REVIEW ARTICLE

BOUNDARY STUDIES IN POLITICAL GEOGRAPHY

A substantial part of the literature in political geography is centered on the study of boundaries and their associated regions. Because political boundaries form the areal expression of the limits of jurisdiction and power of the system to which they belong, they are perhaps the most palpable political geographic phenomena, and thus have held a strong attraction for students of political geography. Approaches to the study of the nature and role of boundaries as spatial factors have been varied, and ideas regarding boundaries have been related closely to their historical and geographical milieu.[1] The resultant methodological variety has produced a substantial set of findings that often are in conflict with each other. This review article attempts to take critical stock of the body of knowledge that has emerged.

We shall see how boundary classifications have evolved, from the simple artifical-vs.-natural division, through classifications describing the basis of the boundary, as physical, anthropogeographical, and so forth, to a classification which relates the boundary to the cultural landscape at the time of establishment. There has also been a shift in interest away from the nature of the boundary's location and history, to its function as it has changed over time. There has been a growing realization that it is the significant similarities and differences between the sociopolitical communities the boundary divides that are reflected in its functions. The importance of circulation zones describing intensity of movement in frontier regions has been increasingly noted, as has the close relationship of distance and the boundary in the spatial form of this circulation.

In order to define some of the basic concepts underlying the nature and role of boundaries, boundary studies in a general context will be treated first. On the basis of a classification according to content and aims, a number of selected case studies will be considered. If generalizations are to have any validity, they must be drawn from and tested by significant case studies that fulfill the requirements of objective research. Many of the boundary studies found in the literature do not meet such qualifications and thus conclusions from these studies have little value in the body of knowledge on the geography of boundaries.

BOUNDARIES IN GENERAL

One of the earliest systematic studies of boundaries is to be found in Semple's famous work, *Influences of Geographic Environment*, in her chapter on "Geographic Boundaries."[2] Her thesis was that "nature abhors fixed boundary lines," and that consequently boundaries rarely attained an established equilibrium, but were subject to constant fluctuation. She, in fact, equated boundaries with frontiers. Uninhabitable areas, according to Semple, formed the most "scientific" boundaries because they both partitioned and protected. In this context, Semple cited the conscious creation of march areas to form "artificial border wastes."[3]

Even when a boundary's location was fixed exactly, Semple observed that the customs divide did not always coincide with it. To support this assertion, she pointed to the example of the "zona libre" idea, as between Mexico and Texas in 1858, under which an attempt was made to establish a commercial equilibrium in the frontier zone. In such a situation both modification and assimilation pressures took effect on either side of the boundary within the zone. The longer the reach of the arm of authority in the frontier area, the weaker that authority, and the more likely the political defection of the area to the stronger side, as in the case of Texas from Mexico to the United States, and of Acre from Bolivia to Brazil.[4]

This dynamic view of boundaries, not as artificial lines, but as variable zones open to pressures from both the physical and cultural environments, was in close keeping with the organismic state theory of Ratzel, whose ideas Semple espoused and developed.

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[1] Stephen B. Jones, "Boundary Concepts in the Setting of Place and Time," *Annals*, Association of American Geographers, Vol. 49 (September, 1959), pp. 241–55.

[2] Ellen Churchill Semple, *Influences of Geographic Environment* (New York: Holt, 1911), pp. 204 ff.

[3] *Ibid.*, p. 216.

[4] *Ibid.*, pp. 230–31.

Semple's generalizations have some relevance to the situation existing at different periods in the history of the Canada–United States boundary region in the Far West. During the period of joint occupancy prior to 1846, the frontier area was without any equilibrium between the contending forces, and even in the era during the first forty years after partition, the modification and assimilation pressures exerted over the border region by the growing dominance of the United States commerce all but caused the political defection of the entire region to the stronger side.

Much of the literature on boundaries in general was written during the two world wars or in their aftermath. These studies were concerned with the nature of boundaries in terms of their being "good" or "bad" from the military point of view. They were part of a search for the causes of friction between nations and for a means of avoiding it. Such studies, although in large measure "utilitarian," served to focus attention on the phenomenon of boundaries and to provide many valuable findings. The redrawing of boundaries based on a variety of considerations in the postwar periods attracted much interest and research activity. This periodic preoccupation, however, has tended to concentrate the research effort within times of change, while interest in boundaries during more "normal" times has not been so great.

Holdich[5] and Lyde,[6] writing during World War I, differed in opinion on the relative merits of boundaries as barriers or bonds. Holdich viewed boundaries as barriers and maintained that the "best" boundaries (i.e., those least likely to be causes of war) must be mountains, lakes, or deserts (suggested as analogous to sea frontiers),[7] while lines of longitude and latitude made for inherently "bad" boundaries. Lyde, however, argued that boundaries should act positively, encouraging peaceful international intercourse, and consequently thought that rivers, as regional bonds, would make good boundaries. This defense-vs.-assimilation argument permeated most discussion on boundary functions at this time. Johnson[8] later criticized both views as oversimplifications, maintaining that the sequences of World War I had disproved Holdich, and that litigation over water rights and uses usually bedevils relations between the riparian states. He also recognized that strategic and linguistic considerations could not be reconciled in the attempt to establish a boundary.

Fawcett,[9] like Holdich, held little respect for straight-line boundaries, not from military considerations, but because of their artificiality in that they were not marked by evident features of the natural landscape. He thought the forty-ninth parallel, already in existence for a century east of the Rockies, and for over seventy years on the Pacific slope, "absurd" and "a source of jokes as prolific as the mother-in-law."[10] He attacked it as "perhaps the least efficient and most costly boundary on earth."[11] Certainly there was great cost involved in demarcating the boundary, although its efficiency has been determined more by the relationship between the societies it divides than by the actual nature of the line.

In his "Principles in the Determination of Boundaries," Brigham[12] introduced a new concept, largely as a criticism of an article by Patten[13] which appeared four years earlier and was based on the traditional distinction between "natural" boundaries as "good" and "artificial" boundaries as "bad." Brigham wrote of "boundaries of economic equilibrium." He saw a conflict between the forces of nationalism, which in their European context produced small states, and those seeking economies of scale which demanded big states. He reasoned that economically unnatural boundaries (those resisting economies of scale) rather than those boundaries not marked by definite physical phenomena were wrong. He cited the boundary between Germany and the Low Countries

[5] Thomas H. Holdich, *Political Frontiers and Boundary Making* (London: Macmillan, 1916), and "Political Boundaries," *Scottish Geographical Magazine*, Vol. 32 (1916), pp. 497–507.

[6] Lionel William Lyde, *Some Frontiers of Tomorrow: An Aspiration for Europe* (London: A. & C. Black, 1915).

[7] Holdich, *op. cit.*, p. 504.

[8] Douglas Wilson Johnson, "The Role of Political Boundaries," *Geographical Review*, Vol. 4 (September, 1917), pp. 208–13.

[9] Charles B. Fawcett, *Frontiers: A Study in Political Geography* (Oxford: Clarendon Press, 1918).

[10] *Ibid.*, p. 68.

[11] *Ibid.*, p. 69.

[12] Albert Perry Brigham, "Principles in the Determination of Boundaries," *Geographical Review*, Vol. 7 (April, 1919), pp. 201–19.

[13] Simon N. Patten, "Unnatural Boundaries of European States," *Survey*, Vol. 34 (1915), pp. 24–32.

with special reference to its role as a generator of friction in 1915.

Following the disorganization of spatial relations in the areas affected by the many boundary changes of the Versailles Peace Treaty, the consequent development of new patterns of spatial interaction stimulated renewed interest in boundary research in Europe. A method akin to a "before and after" approach, based on sound and plentiful data, was often adopted in the study of the recent evolution of some of these European boundaries.[14] The importance of the "before and after" approach will be made clear below in the section on boundary change in the review of case studies.

A critical and provocative note by Boggs[15] in 1932 held that up to that point boundary studies had been confined to international boundaries, and that they had usually been carried out on the false assumption that the functions of the boundaries studied were both uniform and static. All "scientific" geographical study of boundaries, he asserted, should take into account all types of boundaries and all their functions. Without being specific, Boggs suggested that certain general principles could be drawn from the relationship between different types of boundaries and the different sets of boundary functions. A most valuable observation noted that for both international and internal boundaries, functions are not static but do change over time.

Hartshorne[16] further clarified the distinction of function by his suggestions contained in a short note in 1936 for classifying boundaries, not according to physical type, but according to their relationship with the cultural landscape at the time of their establishment. Hence an *antecedent* boundary precedes development of "most of the features of the cultural landscape,"[17] a *pioneer* precedes all settlement, and its associated zone is in *virginal* form until the arrival of human settlement, and a *subsequent* boundary has a degree of *conformity* with major and minor natural and cultural divisions. In the absence of *conformity* the boundary is held to be *superimposed.* The basic property of a boundary which results in inertia was noted by Hartshorne. No matter what its relationships when established, he pointed out, over time it becomes *intrenched* in the cultural structure of its surrounding region.

One of the more valuable, yet largely ignored, pre-World War II contributions to the geography of boundaries was made by Lösch.[18] Quoting Ratzel as his political geographic authority, Lösch found it useful to compare his described economic regions with political regions in terms of their similarities and dissimilarities. This led to a comparison of the frontiers of the two regional types. Lösch noted a wide range of areal coincidence between them, although he recognized that political frontiers were more rigid and more sharply defined, thus reinforcing Hartshorne's *intrenchment* factor with a premium on continuity, as opposed to the "maximum prosperity" force behind economic boundaries. Lösch also threw light on why, following a shift in the political boundary, the new border regions so often become depressed areas. They must transpose their traditional economic activity and often curtail it. Furthermore, the greater the population of these regions the more apparent the effect. Although the forces of comparative advantage may work to the contrary, Lösch's observations have been proven to be true generally.

Lösch further studied national boundaries as locational factors. In comparing per capita sales in Windsor and London, Ontario, in 1931, both cities being virtually the same size in

[14] See for example, P. de Lapradelle, *La Frontière: Etude de Droit International* (Paris: Les Editions Internationales, 1928); J. Ancel, *La Géographie des Frontières* (Paris, 1927); Karl Haushofer, *Grenzen in ihre Geographischen und Politischen Bedeutung* (Berlin-Grunewald: Kurt Vowinckel Verlag, 1927); J. Ancel, "Les Frontières, Etude de Géographie Politique," *Académie de Droit International, Recueil des Cours,* Vol. 55 (1936), pp. 207–10; and Otto Maull, *Politische Grenzen* (Weltpolitische Bucherei, Vol. 13) (Berlin: Zentral-Verlag, 1928).

[15] S. Whittemore Boggs, "Boundary Functions and the Principles of Boundary Making," *Annals,* Association of American Geographers, Vol. 22 (March, 1932), pp. 48–49.

[16] Richard Hartshorne, "Suggestions on the Terminology of Political Boundaries," abstract, *Annals,* Association of American Geographers, Vol. 26 (March, 1936), pp. 56–57.

[17] *Ibid.,* p. 56.

[18] August Lösch, *The Economics of Location,* trans. from 2nd rev. ed. by William B. Woglom, with the assistance of Wolfgang F. Stolpler (New Haven: Yale University Press, 1954). The lack of a translation in English until 1954, and Lösch's reputation as a student of location economics rather than of political geography, are no doubt largely responsible for our ignorance of Lösch's contribution.

population, he found that the retail sales of goods which were cheaper in Canada were far greater in Windsor on the international boundary than in London, some distance back from the boundary; but of goods cheaper in the United States, the opposite was true. The presence of the political boundary created a price differential in certain goods, which in turn became a factor in the location of retail outlets for these goods. This situation has since been documented many times.

Lösch's greatest contribution came with his insight into the impact of a boundary on the flow of a commodity and on its consequent spatial pattern of distribution. El Paso's financial sphere was established by mapping the location of the banking houses keeping accounts with banks in that Texas city in 1914.[19] The pattern produced by mapping the flow of capital was identical to that deduced theoretically by Lösch for the movement of a good (Figs. 1 and 2). In his model, Lösch had found that distance as well as tariffs affected capital transactions and trade in physical goods in the same way that the United States–Mexican boundary affected the flow of capital to and from El Paso. Hence, for the first time by applying location theory to the study of the impact of a boundary, Lösch indicated how one could actually measure a boundary by giving it a *distance* value. Yet it was to be some years before further work would be done along these lines.

In his *International Boundaries*, Boggs took the view that boundary functions were "negative rather than positive,"[20] and repeatedly stressed their restrictive nature. He rejected Lyde's hypothesis, then a generation old, that boundaries acted as bonds. Boggs saw boundaries as barriers to economic intercourse with their "almost unimaginable multiplicity of restrictions."[21] He spoke of this *interruptive* factor as a "nuisance effect."[22]

Boggs' classification of boundaries into physical, geometrical, anthropogeographical, and complex, represented some advance in research techniques. He also presented a useful idea in metaphoric form when he asserted that any boundary is permeable and over time "a sort of osmosis takes place,"[23] the osmotic pressure increasing directly with institutional barriers to interactance.

In his 1940 lecture on "Natural Frontiers," Broek reiterated Lösch's observation concerning the difference between the sharp and definite political boundary on the one hand, and most other types of boundaries, which are "really merging zones of the areal distribution of different types of a phenomenon," on the other.[24] In addition, Broek proceeded to dispel the traditional idea of the inherent "goodness" of the "natural" boundary, emphasizing that boundaries were essentially man-made political phenomena, and even the "unbased" boundary, i.e., one not based on a physical criterion, created its own frontier region. This view served to reinforce Hartshorne's "intrenched boundary" concept. Broek further rejected the whole concept of natural boundaries by substituting the term "physiographic."[25]

Under the influence of the increasing chaos in Europe, Boggs, in 1941, deplored the lack of good maps to show the relative effect of national boundaries.[26] He maintained that as the speed of travel and communication increases, and transport costs decrease, the factors producing fundamental change make possible the integration of a large single nation, and also make impractical the division of Europe along the highly nationalistic lines of numerous small states. He felt it important to show the distribution of, and regional contrasts in, such factors as travel-speed, communication-speed, and transport-cost, and how these

[19] Some years prior to the establishment of the Reserve Bank System.

[20] S. Whittemore Boggs, *International Boundaries: A Study of Boundary Functions and Problems* (New York: Columbia University Press, 1940), p. 11.

[21] *Ibid.*, p. 13.

[22] *Ibid.*, p. 16. Boggs devised an interruptive factor index for world regions based on boundary miles per 1,000 square miles of each state. This crude index showed the degree of political fragmentation in world areas while the international relationships of the political units therein, and their related boundary functions, were ignored.

[23] *Ibid.*, p. 10.

[24] Jan O. M. Broek, "The Problem of 'Natural Frontiers,'" in *Frontiers of the Future*, Lectures, University of California, Los Angeles (Committee on International Relations), 1940 (Berkeley: University of California Press, 1941), pp. 3–20.

[25] *Ibid.*, p. 9.

[26] S. Whittemore Boggs, "Mapping the Changing World: Suggested Developments in Maps," *Annals*, Association of American Geographers, Vol. 31 (June, 1941), pp. 119–28.

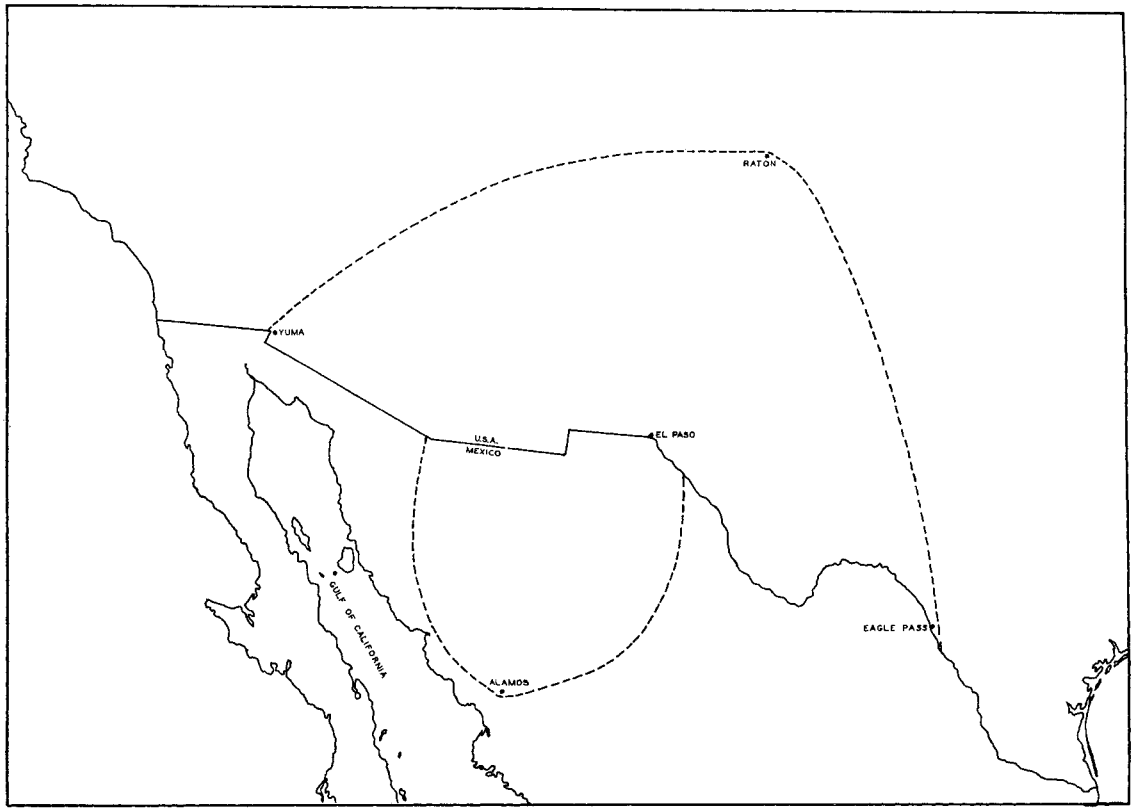

FIG. 1. El Paso's financial sphere, 1914 (after Lösch). Dotted line marks limit of area within which banks kept accounts with El Paso banks.

are affected in regions with a multiplicity of international boundaries. This was the first attempt at a scientific approach in measuring the impact of a boundary on the normal flow of communication, and again there was the implication of the close relationship between the distance and the boundary factors.

In 1942 Spykman introduced for the first time in explicit terms, the study of boundaries as "points of contact of territorial power structures" as opposed to the more traditional approach which, he asserted, characterized boundaries as lines of demarcation between legal systems.[27] Viewed in this manner, the position of a boundary, when observed over time, could become an index to the power relations of the contending forces on either side.

Spykman dispelled the myth that boundaries could be "impassable barriers from nature," noting that the arrival of three-dimensional warfare had forced a change in frontier concepts.[28]

Noting the tendency toward larger states, he suggested that the survival of smaller states was in part due to their strategic significance to the larger states. Furthermore, as the defensive value of a frontier decreased, so did the validity of the concept of buffer states, which were at best, according to Spykman, protective devices made obsolete by modern systems of communication.

Extending the "index of power potential" idea into the utilitarian sphere, Spykman suggested that when the time came to redraw international boundaries at the end of the then-current war, a premium should be put upon avoiding the creation of inequalities in power potential, because the major interest in frontiers should be no longer in terms of the strategic value of the border area but of the

[27] Nicholas John Spykman, "Frontiers, Security and International Organization," *Geographical Review*, Vol. 32 (July, 1942), p. 437.

[28] *Ibid.*, pp 438–39.

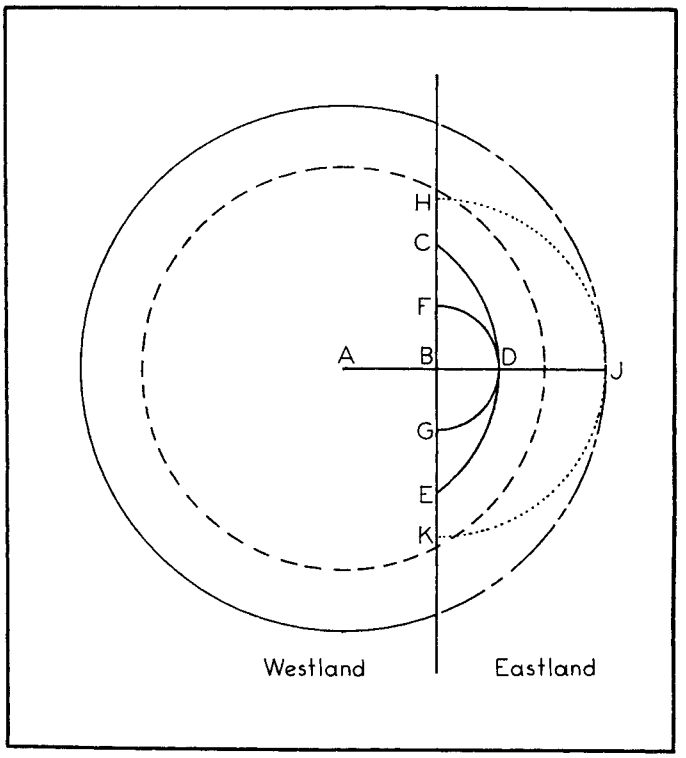

FIG. 2. Reduction of market areas by a tariff. If Eastland collects duties of a height *DJ*, the market of *A* in Eastland would be bounded by *CDE* if deliveries can be made directly to every point, and by *FDG* if only through the customshouse *B*. If *HK* represents not a customs border but a river with only one bridge at *B*, the Eastland market area would be bounded by *HJK*. (After August Lösch, *The Economics of Location*

"power potential of the territory it surrounds."[29] Hence, for Spykman the ultimate objective was to have the new boundaries drawn in such a way as to create states of approximately equal strength.

Revolutionary as this concept was at the time, it left unanswered the problem of measuring the power potential of a given area at a point in time with the necessary accuracy, and, despite its dynamic nature, the concept assumed a static power potential for each geographic area contained within these "new" boundaries.

With the end of World War II in sight there appeared two books, by Peattie and Jones, on the problems of boundary making.[30] The thesis of Peattie's book was that boundaries with few functions were more serviceable to mankind than boundaries with many important functions; that is, the weaker the boundary the better.[31] Although he had doubts about the feasibility of small states, Peattie advanced a type of resurrected buffer state idea which suggested encouraging regionalism in frontier areas, especially those that were traditionally sources of friction between adjoining states, such as Alsace between France and Germany.

In the other problem-solving work, Jones,[32] writing primarily as a guide to laymen who

[29] *Ibid.*, p. 444.

[30] Roderick Peattie, *Look to the Frontiers: A Geography of the Peace Table* (New York: Harper, 1944); and Stephen B. Jones, *Boundary Making: A Handbook for Statesmen, Treaty Editors and Boundary Commissioners* (Washington, D. C.: Carnegie Endowment for International Peace, 1945).

[31] Peattie, *op. cit.*, p. 103.

[32] Previewed earlier by Jones in "The Description of International Boundaries," *Annals*, Association of American Geographers, Vol. 33 (June, 1943), pp. 99–117.

may be instrumental in decisions involving boundary changes of great importance, showed the deep influence of Boggs, under whom he had worked in the State Department. The book is generally considered a sequel to the latter's work of 1940.[33] Despite its utilitarian intent, there was, as Boggs stated in the foreword, "perhaps no better brief introduction . . . to the whole field of boundaries. . . ."[34] Jones hypothesized that, in the event of a period dominated by overripe nationalism, contrary to Peattie's belief, "the only good boundary will be the one that strengthens the power structure of one's own state."[35] Despite the recognized fact that governments are playing an inescapably increasing role in economic life, thus giving already anachronistic boundaries even more ill-fitting functions, Jones saw little hope of solving problems by changing boundaries or by amalgamation because of the depth of national feeling over territorial claims. The solution, Jones thought, lay in changes in concepts of national sovereignty and in the evolution of some supranational control.

Thus during this period up to the end of World War II, the emphasis had been completely shifted from the criteria by which a boundary is drawn, to the functions which it performs. Jones emphasized the importance of understanding circulation patterns as one of the most significant organizing factors. By delimiting circulation regions one could, he suggested, determine places (or lines) of *minimum movement*,[36] and thus avoid dividing a "region." In this context, Jones pointed out that, contrary to Lyde's belief, the division of a "region," such as Upper Silesia after World War I, did *not* have an assimilatory effect.

Although there have been no subsequent books on the general topic of boundaries, several political geography textbooks and a few articles have since contributed to our knowledge.

In his chapter on "Frontiers and Boundaries," Moodie reasoned that, as boundaries epitomized the growth of centralization of authority and power of the states they divided, the functions of a boundary were derived, not from the nature of the line, but from the nature of the communities it separated.[37] Yet Moodie later made the dangerous assumption that there was a direct relationship between the interruptive factor of Boggs' index and boundary friction. In support of his case, he contrasted the high index assigned to Europe with that of North America.

Fischer's article "On Boundaries"[38] appeared long enough after World War II to include consideration of the war's results in Europe. It was a call for more attention to "historical" boundaries. He observed that the criteria on which boundaries have been defined have varied over time. In 1919, language, as an indication of self-determination by cultural distinction, replaced the previous physical emphasis, and after World War II the emphasis shifted to economics coupled with the secondary consideration of population movement. Fischer argued that all boundaries left a lasting imprint, and that the longer a boundary functioned, the harder it was to alter. Hence, there existed concurrent persistence and obsolescence for many boundaries. After a boundary change, the preexisting line often became an internal boundary of secondary importance, yet could persist to be later resurrected. The *de facto* boundary dividing Hudson's Bay Company activity from areas of significant American settlement prior to 1846 in the Pacific Northwest was the Columbia River, which, in its lower course, has survived as an internal boundary dividing the states of Washington and Oregon.

The geopolitical idea regarding boundaries was rejected as representing but a "momentary and transitory expression of the power of adjacent countries,"[39] although Fischer did detect the "emergence of a new kind of boundary zone, a zone of economic and social penetration."[40] Economic and various other changes could shift the secondary lines delimiting these zones of penetration, although the political boundary remained. According to him, it is imperative to view these zones in association with the historic importance of the boundary as a stabilizing factor and as a

[33] Boggs, *International Boundaries*. . . .
[34] Jones, *Boundary Making*. . . , p. vi.
[35] *Ibid.*, p. 19.
[36] *Ibid.*, pp. 20–21.
[37] A. E. Moodie, *The Geography Behind Politics* (London: Hutchinson's University Library, 1957), p. 83.
[38] Eric Fischer, "On Boundaries," *World Politics*, Vol. 1 (January, 1949), pp. 196–222.
[39] *Ibid.*, p. 215.
[40] *Ibid.*

determinant of the distribution of phenomena.

In their textbook, *Principles of Political Geography,* Weigert *et al.* included two lengthy chapters covering the nature, functions, and impact of boundaries.[41] The barrier function of a boundary was dismissed as a fiction. It was viewed more in its selective role regarding movement across it. Borrowing from Boggs, the authors saw cross-boundary influences as osmotic pressure from the neighbor.

Kristof has written comprehensively on the nature of frontiers as opposed to that of boundaries.[42] Although the author was primarily occupied with the theoretical and philosophical aspects historically underlying this difference, some interesting comments were made concerning the nature of boundaries. The boundary was *inner-oriented,* the outer line of effective control of the central government, and indicated the range and vigor of centripetal forces.[43] Contrary to the "frontier," the boundary was considered a *separating factor.* Jones, East, and Schöller were quoted to this effect, and Lyde, as so many times before, was taken to task for his "misconceived" assimilation concept.

Jones' 1959 presidential address to the Association of American Geographers traced boundary concepts over a breadth of time "from the age of the sling-shot to that of the sputnik. . . ."[44] He concluded with the suggestion that nationalism was near its zenith, and that there was some evidence to support Boggs' belief that changes in boundary functions could lessen friction.

CASE STUDIES ON BOUNDARIES

There has been no previous attempt to categorize boundary studies in geographical literature. The following classification is based principally on the division of labor followed by students in particular studies. Eight categories were found to exist:

1. Studies of disputed areas.
2. Studies of the effect of boundary change.
3. Studies of the evolution of boundaries.
4. Studies of boundary delimitation and demarcation.
5. Studies of exclaves and tiny states.
6. Studies of offshore boundaries.
7. Studies of boundaries in disputes over natural resources.
8. Studies of internal boundaries.

Studies of Disputed Areas

Hartshorne introduced his article "The Polish Corridor" in 1937 with the comment that "the political geographer is interested in analyzing the areal facts and relationships involved in the problem of the Corridor."[45] These are the interests of the political geographer in any boundary study involving disputed areas. Hartshorne stated first the problem that the Corridor presented, and then filled in the political and geographical background of the disputed area. He reviewed the attempted solution by the Germans prior to World War I, during which period the inclusion of Polish territories in Prussia "constituted an indigestible element in the state, especially as nationalism developed."[46] The problem after World War I was that the mixed population in the region (Poles in the rural areas and Prussians in the towns) made fair settlement on the ethnic principle impossible. The creation of the Corridor cut off East Prussia from the rest of Germany and thus established a permanent source of friction. A large German enclave remained within Polish territory. Hartshorne summarized that "there is NO geographical solution, i.e., by change of territory."[47]

The time element, Hartshorne observed, is very important because the factual basis of a dispute is always shifting. Historical associations readily amend with time, and economic ties can easily be realigned, but the slowest to change is the cultural association. Hartshorne further made two interesting generalizations: (1) minorities on the "wrong side" of a boundary, with time, will tend to conform with their surroundings, and (2) local difficulties can be overcome by decreasing the importance of the boundary rather than by moving it.

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[41] Hans W. Weigert *et al., Principles of Political Geography* (New York: Appleton-Century-Crofts, 1957), pp. 79–109 and 110–41.

[42] Ladis D. Kristof, "The Nature of Frontiers and Boundaries," *Annals,* Association of American Geographers, Vol. 49 (September, 1959), pp. 269–82.

[43] *Ibid.,* pp. 270–71.

[44] Stephen B. Jones, "Boundary Concepts in the Setting of Place and Time," *Annals,* Association of American Geographers, Vol. 49 (September, 1959), p. 241.

[45] Richard Hartshorne, "The Polish Corridor," *Journal of Geography,* Vol. 36 (May, 1937), pp. 161–76.

[46] *Ibid.,* p. 166–67.

[47] *Ibid.,* p. 176.

In 1938, the same author, in a chapter entitled, "A Survey of the Boundary Problems of Europe,"[48] commented on the different conclusions geographers had come to with respect to European boundaries and questioned whether political geography may claim scientific validity, or is merely a vehicle for natural prejudices. He found that there were too many unstated assumptions and consequently a lack of critical examination of these assumptions. Accordingly, Hartshorne stated four basic assumptions before his survey of boundary problems was begun. These were: (1) there is no distinction between "natural" and "artificial" boundaries, as all are man-made, (2) all boundaries in time can be disputed, so that the problems are relative, (3) the problems of a boundary are in human terms, and (4) the disputes are usually of minor importance to countries involved but of major importance to the people directly affected by the location of the boundary. Hartshorne then systematically considered each European problem area under the headings: area, country now in, country claimed by, population, percentage who speak language of claimant state.[49] For each problem area he rated from A to E the area's geographical associations with the claimant state in terms of (1) nationality, (2) transport and trade, and (3) history. Despite its usefulness, this kind of approach lacks the dynamic factor of time, and hence it is impossible to see trends of changes over time. One must keep in mind the conclusions stressing the importance of the time element reached in the Polish Corridor study.[50]

Held's review of the Saarland[51] in 1951 began, as had Hartshorne's work on the Polish Corridor, with a brief history of the problem and with details of the evolution of the disputed area's boundary. Held distinguished between the Saar's *raison d'être* and *raison de création*.[52] The former had its basis in the decision of 1919 to include and to keep intact the whole mining area within one state, while the latter was founded on the claims to the territory by France and Germany. However, the new boundaries of the Saarland of 1945 improved the area's economic integration. In contrast to the situation in 1919, it included all the manufacturing areas as well as the miners' homes, thus making it a more harmonious unit. The basic inconsonance or problem remained, in that the Saar and the Lorraine iron ore fields of France were economically linked, while ethnically the Saar was more closely related to Germany. Hence by geographical rearrangement of the boundaries, the *raison d'être* was brought to a closer spatial coincidence, but the problem of conflicting claims remained.

Two more recent studies[53] seem to reinforce Hartshorne's generalization that over time minorities tend to conform to their surroundings, if the period is long enough and if the state undertakes a concerted policy of assimilation. Both Wilkinson's study of the old Kosovo–Metohija region in Yugoslavia near the Albanian border, and Randall's work on the Klagenfurt Basin of Austria had similar ingredients and conclusions. Because of its ethnic mixture of Slavs and Albanians, Kosovo–Metohija was made an autonomous region in 1945, and renamed Kosmet. Albanian "irredentism" remained active, and the Albanian minority constituted a continuing problem, especially in terms of education. This centrifugal force within the Yugoslav state was being overcome by a campaign against illiteracy to pave the way for improved technology and closer economic union with the rest of the state.

Randall dealt with another part of the old Austro-Hungarian Empire which, like Kosmet, had been within the same state (in this case Austria) since 1919, and whose ownership had been disputed between Austria and Yugoslavia ever since. The area has a substantial Slavic

[48] Richard Hartshorne, "A Survey of the Boundary Problems of Europe," in *Geographical Aspects of International Relations*, ed. C. C. Colby (Chicago: University of Chicago Press, 1938), pp. 161–213.

[49] Not all inhabited disputed areas contain populations classifiable in terms of their cultural associations with the rival states. Platt found the native Aguarunas in the Upper Amazon "blissfully ignorant" that they could soon become Ecuadorans or Peruvians. Robert S. Platt, "Conflicting Territorial Claims in the Upper Amazon," in *Geographical Aspects of International Relations*, ed. C. C. Colby (Chicago: University of Chicago Press, 1938), pp. 241–76.

[50] Hartshorne, "The Polish Corridor," p. 176.

[51] Colbert C. Held, "The New Saarland," *Geographical Review*, Vol. 41 (October, 1951), pp. 590–605.

[52] *Ibid.*, p. 604.

[53] H. R. Wilkinson, "Yugoslav Kosmet: The Evolution of a Frontier Province and Its Landscape," *Institute of British Geographers, Transactions and Papers*, No. 21 (1955), pp. 171–93; and Richard R. Randall, "Political Geography of the Klagenfurt Basin," *Geographical Review*, Vol. 47 (July, 1957), pp. 405–19.

minority (40 per cent by the 1919 plebiscite). The "geographic unit" upon whose "intactness" a premium was placed in 1919, was based upon the sphere of influence of the regional center of Klagenfurt, which, unlike the Saar, could be closely approximated by natural features. Again the problem was the assimilation of the population into the Austrian state, and again the solution was seen through education because of the linguistic, religious, and political differences of the Slavic minority.

There seems to be no standard methodology for studying disputed areas, although the backgrounds of the areas in terms of the bases of the conflicting claims are always deemed very important. There are built-in difficulties in measuring the ethnic content of a population of a given area. Both plebiscite and census data often lack reliability or are outdated. Mixed populations are seldom conveniently separated in distinct zones but more often than not are spatially distributed by their dominant socioeconomic roles, as for example on a rural/urban basis. Moreover, the premium put on maintaining the economic viability of a region often conflicts fundamentally with the concept of fair ethnic division. The *raison d'être* and *raison de création* should thus be sharply distinguished.

The economic orientation of a region seems easily changed, while changes in cultural tradition involve the longest time lag. The key to assimilation is usually education. It seems that the area directly involved is most often the most affected by a dispute, while this area is not usually of vital importance to the disputant states.

Studies of the Effect of Boundary Change

Although areas where shifts in boundaries have occurred are often also disputed areas, this section is concerned with a survey of those studies whose main theme is *not* the relative merits of claimants to the problem area.[54] It focuses instead on an analysis of the impact of the boundary shift on the preexisting spatial pattern of phenomena, and of its related role in the reorientation of economic, social, and political activities, both in the region which has undergone the change in sovereignty, and in the contiguous areas on either side.

The first truly systematic study of the impact of boundary change came in 1933 with Hartshorne's work on Upper Silesia.[55] Hartshorne himself complained that thus far boundary studies by geographers showed, among other things, "a lack of technique, no recognized terminology, and no means of measurement."[56] The Upper Silesia study certainly added to our techniques, but it was rather limited in findings based on measurement, although many possible means to more accurate measurement were suggested and tentatively followed. Hartshorne first established the importance of the barrier effect of a boundary between states in their total social, economic, and political life, concluding that the primary concern of a proper study must center on associations "of all kinds" of different parts of the border area with each of the bordering states.[57] Exactly what associations are most meaningful for study depends on the type of border area under consideration. In Upper Silesia, a rather densely populated, predominantly urban, industrial, and mining region, Hartshorne concentrated on such associations as accessibility to good roads, and road, rail, electric power, and water supply patterns. By mapping, in addition, such phenomena as industrial sites, and coal, zinc, and lead mines, some measurement of the interruptive nature of the political boundary across this established pattern was made. This was especially important for industrial operating linkages and home/work relationships in Upper Silesia because these had been bisected many times over by the new Polish–German boundary.

Also of interest have been Moodie's studies of the impact of boundary changes in the Julian March region of the Italo-Yugoslav borderlands. His first major work,[58] previewed by an article two years earlier,[59] was a classic in the

[54] Such studies are best found in the field of international law and relations. For example, Norman Hill, *Claims to Territory in International Law and Relations* (New York: Oxford University Press, 1945).

[55] Richard Hartshorne, "Geographic and Political Boundaries in Upper Silesia," *Annals,* Association of American Geographers, Vol. 23 (December, 1933), pp. 195–228.

[56] *Ibid.,* p. 196.

[57] *Ibid.,* p. 199.

[58] A. E. Moodie, *The Italo-Yugoslav Boundary* (London: Philip, 1945).

[59] A. E. Moodie, "The Italo-Yugoslav Boundary," *Geographical Journal,* Vol. 101 (February, 1943), pp. 49–65.

before-and-after approach to the study of boundary change. Like the South Tyrol, the Julian March was, up to 1919, part of the Austro-Hungarian Empire. With the breakup of the Dual Monarchy, the Kingdom of the Serbs, Croats, and Slovenes (Yugoslavia) was formed bordering the Italian Kingdom. The boundary was set well to the east of what might be called a fair ethnic break between Slavic- and Italian-speaking peoples. Although well over half of Moodie's monograph was occupied by a full account of the physical geography and history of the region up to World War I, and a chronological account of the diplomacy surrounding the various claims prior to final settlement after the war, a clear idea of the impact of the boundary change was obtained by a comparison between the pre-World War I period, and the period of Italianization which followed. At the outset, Moodie admitted that the boundary zone of some 4,000 square miles had no ethnic, political, economic, nor even geological or morphological unity; yet, as an historic "zone of strain" it had developed a personality of its own, epitomized by its very nature as a region of shifting boundaries. An enlightening insight into the difficulty and dangers of attempting to compare ethnic data for the same area from different censuses taken under different sovereignties can be obtained from the discussion following the presentation of the 1943 paper to the Royal Geographical Society.[60] Census data since 1910, taken as they were during the era of Fascism, were held by Moodie to be unreliable for purposes of comparison with the 1910 base. The element of language was not enough for nationality definition. Furthermore, census questions on language, couched in phrases such as "usually spoken" or "spoken in the home," could hardly be truthfully answered by the Slovenes when there was official compulsion to speak Italian.

In his follow-up study three years after a further shift in the boundary, this time advantageous to Yugoslavia, Moodie was in the happy position of being able to draw from the "before" data of his own research.[61] In outlining the problems created by the 1947 change, he discussed the interruptive role of the new boundary with respect to such significant associations as the electricity and water supply, river use, the communication network, and the rural economic pattern of production and markets.

The first study[62] was preceded by a twenty-five-year span representing the "after" period, whereas the other study followed the change by barely three years. Obviously in the former case, it was possible not only to establish the disruptive effect of the change on the former pattern of spatial relations, but also to measure the long-run impact of the "new" sovereignty and associated policy in reshaping this pattern. In the latter case, however, only the short-run disruptive or negative effect could be measured, because a three-year period was too short to establish what the long term positive effect of the change would be.

Weigend, in his study of the South Tyrol,[63] was interested in the effects of the boundary changes in the area. He made quite clear, however, that *his* South Tyrol was the old province of Bolzano (Alto Adige) and not the entire autonomous region of Trentino–Alto Adige established by Italy in 1948. He judged the Italianization policy to have been a failure because of the singular lack of assimilation in both the social and political life of the German-speaking population, who even have their own political party at the national level, the Südtiroler Volkspartei (SVP). A needless assimilation move in the legal field brought a fundamental problem which had historically plagued the rural economy of other parts of Alpine Italy to an area hitherto free from it. In 1931 the primogeniture law was abolished, and in time this led to the fragmentation of land holdings. Industrialization, based on the Italian-developed sources of hydroelectric power in the region, and a sharp rise in tourism after 1933, were the activities most stimulated by the economic reorientation to the North Italian Plain. Again the importance of the time lag between change and research stands out. Weigend's research was done almost 30 years after the change, and yet if the study had been made at an earlier date, such important trends as the abolition of the primogeniture law, the

[60] *Ibid.*, p. 65.

[61] A. E. Moodie, "Some New Boundary Problems in the Julian March," *Institute of British Geographers, Transactions and Papers*, (1950), pp. 81–93.

[62] A. E. Moodie, *The Italo-Yugoslav Boundary*.

[63] Guido G. Weigend, "Effects of Boundary Changes in the South Tyrol," *Geographical Review*, Vol. 40 (July, 1950), pp. 364–75.

uptrend in tourism, and the development of water resources, with all their consequent impact, would not at that time have been evident.

Alexander's study[64] of changes along the Benelux–German boundary is a good example of the extreme short-run type. He discussed the various implications of *possible* changes in an area where decisions concerning adjustments of the boundary were still to be made.

House's study on the impact of the boundary shifts in the Alpes Maritimes[65] came a decade or so after significant changes in 1947. The 1947 change which awarded France the upper valleys of the Roya, Vésubie, and Tinée, established the watershed boundary between France and Italy in the Alpes Maritimes. This contiguous area on the "French" side of the divide had been held by Italy since the time of Unification in 1861, when the Franco-Italian boundary was established through the defunct state of Savoy. Hence, House had two time periods to deal with: Italian control from 1861 to 1947, and French from 1947 onwards, although it was, of course, the latter change that received most attention. Two separate considerations of impact were made: (1) that on the states involved, and (2) that on the social and economic life of the actual frontier communities.

It is not easy to define the "frontier region," as one must include more than the area involved directly in the exchange. House considered its narrowest definition as the administrative boundaries of the communes immediately flanking the old and the new international boundaries. In a wider context it could be defined by the limits of such natural regions as those described by river valleys adjoining the boundary.

The major problem directly created by the boundary shift was the cutting of local communes by the new line. In an alpine pastoral economy there is a fine balance between private arable lands and public grazing lands. Furthermore, adequate lumber resources and water supply are essential to a commune's viability. This balance was upset in many areas, and disputes over grazing, forest, water, and local transit rights became common. The area became a key source of supply for the Riviera electrification scheme, and the *Electricité de France* had proceeded to develop the hydroelectric power potential to the full, thus further complicating the already dislocated rural economy by flooding grazing and arable land, settlements, and routeways. Consequently, depopulation, a phenomenon long common to the area, was given even greater impetus, rendering the region a truly depressed area.

Lösch's reasoning as to why areas directly affected by a shift in boundary often become depressed, seems to hold true in this case, although the situation is rather complicated. Because the borderland area was mountainous, it had hydroelectric potential. Furthermore, its relative proximity to the large and expanding population concentration along the Riviera made it feasible to develop this potential. The case might well have been no different had the area remained Italian, although in general since the war France has been far more active in the Western Alps than Italy in dam and reservoir construction.

During the last decade or so France and Italy have moved much closer together both economically and politically, thus relieving many of the tensions in the border region by diminishing the importance of the boundary function.

In the above studies much attention has been given to the difficulty of defining the "affected zone." All students are agreed that it must encompass at least the area transferred, as well as affected adjoining areas. There is certainly no need to employ the normal criterion of regional unity on political, cultural, or economic bases in order to establish the extent of this region. The vital factor is, instead, the effect of the new boundary.

Exactly what significant associations and circulation patterns need to be studied in order to measure the boundary effect depends on the character of the region in question. A clear picture of the preexisting complex of relationships in the area is essential to any study of the effect of change. The lapse of time between boundary change and study is also an important consideration. Many effects become evident in the long run that are not present to an

[64] Lewis M. Alexander, "Recent Changes in the Benelux-German Boundary," *Geographical Review*, Vol. 43 (January, 1953), pp. 69–76.

[65] John W. House, "The Franco-Italian Boundary in the Alpes Maritimes," *Institute of British Geographers, Transactions and Papers*, No. 26 (1959), pp. 107–31.

observer in the early stages, while short-run results may disappear with the passage of time and hence be lost to the researcher working after a considerable period following the change. Perhaps we can learn something from the findings of the highway impact studies which show the necessity for at least two studies because of the difference, often basic, between short- and long-term trends: one study to be made soon after the innovation, and the second after a period sufficiently long for relationships to have become reoriented and normalized.[66]

Studies of the Evolution of Boundaries

Many geographers have been interested in the history of boundaries. For the most part, the emphasis in such studies has been placed on the methods used in the selection of the boundary, and the problems, mostly diplomatic, existing at that time concerning its establishment. Many of these studies also include a discussion of the problems of demarcation and an account of the evolution of the boundary area, especially in terms of boundary changes and disputes over territory.[67]

Jones' two articles[68] during the 1930's on the forty-ninth parallel marked a considerable advance in this type of study. Not only were problems of selection, of demarcation, and of disputes discussed, but Jones was also interested in the effect of the "almost totally antecedent boundary on subsequent settlement, transportation, and cultural patterns of the border zone." In his 1937 work, he set out to ascertain "the extent of interference with circulation" by the boundary since its establishment in 1846.[69] The importance of changing modes of transportation is traced as a primary factor in regional development, and in the varying extent of interference attributable to that boundary.

Pounds' two papers[70] on the frontiers of France were of a somewhat different nature. In the first paper, Pounds examined the basis upon which the idea of the French natural boundaries was founded, and in the second, traced the changing role of this idea through different historical periods. The persistence of the idea that France had the "right and duty to attain" the natural boundaries of "the Ocean, Rhine, Alps and Pyrenees," was of prime importance in the historical political geography of the French state. Despite the different functions France has sought for these boundaries from one period to another, the basic idea has survived.

A recent book by Burghardt[71] adopts the historical approach to the study of the Austrian border province of Burgenland which adjoins Hungary. After presenting the region's physical setting and early history, Burghardt examines the development of the cultural landscape with special attention given to the evolution of boundaries. The visible present-day influence on spatial arrangements of a relict boundary within the region is noted.[72] There is a before-and-after treatment of the 1922 boundary change, the most recent, which set Burgenland's eastern limit, and there is also an analysis of the delimitation and demarcation problems which resulted from these changes. The changes in function of this boundary over time are also discussed, with special emphasis on the most recent change following the unsuccessful 1956 uprising in Hungary when the barrier effect increased sharply. Burghardt touches on the "disputed area" character of Burgenland especially at the time of the 1922 change, noting that the very word "Burgenland" was Austrian-

[66] For example, William L. Garrison and Marion E. Marts, *The Geographic Impact of Highway Improvement* (Seattle: Highway Economic Studies, University of Washington, July, 1958). Many important long-run trends in business and land values in the bypassed settlement of Marysville, Washington, were not evident in the initial period after construction of the superhighway.

[67] For example, John W. Davis, "The Unguarded Boundary," *Geographical Review*, Vol. 12 (October, 1922), pp. 586–601.

[68] Stephen B. Jones, "The Forty-Ninth Parallel in the Great Plains: The Historical Geography of a Boundary," *Journal of Geography*, Vol. 31 (December, 1932), pp. 357–68, and "The Cordilleran Section of the Canadian-United States Borderland," *Geographical Journal*, Vol. 89 (May, 1937), pp. 439–50.

[69] Jones, "The Cordilleran Section . . .," p. 442.

[70] Norman J. G. Pounds, "The Origin of the Idea of Natural Frontiers in France," *Annals*, Association of American Geographers, Vol. 41 (June, 1951), pp. 146–57, and "France and 'Les Limites Naturelles' from the Seventeenth to the Twentieth Centuries," *Ibid.*, Vol. 44 (March, 1954), pp. 51–62.

[71] Andrew F. Burghardt, *Borderland: A Historical and Geographical Study of Burgenland, Austria* (Madison: University of Wisconsin Press) (xvi and 365 pp. Illustrations, maps, bibliography, index. 6 × 9½. $8.00).

[72] *Ibid.*, pp. 79–80.

coined in 1918, while Hungary continued to call the region "West Hungary."

For the political geographer, the book's major drawback is the absence of any comparative analysis of similar borderland situations, and also the lack of general methodological statements and conclusions derived from the study of Burgenland regarding the nature of boundaries, borderland regions, and disputed areas.

This sense of history gives a critical perspective on a boundary's role through time to its present status. As one of the most inertia-prone features of the cultural landscape, the boundary lends itself well to this treatment.

Studies of Boundary Delimitation and Demarcation

A group of studies deals solely with the problems of delimiting and demarcating boundaries. Although many of these studies are merely day-to-day accounts of a boundary commission in the field,[73] some provide important insights into the problems of demarcation.

Dodge[74] described the difficulties of demarcating a linear boundary in unsurveyed tundra in 1921. Because of the extreme northerly latitude, an azimuth error of 100 meters had to be tolerated. Peake[75] came across a rather different set of problems in the tropics, where his commission took 7 years, from 1927 to 1933, to demarcate the Northern Rhodesia–Belgian Congo boundary. This was the third attempt at demarcation by Anglo-Belgian commissions. The watershed boundary was difficult to locate precisely because of the rather featureless character of the region. Consequently, where it crossed the copper-rich area, problems were continually arising, and in many cases the boundary demarcation had to be made several times. Hence, although the boundary was delimited prior to mineral exploitation in the region, it had almost a superimposed quality due to the time lag in establishing its exact location in the field.

The redrawing of boundaries on ethnic criteria in Europe after World War I stimulated several studies describing the difficulties encountered in this task. For example, Cree's study of the Yugoslav–Hungarian boundary demarcation reviewed the diplomatic history of the two countries involved, and then described the method which the boundary commission followed.[76] Of major significance in this study, was the account of the difficulties involved in interpreting a treaty whose boundary awards were based on outdated ethnic and economic data, and yet whose final settlement had to be based on an acceptable division on these cultural grounds.

Significantly, many of these studies are concerned with sparsely populated areas, most of them in the "colonial world" where the necessity to mark exact limits dividing spheres of influence of different colonizers arose only in relation to resource utilization, and even then, on a generally amicable basis without the passion of locally rooted nationalism. The above problems concerning boundary delimitation and demarcation are often at the root of present-day disputes over territory between contiguous newly independent states.

Studies of Exclaves and Tiny States

Studies of exclaves and tiny states are also by definition studies of the effects of boundaries, and hence have a place in this classification.

Whittlesey made studies[77] in the early 1930's of a Spanish quasi-exclave and a tiny state in the Pyrenees. In his study of the Val d'Aran, contiguous with Spain but on the north side of the drainage divide, Whittlesey traced the reasons for the origin and continued existence of this anomaly. The historical role of the Pyrenees as a political boundary is the key to this discussion. Whittlesey reasoned that when the lowland on either side of a mountain boundary was strong, the barrier-function became effective. When the opposite was the case, the barrier-function became ineffective, creating a complex cross-boundary pattern of together-

[73] For example, E. H. M. Clifford, "The British Somaliland-Ethiopia Boundary," *Geographical Journal*, Vol. 87 (April, 1936), pp. 289–307.

[74] Stanley D. Dodge, "The Finnish-Russian Boundary North of 68 Degrees," *Geographical Journal*, Vol. 72 (September, 1928), pp. 297–98.

[75] E. R. L. Peake, "Northern Rhodesia-Belgian-Congo Boundary," *Geographical Journal*, Vol. 83 (April, 1934), pp. 263–80.

[76] D. Cree, "Yugoslav-Hungarian Boundary Commission," *Geographical Journal*, Vol. 55 (February, 1925), pp. 89 ff.

[77] Derwent S. Whittlesey, "The Val d'Aran: Trans-Pyrenean Spain," *Scottish Geographical Magazine*, Vol. 49 (1933), pp. 217–28, and "Andorra's Autonomy," *Journal of Modern History*, Vol. 6 (June, 1934), pp. 147–55.

ness among the people of mountain valleys. The actual content of any league of valleys depended to a great extent on the "chance events of history," such as marriage, inheritance, and war. The Val d'Aran was just such a valley left in league with valleys on the Spanish slope when the Pyrenees became more effective as a political barrier. Its origin and reasons for survival established, Whittlesey proceeded to describe the situation in the Val d'Aran as it existed in 1933. He found that Spanish and French influences were mixed.

The phenomenon of Andorra was treated in much the same way, being regarded as a "challenge to the political geographer to uncover the geographic roots of so exotic a plant."[78] He rejected as a "weak environmental reed to lean upon," the popular explanation of Andorra's political separation as being based on isolation.[79] The concept of "rugged individualism" was rejected on similar grounds, and Whittlesey only partly accepted mutual jealousy between Spain and France as a reason for Andorra's origin and survival. In the absence of any valuable resources, Andorrans protected their autonomy when they "learned the art of playing off their joint suzerains against each other."[80] Whittlesey concluded that the *status quo* provided both France and Spain with sufficient advantages to encourage preservation.

On the basis that "uninterrupted territory was one of the principles for the smooth functioning of a political entity," Robinson[81] examined the case of West Germany and West Berlin. Again, the exclave's origin was established, after which its critical relationships with West Germany, East Germany, and East Berlin were discussed. Lastly, in the light of these relationships, the internal functioning of the exclave itself was studied. Similarly, Pedreschi's study[82] of Campione d'Italia concentrated on origin, evolution, and linkages of the exclave with its homeland.

More recently, Robinson[83] suggested a classification for exclaves based on their degree of separation from the motherland. His divisions, *normal, pene, quasi, virtual,* and *temporary,* point up the fact that the very essence of an exclave, its separation, is a matter of degree and must include consideration of normal lines of communication as well as sheer physical aspects. In Robinson's systematic study, the reasons for origin and survival were again given a high place. He saw, too, a basic dichotomy in an exclave's external relations, those with its neighboring country and those with its mother country. The key relationships here were those involving communications, administration, and economics, for they all bore upon the conditions of life in the exclave itself.

The zonal dissection of Berlin after the war, and the growing barrier-function of the line separating the Soviet sector on the one hand, from the French, British, and American sectors on the other, has given geographers an opportunity of studying not only a city (West Berlin) as an exclave, but also a city (Berlin) as an entity divided. Hence, urban as well as political geographers have become interested in this postwar phenomenon.

Schöller[84] has examined the changes in Berlin's internal geographic structure as a consequence of the political division of the city, as well as of the isolation of West Berlin from its hinterland. By analyzing such phenomena as population shifts and changes in industrial location, Schöller determined that an "economic recrystallization" was taking place in the divided city. Further consequent to the division were changes he observed and measured in the communication pattern, urban foci, and distribution of urban services. Even dichotomies in architectural styles and sharp differences in the policies of urban renewal were found between the two halves of the city. However, at the time of writing in 1953, Schöller saw no changes as yet that would handicap future reunification.

More recently Schroeder[85] selected the public transport pattern, fundamentally affected

[78] *Ibid.*, p. 147.
[79] *Ibid.*
[80] *Ibid.*, p. 153.
[81] G. W. S. Robinson, "West Berlin: The Geography of an Exclave," *Geographical Review,* Vol. 43 (October, 1953), pp. 540–57.
[82] L. Pedreschi, "L'Exclave Italiano in Terra Svizzera di Campione d'Italia," *Rivista Geografica Italiana,* Vol. 64 (March, 1957), pp. 23–40.
[83] G. W. Robinson, "Exclaves," *Annals,* Association of American Geographers, Vol. 49 (September, 1959), pp. 283–95.
[84] Peter Schöller, "Stadtgeographische Probleme des Geteilten Berlin," *Erdkunde,* Vol. 7 (March, 1953), pp. 1–11.
[85] Klaus Schroeder, "Der Stadtverkehr als Kriterium der Strukturwandlungen Berlins," *Erdkunde,* Vol. 14 (March, 1960), pp. 29–35.

by Berlin's division, as a criterion of the changes in the city's geographic structure. He made a before-and-after World War II study of the routes and frequencies of Berlin's public transport system. By this method he was able to find a high correlation between areas of lower density of transportation lines and the East–West sector boundary.

Minghi's paper on Point Roberts[86] examined the situation of an American exclave in northwestern Washington to which land access from the United States proper is possible only through Canada. The Point's proximity to growing metropolitan Vancouver, British Columbia, its isolation from any equivalent population concentration in the United States, and its attraction as a summer resort, have, during the last decade, reoriented its economic and social links toward Canada. This process was furthered by an important improvement in highway access in 1959, which brought the Point within reasonable commuting distance of Vancouver. Some of the details of these changing economic and social linkages were examined, and were found to contrast ever more sharply with the political *status quo*.

Minghi discussed several research approaches which could be followed in studying such a paradoxical problem. These are suggested by concepts of political geographic theory, such as Gottmann's circulation and iconography, Hartshorne's centripetal and centrifugal forces, Deutsch's competing interaction fields, and Mackay's testing of the interactance hypothesis. Minghi believed that a valid approach to the study of exclaves lay in the quantitative analysis of interaction between the exclave and its contiguous state, and between it and its home state.

Exclaves, despite their uncommonness, their esoteric nature, and their primary concern with "*raisons d'être*" and survival, are after all no more than a specialized type of boundary zone, characterized by an unusually high degree of cross-boundary circulatory pressure. Through this inextricable link with boundaries, they have provided geographers with a milieu for studies that have advanced knowledge in boundary science.

[86] Julian V. Minghi, "Point Roberts, Washington: The Problem of an American Exclave," *Yearbook of the Association of Pacific Coast Geographers*, Vol. 24 (1962).

In the case of the west coast region of the Canada–United States boundary, these exclave studies have a considerable significance. They provide convenient analytical tools for studying the impact of the boundary at various stages in the region's evolution. The boundary of 1846 left several Hudson's Bay Company exclaves south of the line; British Columbia itself was a virtual enclave of the United States between 1846 and 1885; and Point Roberts continues as a *bona fide* exclave today.

Studies of Offshore Boundaries

A maritime boundary, unlike a land boundary which directly affects only the two states it separates, marks the limits of the spatial encroachment of a state's sovereignty into the area of the high seas, and thus affects many states. There has been little agreement as to the width of the territorial sea. Studies in this category, consequently, have been largely legalistic in approach, and little attempt has been made to treat offshore boundaries as part of the general complex of political boundaries.

Most of these studies have concentrated on the problems and principles of delimitation, usually treating territorial sea boundaries as separate from other contiguous zone boundaries.

An early study by Boggs[87] centered on the delimitation proposals made by the American delegation to the Conference for the Codification of International Law at The Hague in 1930. Several years later, a more penetrating discussion by the same author[88] attacked the problem of giving a precise meaning to the term "median line," and of finding a type of boundary through territorial waters to the high seas that would be capable of general application. In a more recent article, Boggs[89] was concerned with the variety of territorial boundaries claimed by the states of the world. By map and comprehensive table, he classified states in terms of the boundaries claimed for territorial seas and for other contiguous zones. Boggs saw

[87] S. Whittemore Boggs, "Delimitation of the Territorial Sea," *American Journal of International Law*, Vol. 24 (1930), pp. 541–55.

[88] S. Whittemore Boggs, "Problems of Water Boundary Definition," *Geographical Review*, Vol. 27 (July, 1937), pp. 445–56.

[89] S. Whittemore Boggs, "National Claims in Adjacent Seas," *Geographical Review*, Vol. 41 (April, 1951), pp. 185–209.

some order in this seeming chaos in the form of certain distinctive groupings. He noticed, for example, an indirect relationship between the width of the belt of sea claimed and the volume of a state's foreign commerce. Moodie,[90] several years later, actually showed this relationship cartographically for European maritime states.

As the title suggests, Pearcy's 1959 article on the "Geographical Aspects of the Law of the Sea"[91] was a geographer's analysis of the latest trends in maritime international law. In a section specifically on offshore boundaries, five distinct but overlapping zones were listed and discussed. These were: internal waters, territorial sea, contiguous zone, continental shelf, and high seas.[92] Pearcy concluded that there was an imbalance between the legal claims and physical realities in approaches to establishing satisfactory boundaries separating these zones.

Recently, two books have appeared on the subject of offshore boundaries, one by Shalowitz[93] on the technical–legal–physical problem of delimitation and demarcation, and the other by Alexander[94] on northwestern Europe's coastlands. The latter work, especially in a chapter entitled "Offshore Geography: Theoretical Considerations" and in the "Afterword,"[95] throws fresh light on our understanding of maritime boundaries. Alexander calls the various offshore zones, of which boundaries are an integral part, the "coastland complex." Boundaries are affected by the physical and cultural factors of a coastland, while they, in turn, have an impact on many nonpolitical aspects of the coastland complex.

Alexander notes further that studies of offshore boundaries have followed two principal methods of analysis: one, where theoretical principles of delimitation are applied to actual coastland conditions throughout the world, as in Pearcy's contribution; and the other, where generic principles of delimitation are evolved by generalizing from a wide range of specific cases, as in Boggs' 1937 study.

Alexander concludes that as offshore areas are in a state of continual change, both culturally and physically, the very nature of offshore boundaries is also changing. These boundaries are in general being extended seawards with increasingly vaguer definition as to their function and location. Thus Alexander suggests that we should think more in terms of "frontiers" than of boundaries. The section below discusses a study which reinforces this suggestion.

Studies of Boundaries in Disputes over Natural Resources

There are very few studies in this category. Although there is some similarity between boundary studies that are concerned with resource utilization and those that are concerned with disputed areas, the two fields are quite distinct. The latter centers on areas of dispute concerning the location of the boundary, whereas the former is concerned with a common resource whose mobility often remains unaffected by the boundary itself, but whose utilization by the states concerned is strictly determined by the boundary.

A common example has been the case of international rivers, concerning which a vast body of domestic and international law has evolved. A boundary crossing a river creates an upstream and a downstream state. The utilization of the water by one state can fundamentally affect its use by the other. Friction over the use of river water is especially important in dry-land regions, as Karan[96] pointed out. His comparative study of the problems growing out of conflicts over the use of the Colorado and Indus rivers is offered as a "starting point in research" involving the "seeking out" of new

[90] A. E. Moodie, "Maritime Boundaries," in *The Changing World,* eds. W. Gordon East and A. E. Moodie (Yonkers-on-Hudson, N. Y.: World Book Co., 1956), p. 953.

[91] G. Etzel Pearcy, "Geographical Aspects of the Law of the Sea," *Annals,* Association of American Geographers, Vol. 49 (March, 1959), pp. 1–23.

[92] This zonal classification is now a standard approach to offshore areas in political geography texts. For example, Norman J. G. Pounds, *Political Geography* (New York: McGraw-Hill Book Co., 1963), pp. 112–13 (x and 422 pp.; illustrations, maps, diagrams, tables, chapter bibliographies, index; $9.50).

[93] Aaron L. Shalowitz, *Shore and Sea Boundaries,* U. S. Dept. of Commerce, Coast and Geodetic Survey (Washington: Government Printing Office, 1962).

[94] Lewis M. Alexander, *Offshore Geography of Northwestern Europe,* Association of American Geographers, Monograph Series, No. 3 (Chicago: Rand McNally, 1963) (xii and 162 pp. Maps, tables, diagrams, appendix, bibliography, index. $5.00).

[95] *Ibid.,* pp. 126–37.

[96] Pradyumna P. Karan, "Dividing the Water: A Problem in Political Geography," *Professional Geographer,* Vol. 13 (January, 1961), pp. 6–10.

examples from "different and widely separated areas to illustrate difficult political geographic circumstances."[97]

Recently a study by Minghi[98] on salmon fishing in the North Pacific served to draw attention to the oceans and the competition between states for the natural resources they contain. This competition has led, in the case of the North Pacific salmon, to a convention, the parties to which have agreed to recognize certain boundaries in the area as delimiting their fishing activities. Thus a kind of specialized oceanic division by "sphere of exploitation" has been created between Japan and the United States.[99] It seems certain that as pressure increases to use known resources more intensively and to discover new sources of food and energy, the oceans will come in for ever greater exploitation. This exploitation will tend, as it did in the continents of the New World, to demand a sharper definition of sovereignty as competition becomes fiercer. Given the continued existence of a world politically fragmented into nation-states, the areally defined boundary over the oceans, despite the inherent difficulties of demarcation, might be an answer. There seems to be a beginning in the trend concerning salmon in the North Pacific. Many important factors compounding the problem of any such evolutionary trend in oceanic sovereignty are present. Minghi's study showed that the two major factors were insufficient knowledge of the resource involved, especially concerning its spatial distribution, and the refusal over time by one or more interested but nonmember states, such as the U.S.S.R., to recognize any exclusive conventions formulated by interested states at one point in time. It might well be that with technological advance and population pressure shrinking space to an ever greater degree, the days of ambiguous oceanic sovereignty are numbered, and that the transfer to a system of partition will not be easy.

A study in historical political geography by Hartshorne some years earlier was concerned with control over mineral resources as a possible factor in a boundary change.[100] Specifically, Hartshorne examined the accepted explanation for the new boundary of 1871 in Alsace–Lorraine between France and Germany. This was that Germany wanted possession of the iron ore deposits of Lorraine for the iron and steel industry of the Ruhr. Upon scrutiny of the treaty and of the region's geographical associations at that time, Hartshorne concluded that German annexation was based on a combination of cultural and strategic factors rather than on any desire to gain the mineral wealth. The iron-rich area was, in fact, split between France and Germany by the new line. This study demonstrates the peculiar contribution which political geographers can make in the critical examination of accepted explanations concerning the motives behind boundary changes at specific points in time.

Studies of Internal Boundaries

Although most boundary studies in political geography have been concerned with international boundaries, lines separating internal divisions have also been the subject of research, both at the state and at the more local level. Despite the concentration of effort at the international level, it must be remembered that the pattern of spatial distribution of phenomena can be affected by boundaries separating political units at any level.

Jones' study[101] on Oregon's internal boundaries is one of the classic studies in this category. Essentially a "utilitarian" study designed to demonstrate how a realignment of Oregon's boundaries could effect greater economy and efficiency in government, it was based largely on the concept of nodal regions as defined by the state's circulatory system. Jones' work represented the first utilitarian study that suggested political boundaries be based on functional rather than physiographic regions.

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[97] *Ibid.*, p. 10.

[98] Julian Minghi, "The Conflict of Salmon Fishing Policies in the North Pacific," *Pacific Viewpoint,* Vol. 2 (March, 1961), pp. 59–84.

[99] Japan has agreed not to fish east of the 175° West line of longitude, which at the time of the Convention (1952) was thought to separate Alaskan-spawned salmon from Asian-spawned. Such oceanic boundaries as 175° West must still be distinguished from boundaries in coastland areas which, despite their growing frontier nature, are merely direct extensions of land boundaries.

[100] Richard Hartshorne, "The Franco-German Boundary of 1871," *World Politics,* Vol. 2 (December, 1949), pp. 209–50.

[101] Stephen B. Jones, "Intra-State Boundaries in Oregon," *Commonwealth Review,* Vol. 16 (July, 1934), pp. 105–06.

Ullman's short note[102] four years later was partly a review of articles on boundaries in the Pacific Northwest and partly a suggestive paper on areas for further research. He recommended some guidelines to be followed if county consolidation ever became a reality in the Pacific Northwest. Besides the Cascade watershed, he suggested two other lines east of the Cascade Mountains that separate dissimilar regions. The first was a line about 50 miles east of the Cascades which would include the arid zone of the interior. This area, despite its climatic contrast with the Puget Sound lowlands, was in fact closely linked with the coast economically. The second was a potential boundary marked by the zone of minimum circulation, the "mid-desert traffic divide." After noting the strong resistance to change in the political milieu, Ullman was led to conclude that political divisions were equally if not more deeply entrenched psychologically than the physical environment itself.

Ullman's study[103] of the boundary region between two New England states was of a more systematic nature and explained many of the regional contrasts on either side in terms of the effect of the boundary. The historical evolution of the line was traced as background information. Comparative advantages as a result of the differential in tax structures between the two states were held to account for the particular location of many industrial sites. The spatial patterns of phenomena such as property lines, electrical transmission lines, and water mains were considerably modified by the state line, although elements of the communication network (such as roads and railroads) that antedate the establishment of the boundary in the study region were hardly affected by the line. The basic difference in religious attitude between puritan Massachusetts and liberal Rhode Island also had impact as a locational factor; Boston's nearest racecourse was forty miles away, just inside the Rhode Island state line. Although lacking any vigorous methodological approach, the study nevertheless marked a considerable advance in research on internal boundaries by observing the geography of the zone through the strict frame of reference of the political variable.

Two articles by Gilbert, one just prior to, and the other soon after World War II, pointed up the need, much as Jones' Oregon study did, for a reorganization of the internal political units of England and Wales.[104] In 1939, Gilbert found that current county boundaries had changed little in a thousand years and that new and larger administrative units were necessary to overcome the urban/rural split that had developed in many areas. He noticed that there was precedence for this in that only five provinces existed in Roman times, that during the Middle Ages several different kingdoms existed, and that in the Cromwellian era England and Wales were administered in only seven districts. The article was largely provoked by the intensive emergency defense planning going on at the time. Such planning involved the establishment of many varied functional regions, the boundaries of which seldom coincided. Gilbert found that radio broadcasting had become a great stimulant to regionalism and that the boundaries separating the listening areas of the various BBC regional stations might well form the basis for future administrative regions. This idea of basing internal divisions on regional consciousness expressed by circulatory zones of communication was most forward-looking and not without application at the international level.

Gilbert's postwar study again pleaded for changes in the anachronistic internal boundaries of Britain. After briefly describing the existing structure and explaining its anachronistic nature, he went on to suggest remedies. Boundaries should be drawn so as to create areas large enough for efficiency and for a measure of independence from the central government, while local sentiment and the feeling of neighborhood should be preserved at all costs. Furthermore, it was suggested that accessibility in terms of a time/cost factor could be used as an aid in redrawing the boundaries. The above two studies, along with Jones' contribution on Oregon and Ullman's on the Pacific Northwest, serve to demonstrate

[102] Edward L. Ullman, "Political Geography of the Pacific Northwest," *Scottish Geographical Magazine*, Vol. 54 (July, 1938), pp. 236–39.

[103] Edward L. Ullman, "The Eastern Rhode Island-Massachusetts Boundary Zone," *Geographical Review*, Vol. 29 (April, 1939), pp. 291–302.

[104] E. W. Gilbert, "Practical Regionalism in England and Wales," *Geographical Journal*, Vol. 94 (July, 1939), pp. 29–44, and "The Boundaries of Local Government Areas," *Geographical Journal*, Vol. 111 (April–June, 1948), pp. 172–206.

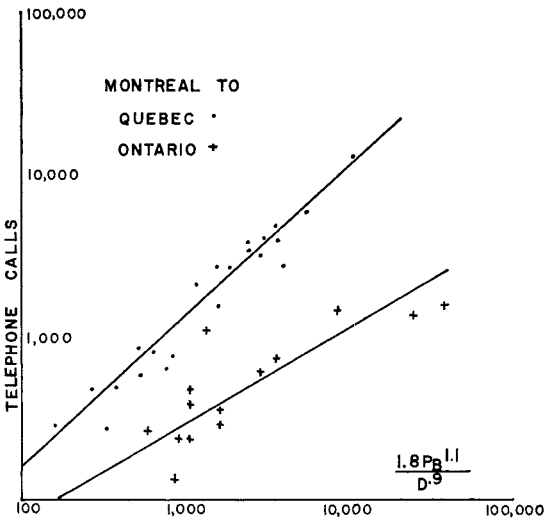

FIG. 3. Long-distance telephone traffic originating in Montreal for a ten-day period to cities in Quebec and Ontario (after J. Ross Mackay, "The Interactance Hypothesis and Boundaries in Canada," *Canadian Geographer*, No. 11 [1958], p. 5).

the political geographer's contribution in the realm of regional planning.

An examination of Idaho's peculiar problem of securing political unity in the face of serious intrastate barriers to circulation was made by Thomas in 1949.[105] This study may be considered a "boundary study" in that its findings would strongly suggest a good case for political division between North and South.

Mackay's work[106] on the measurement of the boundary's relative barrier-effect for various selected types of interaction marked a great advance in boundary research, in that for the first time the effect of a boundary was expressed in clear quantitative terms. A reasonably precise estimate of the effect of a boundary on such key types of cultural interaction as migration, intermarriage, telephone calls, etc., was held to be a powerful analytical tool for boundary studies. By using the nonlinear form of the interactance model, Mackay was able to attribute a distance factor to a boundary as it affected certain types of human activity which crossed it. Mackay analyzed the frequency of long-distance telephone calls between cities within Quebec, and interprovincially between cities in Quebec and cities in Ontario with the same *PAPB/D* value.[107] He found that the interactance between Quebec and Ontario varied between ⅛ and 1/10 of the norm between cities within Quebec. This, Mackay suggested, may be interpreted as a measure of the boundary. Extending this to include cities in the United States with the same *PAPB/D* value, he obtained a distance factor between Quebec and the United States of some 50 times that between Quebec cities. Hence, the French–English language boundary, one may conclude, is small in its interruptive nature compared with the international boundary (Fig. 3). Mackay was, however, careful to point out that this use of the interactance hypothesis does not *interpret* the effect of the boundary, but simply states it in quantitative terms.[108]

Prescott's discussion[109] of Nigeria's boundary problems took the form of before-the-fact hypothesizing about potential frictions resulting from the poor demarcation of many of Nigeria's internal boundaries prior to independence and from their noncoincidence with the distribution of major ethnic groups. As in so many other parts of emergent Africa, the unmarked boundaries were "not meant to stand the strain of increasingly complex functions."[110] Prescott singled out several areas for study where there were serious degrees of nonalignment between the political boundary and lines separating economic or ethnic entities, and made recommendations for changes largely based on economic grounds.

Nelson's work[111] on the Vernon area of Los Angeles County concentrated on the political pattern, and is a contribution to the understanding of the areal distribution and functioning association of the numerous items in the

[105] Benjamin E. Thomas, "Boundaries and Internal Problems of Idaho," *Geographical Review*, Vol. 39 (January, 1949), pp. 99–109.

[106] J. Ross Mackay, "The Interactance Hypothesis and Boundaries in Canada," *Canadian Geographer*, No. 11 (1958), pp. 1–8.

[107] *PA* and *PB* = the population of the two interacting cities, and *D* = the distance between them.

[108] For a similar method of measuring the interruptive nature of a boundary, see Julian V. Minghi, "Television Preference and Nationality in a Boundary Region," *Sociological Inquiry*, Vol. 33 (Spring, 1963), pp. 65–79.

[109] J. R. V. Prescott, "Nigeria's Boundary Problems," *Geographical Review*, Vol. 49 (October, 1959), pp. 485–505.

[110] *Ibid.*, p. 486. This observation underscores the findings in the section on delimitation and demarcation.

[111] Howard J. Nelson, "The Vernon Area, California: A Study of the Political Factor in Urban Geography," *Annals*, Association of American Geographers, Vol. 42 (June, 1952), pp. 177–91.

urban landscape. Significantly, Nelson did not confine his study to Vernon itself, but included in the study area the "boundary zone" surrounding the city. Nelson found that the boundary was a significant factor in the transportation pattern and also in residential, commercial, and industrial land use. The evolution of the settlement, and its relationships over time with adjoining political units, proved to be important considerations in explaining the present-day impact of the boundary. In this respect, the inertia associated with industrial capital investment, and the importance of initial advantages became key factors.

Minghi has used the methods of the political geographer in analyzing the geography of a metropolitan area.[112] All metropolitan areas are characterized by some degree of political fragmentation, but the situation existing in the Washington, D.C. area involved not only fragmentation, but was peculiar in that parts of two states (Maryland and Virginia) and a federal district were included. Key functions with area-wide application such as water supply, sewage disposal, transportation, and planning were selected and their spatial pattern described in terms of the paradox of political fragmentation and economic integration in the metropolitan area. To provide controls, the situation in other metropolitan areas of similar size, such as St. Louis, was also considered Minghi suggested that an estimate of the interruptive nature of the boundaries separating the political units in the Washington area could be obtained by comparing the actual pattern with an "ideal" pattern of circulation as indicated by the physiographic and demographic milieu. The author concluded that this interruptive effect on the circulation patterns of the key functions was considerable and in some respects would have most serious future consequences, unless the functions of the boundaries were to be drastically changed.

This type of utilitarian study demonstrated that the tools created for and moulded by studies of international boundaries could be further amended for use in analyzing the geography of urban regions.

[112] Julian Minghi, "The Spatial Pattern of Key Functions in the Washington Metropolitan Area," unpublished paper (Washington, D. C.: Washington Center for Metropolitan Studies, September, 1960).

SUMMARY AND CONCLUSIONS

In this review of boundary studies, one can see a trend away from the earlier thought-restricting boundary concepts, such as that based on the artificial-vs.-natural dichotomy, toward more function-oriented studies.

In disputed areas, the major problem arises from the intermingling of ethnic groups purported to represent the nationalities involved in the dispute. When the geographer steps from the scientific milieu of objective inquiry into the arena of biased international politics as, for example, in the case of the South Tyrol,[113] we have a glaring example of the misuse of political geography.

One of the most fruitful areas of research on boundaries was found to be the impact of boundary change. Before-and-after studies, if based on reliable data, and if made with full consideration of the length of time period between change and study, increase our knowledge about the two state systems in question by illustrating their differing organization of the same piece of territory.

A change in boundary location, however, is the exception rather than the rule, and although studies of changes have been of great significance in advancing boundary research, we cannot rely entirely on this method. Static boundaries have an impact on circulation patterns, and this impact varies according to the changing boundary functions. Furthermore, we can eliminate the variable of the changing function by measuring a selected form of interaction across the boundary at a certain point in time, as Mackay did in 1958.

More attention to the "normal" situation is needed in boundary research. Therefore, while the discussion in this paper has centered more on studies concerning boundary disputes and changes, the author believes that the studies falling in the other categories have served as important supplements to boundary science.

The significance of studies concerned with boundary evolution is that they provide an historical dimension which is frequently a critical factor in explaining present-day situations. Although studies of exclaves and tiny states are somewhat different in kind, they are

[113] Julian V. Minghi, "Boundary Studies and National Prejudices: The Case of the South Tyrol," *Professional Geographer,* Vol. 15 (January, 1963), pp. 4–8.

essentially boundary studies and contribute a spatial dimension to boundary analysis.

The increased pressure for exploitation of natural resources leads us away from being land-bound in our thinking on boundaries. The oceans may well prove to be the last frontier in the spread of the national-state system, thus completing the political fragmentation of the globe.

Although internal boundaries have not enjoyed the same attention as those of the international variety, studies on this subject show that methodology evolved at the international level can be used successfully at all political levels.

In almost all studies, there has been a conspicuous reliance on secondary data. These data are often the best available and the most reliable in studying influence of the boundary on the flow of goods, services, and people. There is no question of the validity of such studies in political geography, provided that the data are the most appropriate secondary data. The study of international boundaries in political geography, however, must also take the view that boundaries, as political dividers, separate peoples of different nationalities and, therefore, presumably of different iconographic makeup. The political geographer must seek a measure of a boundary's viability as such a divider. For this we must concern ourselves with the role of the boundary in determining spatial patterns of selected behavioral activity which is itself an indicator of iconographic attitudes. Consequently, the political geographer must be prepared to collect data at the primary level. He must undertake investigations in the sociological field, as well as in the cultural and economic areas, for the spatial patterns of social behavior can be even more important than other patterns in determining the impact of a boundary and its viability as a national separator.

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