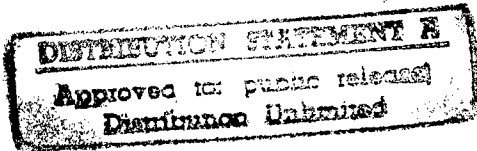


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THE ARRANGEMENT OF NAME INSCRIPTIONS ON GEOGRAPHIC MAPS
(Germany)

[Translation]

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THE ARRANGEMENT OF NAME INSCRIPTIONS ON GEOGRAPHIC MAPS
(Germany)

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Wilhelm Bonacker

TABLE OF CONTENTS

Foreward	Page
I. Introduction, d'Anville's requirement - obligation to main- tain performance level - orientation and name placement - tasks - importance of name arrangement - basic requirements for inscription draft - localization of designations	1
II. The Basic Position of Map Names, normal position - fixed and free arrangement - parallel circle position - meridian position - mixed position - arrangement within map frame - upside-down position - dorsal position - vertical placement - name intersections - overcutting - name breakthrough and cutting	6
III. The Arc Position of the Names, double arcs - triple curva- ture - coordination with guide lines - flat arcs - strong curvature - position along ocean coast - neat placement - name pivoting /swinging/ - constant base line - ribbon-like position	10

	<u>Page</u>
IV. On the Treatment of Spaced Names, bad script picture - letter interval - landbound position - equidistance - uniform visual thickness - influence of map background - lack of law of letter interval - interval between designation parts	13
V. The Stretching of Names, areal names - maximum longitudinal extent - stretched-out names - value of stretching - parenthetical names - visual sagging - bad stretch-out - extent of stretch-out	16
VI. Secondary Designations and Their Arrangement, parenthetical lettering - line distribution - change in lettering style - historical names	19
A. General Rules for the Placement and Execution of Secondary Designations, screening of additions - meaning of principal name - treatment of double names - name ballast - two-line arrangement - various script sizes in one designation - script picture of a designation - line interval	20
B. Treatment of Equivalent Designation Parts, one-line arrangement - treatment of additions - foreign designations - settlement names with equal precedence - parenthetical names	24
C. Position of Subordinate Designation Parts, methodology of parenthetical names - position of foreign names - scholarly name bunching - line interval - additions - underlining	25
VII. Treatment of Name Densification, arrows - avoidance of name bunching - use of empty spaces - elimination of names	29

	<u>Page</u>
VIII. Inscriptions for Aereal Objects, normal position - areal names - centroidal axis - point of concentration - name stretching - areal position axial position - land position - marginal arrangement - interior position - lateral position - flank position	31
Additional remarks: a) continents - b) coastal strips - c) peninsulas - d) isthmuses - e) spits - f) island groups - g) islands - h) mountains - i) plateaus - j) plains, depressions, hollows - k) forests - l) deserts, steppes - m) countries - n) provinces o) Kreise, districts - p) landscapes, physiogeographical - q) landscapes, political - r) landscapes, historical s) oceans - t) ocean parts - u) lakes - v) catchment basins <u>/neve fields/</u> - w) glaciers - x) nations, tribes	34
IX. Inscriptions for Linear Objects, coverage of orographic shape - outstanding name placement	42
Additional Remarks: a) mountain ranges - b) valleys c) islands, narrow, long - d) rivers, canals - e) tunnels f) shipping lanes - g) ocean cables - h) highways - i) directions, destinations - j) lines, mathematical	44
X. Inscriptions for Point-shaped Objects, linear position - one-line arrangement - position with respect to object - distance to object - distance to other map elements - consideration of situation changes to be expected - position with respect to rivers and international boundaries	48
Additional Remarks: a) promontories - b) islands, very small - c) reefs, cliffs - d) peaks - e) passes - f) settle- ments	52
XI. Arrangement of Numerical Data, contour line numbers - isobathic figures - numbers in terrain - elevations along rivers - settlement elevations - peak and pass figures - depth figures - maximum depth data - highway numbers - length or distance figures - reference figures	55
Plates I-IV. Map segments (following page 59 of original)	64
Plate V. Inscription positions (page 59 of original)	65

I. INTRODUCTION

The legibility of geographic names is determined not only by the choice of the script style and the size, slant, and thickness of the script used, but is to a considerable extent made easier or more difficult also by the position of the name with respect to the object it describes, whenever the particular place name is printed in a careless fashion and in violation of the law of inscription arrangement.

The first man to discuss the position and arrangement of geographic names on a map was the great French cartographer J. B. B. d'Anville. Where such lettering "is written in an artificially horizontal fashion," this highly skilled expert asserts that such lettering is "monotonously and tiringly uniform" and "falls far short of giving an impression of the multiplicity of nature" which should, of course, also come out in terrain representation (J. B. B. d'Anville, Considerations generales sur l'etude et les connaissances que demande la composition des ouvrages de geographie, 1777, Paris, pages 67-68).

It is far from enough to enter a geographical place name in any old fashion. The cartographer of our time has the duty - also in connection with the development of the art of inscription placement - to maintain the high level of achievement in cartography and to try to obtain the particular position that will be best for a particular place name.

During the Middle Ages and in the early Renaissance, the names were still inserted in a very jumbled fashion. But this situation improved when the system of changing orientation was abandoned in favor of the increasingly prevailing orientation of the map toward the north. According to M. Eckert, map orientation had "some effect on the position of the map name" but an improvement could not be detected until the time of the "introduction of copper plate engraving and of Latin Italic lettering" (Eckert, M., Die Kartenwissenschaft. Forschungen und Grundlagen zu einer Kartographie als Wissenschaft / Cartographic Science - Research and Foundations for Cartography as a Science, Vol I, 1921, Berlin, page 351). Such factors might of course also exert some influence; but, in view of their pronounced technical character, we would not really want to assign to them any formative or creative force just like that, especially since investigations on this, which also include woodcuts as additional carriers of drawings, are still lacking. We suspect (see Note) that connections to the particular artistic endeavors and also connections aiming at an increasingly more correct spelling of geographic names will emerge in this context. (Note/ Bonacker, W., "The Beginnings of Italic Printing in Maps," (Pet. Mitt. /Petermann Bulletin/, 89, 1943, page 246) - page 251.) According to H. Wagner (Lehrbuch der Geographie /Textbook of Geography, Vol I, Part 1, 1920, Hanover, page

234), it could be proved that during times in which cartographic work flourished, due importance was assigned to the placement of names which is the factor that finally gives the map its mature appearance.

On the subject of the position of the names with respect to the individual map elements of the 1:25,000 topographic map, we have available a set of strict and well-prepared instructions drawn up by O. Wand (Musterblatt fuer di Topographische Karte 1:25,000 /Sample Sheet for the 1:25,000 Topographical Map/, 1939, Berlin, edited by O. Wand; our abbreviation: M.). This set of instructions, to be sure, leaves the topographer enough leeway and does not restrict him in his creative effort, but is nevertheless so designed that it commits him to a uniform directive from which he must not deviate without very good reason.

But this directive is intended only for the mentioned official map and cannot be applied to geographic maps for which other laws are applicable. Of course, A. Bludau (Zoeppritz, K., and Bludau, A., Leitfaden der Kartentwurflehre. 2. T. Kartographie und Kartometrie /Guide for Map Design, Part 2, Cartography and Cartometry/, 1908, Leipzig, 2nd edition; our abbreviation: B.) and H. Fischer ("Map Lettering", Mitt. d. Reichsamts f. Landesaufn. /Bulletin of the Reich Land Surveying Office/, Special Issue No 1, 1925; our abbreviation: F.) have come out with statements on the arrangement of the names in geographic maps, but they only, so to speak, grazed the subject, although, having themselves worked on small-scale maps, they could have made a greater contribution to this on the basis of their experience. (The cartographer will get no help in the exploration of the question at hand from a publication by A. Fretwurst (Die Kartenschrift. Anleitung zum Schreiben derselben fuer kartographische und technische Zwecke /Lettering Instructions for Cartographic and Technical Purposes/, 1920, Stuttgart, 4th edition). The type patterns and models are intended to give the technical draftsman and the plan draftsman suitable and effective letter forms. For the purposes of the cartographer, who must also adapt his work to small and very small scales, these type samples cannot and are not intended to offer guidance, though such guidance might be expected in view of the title.)

Our work here is intended - on a methodological basis and, so to speak, along with the development of a script model - to combine our own experience and findings with those of Bludau and Fischer, to put them in the proper relationship to each other, and to emphasize special features in detail, in order thus to come up with the desired guide lines. In this effort, we shall label the creations of others as such to a greater extent than usual - something that has already been done - and we will use as reference certain German and foreign maps, as well as maps we made ourselves. As a matter of principle, all names were taken over in the style of the entries and were reproduced in Italics. Spelling errors are not corrected.

(Here are the maps and their reference numbers which we used for the comparison of positions.

- 1 Vogel, C., Karte des Deutschen Reichs und der Alpenlaender /Map of the German Reich and of the Alpine Countries/, 1939, Gotha.
- 2 Haack, H., Stielers Hand-Atlas, 1939, Gotha, 10th edition.
- 3 Ambrosius, E., Andrees allgemeiner Handatlas /Andree's General Hand Atlas/, 1930, Bielefeld and Leipzig, 8th edition, 5th printing.
- 4 Debes, E., Neuer Handatlas ueber all Teile der Erde /New Hand Atlas on All Parts of the World/, 1914, Leipzig, 4th edition, 2nd printing.
- 5 Vivien de Saint-Martin, L., Schrader, F., Atlas universel de Geographie, 1923, Paris.
- 6 Bartholomew, J. G., The Times (Survey) Atlas of the World, 1922, London.
- 7 Bertarelli, L. V., Marinelli, O., and Corbellini, P., Atlante Internazionale del T. C. I., 1928, Milan.
- 8 Nawrocki, J., Uebersichtskarte von Deutschland 1:1,000,000 /1:1,000,000 General Map of Germany/, 1935-1939, Berlin, published by Reich Land Surveying Office.)

In view of the manifold character of geographic maps and the areas represented on them, one can only give general directives in reference to classical script positions, so that the mapmaker is sufficiently free to arrange the names according to his esthetic and artistic feelings in such a manner that they will present a clear and understandable over-all impression and will be in a well-ordered relationship to each other that does not reveal any harshness (cf., e.g., figures 1 and 5).

(Beyond the "Reich" frontiers, everybody, especially since World War I, is watching anxiously lest the activities of German scientists and technologists abroad and their contributions to the cultural effort of their host country become known to the general public in any form whatever. How much German labor might thus be hidden behind foreign trade marks and copyrights? We think it is not only a thankful task but almost a duty to publicize the cultural activities of German cartographers abroad in authoritative terms and in the proper light. The hue-value rendition of the map prepared in about 12 colors, which is based on the incomparable realistic relief masterpiece by Herman Kuenmerly

(1857-1905), cannot possibly convey the true impression in Table I; the "photographic eye" is inadequate here. Although the careful execution of the map lettering cannot be discerned - something that could be reproduced only in a line stereotype block according to an original print - the segments, in connection with the subject we are concerned with here, nevertheless reveal the great care exercised in the arrangement of names, which is the one thing we want to bring out here.)

A rigidly regulated position of the lettering on the map "creates a picture of quiet and order," avoids "a jumble that is difficult to unravel" (F.-S. 38) and permits us to insert as large a number of geographic place names as possible. The task "which makes great demands on the cartographer and which in general becomes increasingly difficult the smaller the scale gets - that is, the greater the disproportion gets between the multiplicity of objects or their map symbols and the map inscriptions which always require a certain space" (B.-S. 36), presupposes, in addition to the so "natural" technical skill, also "a technical skill acquired in many long years of schooling and practice" (F.-S. 39).

As a rule, we can establish that every name can only take up a certain position on the map, so that the good quality of a map lettering draft could almost be judged according to this criterion; the arrangement of the name would have to be such that its position would be best just the way it has been chosen and that there is no better position for it elsewhere on the map. But this also creates the necessity of localizing a name or designation which in each particular case can be applied only to one geographic object [1].

In our treatment of this subject, we are assuming six basic requirements which are beyond the scope of our task here but which are most intimately connected with it.

1) "Correct understanding of the meanings of the geographic objects" (M.-S. 33).

2) "A purposeful and careful selection" (F.-S. 36) of the names; we must not simply try to get a large number of names on the map, since that in itself "is not a point in favor of a map" (F.-S. 33).

3) Consideration of all prerequisites for the correct spelling of geographic names.

4) Critical examination of the script styles to be used for the lettering of the names, and exact weighing of style sizes, positions, and thickness [2].

5) Skilful alternation between compact and loose, spaced lettering of names.

6) Well coordinated and not overcrowded representation of the overall situation in connection with a well coordinated color selection.

It is only the harmony of the above conditions with the best arrangement of names that guarantees a harmoniously coordinated script picture: "perfected efficiency is beauty" (F.-S. 45).

[1] Now and then we find mixed designations which should be avoided, since as a rule other solutions can be found. For instance, Fischer (4, No 44) lettered the words: "Golf & Strasse v. Tschili" in a continuous fashion and Barich, Fraude, and Schleifer (2, No 74) did the same thing with "Golf u. Str. v. Tschili," instead of breaking up this combination and separating it, as Fraude and Schleifer (2, No 76) did so satisfactorily.

We care just as little for Vogel and Schleifer's (2, No 74) monstrous, two-line lettering combination "Castillo Punta & I. de S. Andres de la Carbonera," despite the emphasis on the common word for cape; this place name ran over a double sheet of paper. Instead of being content with the name of the island as the main object in the form "I. de S. Andres de la C.," since the headland does not assume much significance in view of its location and since the castle after all has already been indicated by the proper map symbol, the large number of names on this map is increased even further here. The watchword in all our endeavors should increasingly be the following: Simplify wherever this can be done without harm.

Better localization is provided by those parenthetical entries which were used especially by experts working on Debes maps and, e.g., in Fischer (4, No 44, K 5) in the form "Fukaye (O. & Ins.)" or (N 3) "Akkeschi (O. & Bai)," whereby the parenthetical parts are in hair-thin lettering. But since not everything can be given a designation on the map, the cartographers in both cases could have remained content with the entry of the place names, for the observer will, if necessary, also be able to identify the island and the bay, because both have the same name; the master's practice is here also being followed by Erdmann (4, No 50), e.g., with (H 3) "Lamu (I. & Ort)," (H 5) "Arimba (Spitze & Ort)," and "Pecau (Ort & Kap)," avoiding here also short forms for the basic words which might be used here.

[2] O. Herkt, for instance, lent a special note to the province and country names on a transportation map of Central Europe. (Herkt, O., "Kompass" Eisenbahnkarte von Mittel-Europa 1:2,000,000 / 1:2,000,000 "Compass" Railroad Map of Central Europe/, 1906, Glogau. -- This map of

Central Europe was later on taken over as map No 75 in Westermann's Generalkarten [Westermann's General Maps], 1940, after the Glogau Institute had been dissolved.) Herkt did this through a bizarre emphasis on the initial letters of these names. While the names of countries are spaced and treated in a normal fashion, the province names were lettered in compact fashion, whereby the first letter included the descender in its total height. In this manner, for instance the letter H in "Hannover," the letter S as in the letter group Sch in "Schlesien," and the letter S as in St in "Steiermark," were given an unjustifiable logogram appearance. In our opinion, Herkt's procedure here is in line with the errors we pointed out earlier (see Note) and therefore is not worth copying, thanks to the responsible work of subsequent map workers. (Note Bonacker, W., "On the Lettering of Some Characters on Maps," (Jahrb. d. Kartogr. [Cartography Yearbook], 1942, page 97) - page 100.)

II. THE BASIC POSITION OF MAP NAMES

Starting from the horizontal form of inscription and line arrangement spelled out in the literature on the subject, a position which makes for easiest reading, Fischer (Die Kartenschr. [Map Lettering], page 36) considers this position to be the best for maps, insofar as the observing eye hits its center perpendicularly. In the case of straight latitude parallels, the names are to be arranged parallel to the upper and lower map margin. If the latitude parallels are shown as curved lines, the lettering must be adjusted to this "in order to avoid the many mutual interferences which would otherwise result and in order to make the lettering also participate in the representation of the curvature of the earth's surface" (F.-S. 36). (Thus, Fischer adopts d'Anville's ideas to which we referred earlier (page 1) and of which he could hardly have known.) But if the latitude parallels assume a very steep position, as for instance in the northwestern and northeastern portions of the general maps of Asia and North America [1], or if the latitude parallels are even shown as complete circles, as in the polar maps [2], we must not arrange the lettering along these guide lines. From the fixed position, the normal position, which runs either parallel to the map margin or to the dense grid of the latitude parallels, but which also can coincide with the meridians, we must elastically make the transition to the free position (see Figure 12) (see Note); if necessary, both arrangements must be combined in the same space (see Figure 11).

(Note) The segments reproduced in plates II and III have been taken from my two school atlases which I prepared from 1916-1921 for the Swiss primary and secondary schools and which I submitted for the first time to the Bern Geographic Society at its session of 17 March 1921.

With a few interruptions, both map collections are the product of my pen and were under my constant supervision up to the tenth, respectively, fifth editions. My work on these maps was promoted with much understanding by the senior director of the Bern Institute, Dr. Heinrich Frey.)

The position of the names must be such that they can be read from the center of the map. In the left half of the map, we must arrange the straight or arc-shaped name lettering, which is almost perpendicular to the lower map margin, from bottom to top, and vice versa; in the right half, we must write from top to bottom; we must do this, because we read from left to right in German. For these reasons, names and remarks on the western and eastern map margin - regardless of whether we are dealing with individual sheets or partial maps - must be legible from the map center; the names must not come to lie on their backs [3].

But we have a whole series of geographic objects which, due to their vertical course, again and again make it difficult for us to give them a good name position; as a rule these difficulties cannot be avoided despite every effort [4].

"The names should stand as isolated as possible and should not touch each other"; only those names may intersect each other of which "at least one is lettered in spaced fashion" (F.-S. 37) [5]. This requirement seems so natural that one should think that every map worker would meet it, to begin with, for reasons of better legibility; but even C. Vogel made mistakes here and allowed names to intersect each other [6].

"Big and important names must be given the best positions" (F.-S. 38); their position must not be influenced by subordinate names and their legibility must in no way be reduced [7].

[1] The cartographers have tried various solutions for the positional arrangement of the names in the northwestern and northeastern parts of maps of Asia and North America.

a) Elfert (4, No 54) and Huot (5, No 59) maintained a parallel position even in the northwestern part of North America, without having to lay the names on their backs.

b) In the northwestern part of the map of Russian Asia, Corbellini (7, No 103-104) at first oriented the designations according to the parallels; but, like Bonacker (Figure 12), he made a skilful and hardly noticeable transition to the meridian position in the northeastern part. Aitoff (5, No 38), adopted a similar arrangement (5, No 38); but he had no difficulty in writing the names of Spitzbergen and of Franz Josephs-

Land very close and without any transition parallel to the upper sheet margin. Giffault (5, No 39) handled the names on these map sections much better.

c) Corbellini (7, No 121-122) gave the names in the northwestern and northeastern parts of his plate of North America a pronounced meridian position.

d) From parallel positioning, which was still used in the name "Kurilen" on the Asia map, Fischer (4, No 38) imperceptibly proceeded to an arrangement which gave the names a parallel position to the sheet margin already at the latitude of "Aleuten."

We cannot set up any general principles for the treatment of the northern marginal areas on maps of both continents, because one or the other positioning system can be used to advantage, depending on the applied grid draft and the inclusion of the arctic regions beyond the North Pole.

[2] The effort to attain the best basic position for the names on polar maps have caused cartographers to try different methods.

a) Debes (4, No 1 and 1 a), Stieler (2), Andree (3), Chesneau and Bonnesseur (5, No 80), and Corbellini (7, No 3 $\frac{1}{2}$) arranged the names horizontally to the upper and lower sheet edge; Corbellini however adopted this basic position only for the map of the South Pole.

b) Bonacker (Figure 11) and Corbellini (7, No 3 $\frac{1}{2}$) gave the names on the North Pole map a mixed position; in the center of the map, the names are horizontal but in the upper and lower parts of the map they snuggle against the parallels.

c) The pure parallel positioning must be termed outdated and outmoded; in this arrangement the names range from the normal position via a pronounced upside-down position and back again to the normal, fixed parallel position; thus the names can be read only from the outside, i.e., by turning the map around. Even Bartholomew (6, No 8 and 9) and Sydow and Wagner (see Note) adopted such a lettering arrangement.

(/Note/ Haack, H., and Lautensach, H., Sydow-Wagners methodischer Schulatlas /Sydow Wagner's Methodical School Atlas/, 1939, Gotha, 21st edition, - No 60.)

[3] An erroneous, upside-down lettering on the eastern margin of the maps - which is avoided for instance by Debes (4), Andree (3), Vivien and Schrader (5), and Bartholomew (6) - can be found on five

sheets in the Stieler atlas (2). We cannot detect any system in Vogel (1) on the western margin, where the names assume a normal position on five maps but have a dorsal position on 15 plates; in one section, we can even find both arrangements. On the eastern edge, the names along the margin were entered consistently in a dorsal position, i.e., they have to be read from the outside.

[4] Script positions such as those for "Altvater Geb." in Vogel (1, No 21), "Anadyr-Geb." in Bonacker (Figure 12), "Kerguelen-Mulde" in Debes (4, No 1), "Hardt-Wald" in Heyemer and Bosse (4, No 21), "Sichota alin od. Kuesten Geb." in Friedrich, Umbreit, and Rado (3, No 148-149), "Inghilterra" in Corbellini (7, No 9-10), and "Curili" (7, No 84-95) and "Oural meridional" in Bagge (5, No 4), can be considered as barely acceptable.

The words "Grossbritannien" in Fischer and Erdmann (4, No 12 a) and "Bessarabien" in Habenich and Schmidt (2, No 62) were positioned erroneously. In the eastern margin areas of his continent maps, Corbellini (7, No 1-3) gave a dorsal position to several name designations. Vogel and Hiller (2, No 39) arranged "Nord-See" and "Nord-Friesische Inseln" at a small distance from each other along equally arched parallel arcs; these words are opposed to each other only to make sure that "Nord-See" will link up with "(Vester-Havet)" - but there should be no such link here in view of the base line. Inadequate positions with considerable dorsal slants were also assigned to "Oural septentr." by Bagge (5, No 4), "Archipel Japonais," "Iles Aleoutiennes," and "Iles Kouriles" by Aitoff (5, No 38) (see Note), "Cote du Roi Frederic VI" by Huot (5, No 61), and "Gulf of Tartary" by Bartholomew (6, No 67). ([Note] Giffault in part lettered these island groups much better (5, No 39).)

Another wise good vertical name arrangement in a single sheet can easily lead to dorsal positioning when we use the same in a lateral margin position for a plate composed of several maps having the same scale; cf. "Palestina," "Mar Morto," "Giordano" in Corbellini. (Corbellini, P., A. T. I., Il Mediterraneo e gli Stati limitrofi, 1939, Milan.)

[5] The inscription of a correctly placed name should be interrupted only if the letters are spaced properly, thinly. Fischer (4, No 39) was wrong in separating the name "Tsch / ukschen Halbinsel," which had been well placed on two lines, in order to make room for the names of two rivers which had better remained unlabeled; Bonacker (Figure 18) (see Note) also made a mistake when he broke up "Unter / sberg" with "Hochthron." ([Note] An extremely thankful task was the complete reworking of the Reise-Reliefkarte Tirols / Travel Relief Map of Tirol on the basis of the relief created by Rudolf Leuzinger (1826-

1896), which even today can take its place along side the reliefs of Kuemmerly and Imhof. Here too the segments shown in Plate IV hardly give us any idea at all of the beautiful map picture for whose reproduction eight colors were used; nor can we get the proper idea of the masterful terrain feature and letter engraving.) Designations must always be so hyphenated that parts or syllables of it are not torn apart, cf., e.g., "Anadyr /-Geb." in Bonacker (Figure 12) and "Reiter / A^e" (Figure 18).

The letter arrangement should be made with special care in order to make for greater clarity and legibility in the case of intersecting names written in spaced fashion. The position of "Rokitno-Suumfe" with respect to "Poljesie" in Fischer and Erdmann (4, No 12 a), can be considered as barely admissible. But the intersection of five spaced names on the line El-Rarije-Racham, in Fischer and Guthe (4, No 41 E 3), must be rejected, despite the clarity of the illustration, on account of poor legibility.

[6] Intersections in the case of compact lettering must be avoided at all costs; this happened for instance in "AEgholm Sand" and "Ulvs / halelob" in Vogel (1, No 2).

[7] As far as positioning goes, Elfert (4, No 59), for instance correctly placed the name of the mountain range "Cord. Occidental od. Kusten-Kordillere;" nevertheless, the name, which is intersected or broken up by 27 other names, looks illegible because it came out too thin and small and because it practically drowns in its environment. If, e.g., "Der Pfahl" in Vogel (2, No 24) had been engraved a tiny bit larger, its legibility would certainly be considerably better; under certain circumstances, a repetition would seemed to have been in place here, as per the procedure of Heymer and Bosse (4, No 22) for "Pfahl." The words "Mazedonien" and "Thrazien" are a tiny bit too small, compared to the other lettering, in Bonacker (Figure 8).

Plate V, Script Positions (page 65) presents a general picture of the possibilities of name arrangement that come into consideration here.

III. THE ARC POSITION OF THE NAMES

If the designations deviate from the fixed basic position, if they are to be entered free and hence arc-shaped, one should try to obtain a "sure course, smoothness, and neatness" (F.-S. 38) for the arc-shaped line that bears the name [1]. "All arcs, which are not fixed by the parallel position as bent straight lines, must be neither too flat, if they are long, nor too strongly curved, if they are short, so as to create a supple impression" (F.-S. 39) [2].

The arcs should "not be unnecessarily steep and curved and must swing back into the basic direction of the parallels at the ends that are turned away from the object" (F.-S. 38) [3].

Along the ocean coast, mapworkers gladly abandon the fixed position in favor of a free arrangement, even where this is not required by circumstances. But here, efforts must be aimed at avoiding crass contrasts between adjoining inscriptions through balancing of arcs [4].

The important thing is always "to create transitions which give all movements the appearance of a smooth flow and to guide the lines back again to the basic direction" (F.-S. 38). There must not be any interruption in the continuity of an arc-shaped line, nor must that line be allowed to make a transition into a straight line [5]; if the line is run skilfully, "ribbon-shaped" designations often make for better legibility (M.-S. 32) and thus make all the effort devoted to the proper positioning of names and designations worth while [6].

[1] Especially successful is the perpendicular position of the words "Nordfriesische Ist" in Erdmann and Bosse (4, No 14) and "Wolga-Hohe (Ergeni-Hugel)" in Fischer and Erdmann (4, No 12 a); we can find another good arrangement in Vogel (1, No 7) for the opposing names "L. Wursten" and "Hohe Lieth" as well as No 25) "Bohmisch-Mahrtsche Hohe" on a double arc. For instance, Fischer and Erdmann (4, No 32) and Bonacker (Figure 12) had to accept an unavoidable partial dorsal position for "Moll-Tal"; this dorsal position also affected the first part of "Sjewernyi d. i. Nordlicher Ural" and the name "Land der Uralischen Kosaken."

Multiple arcs can be used advantageously in maps with smaller scales. "Awratynsche Hohe" in Fischer (4, No 33) and "Bahr Lutz," "Totes Meer," "Salz-Meer," standing on a triple curve in Fischer and Guthe (4, No 41), came out almost classically successful; on the other hand, "Kantabrisches Gebirge" in Fischer and Erdmann (4, No 34), which is arranged on a six-fold arc-shaped line, came out poorly.

[2] With respect to well balanced name stretching and arc positions, the plates by Ambrosius and Jungk (3, No 25-26), Koecher and Berg (3, No 35-36), Berg (3, No 77-78), Bonacker (Figure 5), Weinreb (5, No 7 and 16), and Bartholomew (6) also offer numerous and excellent examples.

Ambrosius and Jungk (3, No 25-26), Koecher and Berg (3, No 35-36) always adapted the stroke of the names to the guide line in a quiet and well-balanced fashion. Bonacker (Figure 3) lettered "Alpenstein" and Churfirsten" as well as (Figure 8) "Zentral-Balkan" on a basis of flat arcs and hugging the guide lines nicely. One must always endeavor to have the inscription hug the main line of the particular object and must

try not to deviate from the guide line given by the map situation. For instance, Heymer and Bosse (4, No 21), gave the word "Vogesen (Wasgau Geb.)" the right direction; but Erdmann (4, No 14) did not place this namer properly, for it runs northwest and swings in the direction of Saar-Buckenheim. Heymer and Bosse (4, No 22) inscribed "Bayrischer Wald" incorrectly, since the object was not covered at all by the script. Linnekogel (2, No 13) placed "Habelschwerdter G." in a stiff manner, moving away from the terrain feature shown on the map; he also inscribed "Bukk-Geb." and "Doboga-G." with little skill (No 47, I/K 5 and G/H 6).

[3] In addition to flat swinging arcs - for instance, the beautifully shaped (No 23) "Franken Hohe" - Vogel (1, No 28) used, for example, for "Salzkammergut" occasionally also strongly curved arcs, whenever he felt he could cover the entire object in this manner; on the other hand, he avoided (No. 6) - to disadvantage - placing the word "Terschelling," which takes up a free position, on a curved line.

[4] Despite strong curvature of the arcs, Heymer and Bosse (4, No 17) and Heymer, Bosse, and Winkel (4, No 16) proceeded in an exemplary manner along the Baltic Sea Coast. Without resorting to arrows (see Note), these men (4, No 17) managed to get the inscription close to the object. (Note * The arrows are not always the fault of the mapworkers; often they can be blamed on the engraver who, in placing the inscription, fails to reach the object and thinks he can simply put an arrow there.) Fischer and Erdman (4, No 27) arranged the names along the Riviera in a balanced fashion, using flat arcs. Elfert (4, No 57, auxiliary map II) also placed only 11 out of the 85 names in the ocean parallel to the latitude parallels along the coastal strip, without getting an irritating picture. Corbellini (7) likewise arranged the names along the coast in flat arcs in a balanced and skilful fashion; on the other hand, the mapworkers who worked on the French map volume (5) used a free position only occasionally and in an isolated fashion.

The desire for lively positioning of the names along the ocean coast is occasionally exaggerated. Especially the men working on the Stieler [atlas] (2) almost always arranged the names in a free fashion, though it seems to us that they now and then became a little playful.

[5] Now and then, we will get the best position for a name by swinging the inscription just once from one slope of the mountain range to the other; cf. e.g., the excellent arrangement of "Ortler-A." in Heymer and Bosse (4, No 24).

Sometimes, a beautifully-swung inscription cannot be attained even by changing the position with respect to the course of the river, as was done by Heymer, Bosse, and Winkel (4, No 16) in the case of "Netze-Bruch." The position makes a stiff impression, but the problem here

could hardly be solved differently. Mapworkers find things easier in the case of valley names, since names of this kind may be arranged more or less further away from the course of the river; cf., e.g., the successful pivoting of "Obe / r-Inn Tal" in Heymer and Bosse (4, No 25). Here, as in admissible name intersections, the syllables should, where possible, not be broken up.

But in no case is a breakup of the base line permissible in pivoting [swinging] a name; the constant course of this base line was disturbed by Jungk (3, No 71-72) in "Val del Fersina." Likewise, one should at all times try to avoid a change in curvature which is not conditioned by the form of the object and such as was done, e.g., by Vogel and Hiller (2, No 39) in "Nordsee (Vester Havet)" and by Domann and Fraude (2, No 69) in "Hedin-Gebirge (Transhimalaja)"; in such cases one must always make sure that the lines run constant.

[6] In comparison to the usual fixed arrangement, we can discern a well-developed sense of form in the names "Stretto di Gibilterra" and "Bocche di Bonifacio" entered by Corbellini (7, No 37-38, respectively, 22-23), "Strasse von Gibraltar" in Vogel and Schleifer (2, No 26), "Strasse von Bonifacio" in Vogel and Kehnert (2, No 21), as well as "Str. von Gibraltar" in Barich (2, No 97).

IV. ON THE TREATMENT OF SPACED NAMES

Mapworkers, who aim for an orderly treatment of names of areal or linear objects, preferred to abandon the compact inscription form in favor of a form that is dissolved into its component parts; they have attained an almost masterful placement of designations [1]. Here are the points that ought to be observed.

1) The interval between the individual letters of names to be written in spaced fashion should be as uniform as possible. According to our experience, this can always be done - even in such regional names as Denmark - where every letter must be placed on the land area [2].

2) Regardless of whether a designation consists of one name or several parts, the script picture must cover the object uniformly throughout its entire extent; one must always aim for uniform visual clarity, since this is a basic element in legibility [3].

3) K. Zoeppritz (see Note) has tried to fix the dimension of script extension in such a manner that the interval between two letters will not exceed double the height of the letter. (Note Zoeppritz, K.,

Leitfaden der Kartenentwurfslehre [Guide for Map Design], 1884, Leipzig, page 154.) H. Zondervan already pointed out "that the distance is determined not only by the height of the letters, but also by their thickness, color, surroundings, as well as the script style" (Zondervan, H., Allgemeine Kartenkunde. Ein Abriss ihrer Geschichte und ihrer Methoden / General Map Science - An Outline of Its History and Methods], 1901, Leipzig, page 174). Nevertheless, Bludau (Leitfaden [Guide], 2nd edition, page 37), in his revision of the Leitfaden, kept the mentioned ratio, though the study of geographic maps should have convinced him not only of the correctness of this observation but also of the fact that there are no laws with regard to letter interval. We ourselves at times stretched the distance, which is to be figured from and to the letter center, up to five times the height of the letter (see Figure 3) and we found similar relationships for numerous designations also in other maps, without the legibility having been reduced as a result [4].

4) If a designation is composed of several words, the latter, when they are written in spaced fashion, must be separated by intervals in such a manner that the interval between words will correspond to double the letter interval; if the word is hyphenated, the hyphen is not treated as a character.

5) The situation skeleton should be broken through only when necessary. Loose character placement almost always allows elastic side-stepping, so that one can keep the particular name within the area covered by land on the map and so that one can also avoid a weakening of the characters through circular settlement symbols, which fall within the area covered by the inscription, and through names which intersect said inscription. [5].

[1] Despite great skill, even topnotch mapworkers can make not only isolated errors in name placement but they can even go wrong in arranging the inscriptions in major parts of a map; cf., e.g., in Fischer (4, No 40), the northeast corner of West Asia with the limit of 70° E longitude and 35° N latitude; the arrangement in the general map of Germany by Mielisch and Jungk (3, No 41-42); and the unbalanced inscription arrangement for Czechoslovakia, for which Mielisch and Umbreit (3, No 75-75) are responsible. The same applies to no lesser extent to the inscription arrangement for Inner Asia by Domann and Fraude (2, No 69), which is badly in need of rearrangement.

[2] The intervals between individual letters in names inscribed in spaced fashion require utmost care, since legibility is reduced when the individual characters are unevenly arranged; this happens for instance in the case of "Bodensee" in Linnekögel (2, No 14), in the case of "Pommerellen" in Nawrocki (8), and in the case of "Gobi (Schamo)" in Cirbellini (7, No 97-98); in the latter cases, this is probably due to

a hasty and hence incorrect subsequent insertion by another draftsman. It is almost painful to observe with what frivolity and frequency map draftsmen violate the rule on equidistance. -- If a compact manner of inscription is used for a certain geographic feature throughout a certain map, an individual object must not be emphasized - as it happened in the case of "Mittelland-Kanal" in Nawrocki (8) - through spaced character placement. (Here too the nonuniform treatment of the compacted inscription probably occurred in the course of a correction.) If a designation contains abbreviations with superscripted letters, the letter interval must be reduced to half the normal interval; cf. "St. Gallen" in Bonacker (Figure 16).

It is likewise wrong to emphasize the initial letter of a designation (cf. page 5 [2] and Bonacker, W., "On the Lettering of Some Characters on Maps," (*Jahrb. der Kartogr.* 1942, page 97) - page 100), since such treatment - either through the use of a letter form alien to the inscription or through pronounced larger and thicker execution of the initial characters, such as it was done in O. Herkt for all province and country names - can only impair the legibility and result in a disturbance of the uniform inscription picture (Herkt, O., "Kompass" Eisenbahn Kart von Mittel-Europa, 1:2,000,000, 1906, Glogau).

[3] The inscription picture and the name placement are considerably influenced by the more or less strong color tones of the map background. If these tones are heavy, a name or designation must, if at all possible, be placed within optically identical tones. In case of light color schemes, a uniform inscription picture is attainable and assured even when only a few letters are placed on the land area, while the rest are placed in the ocean; cf., e.g., the entry "America centrale" in Corbellini (7, No 1-3), of which only three characters were placed on land; in "Grecia" (No 22-23) likewise, none of the letters sag and only two letters were placed on land.

[4] In some maps, a designation is so arranged on several partial sheets that the name can no longer be read but must be "pursued and tracked down"; cf., e.g., "Ostsee" in Vogel (1). -- It must be noted here that the problem of the permissible letter interval was, by the way, not taken into consideration by Fischer (Die Kartenschrift / Map Lettering7).

[5] To attain a land-bound position, Vogel and Schleifer (2, No 35) skilfully interrupted the one-line inscription "Nieder / lands"; Vogel (1, No 9) also arranged "U / s / e / dom" in an exemplary position.

One should always avoid the isolation of an upper-case letter due to interruption of a designation, as was done e.g., in Vogel (1, No 10) for the letters U and L in "Kulmerland," which are intersected by "Paulshof" and "Falkenst."; the same thing happened in the case of (No 15) for N in "Brandenburg" which has reduced legibility due to its interruption by "Dubrow Bge."; cf. also the inadequate treatment of the name "Rugen" in Vogel (1, No 2) whose legibility was impaired considerably due to interruption by circular settlement symbols and names at three characters.

It is very easy to remedy the disruption of individual letters by means of a slight shift in a designation; this would have been a good thing to do in the case of the letter "c" in "Polnischer Jura" in Nawrocki (8, Upper Silesia Sheet, IIIc); in the middle of that name, we find the elevation figure "425." Occasionally, one can also insert two characters into each other; cf., e.g., the treatment of "s" and "c" in Bonacker (Figure 16) in the names "Alpenstein" and "Switzerland."

V. THE STRETCHING OF NAMES

Maps of countries offer us many possibilities for stretching the names of areas - which had best be balanced in the center of the particular space. Some mapworkers incline toward a compact inscription; others stretch the name to the limiting lines; most of the cartographers aim for a well-balanced, moderate stretching.

The maximum length of the entire name has been figured at $2/3$ of the longitudinal axis for topographic maps (M.-S. 31); Fischer (*Die Kartenschrift*, page 37) fixed it at $3/5$ for geographic maps. The difference between the two values ($1/15$) is hardly significant and means little in practice, since the lettering artist treats stretched-out names purely intuitively and is not in the habit of beginning and ending the inscription schematically with the help of a millimeter ruler. He will carefully check on each position by eye and will subject the stretch ratio to a numerical control only occasionally, at the start of his work. The stretching of the designation up to $2/3$ of the longitudinal axis can be deemed adequate and should not be exceeded. Entries meeting this requirement insure not only a harmonic positioning in the space to be lettered, and can thus also emphasize its significance, but also contribute to better legibility, which must always be the main consideration.

The mere stretching of a name may lend it validity for a larger surface, insofar as the inscription keeps its visibility value - without the name being given greater significance due to greater height or thickness [1].

But the desire for better legibility for short designations must under no circumstances lead to a change in the name; traditional and clear spelling do not depend on the moment, but are lasting factors [3] (cf. also Chapter IX, page 42).

There are in particular three large geographic areas (Gobi, Sahara, Sudan) which, due to the shortness of their names, make it difficult to inscribe them in an easily grasped and hence also legible manner; cartographers have tried to solve that problem in various ways [2].

To make sure that the stretch-out of the designations will be geographically correct, one must use, in addition to maps of all kinds, also the pertinent literature, since the maps often cover areal or linear objects with respect to their extent either in different ways or with insufficient accuracy, and since the literature now and then fails to give us adequate information on this [3].

[1] For instance, the addition of a name in parentheses is permissible only if the name does not differ from the principal name with respect to size and thickness and if the designation dominates the object in its entire extent, thus creating the proper visual effect; this was done successfully by Fischer and Erdmann (4, No 12 a) for "Wolga-Hohe (Ergeni-Hugel)" and Heymer and Bosse (4, No 21) for "Vogesen (Wasgau Geb.)" or Koffmahn and Schleifer (2, No 37) for "Dover Str. (Pas de Calais)," in (No 38) for "St. George's (South) Channel" and St. Patrick's (North) Channel." "Der Kanal (English Channel oder La Manche)" in Koecher, Jungk, and Umbreit (3, No 99-100) can be considered as an equivalent inscription, since the smaller connecting work does not create any perceptible sag in the letter picture.

Bosse (3, No 166-167) failed to do a good job on the inscription "Nansei-schoto (Liu-kiu-oder Lu-tschu-Iⁿ)", although he managed to place many names in this area. To be sure, the name inscription, extending from 24°-28°30' N latitude, covers the entire object; but since only the principal name was lettered heavily, while the additional name was lettered thinly, the name of the island group looks as though it extended only from 24°-25°30'; the rest sags considerably. We can find a dip in the parenthetical names also in Corbellini (7, No 20-21) for the inscription for the North Italian lakes and (No 88-89, auxiliary map) for "Bahr Lut (Dead Sea)", and in Vogel (1, No 31) for "V. Bregaglia (Bergell)."

[2] Some map draftsmen limit the extent of short designations to the utmost; for instance, Elfert (4, No 11) in this connection had to accept the 14-fold value of the letter eight in the spacing of the characters for "Sahara." (Spaced inscriptions like these are no rarity; for

instance, Vogel (1) stretched "Ost-See" with an 18-fold letter interval. Such names must be tracked across the map letter by letter and cannot simply be "read off.")

Other cartographers bridge the long distance by incorporating unnecessary script additions; this was done for instance by Erdmann (4, No 45) and Barich (2, No 78) with the inscription "Sahara oder Grosse Wuste"; something similar was done by Chesneau (5, No 52) with "Sahara ou Grand Desert" or by Jungk (3, No 146-147) with "Schamo (Sandmeer) oder Gobi (Wuste)" and by Aitoff (5, No 38) with "Desert de Gobi (Schamo)." One must be modest in such cases and, according to the example given for "Sahara" by Corbellini (7, No 109-111), refrain from any additional inscriptions. Besides, "Sudan" simply does not have another name that could be put down to fill the space, and no one misses it.

[3] Though the scale may permit it, the name should never be stretched beyond the object. Since the narrower Wasgenwald Vosges Forest or Wasgau belongs to the Vosges Mountains, and since it helped give this object its pronounced German name, "Die Hardt" in Vogel (1, No 22) should not extend all the way to Zaberger Steige Saverne Gap. (Neither the nonhomogeneous geological structure of the Vosges Mountains, nor other factors justify Vogel's northern limitation of this ridge on the left bank of the Rhine. We do not agree with H. Lautensach (Laenderkunde. Ein Handbuch zum Stieler Geography - a Handbook for the Stieler Atlas, 1926, Gotha, page 125), who terminated the Vosges Forest "at the Saverne Gap (381 m)" and thought he could interpose "Saverne Hill Country" between Hardt and the Vosges Mountains, because "in local language, the Vosges Forest runs further north, close to the Alsation-Palatinate boundary, approximately to the line Bitsch - Worth." No matter what the reason may be, we think it is wrong to let a name run beyond the object it is supposed to label within the area in which the name is used; an orographic nomenclature, which has grown and developed and which has been handed down over the centuries, can be abandoned only if higher national interests must be taken into consideration. -- But here we run into a very ticklish question: How can we explain the fact that the custodians of German geographic names - our geographers - fail to agree on the designation of these mountains and on their limitations? We intend to discuss this later.) Similarly, we cannot find an explanation for what Fischer did (4, No 39 and 44) when he stretched "Grosser Chin-gan" beyond the Amur River into the southeast extension of the Apfel-Geb. Apfel Mountains; in Corbellini (7, No 20-21) is it hard to read the excessively stretched name "Berner Oberland" which on sheet 22-23 was increased even further in a different style, so that the beginning and the end of the designation are located near the Rhone, respectively, beyond the Engelberger Aa. Since hand atlases must be considered as primary sources, placement errors are bound to cause

repeated errors in subsequently prepared maps; this is one more proof for the significance of the hand atlases; at the same time it also indicates the measure of responsibility resting on the publishers and cartographers of such map volumes.

The stretched entry of "Islas Baleares (Die Balearen)" was done by Fischer and Erdmann (4, No 34) quite consciously also in No 12 a; they did, to be sure, want to cover the entire island group, but failed to see that the Pityusen [Islands] cannot be included here, since they do not belong to the Balearic Islands; this, too, by the way, is the kind of error which appears incorrigible also in Corbellini (7, No 37-38), Bartholomew (6, No 34), and Prudent (5, No 20). Vogel and Schleifer (2, No 23), A. Hettner (Grundzuege der Laenderkunde / Fundamentals of Geography /, Vol I - Europe, 1923, Leipzig and Berlin, 2nd edition, page 300), and H. Lautensach (Laenderkunde, page 312) recognized this correctly; but E. Banse showed this incorrectly (Banse, E., Lexikon der Geographie / Geography Lexicon /, Vol I, Brunswick and Hamburg, 1923, page 135).

VI. SECONDARY DESIGNATIONS AND THEIR ARRANGEMENT

Much too little attention is being devoted to the position of those designation parts which are either of an equivalent or an additional nature, such as for instance those that are put in parentheses, that must be drawn in smaller, or thinner.

If a cartographer adopts a designation whose components form parts of the same or of a different language, he must first decide on the sequence of the individual names, observing the methodological considerations applicable to the particular map [1]; at the same time he must also weigh the problem of separation, one-line or multi-line arrangement, and placement in parentheses, taking the following rules into consideration [2].

Even a good inscription arrangement can give us a harmonic script picture only if the script style, size, and thickness of a designation consisting of several words are properly rendered in a well-balanced relationship; these factors are in an extremely close reciprocal relationship [3].

There are serious objections to the use of different styles within one designation, since legibility is impaired noticeably when script styles are alternated. On the other hand, the thinning of the script stem and even the small writing of parts of the entire designation are permissible and at times even necessary [4].

[1] One must methodically reject both an inexplicable alternation in the sequence by Bartholomew (6, No 27) for "Trier / (Treves)," which is contrasted by "Aix-la-Chapelle/ (Aachen)," "Cologne / (Koln)"; and we must also reject the differing placement of the parenthetical names in Erdmann (4, No 45), who entered "Reunion (Bourbon)" (franzos.) correctly but wrote "Mauritius (britisch) (Isle de France)" incorrectly.

[2] Though they used two script styles, Domann and Hiller (2, No 61), managed to make a differentiation in the inscription "Gorki Nowgorod"; but in so doing, they neither separated the designation parts by commas, nor did they place the secondary name in parentheses, which would have been the only correct thing to do here.

[3] Though the name placement came out quite successfully, the inscription "Cord. Occidental od. Kusten-Kordillere" does not come out properly in Elfert (4, No 59); a plus or a minus with respect to script height and thickness can do a name much good or harm.

[4] Fischer (4, No 43) skilfully weakened the proper names of the designation "Süd-Chinesisches Meer / Chiana-See [sic] der Seefahrer, Nan-hai (Süd Meer) der Chinesen," which stood on the second line in hollow lettering; but he used Roman letters for the disturbing additions, probably because he felt that they did not belong on the map. Fischer (4, No 38) treated the additions in "Grosser oder Stiller Ozean/ Südsee der Deutschen Seeleute, Pacific der Engländer und Amerikaner" in a similar manner. Domann and Hiller (2, No 61), in placing the secondary designation of "Gorki Nischni Nowgorod," did not use a smaller capital letter, as should have been done, but a Roman character. Capital, Roman, and Italics were mixed helter-skelter in Habenicht and Schmidt (2, No 63) for "Insel Cypern / (Kypros neugriechisch, Kibris türkisch, / Cyprus Englisch); they also used block, capital, and Roman for "Mesopotamien / arab. El Djezire d. i. Insel."

A special position may be assigned only to historical names which, if basically entered in bold-face type Balkenschrift, are not changed in their execution even when placed in parentheses. Of course, these names only have a subordinate position; they do not have a superordinate position, as in Fischer (4, No 40), for the designation "Bolbitinische Mdg." which belongs to "Rosetta Mdg."

A. General Rules for the Placement and Execution of Secondary Designations

Additional designations may be used in maps only after a most rigid screening and selection process, since it is the task of map inscriptions to indicate a geographic object in a clear and correct manner. [1].

The placement and execution of a principal name must always do justice to its priority position. This endeavor, however, is hindered not only in foreign geographic designations by the circumstance that now and then several names compete with each other [2].

One must always try to put a designation, which cannot be placed on one-base line, if possible only on two lines [3].

To get a calm script picture, one must avoid using more than two script sizes in one designation [4].

The script picture of a designation placed on several lines is to be so shaped that the continuity will be preserved and will be discernible without doubt. The names, on the one hand, must not be glued together, and the line interval, on the other hand, must be in a pleasing relationship to the extent and the size and execution of the script forms [5].

To get a harmonic script picture, if the principal name was entered in a stretched-out fashion, one must also arrange the other designation parts in a spaced fashion; but in these parts, one must always try to get a smaller character interval than in the principal designation [6].

[1] Occasionally, data are misplaced in parentheses which have nothing to do with the designation and had better be left out; cf., e.g., "Halbinsel Apscheron / (Petroleumwerke [oil refinery])" in Habenicht and Schmidt (2, No 67), where the addition was made in spaced Italics. In this connection, we ought to refer also to the misspelling of the place names "Desert de Gobi / (Takla-Makan)" in Bagge and Aitoff (5, No 41), which have nothing in common.

There are no objections to the Italics for "26 Meter unter dem Niveau d. Schwarz. Meeres" [26 m below the level of the Black Sea] in Fischer and Erdmann (4, No 12 a) and "(seit 1875 Hauptmdg. d. Indus)" [since 1875, principal mouth of the Indus River] in Fischer (4, No 42, B 4); but there are objections, in the first-named example, against the repeated additional entries on the salt content of water bodies and, in the second-named example, against a similar parenthetical entry (No 40), which was incorrectly arranged.

In Fischer and Guthe's (4, No 41) inscription "Bahr Lut, Totes Meer, Salz-Meer" it would be a good idea to omit the last part of this designation, since Totes Meer [Dead Sea] suffices as the German name for this object and since more than one name would in any language be more than needed; instead of the comma, it would be better here to put "Totes Meer" in parentheses, since, in view of the methodological arrangement of the plate, the German name here is only a secondary designation.

[2] Scherrer, Glamann, and Fraude (2, No 33) have given us a classical example of incorrect inscription with the entry of "Dover-Kanal / Strasse von Dover / Str. v Calais" on three, mutually independent lines. This monstrosity does of course indicate the conscientiousness of the cartographers involved, but not their critical screening and even less their proper selection of the German version of this name, since, in addition to "Strasse von Dover" the term "Strasse von Calais" is also used, though there is no agreement as to which designation is the solely correct one. The Italians, the French, and the British do not allow double names in their languages and easily omit names which for some reason have become outdated. In the above example, the designation "Dover-Kanal" is today correctly felt to be superfluous and thus only bears witness also to the inconsistency in geographic names, in which we can observe ups and downs and life and death.

Under no circumstances must the principal name be permitted to drop visually below the additional entry, as it happened in the case of "Milau-i-Djehun / (Djas-Morian)" in Habenicht and Schmidt (2, No 67), K 10). We must also reject Bonnesseur and Aitoff's (5, No 32) inscriptions for Yugoslavia where a relationship to the higher placed "Yougoslavie" has not been made discernible, probably less due to the later displacement than due to the treatment of the parenthetical name "(Roy^{me} des Serbes, Croates et Slovenes)" in uneven script and compact lettering.

A crass disproportion can be found in Chesneau (5, No 55) who lettered "Abyssinie" heavily and then added "(Ethiopie)" in a slightly more spaced but weaker fashion and in the same size; besides, he almost doubled the letter interval. (On the other plates of Africa, the same cartographer however treated names of this kind entirely correctly, so that in this case too the incorrect inscription may perhaps be blamed on someone else.)

[3] Fischer (4, No 28) gave exemplary treatment on two lines to the term "Der Kanal / (The English Channel, La Manche)" and he also did a good job on "Doverstr. / (Pas de Calais)," but this designation is disturbed considerably by avoidable name intersections. Only in special cases is it permissible to put names on three lines; this was done by Fischer and Erdmann (4, No 36) for "Agaisches / Meer / (Archipel)". "Piraus / (Pirews) / (Peiraiëvs)" in Domann and Hiller (2, No 53) and "(Herakleion) / Megalokastron / (Candia)" in Habenicht and Schmidt (2, No 63) had better be put on two lines, separated by a comma, rather than on three lines.

Habenicht and Schmidt (2, No 67) put "Meerbusen / v. Karabugas / (Adshidarja-B.)" on three lines; Schmidt (2, No 65) did a monstrous and likewise incorrect thing when he put "Meerbusen / Karabugas / (Schwarzer

Schlund) / oder Adshidarja / (Bitteres Meer)" on even five lines; on top of everything, he very disadvantageously mixed "Kapital" and hollow /Sylvan/ letters.

In a similarly complicated procedure, Vogel and Schleifer (2, No 35) handled the inscription of the North Sea with "Nord See / oder / Deutsches Meer / German Ocean der Engländer, Vester Havet der Danen," instead of being satisfied with the three-line arrangement: Nordsee / (Deutsches Meer) / (German Ocean, Vester Havet).

[4] The clear, two-line arrangement of the designation "Lac Lemane (Lac de Geneve) / Petit Lac" and "Grand Lac" by Corbellini (7, No 22-21) suffers not only from the incorporation of the two superfluous last designations (see Note) but also from the use of three type sizes. (Note) One could also do without the unnecessary addition "(Bodan)" in Linnekogel (2, No 14.).

[5] If a designation is arranged on more than two lines, one must try to attain an optical impression of equidistance; this was not done, e.g., in Vogel and Schleifer (2, No 35) for the four-line designation of the North Sea and in Corbellini (7, No 4-5) for "Territorio / del / Tanganica," which was arranged on three lines.

Whenever possible, one should make unavoidable additional designations smaller and lighter, using the same type, and place these additions under the name in parentheses; but one should avoid taking over common terms such as "Thar (d. i. Wüste)" by Habenicht and Schmidt (2, No 67) and "El-Erg (Dune)" in Corbellini (7, No 11-12); they do not belong to the representation of countries.

Fraude and Schleifer (2, No 77) insured the continuity of the designation "Kurilen oder Tschil-Iⁿ / (De Vries-Iⁿ)" despite a line interval of 2.1 cm; this interval is just about barely maintained in the case of "Suomen Lahti / (Finska Vika)" by Corbellini (7, No 68), though it would be better to put the Swedish name 2 mm further north. But the continuity was lost completely in the case of "Riukiu-, Liukiu- od. Lutschu-Iⁿ / (Nansei Schoto)" in Barich and Schleifer (2, No 72), since we have an interval of 4.5 cm here. Only the initiated can recognize the continuity of the inscription "Sach / sen" in Vogel (1, No 14), which was placed on two lines that are 14.3 cm apart.

[6] The inadequate rendition of the parenthetical addition in the case of "Valtellina / (Veltlin)" in Vogel, Scherrer, and Brendel (2, No 16) can probably be blamed partly on someone else; the addition does hold a central position, but has not been stretched sufficiently, so that there is quite obviously no visual harmonic relationship to the principal name.

B. Treatment of Equivalent Designation Parts

Equivalent secondary designations within a designation should, where possible, be placed on one line; if they are stretched out, the same spacing should be maintained; e.g., Bad Kreuznach, V a l d i S o l [1]

Additions in the designations of Romance languages should be written smaller only in connection with the names of settlements; they should be directly added to the name or they should be arranged below its center; e.g., Colle di Tenda, but Mola ^{di} Bari Castellamare / ^{di} Stabia [2].

If the inscription for a geographic object is not in the German language, but in several foreign-language proper names, it must be arranged in a one-line script, separated by commas; e.g., The English Channel, La Manche [3].

The equality of the Finnish and Swedish languages in Finland is expressed by Finnish cartographers by means of undifferentiated treatment of settlement names with respect to size and thickness; non-Finnish cartographers however are justified in avoiding equivalent double designations by breaking down these double designations methodically, taking all criteria into consideration; e.g.: Helsinki / (Helsingfors) [4].

[1] Vogel and Hiller (2, No 48) used three different letter intervals within the inscription "Kleine" and "Grosse / Walachei"; they used a smaller and a medium interval for adjectives, while the landscape name, which must be linked with both, was entered with a larger letter interval. In such cases, a repetition is preferable and it is better to place the lettering area by area, independently of the areas concerned, and, where possible, in an equivalent fashion.

Fischer and Guthe (4, No 41) used an equal setup for "Bahr Lut, Totes Meer, Salz-Meer", but in so doing made the designation more complicated and gave it a more scholarly and contrived look.

Lettering artists as a rule treat conjunctions within a designation in an equivalent fashion. There are no objections to writing these parts of a designation a little smaller in German words, such as was done in a well-balanced manner by Elfert (4, No 58) for "Westliche oder "Kusten-Kordillere" and "Kordilleren oder Anden" and by Thomas and Umbreit (3, No 67-68) for "Wasgenwald oder Vogesen". There are no objections in these cases because they do not have the effect of foreign bodies here. Besides, short forms in designations can at times also be

written smaller. For instance, the abbreviation "d.i." [that is] does not have a disturbing effect in Fischer and Erdman (4, No 12 a) in the lettering of the Ural Mountains.

[2] It is however impermissible to write the articles small in the case of "Val di Daone, Val di Sole," as was done by Vogel (1, No 31); here, one should always adopt the practice used by foreign map-makers who treat this designation part in an equivalent fashion.

[3] Since Corbellini (7, No 38) decided not to give the Italian name for the Baltic Sea, we find that the names "Baltijas Jura, Laane Meri," which he gave in the Lithuanian and Esthonian languages, are equivalent in value and that they were properly separated by a comma.

[4] Finnish coastal settlements as a rule are inscribed in Finnish and Swedish; this was done also by Habenicht, Kehnert, and Hiller (2, No 41), Taenzler, Thomas, and Jungk (3, No 118b-118c), and Corbellini (7, No 68); in these cases the following procedure is used: if, for instance, the Swedish population of a settlement is in the minority, the Swedish name is put in parentheses; the same is done when the Finnish population is in the minority. One cannot use any other method of inscription here, since Swedish and Finnish enjoy equal rights in Finland. Similar criteria also apply for the spelling of settlement names in Switzerland; e.g., "Neuchatel (Neuenburg)," "Geneve (Genf)"; on maps prepared for German use, the German designation of course holds the main position. -- The rules on the entering of parenthetical names should be observed in all parts; the provisional placement of designations should be avoided where possible.

C. Position of Subordinate Designation Parts

Secondary designations placed on the same base line must always be put after the principal name [1].

According to its character as a secondary designation, the arrangement of additional parenthetical names, not standing on the same base line as the principal name, must hold a well-balanced middle position below the base line. [2].

Parenthetical names for one and the same designation must be given equal treatment. If several equivalent names are in parentheses, they must be clearly separated from each other by a graphic symbol, not just by a space [3].

The arrangement of a parenthetical name must be fixed interval-wise in such a manner that it will not stick to the parent name; but it must not be placed so far away that one could doubt the connection between the two names [4].

Incorrect lateral positions and positions in which the parenthetical names are arranged above the principal name or below the latter, with considerable lateral shift, always indicate that they were most probably entered later on. Since such changes are rather insignificant, it would be better to correct the whole setup when a name is entered subsequently, after the principal name. This is better than destroying a good script picture through such incorrect name placement [5]. (There must be no lack of time or shortage of means when it comes to keeping the corrections up to date and entering them carefully. Here too one can recognize the big gap between the geographic institutes, which fulfill a cultural mission, and those few mapmaking firms which pursue purely mercantile interests or which have sunk to the level of map factories.)

Additions of a changeable nature, which are not originally tied in with the proper name, should always be put in parentheses and should, where possible, be entered in different type. [6].

Occasionally, geographic names assume a special position in view of the special form or location of the particular object [7].

Finally, let us say a word about the treatment of underlinings, which should be made light with respect to their thickness, - even when they belong to thickly lettered inscriptions - and which should have their script stem thickened by about up to $\frac{1}{4}$ in thickly lettered names. It is better to make the underlining just a tiny bit longer than the name. The distance from the name itself depends on the size and thickness of the script; the underlining should not hug the name, nor should it be too far away from it [8].

[1] A lateral parenthetical position on the base line of a principal name and a position closely adjoining that name is permissible only if the principal name starts right at the object itself; c.f., e.g., "Ras Assir (K. Guardafui)" in Barich (2, No 84), though it would have been better here to switch the two names, or even to omit the entered principal name altogether. Domann and Hiller (2, No 84) incorrectly arranged "Patras (Patrai)", and Corbellini (7, No 76 $\frac{1}{2}$) did the same for "Valona (Vlore)" and "Akr. Levkon (Asprokavos)", Mielisch and Jungk (3, No 41-42) for "(Praha.) Prag", and Scherrer and Hiller (2, No 40) for "(Dronthm.) Trondheim."

Though he otherwise chose his name placement rather well, Jungk (3, No 146-147) came out rather poorly in the cases of "Schamo (Sandmeer) oder Gobi (Wüste)", "Tien-schan (Himmels Geb.)", and "Ektag (Weissgipfel.) Altai"; he only gave the foreign proper names equivalent treatment; the linking of "Riu-kiu- (Japan.) oder Lu-tschu-Ins. (chin.)" in Friedrich and Umbreit (3, No 164-165) is downright misleading.

In a one-line arrangement, parenthetical names should be placed closely adjoining the principal name so that the continuity will be maintained; cf., e.g., "Timor (Timor)" in Corbellini (7, No 95-96). Corbellini (7, No 153-154) put "Solimoes (Amazonas)" in an impossible position on the same bank of the river; here the distance between the two names corresponds to the extent of the principal name, so that a relationship between the two can be recognized only with difficulty.

[2] Bosse and Fischer (4, No 37) made extremely frequent use of parenthetical names in the eastern part of the Aegean Sea. The customary German versions of these island names were put in first place and the Greek, Turkish, or Italian names were placed in parentheses, though unfortunately not always under the principal name; besides, the language designation was also entered here and there, which was utterly unnecessary. Fischer and Erdmann (4, No 35) arranged the parenthetical names "(Corse)" and "(Sardaegna)" in a skilful manner. Bartholomew (6, No 52) put the parenthetical designations in Palestine in a good position, though these names are not exactly satisfactory on account of their too small type.

Vogel (1, No 30) made an error in his positioning of the entire parenthetical entry "Langen S." which would be better placed below the long drawn-out and fully written out German name in the form "(L. Maggiore, Verbano)"; similar criticisms can be voiced also in connection with the inscription for the same object in Bonnesseur and Chesneau (5, No 28). Heymer and Bosse did an unsatisfactory job on the inscription "Lago Maggiore (Verbano, Langen See)" which they put on one line; since the part in the parentheses came out lighter, the designation does not appear to cover the entire object in its full thickness and clarity.

[3] Unclear parenthetical names in the form "Saloniki / (Selanik Solun), such as they were used by Domann and Hiller (2, No 55), easily cause misreading due to the absence of the comma; besides the Turkish and Serbian spellings had better be replaced here with the Greek spelling, which is Thessaloniki.

In the principal name "Grosser oder Stiller Ozean," Fischer (4, No 38) treated the conjunction in a permissible and by no means disturbing fashion; but on the second line, he put, quite unnecessarily "Sudsee der Deutschen Seeleute, Pacific der Engländer & Amerikaner," whereby he entered the explanatory additions in Latin script. This is wrong, both methodologically and technically; the situation is similar in the case of "Sud-Chinesisches Meer / China-See der Seefahrer, Nan-hai (Sud Meer) der Chinesen" in Fischer (4, No 43). In the first case, it suffices today to put Stiller Ozean / Pacific Ocean / without any additional entry; in the second case, it is recommended that one use the spelling Sudchinesisches Meer / (Nan-hai) / South China Sea /, whereby the Japanese name might be added in parentheses.

[4] In combination with good spacing, exemplary line intervals were chosen by Kehnert and Schleifer (2, No 43) for "Ost-See / (Baltisches Meer)" and by Habenicht and Schmidt (2, No 62) for "Wüste Gobi / (Schamo)". Corbellini (7, No 68) treated the double names for water bodies in Finland in a good fashion.

Vogel (1, No 30) gave an excellent two-line arrangement for "Sitten / (Sion) und Genfer See / (Lac Lemman)"; the latter designation however was unnecessarily crowded as a result of the additions "Grosser S. und Kl. See," which could have been left out. (The uneven treatment of the adjectives and the basic word here is quite noticeable.) If a designation takes up more than two lines, the line intervals must be equal; they must not vary, as in Kehnert and Schleifer (2, No 43) for "Pleskauer S. / oder / Pskowscher / See", since otherwise an improvised, unruly impression is created. We ourselves have always tried to arrange additions and parenthetical names in as well-balanced and moderate a manner, using the same type; cf., e.g., (Figure 19), "Feistritz / a.d. Gail," "Villacher A. / (Dobratsch)" and the double inscription south of the Karawanken Mountains. (The examples we gave, however, at the same time also reveal that the line interval must not be smaller than a certain magnitude, which here seems to have been exceeded, so that ascenders and descenders of the designations will not interfere with each other; a plus or minus in the dimension of just one stroke thickness can just about perform miracles.)

[5] Though a slight lateral positioning of parenthetical names can occasionally not be avoided, one must say that displacements to the extent undertaken by Fischer and Erdmann (4, No 35) in "Valtellina / (Veltlin)" and in Mortell T. / (Martell Tal)" by Vogel (1, No 31, C 5) (see Note), are utterly wrong. (Note Of course if such a displacement is indeed indicated, the basic word should be written in the principal name, and not, as was done here, the other way around.) Such an erroneous placement, in view of the otherwise great skill of the cartographers mentioned above, can only be explained as a subsequent insertion of the parenthetical names, which perhaps was not even performed by the cartographers themselves, but by third parties.

Examples of such erroneous positions above or below the principal names are "(Decin) / Tetschen," "(Opava) / Troppau" in Mielisch and Jungk (3, No 41-42), "Gotenbuřg) / Goteborg" in Vogel and Hiller (2, No 39), "(Gjor) / Raab" in Scherrer and Linnekogel (2, No 18), "(Lwow) / Lemberg" in Kehnert and Schleifer (2, No 44), "(Kowno) / Kaunas" in Corbellini (7, No 58) and "Temesvar / Timisoara)" by Domann and Hiller (2, No 56).

[6] Vogel (1, No 1), for instance obtained a good parenthetical position for additional information on administrative subdivisions in the case of "Helgoland (z. Kr. St. Dithmarschen)" and for distance data in the case of "Flensburg - Kiel (7 Stunden)" [7 hours].

[7] Under the existing conditions, we can approve Domann and Hiller's (2, No 55) solution for the placement of the additional designation "Ak Deniz-Boghazi / Hellespontes" which belongs to "Dardanellen Str."

[8] A good execution of the underlinings can be observed in Vogel (1), Stieler (2), Debes (4), Andree (3), Corbellini (7), Bagge and Aitoff (5, No 45), and Weinreb (5, No 26). -- Although they were treated properly as far as intervals are concerned, the underlinings in Bartholomew (6, No 47) appear too heavy, since they are almost as thick as the script stem.

VII. TREATMENT OF NAME DENSIFICATIONS

When many names are densely bunched in a small area, they should be distributed as uniformly as possible; here, efforts should be directed primarily at refraining from any deviations from the particular base line (parallel or map margin). Now and then however it will be necessary to place the most important names in the empty spaces in arcs swinging upward and downward, whereby the curve should begin or end as near to the object as possible.

Unlike Fischer (*Die Kartenschr.*, page 38), we feel that hints and indications by means of an arrow, often issuing from the end of a stroke, can always and under all circumstances be avoided. Such a relationship of the designation to the object reveals only an improvised solution with which the mapmaker will not be satisfied [1].

In case of a local densification of names, it is a good idea to use "a centrifugal arrangement" of names, tending from the middle of the bunched area, "in order to lighten the script picture" (M.-S. 31) [2].

"Where names are bunched up, the important thing to do is to exploit the available space to the utmost, giving most exact consideration to the number, height, and length of all names, since even the slightest subsequent change will require the reworking of an entire major portion" (F.-S. 38). The endeavor to make room for the names of subordinate designations must not mislead us into removing principal names from these spaces and perhaps assign them a position which could raise doubts as to their relationship to the object [3].

To assure the adequate legibility of the drawing and the lettering, "one must confine the strong bunching of names, which cannot always be avoided, to small sections of the map" (F.-S. 33). To attain the best possible balanced arrangement, it will under certain circumstances be unavoidable "to work the map over several times" (F.-S. 39); but after many years of experience, the mapmaker will know how to skirt such hazards [4]. Only in the rarest cases will it be necessary to leave a designation out in order to make room. But this should be done unscrupulously then, since the requirement for clarity and legibility in a map has priority and since everything must be subordinated to this effort [5].

A densification of the names may occur also where the mapmaker does not want to omit unnecessary additions in the inscription or where he even lets himself be guided by the endeavor to put foreign versions after the German designations more than would be needed [6].

[1] Vogel (1), No 4) used arrows along the Baltic Sea Coast to spare the basic outline near "Leba," "Stilo Bake," "Glash," "Ossecken," and Wittenberg," not because of the densification of designations, but in order to establish a link to the objects which are about 3-4 mm away. (Arrows connected with the inscription we consider necessary only in case it is required to indicate a direction, a destination. Cf. page 12, note marked * and page 41, note marked **. These indicator signs are to be placed along rivers only to clarify and indicate the direction of flow, especially in the case of bifurcations; cf., e.g., the arrow arrangements in Nawrocki (8, Berlin Sheet, I e) northeast of Laage and (Hamburg Sheet, VIII g) east of Wardboehmen. But there is no special advantage in the schematic arrangement of these directional symbols by this cartographer on all sheets of the Germany map, in connection with all river names.)

[2] The cartographers of the Stieler (2) and the Andree (3) atlases skilfully mastered the problem of name punching; cf., e.g., the Upper Silesian industrial region in Kehnert and Schleifer (2, No 44). On the other hand, Scherrer and Fraude's (2, No 34) inscription of the Ruhr region, which gets increasingly difficult with the increasing densification of place names, came out badly; Vogel's (1, No 14) placement of names in the Berlin area needs to be rearranged now. Here, a nonhomogeneous script picture has developed in the course of time due to constant local supplementations and corrections; this picture can be restored to the level of Vogel's creative skill only through thinning out and a change in the arrangement.

[3] The utilization of empty areas occasionally can mislead the mapworker into incorrect name placement. Thus, Heymer and Bosse (4), No 18), e.g., arranged "Zuid-" and "Noord- / Holland" on two lines, of

which the first was placed in the ocean area and hence can be misread as a coastal strip, since the link with the designation portion called "Holland" is obviously lacking. Linnekogel, Schmidt, and Schleifer (2, No 64) assigned an impossible position to the names "Palaestina," "Gross-Libanon," "Alwitien," and "Hatay," all of which were placed in the ocean.

[4] A favorable distribution of small bunched areas was attained by Fischer (4, No 33) along the mouth of the Dvina River and by Vogel (2, No 4) at the mouth of the Tote Weichsel /Dead Vistula/ into Danzig Bay. Heymer and Bosse had an incomparably harder job in the area of Charleroi (4, No 18), in the Ruhr region (4, No 19), and in the Upper Silesian industrial area (4, No 20) due to the wealth of designations and in view of the densification of major settlements. In the Berlin area (4, No 20), their endeavors could find just as little fulfillment as the endeavor of Fischer (4, No 28) in London. These cartographers here resorted to abbreviations, which in part shrink down to just one letter, only because they did not fight their way through to the necessary thinning out of the area, especially since the secondary maps "Berlin u. Vororte" (No 16) and "Umgebung von London" (No 28) could give sufficient indications. The same can be said about Heymer and Bosse's (4, No 21) procedure in the inscription of the Paris area, despite the map entitled "Umgebung von Paris" (4, No 27), which had been created by Fischer and Erdmann.

Intolerable name bunching was avoided in the atlases of Vivien and Schrader (5), Bartholomew (6), and the map volume of the T.C.I. (7).

[5] Fischer (4, No 39, 28) accepted the rather unfortunate position of "Aschiche" only in order to be able to place "Imjanpo" and "Chandao / chezsy" on his 1:15,000,000 map: settlements, which are missing in his own 10-million map (No 44), could be suppressed here especially.

[6] In contrast to the endeavors of German cartographers to do justice to foreign names and to place them additionally in parentheses, the Italians, French, and British avoid double designations especially where they appear as annoying ballast to use; cf., e.g., the limited use of parenthetical names in the Aegean Sea in Corbellini (7, No 75-76).

VIII. INSCRIPTIONS FOR AREAL OBJECTS

Let us now examine and discuss the particular optimum name positioning of the objects to be inscribed in the light of their dimensional form - objects which occur on the map in the shape of area-enclosing lines or dotted areas.

The inscription of areas - of geographic spaces - is to be so handled that the position of the name will allow us reliably to read off the extent of the lettered area. Where possible, the names should run parallel to the parallel; it should assume a normal position and it should deviate from the parallel only where the axis of the area is tilted diagonally up to the north-south line.

The cartographer must devote special attention to these names which are to be put on the map in an almost emphasized and pronounced manner. With skill, he will seek to avoid being accused of presenting a "schematic or diagrammatic arrangement," e.g., of the political subdivision names in Australia and the United States, which Eckert (Die Kartenwissenschaft, Map Science, Vol. I, page 351) objected to at one time; names of such kind should appear as "something that grew by itself."

Prior to any other lettering, all "areal names," as Wagner (Lehrb. d. Geogr., Vol I, Part 1, page 235) calls them, must be entered on the map. One must always place special emphasis on a correct organization as far as intervals are concerned and on a well-adjusted stretch-out of the names. The names must always assume a harmonic position in the area to be lettered; this will contribute considerably to the legibility.

In larger areas, the name should, where possible, be placed inside the area and "near a contour line" (F.-S. 37). If the centroidal axis happens to run in the same direction as the parallel, it is recommended that the name be placed parallel to the parallel. If this is not the case, "a nicely arched centroidal axis running along the main dimension of the area" (F.-S. 37) should serve as guide line. As a rule, a single arc of the form will suffice; now and then the names make a "smoother and more eye-pleasing impression" (F.-S. 37) when a double arc is used [1].

The inscription of unconnected loose areas (island groups, etc.) should be arranged along a base line running through the center or point of concentration of the area or, if the designation comes on two lines, on lines near the center or point of concentration [2].

If an area is fixedly bounded by a color strip or by some other map symbol, the name itself should "not be run all the way up to the outlines" (F.-S. 37). Clarity and legibility are always promoted considerably "if a suitable interval" (F.-S. 37) is placed here, that is, if the length of the name takes up only about $\frac{2}{3}$ of the extent of the object along the base line.

For landscapes without fixed outlines or for the representation of regions inhabited by a tribe, Wagner (Lehrb. d. Geogr., Vol I, Part I, page 235) requires however "that the name coincide pretty well with the

entire longitudinal axis of the particular area." This reasonable requirement, which also corresponds to the geographic conditions, is however expanded by Fischer to the point where "the name should be laid out under all circumstances in the direction of the main extent and along the full length of its valid coverage" (F.-S. 37). In this kind of geographic areas we are as a rule dealing with those that cannot be outlined rigidly, on whose extent even conflicting opinions exist, and where the course of the delimitation now and then corresponds more to a boundary zone which must also be treated as such. It therefore cannot be ascertained why the start and the end of a designation of areas that have no definite outlines should coincide with an ideal boundary line and take up 5/5 of the longitudinal dimension. Since, in addition, an inscription cannot give us any definitive limitation of an area, one cannot see why the dimension (3/5) should not also be used for regions which do not have an outline; everything speaks for the maintenance of this ratio also in the case of unlimited areas.

Finally, we come to the question as to the best position of the designations for areal objects of changing dimensions; as an example, let us take [Lake] Chad here [3].

Some types of "areal positioning arrangement" of map names, as Eckert (Die Kartenwissenschaft, Vol I, page 351) calls them, even help geographic objects, insofar as, e.g., glacier designations can document the course of the ice flow by their very position, in a purely external fashion (cf., page 41, w) glaciers).

[1] Under no circumstances must the arrangement of unrestricted area names look artificial and contrived. The cartographer must again and again critically examine his own creation in all its parts and must deviate, e.g., from a parallel circle position, only in case of dire need. Nothing would be worse - to quote Imhof - than to use something that "was good in one case also in other areas and scales," since such a working procedure is bound to lead to "poor results" (Imhof, E., "Some Remarks on the Science of Mapmaking (Special Article for the Swiss Land Exhibit in Zuerich, 1939)," (Vermessung, Grundbuch u. Karte / Surveying, Cadaster Book and Map /, 1941, Zuerich, page 169) - page 170).

[2] Special care must be taken in the placement of those designations which cover a multitude of objects with one inscription. Fischer and Erdmann (4, No 35) achieved this in an exemplary fashion with "Arcipelago Toscano" and the stretch-out of the names "Kykladen" and "Sporaden" (4, No 36). Erdmann (4, No 47) achieved this to a no lesser extent in the case of "Pinguin-Iⁿ" though this name had to be intersected by 16 other names; but elsewhere, (No 45), he went completely wrong on "Ping / uin / - I / nseln."

[3] Some cartographers, e.g., Domann and Barich (2, No 83) use the axial position to cover the entire area of the vast swamp area with "Tschad-Tchad-Chad-See" (see Note); while Mielisch (3, No 176-177) uses "Tsade (Tschad)" and Corbellini (7, No 109-111) uses "Tcad / (Chad"; others try to do the same thing with the help of a lateral placement, as in the case of "Tschad-See" in Fischer (4, No 49) or "L. Ciad" in Corbellini (7, No 107-108).

(Note) There are considerable objections to the linking of three names from different languages with the German basic word; quite apart from that, all words in this designation mean the same thing, i.e., water, lake.)

Other cartographers indicate already through the entry of the name that they intend to label only those parts of this sweet-water body which are emphasized color-wise as water basins; cf., e.g., "Lake / Chad" in Bartholomew (6, No 70) or Chesneau (5, No 45), for "L. Tchad."

All these name positions have their justification; the latter name placement of Lake Chad is especially justified in case of emphasized coloration. -- Without going into any lengthy explanations, let us briefly discuss the best spelling and name sequence of the designations found for this inland lake in German atlases; we shall not go into those designations that are found on foreign maps. On maps for German use, it suffices to have "Tschad" in the German phonetic spelling; it is not necessary to write "Tschad-See," since "Tschad" already means water. If the map is intended for international use, one must take into consideration the political control of the area and France's lion's share of the shoreline (3/4); hence one must add "(Tchad, Chad)" to the name, putting the French spelling first. Any other treatment would conflict with existing conditions; one can of course omit the secondary designation "Kulu" which is used by the island dwellers.

Additional Remarks

In addition to the hints given earlier, we would like to give some further data here on the arrangement of the inscription of the principal areal objects which as a rule should, where possible, be executed in a stretched-out fashion.

a) Continents. Debes (4, No 1) did an excellent job on the two-line arrangement of "Sud-Amerika" and "Nord-Amerika", avoiding a lateral displacement. Corbellini (7, No 1-3) also achieved a good position for the names of continents whose base line hugs the meshes of the parallels.

-- Habenicht and Schmidt's (2, No 62) erroneous arrangement of "Zentral-Asien" shows that geographic names such as this one or, for instance, "Vorderer Orient," "Morgenland," and "Abendland," should not appear on any maps.

b) Coastal Strips. They are either lettered on the land area, as is done as a rule with Upper and Lower Guinea, or the designations assume a position in the ocean, though parallel to the coast, as in Vogel and Schleifer (2, No 23) for "Coasta de Poniente." Domann and Barich (2, No 82) and Barich (2, No 84) arranged the names well in the ocean and skilfully indicated the connection to the coastal strip: cf., also "Malabar Coast" and "Coromandel Coast" in Corbellini (7, No 93-94), as well as "Grain Coast, Ivory Coast," etc. in Bartholomew (6, No 76), which were not interrupted thanks to their more distant position. Corbellini's (7, No 30-31) landbound entry of the coastal names in Catalonia and Liguria must be considered merely an improvised placement, which was undertaken only in order to make room for the inscription of numerous objects near the coast, whose names were put on the ocean.

c) Peninsulas. Where possible, Vogel (1) placed these names in the interior of the object and covered the areas through differing stretch-outs of the designation on a ratio of 1:2 to 8:11. By means of an arrangement curved in four places, Habenicht and Schmidt (2, No 101) tried to gain a central position for "Baja California," which Elfert (4, No 54) attained more evenly with "Halb¹ Kalifornien" and only two curvature points. Compared to "Coburg P^a" in Fischer and Winkel (4, No 52), there is too much movement in the case of "Koburg-H.-I." in Schmidt and Schleifer (2, No 90, B 1). These mapmakers knew how to cover the same object with a differing position in an excellent manner; Schmidt and Schleifer placed "Kap York / Halbinsel" on two lines, parallel to the parallels; Fischer and Winkel arranged "Cape York-Halbinsel" separately in an axial position; cf. also "Balkan - / Halbinsel" and "Krim" in Bonacker (Figure 10) as well as "Arnhem-L^d" and "H.-I. / York" (Figure 15).

d) Isthmuses. As a rule it will be advantageous to use only one name placement in ocean position, such as was done by Fischer (4, No 43) with "Isthm. v. Kra." by Bonacker (Figure 9) for "Isthmus / v. Panama," and by Elfert (4, No 54) for "Isthm. v. Panama." In the case of large area objects, e.g., "Isthmus / v. / Tehuantepec," Habenicht and Schmidt (2, No 101) and Elfert (4, No 54), preferred a land position, which is almost obligatory here.

e) Spits. Here it is recommended to have the designation always hug the longitudinal object by means of a lateral parallel positioning; cf., e.g., "Frische Nehrung" and "Kurische Nehrung" in Heymer and Bosse (4, No 17) where we have a good name stretch-out; Nawrocki (8), where

the name is not stretched out enough. Fischer and Erdmann (4, No 12 a) took up three lines for "Landzunge / v. / Arabat," though a two-line arrangement would have been the obvious thing here; it would also be better here to have a normal position, such as it was taken up by Thomas (3, No 144b-145b).

f) Island Groups. Debes (4, No 1) gave a lateral arrangement, which is almost ideal for small-scale maps, to the names "Britische Iⁿ," "Japanische Iⁿ," "Kl. Antillen," and "Philippinen." This master cartographer (4, No 51 and 53), who is a graduate of the Gotha school, always knew how to put such designations in the best position. Bonacker (Figure 15) gave similar treatment to "Bismarck- / Arch." and to "Molukken" and "Sulu-Ins." which he put in a flank position. Other exemplary flank positions are (Figure 9) "Bahama-Ins.", "Grosse Antillen," and "Kleine Antillen." Heymer and Bosse (4, No 15) did a magnificent job in placing "Ostfriesische Inseln" and "Nordfriesische Inseln" far from the objects; in the intervals they put the names of the individual islands on flat arcs. Fischer (4, No 42) did a good job in placing "Andaman Islands" and "Nicobar Islands" with the help of good placement and he arranged designations of the same kind elsewhere (4, No 52) in an exemplary fashion. Vogel and Schleifer (2, No 29) made a methodological error in their four-line arrangement of "Kanal-Inseln / (Channel Islands) / Iles Normandes / (Englisch)," instead of entering Kanal-Inseln / (Channel Islands, Iles Normandes) / (Brit.) on three lines. It is especially difficult to create a clear script picture of "Die / Halligen" whose stretch-out Heymer and Bosse (4, No 15) handled satisfactorily with the help of a two-line arrangement, near the point of concentration of the designation. Nawrocki (8) entered "Halligen" on the centroidal axis, omitting the article, which must not be left out here; but he stretched the inscription to double of what it should have been, i.e., 24 mm, instead of 12 mm. Vogel (1, No 1) used for "Die Halligen" a peripheral arrangement on two lines, but moved too far from the center of the object. This master cartographer of the Gotha school stretched the names of island groups by far too much, so that we can find ratios of 6:7 up to 10:11 here.

g) Islands. Depending on the available area, Debes (4, No 51 and 53) and Corbellini (7, No 63) placed such island names as "Oland" and "Gottland" on land; Debes also did an exemplary job on lateral name placement, as did Fischer and Erdmann (4, No 35), e.g., through the lateral arrangement of "Korsika" and "Sardinien." Bonacker (Figure 10) did a less effective job on "Sardinien," which should have been shifted to the side by 3 mm. Vogel and Schleifer (2, No 30) put "Ile / de la Camargue" in an original position which is adapted to the position of the object; Glsmann and Schleifer (2, No 31), did a better job on this island. When using an interior map position, Vogel (1) always stretched the island names in ratios of 1:2 to 2:3 and when using a marginal

position, he preferred a rigid, area-bound arrangement with compact lettering, e.g., "Sylt," "Fehmarn," "Bornholm"; but he also used narrow spacing for a flank position hugging the island form, e.g., "Ameland," "Terschelling," and "Norderney." Linnekogel (2, No 47) treated the entries "Grosse Schutt-Insel" and "Kleine Schutt-In." in a noteworthy fashion.

(Apart from the uniformity of abbreviations of common words - which must be attained in all maps and which is here violated by "In." for "Insel" /island/ - we are again and again surprised by the arbitrariness and even unawareness with which cartographers make up abbreviations. Sometimes they use, e.g., Halbi., H.-I., or Halb-I.; sometimes they omit the hyphen; sometimes they do not differentiate sufficiently consistently between singular and plural for island and islands when they write I. and Ins. The absurdity and fallacy of this abbreviation for island (In.) can also be noted in a similar procedure for Berg /mountain/ - Be., Rutte /Rut/ - Hu.)

h) Mountains. Heymer and Bosse (4, No 25) did an excellent job with their free placement of "Julische A." and "Oetztaler A." along an arc; Vogel (1, No 13) did a good job on "Dammer Bge." and (No 15) "Katzen Geb." Extensive ranges, such as "Sudeten," "West-Beskidien," "Tatra," and "Niedere Tatra," were inscribed along exemplary and beautifully swung lines by Nawrocki (8); but in the case of "Bayrischer Wald," he did not adhere to the guide line; in the case of "Vogesen oder Wasgenwald" he shifted the entire designation 3 cm to the north; and in the case of "Fichtel-Geb." he made some classical mistakes consisting of inadequate position, uneven interval between characters, and varying size and thickness of characters.

i) Plateaus. Fischer (4, No 38) and Habenicht and Schmidt (2, No 62) put "Dekan" in a good position; Barich (2, No 79) did an exemplary job in putting "Tademait-Plateau" on a double arc; but, in view of the present state of the art, such maps should no longer contain entries such as "Hochplateaus (Gebiet der Steppen)" and "Plateau ca. 2,400 mm" in Fischer (4, No 40, F 6), and "Hochflache / von / Paderborn" in Fraude (2, No 11). With the disappearance of unexplored regions and hence also of empty spaces on maps, data such as these should be omitted in favor of the actual geographic designations, i.e., the proper names; even comparatively open areas of the map should not mislead the cartographer into adopting the procedure described above. After all, it is the task of the map to present a true picture of the visible fixed phenomena on the earth's surface with their colorful alternation of wide-open and narrow spaces. The inscriptions should also be adapted to this main idea and should be coordinated with the given conditions; they should not create a picture of uniform distribution of names where this is not the case.

j) Plains, Depressions, Hollows. We have some very instructive examples in the free arrangement of "Oderbruch" in Fraude (2, No 8), "Las Marismas" in Vogel and Schleifer (2, No 27), and above all, we have a very informative example in the comparison of the entry "Marchfeld" in Nawrocki (8, Vienna Sheet) with that in Heymer and Bosse (4, No 23); here the latter version comes out better. Cf. also the inscription placement of "Oberit. Tiefeb.," "Walach. Tiefeb." etc., in Bonacker (Figure 10).

k) Forests. We have some instructive inscription examples in the case of the wooded areas in fixed and free arrangements in Vogel (1, No 21) and the example of "Tucheler Heide" in Fraude (2, No 8). When necessary and when forced to do so by the outline of the object, Vogel (1) also accepted a lateral shift; cf., e.g., (No 28, B 4) "Unter - / Weilhardt Forst / Ober-."

l) Deserts, Steppes. As examples of good name placement, we can point out "Dascht-i- / -Lut" in Habenicht and Schmidt (2, No 67, K 8), "Hunger-Steppe / (Bedpak-Dala)" in Habenicht and Brendel (2, No 68, E 10), "Kaspische Steppe" in Scherrer and Hiller (2, No 5), and "Grosse Viktoriawüste" in Schmidt and Schleifer (2, No 89). Habenicht and Schmidt (2, No 67, G/H 16) handled "Kevir (Salzwüste)" visually incorrectly and Schmidt (2, No 65) did the same for "Nefud (Rote Sandwüste)"; instead of writing Thar, Domann and Fraude (2, No 69) entered, by way of explanation, "Thar (d.i. Wüste)" and, in addition, indicated through their execution of the inscription that the designation should be read as Thar-Wüste.

m) Countries. One should always endeavor to obtain a landbound placement, since otherwise parts of the designation standing in the ocean will be less clear; this happened in the case of "Turkisch. Reich" in Fischer (4, No 38); here, likewise, only the first two characters of "Norwegen" are on land. Let us give a few ratios by way of reference, though first-ranking cartographers give us such ratios for the extent of country names only with great caution. On an average, these names are stretched by Bartholomew (6) on a ratio of 2:5, by Vivien and Schrader (5) 2:3, in the Andree atlas (3) 2:3 to 5:7, in Stieler (2) 3:4, and in Corbellini (7) 4:5. Legibility will always be impaired when such names are stretched out too much, as for instance in Elfert (4, No 55) where some designations were stretched up to 4:5 and even 9:10 of the entire extent. We ourselves have always used the ratio of 3:5 or also 2:3, such as for "Liechtenstein" (Figure 16), because we felt that these ratios look rather well proportioned. -- In Corbellini, country names - full of many flourishes - as a rule assume a pronounced axial position; here, e.g., "Uruguay" is the only country name that has been placed parallel to a parallel in South America.

(7, No 4-5). Due to the preferred free positioning of these names, the over-all script picture makes a rather unruly impression; this impairs the clarity of the maps (7, No 13-14).

n) Provinces. The Debes cartographers (4) handled this type of geographic names in an exemplary fashion. Even in a minor stretch-out, Koffmahn and Schleifer (2, No 37) managed to cover the areas of the counties excellently by using narrow and high letters which can be drawn clearly. Department names were given good legibility by Koecher, Kratz, and Jungk (3, No 77-78) with the help of a minor stretch-out of 1:4 to 1:3. -- Here too Corbellini (7, No 37-38), though unnecessarily, as a rule abandoned the parallel position and arranged these names, e.g., "Algarve," in axial position on arched lines; this Italian cartographer (7, No 166-167) achieved a better position for the state and division names in Australia, though it would have been a good idea to stretch them less in this case.

o) Kreise, Districts. Here, too, we would first like to point out the careful treatment of such names by the Debes cartographers (4); cf. also the fixed, good arrangement of "Kreis / Uelzen" by Vogel (1, No 7). -- We do not recommend the connecting of a landscape name for a Kreis designation, such as it was done by this old master (1, No 8) for "Kreis / Kreis / -Prignitz / West- / Ost-" on three lines, which can be deciphered only by the initiated, since this name must be read in the sequence: first line - third line - second line, especially because the type used for Prignitz does not stand in any relationship to the other designation parts. The imitation of Vogel's (1, No 14) arrangements for "-Geb. Kr. / Mansfelder- / -Seekr." and (No 17) "Unt. / Ob. / Westerwaldkr." can be recommended just as little.

p) Landscapes, physiogeographical. Vogel achieved a good, free position for "Stormarn" (1, No 7), "Sassen" (No 11), "Die Borde" (No 14), and "Goldene Aue (No 13-14), but in the case of "Luneburger / Heide" (No 7) he moved too far from the center point. The axial position of the designations is excellent in Fraude (2, No 7 G 5/6) for "Wendland" and in (No 11, G 4) for "Wetterau"; some spaces also permit a position parallel to the parallels, such as Linnekogel (2, No 14) used it for "Oberschwaben."

q) Landscapes, political. Nawrocki (8, Eastern Alpine Region Sheet) arranged "Slovenien" beautifully in a double arc. Heymer and Bosse (4, No 21) found a good arrangement for the designation "Ober- / Unter- / Elsass" by means of a slightly reduced interval between the characters on the first line, as compared to the interval of the characters in the principal name; Linnekogel (2, No 14) was not able to achieve the same effect with his entries; this could easily have been attained if the abbreviations Ob.- and Unt.- had been used.

r) Landscapes, historical. A model of a clear, lively inscription arrangement of such names in France was created by B. Hassenstein (cf., von Spruner, K., and Menke, Th., Hand-Atlas fuer die Geschichte des Mittelalters und der neueren Zeit / Hand Atlas for the History of the Middle Ages and Modern Times /, 1880, Gotha, 3rd edition; Plate 57, "France, 1815-1871," 1:6,000,000, 1876); Fischer and Erdmann (4, No 27), Koecher, Kratz, and Jungk (3, No 87-88), and Weinreb (5, No 8) achieved an excellent placement of the old "gouvernement" names, though in Weinreb these names suffer due to the rather unfortunate choice of the type; cf. also the treatment of such names in Bonacker (Figure 13).

s) Oceans. One should always avoid a stiff arrangement such as that of Habenicht and Schmidt (2, No 62) for "Grosser Ozean" parallel to the map margin. Bartholomew (6, No 22), without looking for the center axis of the ocean areas, put "Atlantic Ocean" very close and parallel to the northern margin, "North Sea" similarly with respect to the eastern margin, and thus impaired the otherwise good script picture with these awkward arrangements.

t) Ocean Parts. Sea, sound, and bay names were arranged well by Fischer and Erdmann (4, No 35), Bonacker (Figures 10 and 15), Fraude and Schleifer (2, No 77), and Kehnert and Schleifer (2, No 43); Vogel and Hiller (2, No 6) did a good job in lettering "Pommersche / Bucht" and "Danziger Bucht" in a compact form. Straits and port names appear in well chosen positions in Fischer (4, No 42); the ribbon-like entries "Oeresund" and "Drogden" in Baedeker (Norwegen, Daenemark, Island, Spitzbergen / Norway, Denmark, Spitsbergen /, 1931, Leipzig, page 58) and "Hamarne" in Nawrocki (8; Berlin Sheet, V/VI b) are likewise noteworthy. A specially successful and informative script picture was produced by Fraude (2, No 8) and Heymer, Bosse, and Winkel (4, No 16) with the compact arrangement of the bay or lagoon names for "Oderhaff" and "Stettiner Haff." On the other hand, there are considerably objections to the inscriptions "Golf von S. Eufemia" and "Golf von Squillace" in Roman type in Vogel and Schleifer (2, No 22) compared to the hollow-letter names of equivalent objects; "Balearen-Becken" by the same cartographers (No 23) makes a stiff impression, the straight base line being parallel to the eastern margin of the map. Domann and Hiller's (2, No 53) positioning of "Kanal / v. Zante" is wrong because of the arrangement of the name, which ends at the exit of the canal and thus only touches the object covering it. In maps of smaller scale, the situation picture often allows us to enter the names of straits only off to one side, such as was done, e.g., for "Bosporus" in Bonacker (Figure 10). But we cannot accept the solution of interrupting a coast line merely in order to place, e.g., "Dard."; a flank position would have been better in this case.

u) Lakes. Where possible, lake names should assume an interior position, since the customarily thin characters look particularly good against the light blue lake background; cf., e.g., "Thunersee," "Wallensee," and "Konig S." (see Note) in Bonacker (Figures 2, 3, and 18) or "Chiem / See," "Atter S.," "Traun S.," "Neusiedler See" and "Platten See / (Balaton)" in axial position in Nawrocki (8, Eastern Alpine Region Sheet) as compared to "Millstatter S." and "Weissen See," which of course had to be arranged in a flank position due to their shape and could not assume a normal position, such as in the case of "Wocheiner / S." and "Kis / Balaton," where a normal position should have been used. (Note ** There are considerable objections to the breakup of the inscription due to intersection by the word "St. Bartholomae"; this designation should be put east of the lake, whereby an arrow might be used as exception to indicate the object.) The significance attached to the reduction ratio also with respect to the name position can be seen in a comparison of the inscription for the same object by Bonacker. On a scale of 1:200,000, the sharp rock ridges (Figure 6) still permitted the arrangement of "Vierwaldstatter See" on a beautifully shaped double arc, while on the scale of 1:600,000 the lake name (Figure 1) had to be put on two lines.

v) Catchment Basins [Neve Fields]. According to the procedure of R. Finsterwalder and H. Biersack (Karte der Zillertaler-Alpen / Map of the Ziller Valley Alps, eastern sheet, 1:25,000, 1934, Vienna), for "Griessbachjochkees" and "Schattseitkees," these designations should best be arranged parallel to the contour lines; occasionally, it might be proper to place these names parallel to the crest line or in an axial position, such as in the case of "Scharfkarkees" and "Steinkarkees."

w) Glaciers. The plasticity, the movement of the ice streams, can be shown by arranging the inscription in an axial position perpendicular to the contour lines; cf., e.g., "Gr. Aletsch Gletscher" in Vogel (1, No 30) and "Pasterzen-Gl." in Bonacker (Figure 17).

x) Nations, Tribes. Names of nations, which mostly do not have definite limits, were stretched out suitably by Debes (4, No 12 c) with ratios of 2:3 to 3:4 of the longitudinal extent and by Corbellini (7, No 15-16 and 109-111) with ratios of 3:5; Barich (2, No 84) and Habenicht and Schmidt (2, No 104-108) arranged these names in an exemplary fashion in Africa and South America. Contrary to his own instructions, Fischer (4, No 39 and 40a) stretched these names to a lesser degree and thus achieved good clarity. The stretch-out of nation names is good also in Thomas (3, No 31 to 32) and Bartholomew (6, No 55). -- One should avoid entries such as "Innere / oder / Burkejewsche Horde / der / Kirgis-Kosaken," which Habenicht, Kehnert, and Hiller (2, No 59) put on four lines, using three letter styles.

IX. INSCRIPTIONS FOR LINEAR OBJECTS

The following remarks apply first of all also to objects with a linear extent, e.g., mountain ranges; here the name should swing easily as it adapts itself to the shape of the object; there should be no kinks or minor arcs [1]; of course, the inscription must under all circumstances correctly cover the orographic form [2].

Names of mountain ranges should not be placed on the ridge, which must remain free, but on the slope, though nearer to the crest than to the foot. If surface forms with lateral illumination are to be shown on the maps, it is recommended that the entry be put on the brighter slope for better legibility.

Valley names are placed along the valley floor, likewise along the adjacent bright slope, and follow the depth contour of the valley bottom in beautifully shaped sweeps.

In the lettering of rivers, the designations are to be repeated in increasing sizes as we go downstream and, where possible, in not too great intervals, to avoid lack of clarity. How necessary such a methodical arrangement of names of water bodies can be, is illustrated, e.g., by the circumstance that even geographers have doubts about the designation of the lower course of the Bug River, from the confluence of the Narew River to the Vistula, simply because our maps lack name entries (Bug) precisely for this section and since the designation of this river section was not clarified until the issue of a decree by the Reich Ministry of the Interior on 8 October 1941 (VIa 1462/41:6460a).

Long drawn-out and narrow objects (islands, spits, etc.) often do not permit us to insert their names; such names must therefore be placed close by, hugging the course of the object, using a calm, balanced arc. In case of very long objects it is advisable not to space the name too much, but to prolong it, e.g., by spelling out the additional term "Gebirge" [mountains], if one happens to be there [3], or to enter it twice [4].

For reasons of legibility, Fischer (*Die Kartenschr.*, page 37) suggested that one stretch out a mountain name, if possible, by means of its retranslation; e.g., "Grosser (russ. Bolschoi) Chin-gan." We do not really want to advocate such a procedure. First of all, parenthetical names, as we explained elsewhere in this connection (page 25), must be arranged differently; second, adjectives and basic words, if translated into German, should not be retranslated into their original language. There are no objections to a double inscription where we have a secondary name; we have discussed the arrangement of both designations with respect to each other elsewhere (pages 19 to 22).

[1] The eye can feast on the perfect and beautiful arrangement of the inscriptions of the names on the physical map of Europe by Ambrosious and Jungk (3, No 25-26), the specially well done plate entitled "Eastern Alpine Region" by Nawrocki (8), the representation of Central Europe by Koecher and Berg (3, No 35-36), of the Eastern Alps by Berg (3, No 77-78), of the Balkan Peninsula by Mayr and Jungk (3, No 134-135), of the physical plate of Africa by Koecher and Jungk (3, No 170-171), and of the political plate by Koecher, Jungk, and Taenzler (3, No 172-173), of Iceland by Erdmann (4, No 30) and Koecher and Jungk (3, No 113 to 114), of Sardinia by Fischer and Erdmann (4, No 35), of Italy by Fischer (4, No 40 a), and the plate of Palestine, prepared by Fischer and Guthe (4, No 41), which reveals great maturity in all parts. The position picture for the Alpine map (7, No 17-19) and the names for the Small Antilles (No 153-154) were treated excellently by Corbellini; Bartholomew did a similarly good job for England and Wales (6, No 20) and Weinreb (5, No 16) for England. Bonacker (Figure 5) tried to achieve a well-balanced script picture in all parts in the area of the Tessin Alps both through a well-selected stretch-out of the valley names and a resulting alternating letter interval, and through the use of varying script heights.

Only few people can see how much one can get out of the study of the names entered on the plate of the South Sea Islands by Haack, Feickert, and Schleifer (2, No 91) and what a vast job of deliberating and weighing was connected with this. The map user gratefully views such laboriously prepared sheets on which every stroke and every line reveal mature skill and where the position of the map names also indicates conscientious and loving treatment.

[2] One can note placement errors also in well-known German objects. For instance, Heymer and Bisse (4, No 22) were wrong in their inscription of "Bayrischer Wald" ridge between Danube, Regen, and Ilz, whereas this object was correctly inscribed in Stieler (2, No 46); cf., also H. Lautensach (Laenderkunde, page 106) and Volz (Das Deutsche Reich. Einleitung /The German Reich - Introduction/; (F. Klute, Handb. d. geogr. Wissensch. /Handbook of Geographic Science/, 1936, page 61) - page 86).

[3] The desire for a better coverage of an object in the case of short designations must not mislead us into attaching to the name an unaccustomed radical word such as was done in Vogel (1, No 26) and Nawrocki (8, Central Alpine Region Sheet) in the case of "Jura Gebirge." Here, only the versions "Jura," "Der Jura," or "Schweizer Jura" are permissible and the cartographer must choose among them; we would be justified in rejecting, e.g., the spelling "Harz-Gebirge" as an error.

/ 4 / Occasionally, repetitions make a contrived impression and should therefore be avoided. Now and then, orographic conditions almost force us to enter a designation twice; cf. Bonacker (Figure 2) for "Ober-Simmental," "Nieder-Simmental" (see Note), and (Figure 20) for "Ober-Pinzgau," "Unt.-Pinzgau" or "Namib" in Erdmann (4, No 45) and especially "El-Ror" in Fischer and Guthe (4, No 41), where the names were twice run successfully from one river bank to the other. ([Note] Here, an even better relationship could have been established to the sister name with the same stretch-out, using the abbreviation "Ndr." and larger letter intervals.)

Additional Remarks

Let us add a few supplementary remarks on the linear objects which we have just discussed.

a) Mountain Ranges. Vogel (1, No 13) inscribed "Wiehen-Geb." and "Egge Gebirge" in an exemplary fashion; Linnekogel (2, No 13) executed an exemplary entry in all parts for "Bohm. Kamm / (Adlergeb.)"; cf. "Rigi (Figure 1), "Erzberg" and "Karawanken" (Figure 19), "Rhodope-Gebirge" (Figure 8), "Vogesen" (Figure 14), and "Lebern" (Figure 7) in Bonacker, who, however, failed on the inscription "Roggen" (Figure 7) which should have been moved 2 mm northwest. -- In an otherwise very painstaking inscription job, Mielisch and Berg (3, No 125-126) made a number of placement errors. For instance, they placed "Toscanischer (Etruskischer) Appenin" too near the ridge, which is cut three times by the designation; the name should have been put on the northern slope at a distance of about 1 cm from the crest line; cf., e.g., the well-selected separation from the ridge line which Bonacker (Figure 3) created for "Alpstein" and "Churfürsten". One must always avoid a pronounced ridge position, which was used too often by Corbellini (7, No 37-38 and 73-74). An instructive example of a placement error is represented by "Teutoburger Wald" in Vogel (1, No 13). The designation, which is placed in the plain, since the ground plan representation did not permit another position southwest of the ridge, should have been placed over the crest line on the northeast slope.

b). Valleys. Valley names were placed in an excellent manner by Nawrocki (8, Eastern and Central Alpine Region Sheet) and by the Debes cartographers (4). Vogel (1, No 28) did a good job extension-wise and position-wise for "Isar Tal" and "Gasteiner T."; but he shifted the words "Ober- / Unter- / Vintschgau" (No 31) laterally on the first line and spaced them unevenly; this shortcoming could have been avoided if the name had been entered twice. Valley bottoms can often be covered very nicely through a well-executed sweep from one side of the valley to the other, such as was done by Vogel (1, No 33, B 3) for "Lavant- / Tal," by Bonacker (Figure 3) for "Toggenbu / rg," "Fusch / er T.," or

"Rauris / tal" (Figure 20), and by Heymer and Bosse (4) for "Obe / r-Inn-Tal" (No 25, A 2) and "V. di Zol / do" (C 3). An inscription arrangement oriented in all parts can, in itself, clarify the significance of the individual valley landscapes and their relationships to each other; this was done successfully by Bonacker (Figure 5) in the area of the Tessin Alps.

c) Islands, narrow, long drawn-out. Depending on the scale, it will be advisable to use a flank arrangement that hugs the object. This was done for "Palawan" by Fischer (4, No 38), while he used an interior position (No 43) in his 10-million plate for "Palawan (Paragua)," similar to Bonacker (Figure 9) for "Kuba."

d) Rivers, Canals. Branches of mouths of large rivers (Rhine, Danube, Nile, Ganges, etc.) are covered extension-wise by means of an inscription taking up an ocean position that the designation amounts to about 3:5 of the distance between the outermost mouth branches. The name is to be so arranged parallel and far from the coast in a flat arc that the designations of the mouth branches, settlements, and the like, will, where possible, not touch it as it takes up a free position; cf. e.g., "Donau-Mundungen" in Domann and Hiller (2, No 57) and "Nil-Mundungen" in Kehnert and Schleifer (2, No 81), as well as the treatment of "Wester- / Oster- / Ems" by Heymerb and Bosse (4, No 18), where the inscription, placed in the course of the river, clearly emphasizes the common feature, thanks to its arrangement. -- Vogel and Schleifer (2, No 20) entered "Delta des Po" instead of Po-Delta or Po-Mundungen / mouths of the Po, respectively, "-Mägn." in a manner which is not recommended; the one-line placement of "Wol / ga-Mun / dung / en" in Habenicht, Kehnert, and Hiller (2, No 42), as against "Donau-Mundgn." also came out rather badly; the inscription "Dona / u / -Mä / gn." in Habenicht, Kehnert, and Hiller (2, No 58) is also disturbed considerably in its over-all script picture. Schmidt and Barich (2, No 86) stretched the entry "Mundungen des / Zambeze od. Sambesi" twice as much; extension-wise, the name covers a coastal strip of 300 km of liner extent instead of about 150 km.

A comparison of the sequence of river names in Vogel (2), Debes (4), and Nawrocki (8) for Rhine, Main, Elbe, and Havel is quite informative even though it was necessary here and there to repeat entries several times due to the subdivision of the individual maps. The name "Rhein" for the river section from Lake Constance to Emmerich was entered 13 times in Vogel, six times in Debes, and five times in Nawrocki; the last named values result from the scale reduction so that the three cartographers mentioned maintained just about the same sequence density. While the corresponding figures for "Main" (8, 4, 5) and for "Havel" (12, 5, 5) reveal similar ratios, the values for "Elbe" (17, 11, 13) indicate an interval densification in Debes where

we would normally expect eight names; the densification is considerably greater in Nawrocki, who increased the densification by about 50%. -- Here, too, we cannot give any rules for frequency and we cannot establish a ratio with respect to river development, since more frequent name entry is required in accordance with the form of the course of the water body and the greater or lesser thickness or density of the accompanying map elements. It is recommended that one sketch in these names before the settlements are entered and that they be lettered in definitively after the settlement names have been lettered.

Increasing use is being made in geographic maps of a kind of type for names of water bodies in which the characters are perpendicular or even slightly slanting backward; cf., e.g., Vogel (1), Stieler (2), Andree (3), Debes (4), Bonacker (plates I-IV) and Corbellini (7). The legibility of the names is enhanced by the cartographers through a noticeable spacing of the letters. Such spacing may be used for river names, and for individual names, only where it is used as a matter of principle throughout the map; it must not be used for just one object, as was done by Nawrocki (8) for "Mittelland-Kanal."

River bends occasionally make it possible to swing a name from one river bank to the other. The entry "Ha / vel" in Vogel (1, No 14, A 4) is just about classical; "Dornb. / Ach" (No 27, E 3) and "Neustadter Was / ser" (No 15, C- 5/6) were handled well; "Ko / nigs / Gr." (No 14, B 4) did not come out as well; Fischer (4, No 43, F 4) lettered "Pula / ngui" satisfactorily; but Erdmann crossed the river twice unnecessarily with "Si / m / o-J." (No 38-39, L 4, Columbus-Weltatlas / Columbus World Atlas, 1935). (This erroneous placement, according to a subsequent check, occurred only in connection with a shift of "Kivalo" (4, No 30), which has now been placed in a better position.)

River names should always hug the water body; they should not move away from the latter, as in the case of the entry "Oste" in Nawrocki (8, Hamburg Sheet, VII f); there is no reason - symbol-wise - to allow "Wumme" (VIII f) to run beyond the source.

e) Tunnels. In representations on a larger scale, it is recommended that the names, written in compact form, be placed in a middle position, parallel to the graphic symbol; where small-scale maps do not allow such an arrangement, tunnel names are given a tied-in normal position.

f) Shipping Lanes. Along these transportation lines, ports of departure and destination, where possible, are placed in a middle position by Elfert (4, No 10), while Corbellini (7, No 6-8), facilitating

the orientation, enters them twice, each time near the land; depending on the extent in the map picture, one or the other form of placement will turn out advisable; occasionally, one might use a position near the margin, such as was done skilfully by Erdmann (4, No 12 b).

The sequence of settlement names must always be so handled "that the names of the terminal and intermediate stations will be indicated as to their location by the position of the names" (B.-S. 38). Erdmann (4, No 12 b) in his map of Europe reversed this name sequence completely; instead of writing N.-York -- Stettin or N.-York -- Bremerhaven, he wrote, in contrast to the geographic location, "Stettin -- N.-York" and "Bremerh. -- N.-York."

g) Overseas Cables. The lettering of overseas cables on geographic maps only has a direction - indicating character; it thus does not require "from" and "to" indications; nor does it require any abbreviations near the margin; it is better to use an arrow here. Since, in addition, the applicable map symbol is explained anyway, the inscription "Telegraphen-Kabel von Calais" in Vogel (1, No 1) should, instead of its middle position, take up a position near the left map margin in the considerably shorter form "Calais"; cf. this arrangement, e.g., in Erdmann (4, No 12 b).

h) Highways. Along the routes of the explorers, Corbellini (7, No 113-114) put their names parallel to the transportation routes, whereby he used compact in addition to spaced lettering; this was also used by Fischer (Columbus Weltatlas, 1935, No 61-62, C 1/2) for "Pilger-Strasse" [pilgrim's highway] and by Habenicht and Schmidt (2, No 66, a 3) for "Pilgerstrasse nach Mekka"; cf. also Bonacker (Figure 20) for the placement of "Pinzgauer Spaziergang" on a double arc.

i) Directions, Destinations. In case an area located between the inner and outer margin [sic] should allow us to do so, we place the directional names, which should not be put inside the map, within that area. To get a calm picture also in this part of the map - which was disturbed considerably by Vogel (1) and Nawrocki (8) due to insertion of the direction of the transportation route - it is recommended that one use an inscription parallel and near to the interior edge, such as was done by Elfert (4, No 55), e.g., for "Kap Canso" and "Santiago de Cuba." To establish the link to the pertinent map element, it is a good idea to use an arrow, which also obviates the need for such words as "from, to" and their [German] abbreviations "v." and "n." If there is a lack of space, the directional names can be put on two lines; cf., e.g., the arrangement of such destination names on the map margin by Bonacker (Figure 19). The selection of these names must be particularly strict; their placement near the object must be confined to a certain type of map symbols and main destinations and the sequence of the names

must also correspond to their geographic location. One should under all circumstances avoid a methodical break, such as it appears in Nawrocki (8). While on all other sheets of the Germany map, directional names appear only in connection with Reich highways as main traffic arteries, we find such names also on the Eastern Alpine Region Half Sheet in red for two secondary highways and for 28 railroad lines.

j) Lines, mathematical. As a rule, cartographers enter the names of mathematical lines of the earth in spaced lettering and parallel to the lines in an effort to lend them more weight. Depending on the extent of the map, one may have to repeat the designation, which should, where possible, not be placed in ground plan portions and densely lettered parts of the map.

X. INSCRIPTIONS FOR POINT-SHAPED OBJECTS

Geographic designations belonging to a point-shaped object (settlement symbols, peaks, etc.) assume a "linear position," as Eckert (Die Kartenwissenschaft, Vol I, page 351) calls them; it is best to have them hug the parallels. Only in exceptional cases should the name run in a different direction and in that case it must be entered only in a slightly curved fashion.

The inscription for point-shaped objects should always be on one line, since such an arrangement, in our experience, may contribute considerably to a calm script picture. [1]

A name standing next to the object should "not touch or even cover the latter" (f.-S. 37); its position must however clearly indicate the fact that it belongs to the object.

For the position-wise arrangement of the names with respect to the individual object, we have a rule for the topographic map which states that the designation is to be placed east of the object (M.-S. 31). If the situation conditions do not allow this, and if the ground plan portions might be disturbed considerably, one may place the name above or below, or if necessary, to the left, above and/or below. We cannot lay down any rules for the arrangement of these entries as far as geographic maps are concerned; although in point-shaped objects the name should stand "closely above the symbol," Bludau (Leitfaden, 2nd edition, page 37) already indicated that a "strict observation of this rule, which would prevent all doubts as to the connection between the symbol and the name ... in general ... cannot be made today in view of the increasing settlement of the civilized countries and the comparatively small scales." The user's requirements as to the content of the geographic map tax the name absorption capacity of a map to such an

extent "that every available space must be used for lettering, so that one can hardly pay any attention to the need for putting the name in a position where there will be absolutely no doubt as to its connection with a certain object" (B.-S. 37). Thus we get "in fact sufficient doubt as to the pertinence" of names to individual points; but these points must not be of such a nature that the uncertainty "can be eliminated only through a comparison with the neighboring objects and their names" (B.-S. 37).

The interval between the name and the individual object depends both on the size and the thickness of the name and on the dimension of the area taken up by the individual object on the map. As a rule, if we place the inscription off to one side of the object, the distance to the object can be made equal to the height of the lower-case letters. If the name is above or below the object, the distance may be reduced by very little; but one must always avoid the extremes of having the inscription literally glued to the object or putting it too far away [2].

In any name placement, one must make sure that there will be enough clear space between the designations and the degree lines, highways, railroads, rivers, etc., and that they will not look as though they were glued on or that they cut into parts of a name and thus impair its legibility; often a better arrangement of the names can be achieved by entering the latter a few tenths of a millimeter higher or lower [3].

The name placement of large settlements must always be made with a view to the city expansion to be expected, so that settlement names will keep their good arrangement even if a particular city expands and so that it will not be necessary to shift them around after a few years. The criterion for such name placement is constituted solely by the legibility, which must not be reduced by any sort of interruption in an otherwise compact lettering form [4].

In order to remove any doubt as to the pertinence of a name to its object, names of this kind must be put very close to the object; where possible, the word should start at the object. One should also aim for a certain balance in the height of object and name; e.g., a circular settlement symbol or a small island should, where possible, stand on the base line of the name. If the script is smaller than the object, it is best to use the centroidal axis or the center line. Regardless of whether the name is higher or lower, above or below the object or to the left of it, "the relatively best position should be chosen" in the individual case (F.-S. 36).

As for the settlements situated along rivers and near international boundaries, one should arrange these names, where possible, on the same side of all those settlement symbols which are on the same bank or which must be placed in their particular political region [5].

By virtue of the mostly empty water area, the inscription of objects near the coast offers less difficulties than the land area which is filled with all kinds of lines. Cartographers learned to use this advantage offered by empty areas a long time ago; for instance, on the portolano charts, they arranged the names perpendicularly to the coast line, though a little too rigidly, which gave the coastal margin a tooth-wheel appearance; Eckert (Die Kartenwissenschaft, Vol I, page 350 quite aptly called this the "hedgehog" look.

[1] Some cartographers, even those of our times, neatly follow K. Tuerst's procedure, though of course without directly referring to the latter; in his map of the Swiss Confederation, which he made in 1496-1497, Tuerst put even short two-syllable names on two lines and thus mishandled them unnecessarily. In a small section of the map, published by R. Grob (see Note), the Zuerich municipal physician arranged 26 names - out of 51 names in the form of "b^eu / plitz," "b^eu / ren," etc. - on two lines. (Note Grob, R., Geschichte der schweizerischen Kartographie / History of Swiss Cartography /, 1941, Bern, plate 3.)

[2] Debes (4) always found a harmonic ratio between the interval and the size and thickness of the object; cf., e.g., also in Vogel (1, No 1) the well chosen intervals between "Husum," "Schleswig," and "Barth" (No 2). The study of the maps we referred to would soon give us the proper feeling for a sure interval arrangement of the inscription and would enable us to avoid excessively large intervals such as we find them for instance in Vogel, Scherrer, and Brendel (2, No 16) for "Innerthal" (3 mm) and which in this case are obviously due to a correction. On the other hand, one should also avoid putting the name too close to the object, such as for instance in Bonacker in Figures 9 and 10 in the case of several designations. The causes of this erroneous name arrangement here can be traced to another mapworker and in Figure 9 concerns the subsequent entries "St. Thomas," "Barranquilla," "Cartagena," "La Guayra," and Caracas." No matter how one may look at these supplementations - which were not successful in any of the cases - they help us prove the great importance of correct name placement which must under all circumstances meet certain criteria. The "misplacements" of several settlement names in Figure 10 (e.g., "Basel," Marseille) are a horse of a different color; these errors did not come about until an enlargement of the settlement symbols after the engraving had been completed.

When another cartographer or engraver gets into the act, the results can be catastrophic where the frame of a map is shattered extension-wise and where not only the supplementations deviate from the planned layout of the map, but where also the technical reproduction or rendition is not aimed at coordination with the existing situation and script picture. Cf., e.g., in Bonacker (Figure 4), the section below the line Cassano - Lentate, which lacks any tie-in whatever with the original map picture.)

An example of an objectionable misplacement can be seen in Bonacker (Figure 13) also in the form of "Ales"; the name had better be placed east of the settlement symbol. (This misplacement, if I remember correctly, obviously is connected also with a correction of this settlement name, which originally read: Alais. Corrections are not always made carefully; this can also be seen by the supplementary entry "Vichy" which was lettered considerably larger.)

[37] Horizontal misplacements, such as "Freiburg" in Bonacker (Figure 14) and "Maarianhamina" in Corbellini (7, No 61-62) must be avoided at all costs; here, we find parallels running right through the middle of the descenders, which gives us the impression that something was crossed out. Less obvious disturbances can be found not only in Nawrocki (8), but in many other maps; we mentioned Nawrocki here because we think that such placements could have been avoided in view of the loose name distribution on his map of Germany. Bonacker (Figure 11) could easily have avoided disturbing the island name "Vancouver" by moving it away a little from the parallel.

[47] In a lightly treated, ground-plan-shaped representation of large settlements, designations of suburbs can also assume a similar position, such as Bartholomew (6, No 20) used with good resulting legibility in the case of "Leeds," "Manchester," and "Nottingham"; Vogel's (1, No 7) placement of "Bremen" in this respect can be termed as barely acceptable, while that of "Kiel" (No 1) is poor.

[57] The correct placement of designations along rivers, which for long distances run along parallels, is difficult. By means of a skilful, often loose position, one can obtain a clear script picture, which does justice to the position of the objects on both sides of the stream, here too. Cf., e.g., the correct and free arrangement of "Rheingau" in Heymer and Bosse (4, No 19).

In the boundary zones, likewise, the Debes cartographers tried to avoid running names of individual objects beyond the political boundaries, so that the pertinence of a name would be indicated already by its position. Subsequently boundary shifts and frontier corrections make this methodical procedure rather difficult, since name shifts cannot be justified for this purpose and are not undertaken here.

Additional Remarks

In supplementation of the previously discussed name placement, we would like to call attention to the advantageous arrangement of names of point-shaped objects, referring especially to plates I-IV. To assure a calm script picture, such names should be given a free position as a matter of principle only in exceptional cases and occasionally, e.g., along the shores of oceans.

a) Promontories. Models of well-chosen name placements were created by Fischer (4, No 52), Debes (4, No 51 and 53), Corbellini (7, No 95-96) and by the Stieler cartographers who always tried to make a distinction between secondary and principal objects also in the script picture.

b) Islands, very small. These small objects were lettered in a clear, well-arranged, and unmistakable fashion by Debes (4, No 51 and 52), Barich-Schleifer (2, No 73), Sternkopf, Jungk, and Umbreit (3, No 162-163), and Corbellini (7, No 153-154).

c) Reefs, Cliffs. Anyone looking for examples for the arrangement of these names should look up Vogel (1, No 1 and 2), Debes (4, No 51 and 53), Barich and Schleifer (2, No 73), Baum, Koecher, and Jungk (3, No 223-224), and Corbellini (7, No 95-96).

d) Peaks. We can find excellent arrangements for fixed mountain names in the German hand atlases, in Nawrocki (8) and in Corbellini (7). In this position, we put the name either to one side of the peak or we write it above or below the latter in such a manner that it will under all circumstances, regardless of the location of the elevation figure with respect to the name, be no further from the summit than the elevation figure; cf. e.g., "Hut-B." in Nawrocki (8, Berlin Sheet, VI h) and "M. Pramaggiore" (Eastern Alpine Region Sheet, II d) as against the misplacement of "Hogolie" (Vienna Sheet, VIII C); the same mistake was made for "Insels / 196 B." which was put on two lines (Munich Sheet, IX c).

A number of cartographers prefer an inscription arrangement where the name describes an arc above or below the peak in such a manner that the chord of the arc intersects the apex horizontally; cf., e.g., "Hohe Acht" and "Moos -B." above the object in Nawrocki (8), Munich Sheet, III d and VIII a), as well as "Bunsbg." and "Ruhner Bge." (Hamburg Sheet, X d and XII f) below the peak. Occasionally the inscription can also be skilfully distributed over two arcs; cf., e.g., "Rauen- / sche Bge." (Berlin Sheet, V h). In these arc positions one must always make sure that the peak name does not move too far away from the elevation

point, as can be observed e.g., for "Weinsberg" and "Zamcisko" in Nawrocki (8, Vienna Sheet, VII h and XI g); sometimes we can even find an elevation figure between the name and the object; cf., e.g., "Dzban" and "Vieh-B." (Vienna Sheet, IV d and VI g). In no case must the name swing away from the object in this kind of name placement; it must not assume a position such as it did in Nawrocki (8, Vienna Sheet, XII g) for "Javorina" and for "Donners-B." (Munich Sheet, IV e) which should have been put above the symbol.

e) Passes. Though these places are not indicated by the object itself, the names of mountain cols are arranged in many ways on terrain maps.

Some cartographers placed their inscriptions parallel to the pass roads or mile trails especially in large-scale representations; cf., e.g., Vogel, Scherrer, and Brendel (2, No 16), for "Furka P.," "Pragel," Thomas and Berg (3, No 83-84) for "Fluela P.," and Nawrocki (8, Central Alpine Region Sheet) for "Gemmi P." Here the cartographers were obviously guided by the wish to letter the inclines and the traffic route in their full extent, but not the pass as such in its deepest and hence for us point-shaped incision. Bonacker (Figure 14) was guided by a similar intention in his lettering of the 28-km wide divide: "Burgundische Pf."

In contradiction to the above-mentioned inscription placement, which follows the valley cut, mapworkers execute a 90° turn, put the name parallel to the crest line of the range, into which the col is embedded, and arrange it perpendicularly to the valley line; cf., e.g., Thomas and Berg (3, No 83-84) for "Arl B.," "St. Gotthard," Vogel, Scherrer, and Brendel (2, No 16) for "Grimsel," "Arl-B.," "St. Gotthard," and "Oberalp P.," as well as "Arlbg. P." in Nawrocki (8).

Especially important mountain passes, e.g., "Brenner," "St. Gotthard," were arranged in an arc position by Nawrocki (8), obviously in an effort to cover an area, an entire body of mountains. We can find the same positioning for "Simplon" in Vogel, Scherrer, and Brendel (2, No 16) and "Bernina Pass" in Thomas and Berg (3, No 83-84). There are no objections against such a treatment of important mountain passes; but one must object to the frequent arc positioning of the pass names in Corbellini (7, No 17-19) which look contrived and artificial, since Corbellini does not have a similar intention here and since such an arrangement is indicated here neither by the object itself nor by its shape in nature.

The normal arrangement will always have to enhance the script picture and will have to be tied in with the parallels; this arrangement was used by Vogel, Scherrer, and Brendel (2, No 16) for "Oberalp-

/ P.," by Thomas and Berg (3, No 83-84) for "Splugen," and by Nawrocki (8) for "Splugen P.," "Reschen Scheideck." Vivien and Schrader (5) also gave pass names a fixed position and refrained from differentiating the significance of mountain cols [indentations] by means of placement differences, especially since such a difference can, if necessary, easily be created through corresponding inscription treatment.

f) Settlements. A tie-in of several differentiating additions with a settlement name can be achieved through a skilful positional arrangement with relation to the settlement symbol, such as Nawrocki (8, Munich Sheet, IV d) almost succeeded in doing it on three lines with "Nd.- / Obr.- / Lahnstein," if he had not disturbed the legibility of the subscripted additions by cutting into the ground-plan lines, which could have been avoided through a slight lateral shift. The same flaw can also be found in the case of "Alt-" (VII b) in the designation "Alt- / Bad- / Wildungen," which would not have been impaired if it had been shifted slightly to the side. Settlements located on the same latitude allow us to put the addition on the same level; Nawrocki (8, Vienna Sheet IX b) established a good tie-in between "Nied.- / Ob.-" and "Frauenwaldau." If the symbols assume a diagonal position in the map picture, the principal name here too must assume a middle position with respect to the additions, and must not be moved closer to one designation part, such as the part labelled "Unt.-" in Vogel's (1, No 28, C 3) "Hoslwang / Unt.- / Ob.-." This Gotha cartographer (1, No 28, B 4) did an excellent, though more difficult job on the placement of "Unt.- / Mitter- / Ob.- / -Garching" on four lines, whereby the additions have been placed below each other and the name assumed a middle position, off to one side of these additions. Cf. also the three-line vertical arrangement of "Unt.- / -Iberg / Ob.-" in Bonacker (Figure 1), respectively, "Obr.- / -Buchsiten / Nrd.-" (Figure 7); the latter figure, in the form of the words "Obr.-Bipp" and "Ndr.-Bipp," also offers us examples of the coupled writing of the additions, which was indicated here.

By means of a slight lateral or upward or downward shift, one can often achieve a better position of the settlement names with respect to the settlement symbol, and this position will also be less disturbed by other map elements; cf., e.g., "Bad Schwalbach" in Nawrocki (8, Munich Sheet, V d), which would be in its proper position if it were shifted 3 mm to the left.

There are furthermore serious objections to an inscription placement in which the settlement symbol is placed inside the name inscription, on the level of the descender of the inscription, as was done by Nawrocki (8, Munich Sheet, IV g) for "Nieder / bromm," or where the symbol is put between the lines of a two-line inscription, as was done by Nawrocki (8, Munich Sheet, III d) for "Munster- / maifeld."

A skilful distribution of settlement names - and simultaneous consideration of the left- or right-bank position - was attained by Kehnert and Schleifer (2, No 81) on the Nile, whereby their effort was at the same time obviously aimed also at again and again reverting from the free position to the fixed position. Endeavors of this kind, also in regard to the location of settlement names with respect to political boundaries, cannot be detected in a whole series of cartographers and map draftsmen, e.g., Bartholomew (6) and Hansen (5, No 18).

Now we might call attention to the correct placement of hyphens in additions and in a multi-line inscription arrangement, since cartographers do not always assign due significance to this subject, which W. Bonacker took up in one of his articles ("Contributions to the Cartography of Switzerland," (Schweiz, Geogr. /Swiss Geography/, Vol 2, 1925, page 54) - page 58). The connection and cohesion of designation points of places must also strictly follow the rules of German spelling and cannot be left to the discretion of the individual cartographer.

XI. ARRANGEMENT OF NUMERICAL DATA

We have an important inscription element of the map in the form of numerical data which in geographic representations forms an integrating component of map lettering and which in its manifestations - if correctly used and arranged - can contribute much to the understanding of the flattened picture of the earth on the map.

All numbers, which due to the manner of their rendition can easily be drowned in the map picture, must be placed with infinite care and clarity, giving strictest observation to the requirement that "a strict selection is better than too extensive use" of elevation figures (F.-S 55) [1].

A senseless heaping up of elevation and depth figures on geographic maps must always be avoided; the screening and selection must be done, not by the map reader, but by the mapmaker who through generalization must accomplish a practical preparation of the situation picture and the inscriptions [2].

On large-scale maps, the elevation figures must be put into the contour lines and - contrary to the instructions for the topographic map (M.-S. 22) - must be so lettered that they can be read, upon normal viewing of the map, without any need for turning the map around [3].

The depth figures to be written next to or into the isobaths should best be given a position within the depth contour lines and are to be placed perpendicularly to the course of these lines [4]. In entering these figures, one must avoid a schematic arrangement of numbers which must be capable of being read off easily in their sequence, holding to the line [5].

Nameless elevation figures are to be so placed in the terrain that both the lowest values of the depressions and the highest elevations of orographically delimited areas - the culmination points of definite areas - will be shown clearly [6].

Uncertain elevation figures must also be indicated as such [7]. Where the lower and upper elevation of an area of its middle elevation are to be shown, it is recommended that the numbers be arranged below the designation in a middle position and in parentheses [8].

Along rivers, elevation figures should be put only at confluence points of tributaries and along transportation routes they should be put only at road crossings, river crossings, and the like [9].

Elevation figures for settlements should, in large-scale maps, best be placed in parentheses and in a middle position below the settlement name; such elevation figures are available ready for use in Germany unfortunately only for the areas of Bavaria and Wuerttemberg; they are available in a preparatory stage also for Austria and for France and Italy. In small-scale maps, however, the elevation figures should be put near the map symbol; parentheses should be omitted here, since there cannot be any doubts here as to the pertinence of the numbers to the particular object [10].

Elevation figures to be written next to peaks and passes should as a rule be so arranged near the situation-wise fixed object that the designation and the number will assume a harmonic position with respect to the object and its surroundings [11].

To avoid an awkward, stiff inscription arrangement, numerical values belonging to mountain and pass names are to be entered, not on the same level as the designations, but a noticeable distance away from them [12].

Numbers serving to indicate the elevation of water bodies are to be arranged in a fixed position; in case of smaller lakes and in case of off-center positioning of the depth figure, one can also use a free position [13].

Special importance must be assigned to numerical data in terrain representations which, due to their arrangement along the isobaths, seek to define the relief of large water basins and which show, in the ocean, the highest elevations of the [ocean floor] rises with respect to their [submarine elevation] heights and the greatest depths of the earth with respect to the [submarine] depths, as well as the maximum depressions in the inland lakes. In general, our guide lines for the placements of the elevation figures can be applied to the placement of depth figures, which must always deviate from the height figures also in regard to the technical execution. Maximum depths of oceans or ocean parts must always be placed in correct positions; in inland lakes, these figures assume also a local position on large-scale maps [14].

The numbers used for the numbering of highway types are to be lettered perpendicular to the course of the transportation route and in a lateral position to the latter and are to be entered interval-wise in a sequence so that there will be no doubts as to the numbering of a highway between the larger settlements or intersections and the forks in that highway [15].

Length figures for tunnels are best put in a position parallel to the transportation route [16]. If numbers take over the functions of geographic area names, they must be inserted into the concentration point of the administrative district in emphasized lettering [17].

[1] The relation between a number and its object must be visible at a glance; if there is no pertinent object, the figure must be tied in with a point; cf., e.g., the treatment of numerical values by Bonacker in plates I-IV. Here one must always manage to show the tie-in without having to resort to the use of an arrow, such as it was improperly used, e.g., in Fischer (4, No 39, b 9) in an effort to tie the figure "1880" to the peak which is 5.5 mm away.

[2] The map user will be rather puzzled as he tries to track down the number series for the Cameroon River in Fischer (4, No 49, supplementary map II a) and he will in vain look for the logic in the entires "5 / 7 / 4 / 7 / 7 / 9 / 12 / 15 / 11 / 8 / 6 / 2 / 7 / 7"; in place of 14 numbers, spread along 22 mm of the map, this pupil of Debes' could have illustrated the changing depth of this river just as adequately and clearer by writing: 5 / 4 / 15 / 2 / 7.

[3] Nawrocki (8) was quite justified in avoiding an arrangement of elevation figures running down the slope, toward the valley floor, since such a number placement would be violating all healthy cartographic principles and methods; the introduction of such an arrangement could only serve the need for ramming through an innovation at all costs (cf. Bonacker, W., "On the Lettering of Some Characters on Maps," Jahrb. d. Kartogr., 1942, page 97) - page 100).

[4] In addition to this arrangement, used by Corbellini (7) and Nawrocki (8), we find a lateral position in Stieler (2), Andree (3), and Debes (4), while these numbers have a horizontal position in Vogel (1).

[5] Instead of a rigid arrangement of isobathic figures - such as we find it for instance in Corbellini (7, No 17-19) in the Ligurian Sea - we should like to recommend his loose, beautifully shaped arrangement in (No 66-67) for the Black Sea and the Ligurian Sea.

[6] In gently rolling terrain, a skilful arrangement of numbers is particularly important for the rendition of elevation figures; this was done excellently by Nawrocki (8, East Prussia Sheet) for "175," "191," and "184," for the principal hills above the 150-m contour line. Nawrocki (Hamburg Sheet) also did an excellent job on the maximum depth figures for the depressions in Friesland, e.g., "-0.7" which he tied in with a point. The knowledge of the depressions, as one of the most interesting phenomena of our continent, should - insofar as the attention of the cartographers might have been directed also to this subject - have been confined in large circles of geographers not just to the Caspian Depression and the depressions in Holland and Friesland. (The depression regions of the earth were emphasized for the first time in an atlas by O. Marinelli, Atlante scolastico di geografia moderna, Vol I, 1914, Vol 2, 1913, Milan.) Our knowledge of the Wash Depression is rather spotty, not to speak of the depressions in the diluvial river mouth areas of the Rhone, the Etsch, and the Po.

In a relatively dense distribution of contour lines, a number on the slope - such as we find it for instance southwest of Goldap (East Prussia Sheet) in the form of "227" - is worthless; the entire "388" west of Ebersdorf. (Vienna Sheet, X d) and "108" southwest of Karlsruhe (Munich Sheet) mean nothing; and the number "56" southwest of Kanin (Berlin Sheet, II h) tells us nothing, since the number 86 nearby gives us the desired information.

A good arrangement of elevation figures in level and rolling terrain cannot be attained from one instance to the next; it can be attained only with the help of the planned working-through of the initial maps, sector by sector. In the light of this statement, the two-time entry of "696" in Albuch (Munich Sheet, VIII g) below the 700-m contour line has no meaning; the only correct thing to do here would have been to put only 777 as the regional maximum elevation north of Weissenstein. Bonacker (Figures 5, 6 and 7) selected his elevation figures on the basis of methodological view points.

[7] Fluctuating elevation figures must be provided with question marks and, if they belong to mountain ranges, they must be entered according to example in Habenicht and Schmidt (2, No 66, F 7) for "Dj. Ghaswan / 3000?" In view of the position and the nature of these elevation figures, the number must be put in parentheses.

[8] Average elevation of [submarine] depth figures must be entered according to the rendition of "Plateau ca. 2400 m" in Fischer (4, No 40, F 6), "(Hochland 2400 m)" in Habenicht and Schmidt (2, No 66, K 10), "(350-500)" in Habenicht and Schmidt (2, No 66) for Badiet e'-Scham and "700-1000 m" for Gr. Nefud; one must not leave out the parentheses - which Fischer (4, No 40, F 7) omitted for instance for "600 bis 1200" - even when isolated inscriptions are used. However, one should avoid using the abbreviation of our length measurement, since another reference measure does not come into consideration. Additional data should be shortened as much as possible in order to reduce the number of names on the map and they should be given in a less long-winded fashion, as for instance for "El'Gisr / Hochste Bodenschwelle von durchschn. 16 m Seehohe" by Habenicht and Schmidt (2, No 66, a 2).

[9] It is absolutely worthless to write numerical data just anywhere along a water body, such as was done by Nawrocki (8, East Prussia Sheet) in the form of "70" along the Bug River (VI g) or "79" along the Narew. There must always be some connection to another map element; Nawrocki did this correctly at the confluence of the Drewenz River and the Vistula (II f) in the form of "35" and (Upper Silesia Sheet) at the confluence of the "Rajcanka" into the Waag (II f) with "319" and for the confluence of Schemnitz and Eipel (II h) with "126."

[10] Under no circumstances must there be a motley alternation of numerical lettering within a plate; this is noticeable in Umbreit (3, No 65-66) inasmuch as he uses, in addition to non-parenthesized numbers such as "96" near Hanau and "136" near Darmstadt, also parenthetical numbers for Frankfurt "(92)" and for Oppenheim "(84)"; likewise, Habenicht and Schmidt (2, No 66) should not have used "915" for Teima and "870" for Medina in company with such combinations as "Jerusalem (790)" "Bereidah (520)."

The elevations of the last-named three settlements, by the way, seem to have been rounded off to tens; we have always adopted this method ourselves, insofar as we were dealing with settlement elevations of over 100 m.

[11] In case the elevation figure is arranged laterally to the peak or the pass, it is recommended that the figure be placed at such an interval that the open space amounts to about 3/4 of the height of the elevation figure; but if the number stands above or below the object,

the distance can be reduced to half the height of the number. One can always avoid such misplacements as we can observe in Nawrocki (8, Vienna Sheet, XII g) for "585 (Klenova)"; the elevation figure should be moved 2 mm to the left in this case. One must also always avoid interfering with other designations; Bonacker could have avoided that easily for "1903" and "Schwyz" (Figure 1). Under no circumstances should a designation be put between the number and the peak itself. We can approve neither of the placement of the number "928" below the word "Kreuz-B." which stands on a concave arc (Munich Sheet, VIII d) and hence far from the peak, in Nawrocki (8), nor can we accept the combination of the elevation figure with mountain and pass names in the form "Caua (Cagua), 1194" in Barich and Schleifer (2, No 73, f, D 2), "Bg. Wodolei, 780" in Fischer (4, No 44, M 2), "Marien / Bge. (110)" and "Ulrichs H. (119)" in Vogel (1, No 15, D 1/2, respectively, E 3), of "Aden, Dj. Schamscham, 526" in Habenicht and Schmidt (2, No 66).

[12] We prefer placements such as "1744" with respect to "Hochgern" (II a) and "1288" with respect to "Gais B." (III a), rather than such line-holding arrangements as "2595" with relation to Reisseck in Nawrocki (8, Eastern Alpine Region Sheet, III c) and "1036" with relation to "Hocheck" (VIII a).

[13] The elevation of the sea level should be entered only once and should not be repeated as in Vogel and Hiller (2, No 49) with "106" in Lake Balaton; the numbers should be so arranged that they will not impair the legibility of the lake name; cf., e.g., the irritating arrangement of "533" in Lake Ammer in Vogel (1, No 27).

One must make a clear distinction between elevation and depth figures within a map by means of differing style and direction. In Andree (3), Debes (4), Bonacker (Plate I) and Stieler (2) standing numbers are used to indicate the water level, while reclining numbers are used to show the maximum lake or sea depth; but in Kehnert and Schleifer (2, No 43) there was no need for the entry "+35" for Wirtz-Jarw, nor was there any need for the additions "30 m uber d. Ostsee" and "13 m tief" for Lake Peipus; likewise, there was no need for the entry "395 u. M." in Thomas and Umbreit (3, No 67-68) for Lake Constance. In Erdmann (4, No 30) - in accordance with the procedure of Erdmann and Winkel (4, No 31) - the elevation figures of Lake Vener, namely "44", and of Lake Vetter, namely "88", should be perpendicular, not reclining, since the observer is otherwise bound to look upon these figures as depth figures.

If depth figures are placed in a central position, it is recommended that also the entry of the elevation above sea level be given in a fixed and horizontal arrangement; cf., e.g., the sensible entry of

"Werte $\frac{215}{215}$ " and "435" for Lake Vierwaldstaetter in Bonacker (Figure 6).

A mixing of both arrangements cannot be advocated; this was done in Thomas and Umbreit (3, No 67-68) in Lake Constance, where "252" is parallel to the parallel, whereas "395 u. M." takes up a free position below the designation.

A noteworthy free position - parallel to the form of long drawn-out Lac de Joux with "1008" in Thomas and Berg (3, No 83-84) and above all in combination with the designations - were given by Herkt, Taenzler, and Jungk (3, No 59-60) to the numbers "37 (43)" for Lake Schwerin and "63 (22)" for Mueritz, as well as by Bonacker (Figure 1) for the values "437" and "214" in Lake Vierwaldstaetter.

In a similar manner, there is just as little justification for attaching the elevation figures of the inland lakes to the designations - such as was done for "Niris-See, 1550" in Habenicht and Schmidt (2, No 67).

The minus signs of the figures for inland lakes lying below sea level must be given especially clearly; this was done easily for the Dead Sea with "-394" and for Lake Genezareth with "-208" in Linnekogel, Schmidt, and Schleifer (2, No 64).

[14] There is still no agreement among cartographers as to the visual representation of the character-wise value of the numbers by means of a corresponding execution of the numbers. Depth figures should under all circumstances be entered in an inclined manner, so that they can be differentiated against elevation figures, which must be written perpendicularly.

The diagonal position of the numbers "44" for Lake Verner and "88" for Lake Vetter in Erdmann (4, No 30) initially makes us think that we are dealing with depth values here, since such values were entered throughout Debes in an inclined position; it is only the comparison with Sheet 31 which will tell the observer that the water level was here indicated in a different script direction. Domann and Hiller (2, No 53), in one plate, put "285 m tief" in Jez. Ochrida in a perpendicular position, right next to the inclined entry "54 m tief" in Jezero Prespa"; this amounts to a change in the script position; in these cases, and in the case of "44 m tief" in Lake Skutari, the accessory words are to be omitted.

In contrast to the maximum depths of the world oceans, whose position changes due to the progress of limnological research and which must be checked constantly, the depth data of inland lakes as a rule

are permanent values. In a local arrangement, we recommend the inscription of the maximum depths in the form $\frac{\cdot}{528}$; this rendition, which was

used extensively for the first time by O. Marinelli (see Note), constitutes a satisfactory solution also from the purely graphic viewpoint.

(/Note/ Atlante scol. di geogr. mod. -- In this map volume, Pietro Corbellini of Bergamo succeeded for the first time in bringing out his outstanding creative ability in the field of terrain representation. But this publication is also connected with the name of the Glogau cartographer Rudolf Pfeiffer (1879-1944), who, as Corbellini's closest collaborator for about 25 years, adopted the latter's ideas and helped these ideas make a breakthrough also in the technical aspects.)

If the reduction ratio does not allow a local entry of the lake depth, the number must be placed in parentheses, such as was done by Erdmann and Bosse (4, No 14) with "(252)" in Lake Constance and by Erdmann and Winkel (4, No 31) with "(94)" and "(119)" in Lake Vener and Lake Vetter.

To get a clear relationship, height and depth values should always stand next to each other and, where possible, below the lake name and parallel to the latter; cf., e.g., the careful rendition of "37 (43)" in Lake Schwerin, of "63 (22)" in Mueritz by Herkt, Taenzler, and Jungk (3, No 59-60) and "423 / 151" in Lake Wallen by Bonacker (Figure 3), who rendered the height perpendicularly and the depth in an inclined fashion.

Fluctuations in the sea level height also result in a changing sea or lake depth, which was rendered by Nawrocki (8, Eastern Alpine Region Sheet) by the data "1-2" in Lake Neusiedler and "3-4" in Lake Balaton, though he entered the latter numerical value twice, which was unnecessary here. Since these depth figures cannot be tied up with any points, it is recommended to put them in parentheses, to tie them in with the height figure, and to assign them a position parallel to and below the lake name.

[15] The numbering of our Reich highways has been adopted from the French cartographers in the form of a flank position, e.g., in Nawrocki (8). In maps of larger scale, we are even justified in using a position inside the traffic arteries, in connection with the proper weight of the highway symbol; here the numbers, placed in little boxes, keep their perpendicular position but must be so treated in their rendition that the thickness of the highway symbol will not be interrupted visually (cf. Bonacker, W., Autokarte Sued-Deutschlands / Motor Map of South Germany, 1:500,000, 1934, Bern, 1st edition; 1938, Stuttgart, 2nd edition.

If a highway has two numbers on a short section, it is recommended that the smaller number, which as a rule is assigned to the more important highway, be treated normally as to size and thickness, and that the other figure be made thinner and be put in parentheses below the principal number, though on the other side of the transportation route and in a middle position.

To avoid misreading of the numbers 6 and 9, it is customary to indicate such numbers along north-south highways by means of an added period, e.g., 6., 9.; Nawrocki (8, Hamburg Sheet, IV g) was justified in treating the ordinal number 68 in a similar fashion, in order to prevent it from being misread as 89.

[16] Along the Lower Hauenstein, Vogel (1, No 26), e.g., used such a free position for "8130 m"; here and in similar cases one can forget about the addition of the abbreviation of our length measurement.

[17] Such an improvised solution - which always reveals that the map could show more than it is permitted to by its scale - was used by Fischer and Erdmann (4, No 28) for the counties of the British Isles, by Heymer and Bosse (4, No 26 a) for the Komitats [counties] in Hungary, and by Elfert (4, No 59) for the lettering of the departments in Uruguay.

Explanations for figures and for abbreviations of proper names are best put in an undisturbed position far from the ocean (see Note) or they are put in compact form inside the map near and directly along the marginal edge, if they appear in different parts of the plate. (Note) The ownership of the increasingly dense telegraph cable network in the Rio de la Plata were illustrated in a similar manner by W. Bonacker (Carte des Communications Telegraphiques de l'Amerique du Sud, 1:8,000,000 1926, Bern.)

FIGURE CAPTIONS

Plate I

Segments in original size. W. Bonacker, H. Kiemmerly. Schul-Karte der Schweiz [School Map of Switzerland], 1:600,000, edition D. Bern, 1933. -- Engraving by R. Edelmann.

Figure 1

Plate II

Segments in original size. W. Bonacker, Schweizerischer Schulatlas [Swiss School Atlas], 1935, Bern, 10th edition, Figures 6, 7. -- Schweizerischer Volksschulatlas [Swiss Grade School Atlas], 1934, Bern, 5th edition, Figure 8-10. -- Engraving by R. Edelmann for figures 6, 7, 9, 10; by W. Bonacker for Figure 8.

Figure 6

Plate III

Segments in original size. W. Bonacker, Schweizerischer Volksschulatlas, 1934, Bern, 5th edition, Figure 11-13, 15. -- Schweizerischer Schulatlas, 1935, Bern, 10th edition, Figure 14. -- Engraving by R. Edelmann for Figures 12-14; by M. Gattschalk for Figures 11 and 15.

Figure 11

Plate IV

Segments in original size. W. Bonacker, R. Leuzinger, Reise-Reliefkarte von Tirol [Travel Relief Map of Tirol], 1:500,000, 1932, Bern. -- Engraving by R. Edelmann.

Figure 16

INSCRIPTION POSITIONS

Plate V

Arc position
free
dorsal position
upside-down

Normal position
fixed
parallel position
arc and curve-shaped

Meridian position

stiff,
on straight-line
base line

free
with spaced
characters
Arc position

free
lively

Ocean position

Land position fixed
normal position

flank position

Middle position

free on several
arcs, ribbon-like, undulating

divide

slope position

pivoting

hugging

free
multiple arc

Principal name

secondary designation
in middle position

Middle position
at concentration point

flank position

Lateral position

Areal, interior, middle position
on centroidal axis,
axial position free,
 extended,
 stretched-out

superscripted short form

fixed, normal
horizontal, straight-line
compact lettering

fixed, normal, loosened
spaced with bright
letter interval

5058

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