. in diameter woven together by a mantle of fungal hyphae in addition to those of the endophytic mycorrhiza; this tree reaches a height of 18 m. in dry places, but in wet boggy parts grows as a low bush, and in the northern portion of the Forest shows a peculiar growth-form in which the diffusely branched stems are prostrate with ascending ends.

(3) The woods of the hill region pass above 1200 m. into the subalpine zone, the chief tree here being the spruce (*Picea excelsa*), along with scattered beeches and sycamores. This zone includes many tall-growing herbs in the wooded parts (*Adenostyles albifrons*, *Mulgedium alpinum*, *Senecio Fuchsii*, *Ranunculus aconitifolius*, *Aconitum Lycoctonum*, *A. Napellus*, *Centaurea alpina*, etc.); a rich rock-flora (*Alchemilla alpina*, *Veronica saxatilis*, *Campanula latifolia*, *Hieracium prenanthoides*, *H. aurantiacum*, *Mulgedium Plumieri*, *Sorbus chamaemespilus*, etc.); extensive grass-heaths (*Nardus stricta*, *Meum athamanticum*, *Arnica montana*, *Lycopodium alpinum*,

Gentiana lutea, *Rumex alpinus*, *R. arifolius*, etc.); and swampy hollows whence streams arise (*Bartsia alpina*, *Soldanella alpina*, *Sweetia perennis*, *Viola palustris*, *Eriophorum polystachyum*, *Selaginella selaginoides*, etc.). The rich subalpine bryophyte flora is also noted.

Both papers are illustrated by beautiful photographs, those forming the large plates in (I) being particularly fine.

FORESTS OF PROVENCE

Tansley, A. G. "The forests of Provence." *Gardeners' Chronicle*, 1912, 11 pp. (reprint), 7 figures.

The author points out that within a space of 30 miles all transitions may be traced between the typical Mediterranean coast vegetation and that of the high Alps. Since the underlying rock is almost everywhere limestone, the main factors differentiating the vegetation are climatic and correspond with a decrease of temperature and an increase of moisture in passing from the low hills of the coast to the high mountains of the Maritime and Provençal Alps. The influence of aspect upon the vegetation is very striking, the cooler and moister northern slopes frequently bearing quite a different flora from that of the sunny southern slopes. Four main forest zones are distinguished and described: (1) the Mediterranean types of *Pinus halepensis* and *P. maritima*, with *Quercus Suber* locally; (2) a belt in which *Quercus pubescens*, a deciduous oak allied to *Q. sessiliflora*, is dominant; (3) a belt of *Pinus sylvestris* extending into the subalpine region and forming the tree limit on slopes of southern aspect; (4) forest composed of *Picea excelsa* and *Larix* which form the uppermost belt, at least on northern slopes. The zonation is on the whole very well marked, though the four belts are much influenced by aspect and there is a good deal of mingling in the transitional zones.

STEPPE OF ASIA MINOR

Andrasovsky, I. "Előzetes jelentés Kisázsia steppeterületén 1911—ben tett utazásomról." *Botanikai Közlemények*, Budapest, **11**, 1912, pp. 57–64. With a German summary ("Vorläufiger Bericht über die im Jahre 1911 in den Steppen Kleinasiens ausgeführte Reise").

The author's observations appear, judging from the German summary appended to his paper, which is written in Magyar, to have been made in a region of great ecological interest. Asia Minor somewhat resembles Spain in physical features, consisting of a great inland plateau having an average elevation of 800 metres or more above the sea, fringed by a narrow strip of low-lying coast. The table-land is broken up into basins by great mountain ranges, and one of these basins, having no outlet to the sea, drains into an extensive series of shallow salt lakes extending from Phrygia through Lycaonia into Cappadocia. The climate shows a wide range from the hot damp littoral zone to the cold dry wind-swept central uplands. During his journey the author collected 800 species of flowering plants, chiefly Compositae, Papilionaceae, Cruciferae, Gramineae, Boraginaceae, and Labiatae; the cryptogamic flora is evidently very scanty. The steppe region of Asia Minor is developed in three basins, the vegetation of which is described. The volcanic tuffs showed an interesting flora, and in the Kara-Dagh and Karadja-Dagh mountains the steppe species ascend to a height of 1600 metres, above which comes the montane zone with *Quercus*, *Salix*, *Crataegus*, etc.; the most characteristic xerophytes are *Artemisia*, *Peganum*, cushion-forming species of *Acantholimon*, and densely hair-clad Labiates (*Thymus* and *Salvia* spp., etc.), while the high rocky ridges also show a markedly xerophilous vegetation including *Ephedra*, *Astragalus*, *Eryngium*, *Verbascum*, *Salvia*, *Carduus*, *Cirsium*, *Centaurea*, *Echinops*, *Artemisia*, etc. The flora of the great salt lake at Tuz Tcholu includes species of *Triglochin*, *Scirpus*, *Heleocharis*, *Asparagus*, *Atriplex*, *Rumex*, *Lepidium*, *Frankenia*, *Statice*, *Taraxacum*, *Scorzonera*, etc., showing the general characters of halophytes and strand-plants. The inland salt marshes of Tuzlu-Göl have the characteristic salt-marsh genera *Salicornia*, *Arthrocnemum* and *Plantago*.

It is greatly to be hoped that the author will publish his detailed account of the vegetation of this interesting region in German (or some other generally read language); the same remark applies to a considerable number of other papers on the vegetation of comparatively little explored areas, both in Asia and in south-eastern and eastern Europe, of which notices will appear in this JOURNAL later.