

DER MOUNT RAINIER, WASHINGTON UND SEINE GLETSCHER

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Mit 1 Karte, 4 Abb. u. 5 Bildern

Vorwort: Bei einem Besuch des Mount Rainier und des Mount Baker im Cascaden-Gebirge 1952 im Anschluß an den VII. Int. Kongreß für Photogrammetrie in Washington D. C. konnte W. Hofmann-München erstmals einen nordamerikanischen Gletscher mit Hilfe der besonders in den Ostalpen bewährten Methode der terrestrisch-photogrammetrischen Gletschervermessung aufnehmen, nämlich den Nisqually-Gletscher an der Südseite des Mount Rainier (vgl. Erdkunde, VII, 1953, S. 217 ff.). Dabei war geplant, die Veränderungen des Gletschers in den folgenden Jahrzehnten durch Wiederholungsaufnahmen unter Kontrolle zu halten. Die fertige Karte im Maßstab 1 : 25 000 kann nunmehr vorgelegt werden (Kartenbeilage). Der Rückgang der Gletscher in den letzten 100 Jahren, ähnlich dem der Alpen-Gletscher, aber auch Anzeichen für ein Wiederauwachsen in neuerer Zeit hatte auch bei amerikanischen Gletscherforschern ein erhöhtes Interesse an diesem leicht zugänglichen Gletscher des Cascaden-Gebirges wachgerufen. Zwei sehr gute Kenner des Mount Rainier National Park, V. R. Bender und A. L. Haines, haben sich freundlicherweise bereit erklärt, die Ergebnisse der bisherigen Gletscherforschung am Mount Rainier zusammenzufassen und aus dem Vergleich der kartographischen Aufnahme von 1910 (Leitung Fr. E. Matthes) und der neuen von W. Hofmann genaue Berechnungen über die Flächen- und Volumenveränderungen des Gletschers anzustellen. Um diese speziellen glaziologischen Forschungen in die geographische Gesamterscheinung des Mount Rainier und des mittleren Cascaden-Gebirges hineinzustellen, hat der Unterzeichnete versucht, an Hand älterer und neuerer For-

schungsergebnisse die Eigenart des Gebirges in klimatischer, vegetationskundlicher, geomorphologischer und glaziologischer Hinsicht zu zeichnen.

Der Herausgeber

Mount Rainier, Washington, and its glaciers

Summary: In 1952, the Nisqually Glacier of Mt. Rainier in the Cascade Range was the subject of a terrestrial photogrammetrical survey by W. Hofmann. The map (1 : 25,000) produced (cf. map) is to serve as a basis for the study of the oscillations of the glacier in future years. V. R. Bender and A. L. Haynes took the opportunity to calculate, according to length, area and volume, the shrinkage of the glacier which had taken place since the survey by F. E. Matthes in 1910. The glacier has shrunk from 7.1 Km. to 4.05 Km. in length, and from 6.99 sq. Km. to 6.22 sq. Km. in area. The loss of volume amounted to 121,389,300 cu. m. The climatic snow line rose during these forty-two years from 1800 m. to nearly 2300 m. above sea level. In the first paper, "Mount Rainier and the middle Cascade Range", C. Troll gives a general geographical account, based on the more recent literature, of Mt. Rainier in its setting within the middle Cascade Range together with the gorge of the Columbia River which affords a cross section through the mountains almost down to sea level. The formation of the present-day mountain relief began in the Oligocene and continued during the Pleistocene Period through enormous volcanic eruptions, epirogenetic tectonics as well as fluvial and glacial erosion. Reference is made to the recent theories of E. T. Hodge about the Columbia gorge, according to which the

valley should be considered as of epirogenetic and not of antecedent origin.

The climatic zoning from the rainy Pacific coast tho the dry interior of the Columbia Plateau is reflected in a corresponding sequence of vegetation belts. The Columbia Gorge makes it possible to view this sequence in its horizontal as well as its vertical arrangement and thus fused into a three dimensional picture, and further to observe the influence of northern and southern aspect on the vegetation cover. Particularly remarkable is the climatical and ecological gradation in the high mountain region of Mt. Rainier. In the zone of maximum precipitation and immense snow cover during the winter, which coincides approximately with the crest of the Cascade Range with its cloud belt, the upper limit of trees and the climatic snow line (2,000—2,100 m.), lie perhaps closer together than anywhere else in the world. In greater altitudes, on the conical mountain tops which reach high above the cloud belt, precipitation again decreases to such an extent that great dryness, evaporation and insolation give rise to honeycomb and "penitentes" forms of the firn snow, a

phenomenon which resembles the vertical zoning of climate on tropical and sub-tropical volcanic cones like Mauna Kea, Kilimanjaro, Popocatepetl, Teneriffe and Sajama.

The very interesting observations of *D. B. Lawrence* about the effects of the seasonal winds on the shapes of the trees in the Columbia Gorge, directed attention towards the sequence of weather conditions in the oceanic west and the continental east of Washington and Oregon, particularly to the wind system in the Gorge. Advances of cold air during the winter, accompanied by great dryness and glaze storms, make themselves felt very drastically in the western part of the Gorge where the trees are damaged and pruned by ice coating so that the foliage is only able to grow on the west side. In contrast, the trees in the eastern section of the Gorge suffer a deformation where the foliage points eastwards looking almost like flags; this is due to the continual summer winds whose effect is enforced by a daily pulsation. For comparison, a third type of wind pruning of trees is mentioned which is found at the altitudinal limit of trees in the Rocky Mountains.