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A project of doubtful utility: measuring legislative opposition to the Pennsylvania Canal

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Abstract

A spatial model of legislative roll call votes is used to examine the debate surrounding the decision to build a canal across Pennsylvania in 1826. The model reveals a sharp polarization between the English and German-speaking regions of the state, with marked splits over the establishment and funding of the Pennsylvania Canal and other fiscal issues. Representatives from the German-speaking regions consistently opposed all spending initiatives. This regional split, underappreciated by geographers and historians, provides evidence in support of a broader positioning of culture and ethnicity in the study of political behavior. The model itself provides a novel means of analyzing and assessing geographically based voting blocs. © 2000 Elsevier Science Ltd. All rights reserved.

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The identification and explanation of sectional differences within states or geographic regions is a recurring theme in political geography. This paper proposes an application of a model developed by Poole and Rosenthal (1997) that offers a means of measuring such differences quantitatively. The model involves mapping legislators onto a two dimensional space, where the distance between legislators is proportional to their commonality in voting behavior. To the extent that legislators represent the interests of their geographically based constituents, it is possible to see which geographical areas are politically aligned or nonaligned with one another. The model is applied to the state of Pennsylvania for the year 1826, a year in which the state was debating construction of a statewide canal to link the eastern seaboard with the Mississippi/Ohio watershed.

A conventional explanation for the voting on the canal is that the different sections

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of the state voted for or against it depending on their economic self-interest (see Majewski, 1997). The model invites another interpretation: that the different regions of the state all gave their support to the canal, with the significant exception being the areas of German ethnic settlement. Since the German language was dominant in these areas, this distinction may be seen as an expression of linguistic regionalism (Murphy 1991, 1993), one that complements recent work identifying correlations between locality, ethnicity, and voting behavior (Shelley, 1994; Eagles, 1995; Landa, Copeland & Grofman, 1995).

Typically such studies make use of popular election returns rather than legislative roll calls. Roll calls have the advantage of allowing the analysis of specific issues, but associating them with geographic areas requires the assumption that legislators' voting behavior correlates with the views of their constituents. Such an assumption is reasonable where voting districts are small and relatively homogeneous, and this is the logical basis of the American system of particular representation (Wood, 1969). On the other hand, Poole and Rosenthal (1996) have demonstrated that this assumption is fallacious at the level of the United States Senate, where pairs of senators from the same state are no more likely to vote in tandem than random pairs of senators. In this paper, I will argue that the polarized voting records of legislators from the German and English speaking regions in Pennsylvania are evidence of fundamental differences in the populations of these regions as a whole.

Pennsylvania in the national and world economy, 1826

The state of Pennsylvania and the year 1826 are not parochial selections for study. The time and place represent a critical juncture in the development of America's national and international economy. New York had just opened its cross-state Erie Canal in 1825 with phenomenal commercial success; Pennsylvania, already having yielded commercial pre-eminence to New York over the prior decade, was now faced with the prospect of being completely shut out of trade with the continental interior of the United States. Pennsylvania's commercial interests also felt competition to the south, where Baltimore and Virginia interests were pursuing the simultaneous construction of the Baltimore and Ohio Railroad and the Chesapeake and Ohio Canal across the state of Maryland.

Pennsylvania had long desired a better trans-Appalachian transportation route. Numerous turnpike companies were chartered and subsidized by the state toward this end in the first two decades of the nineteenth century. Even so, the crossing remained arduous and costly. A canal-based route had figured in Albert Gallatin's 1808 national transportation plan, but without federal subsidy such a project was inconceivable (Meinig, 1993). The emergence of an international convertible bond market after 1815 provided an alternative means of funding. The bonds which New York, Pennsylvania, Maryland, Virginia and other states would issue to finance their canals attracted the attention of capitalists and gentry in London, Amsterdam and Paris motivated by higher rates of return than those available in Europe (Ferguson, 1998). America's stable political landscape was also attractive to European investors

“tired of seeing their accumulated capital wasted in powder and shot” (McGrane, 1935, p. 26).¹

The bill to authorize the construction of the Pennsylvania Canal received broad support from both sides of Pennsylvania’s bicameral legislature, but opposition was not trivial. Neither side provided the two-thirds majority required to overcome a gubernatorial veto. Many accounts of the canal ignore this opposition entirely (Shelling, 1938; Rhoads, 1960; Shank, 1991), or focus on the earlier technological debate between canals and railroads (Rubin, 1961). Where opposition is addressed, it is frequently explained in terms of the tensions between cities and their hinterlands, or “court and country”, that characterized this period (Groves, 1987; Wilson, 1995). While it is true that Philadelphia interests spearheaded the canal concept, urban votes alone were not sufficient to see it through the Pennsylvania legislature. Philadelphia and Pittsburgh legislators combined for only about 1/6 of the votes in what was then an overwhelmingly rural society. An alternate interpretation is to explain the “nay” votes in terms of economic interests (Majewski, 1997). Here, opposition is identified with areas that did not stand to benefit from a project, either because they were too far removed geographically from it or because an existing economic relationship was threatened. An example of the latter case is found in the south-central part of Pennsylvania, where economic links with Baltimore were greater than those with Philadelphia.

These explanations for opposition to the canal, while valid, fail to account for key aspects of the voting pattern in Pennsylvania. Support for the canal came from both “court” and “country”, from areas extremely rural and very remote from its proposed alignment. In contrast, some of the most vocal canal opponents were from counties along the proposed alignment. A clearer explanation emerges when ethnicity is considered. The areas of Pennsylvania most closely aligned with opposing votes were the areas of German ethnic settlement.

The Pennsylvania German counties: a landscape of reluctance

Pennsylvania was distinctive among American states in that it had a sizeable, enfranchised, non-English speaking population. By 1826, Pennsylvania’s Germans were primarily second, third, and fourth generation immigrants, with the largest influx having arrived between 1749 and 1754.² A majority had emigrated from the Palatinate of what is now southwestern Germany, with substantial contributions from Württemberg and Switzerland. These immigrants had found William Penn’s “Holy

¹ Of course, most of these bond issues proved unprofitable in the long-term. Pennsylvania would default on its interest payments in 1842, joining a long list of other canal building states, punctuating one of the first modern international peacetime debt crises. Pennsylvania’s canal, though it was completed by 1834, never captured more than a few percent of the Erie Canal traffic.

² The use of the term “German” here and throughout this paper applies to these Pennsylvanians of German descent, and reflects both the early nineteenth century vernacular as well as contemporary scholarly usage (Glatfelter, 1990).

Experiment” the most receptive of the American colonies politically and culturally, and compared with later influxes of non-English speaking Europeans, assimilation was modest. There was a thriving German language press in the 1820s that would survive nearly another century until World War I; Pennsylvania’s laws and reports were printed bilingually until the Civil War.

While the so-called “sect people”, such as the Mennonites and Amish, came to be the most iconographic of this group of immigrants, they represented no more than 10% of the Pennsylvania German population. The vast majority were “church people”, primarily Lutherans and German Reformed (Glatfelter, 1990). Both church and sect groups tended to settle in well-defined contiguous areas (Fig. 1); even today the “German counties” are readily identifiable through toponyms and surnames. Agriculture was the dominant economic activity. The legislators representing these areas, most of whom were farmers themselves (Anonymous, 1834), accounted for the bulk of the nay votes on the Pennsylvania Canal.

These nay votes reflect a general disinclination to countenance government spending of any variety. The canal was but the largest of a series of expensive and expansive projects to have been proposed in the decade, projects that included radial penitentiaries with rigidly enforced solitary confinement (Johnston, Finkel & Cohen, 1994) and mandatory schooling for all of the state’s children (Wickersham, 1886). These projects, taken together, represented a wave of modernity that posed a threat to the German language and culture. They offered nothing that the typical German farmer did not already have, aside, perhaps, from the prospect of higher taxation. In their response to modernity, the Pennsylvania Germans were aligned with farmers from other regions, such as New England, where farmers objected to the damming of rivers for industrial use and to the presence of textile mills in their midst (Prude, 1983; Kulik, 1985). But the Pennsylvania Germans’ conservatism was more encompassing, frequently placing them at odds even with the English-speaking far-

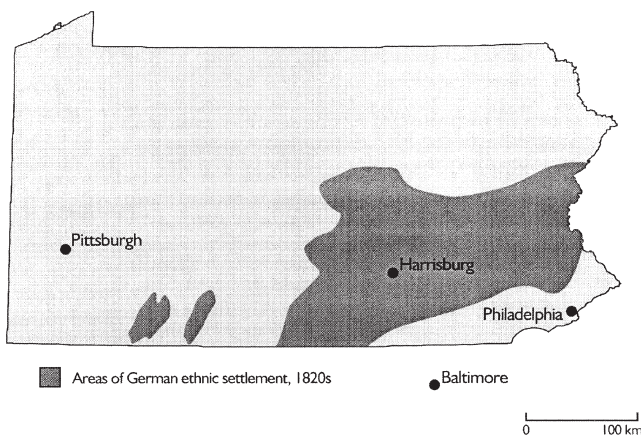


Fig. 1. Areas of German ethnic settlement in Pennsylvania, 1830. County boundaries after Long (1996), German areas developed from Lutheran and German Reformed Synod Minutes (Evangelical, 1825; General Synod, 1825; Editor, 1831).

mers of the state, reflecting their emphasis on self-sufficiency over the development of markets.

One is tempted to offer the Pennsylvania Germans as a perfect case study in the recent trend of identifying “sites of resistance” against cultural oppression (Clark, 1993; Routledge, 1995; Pile & Keith, 1997). They were a minority group with an agrarian heritage, speaking a minority language, interested in protecting and preserving their eighteenth century lifestyle against the onslaught of nineteenth century modernity. Their resistance, if we are to call it that, was largely exercised in a manner afforded to few traditional agrarian minorities, at the ballot box. While their minority status ensured they could not prevent large public projects and social experiments, they were able to mollify their final shapes.

There are some advantages to this view of cultural resistance. It represents the Germans as active agents in the production of their lived daily worlds, as opposed to the passive and tragic receivers of an inevitably encroaching Anglo hegemony. They are the creators of an “authentic and not merely reactive politics” (Ortner, 1995), even if it was a traditionally conservative one; they are not simply the creators of a quaint material folk-culture centered on stove plates and hex signs (Pennsylvania Folklife, 1997). Given present-day sensitivity to the pitfalls of development (Cowen & Shenton, 1996), the anonymous German farmers who sued the Canal Commission for damages may deserve the label “heroic” as much as the canal designers themselves (Rawle, Penrose & Watts, 1830; Watts, 1835; Shaw, 1990). The spectacle of Pennsylvania’s canal-induced bankruptcy in 1842 provides the most substantial evidence authenticating the German perspective.

Yet I do not agree with the romantic trope (Smith, 1996) and radical tone that is characteristic of resistance studies, where the savvy and resourceful resisters are very clearly distinguished from their tyrannical oppressors. The Germans were not battling a colonial power; they were white, European, Christian, landed, and enfranchised. There was no question over indigenous rights or original occupancy; they had arrived in tandem with the English, Scots–Irish and other ethnic groups. They were hardly peasants in the sense this term is usually used, nor poor (Lemon, 1972). Hence the term “reluctance”, with a nuance better reflecting the ambivalent character of progress, would appear to be more fitting than the term resistance in this instance.

Mapping the canal vote

The final vote in the Pennsylvania House of Representatives authorizing a canal was 61–32, with the Senate vote even closer, 19–14 (Pennsylvania, 1826a,b,c). The House vote is mapped in Fig. 2, along with the two canal routes then under serious consideration. Discussion of the eastern section between Harrisburg and Philadelphia (a section that would eventually be built as a railroad) had been deferred for the time being, as had a number of other knotty questions, such as how the canal would traverse the Appalachian mountains and, indeed, how the entire enterprise would be funded. While the southern route was the preferred one, given its shorter length and alignment with Pittsburgh, many still favored the northern route, as it provided a

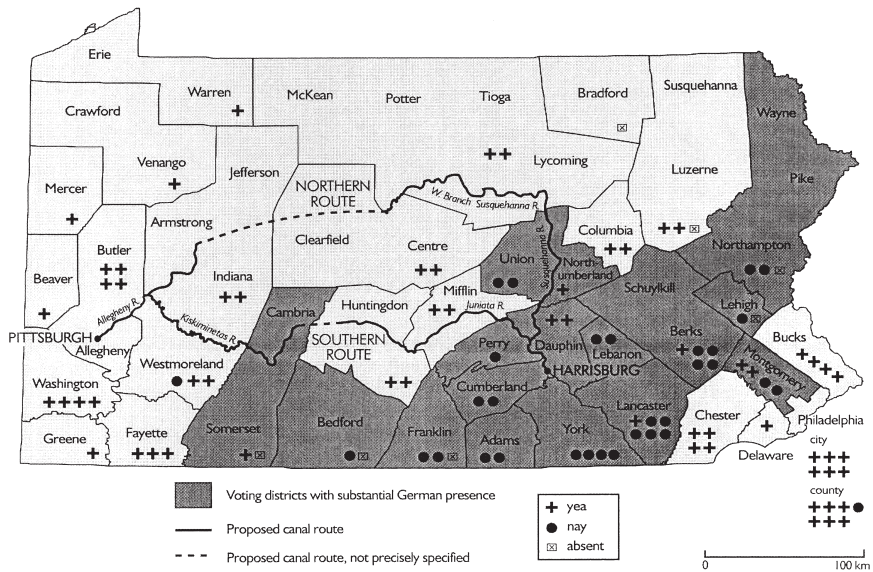


Fig. 2. House of Representatives vote for commencement of the Pennsylvania Canal, with two routes under consideration.

more convenient eventual connection to Lake Erie, where it was hoped much of the Erie Canal traffic could be diverted. The northern route also offered an somewhat easier mountain crossing.

Four of the nay votes cast were from districts that were on the potential canal routes, including one (Perry County) that was guaranteed a canal presence, regardless of which route was chosen. When Perry’s Jacob Huggins voted against the canal, he was voting against the commercial traffic, the population increase, the towns and perhaps even cities that would arise in his county in the same manner as the Erie Canal cities of Syracuse, Rochester and Buffalo. Clearly there were considerations beyond raw economic benefit that influenced his vote.

Twenty-two of the thirty-two dissenters in the House took the unusual step of publishing a letter in the House Journal to explain their votes. The only such letter in the entire legislative session, its very existence suggests the passion felt by the naysayers on the issue. The letter raised objections to the vagueness of the legislation as well as its hasty passage. It questioned specious cost estimates that had the canal costing two-thirds as much as the Erie Canal, despite a route at least 25% longer and requiring over five times the number of locks. The letter also raised issues that had cultural and even ecological components. The canal would impact the lives of certain farmers, and even if this change resulted in greater income, it was still a change that was uninvited and unwelcome. Farmers in the Mohawk and Genesee valleys in upstate New York had quickly capitalized on the increased market access provided by the Erie Canal (Sheriff, 1996). But the twenty-two signatories were dismissive of this; to them the canal was, at its essence, “unnatural”. The bill, they

wrote, “undertakes to authorize impediments to the navigation of this great highway of nature”, referring to the slackwater dams to be constructed across the Susquehanna River. Even if canals can be rationalized in certain cases, they maintained, canals that parallel navigable rivers are not only unnatural, but redundant. Ultimately this was “a project of doubtful utility” (Pennsylvania, 1826b, pp. 326–328).

Some of the signatories favored a scheme in which the natural channel of the river could be enlarged and deepened to permit steamboats to travel upstream on the Susquehanna and other state rivers. Notably, this did not violate their sense of “natural” in the same way the canal did. They seemed unrealistically sanguine about the navigation potential of the Susquehanna, a river with numerous falls and rapids and one that can be traversed by foot in many spots after a dry summer. Three steamboats constructed with Baltimore money prior to the 1825 season gave reason for at least cautious optimism. While there were occasional problems ascending some of the larger falls, one of these boats did reach as far north as Binghamton, New York (Oliphant, 1955).

Other signers of the letter appear not to have even favored this alternative, preferring instead to do nothing at all, leaving any river improvements to the steamboat companies themselves. This accounts for the fairly weak support that the collective body of river-improvement bills received during the session, with only two river projects funded (at levels on the order of 1% of the canal allocation) and neither ever commenced.

Modeling the 1825–26 legislative session

Of greater interest than the outcome of single critical vote on the Pennsylvania Canal is the question of whether the pattern occurred systematically across all canal-related votes or even across other issues. To answer this question, I make use of a spatial model for legislative roll call analysis, W-NOMINATE, developed by political scientists Keith Poole and Howard Rosenthal (Poole & Rosenthal 1985, 1991, Poole & Rosenthal, 1997).³ The nonlinear logit model is based on the presumption that each legislator has an ideal location and each vote carries two ideal locations, one for “yea” and one for “nay”. Legislators will typically vote for the choice that is closer to their own location.

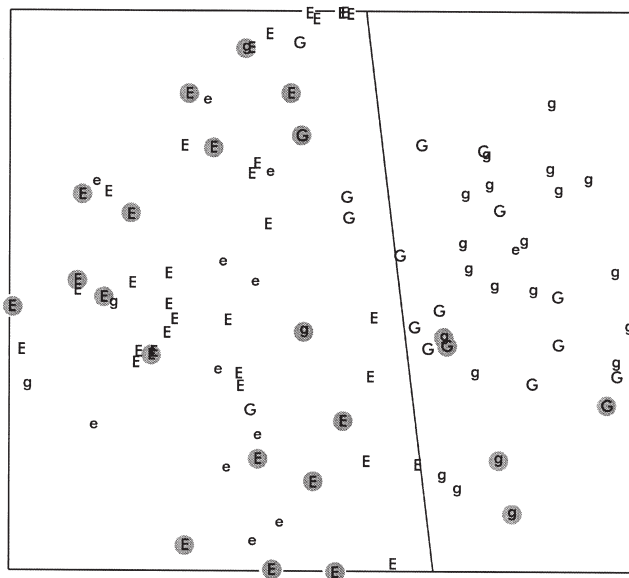
For a legislature containing n members, each legislator’s location is a uniquely determined point in an n -dimensional space, defined as a vector containing each of his or her voting results. For example, the location of legislator A could be given as $\{1,0,0,1,0\}$, where 1 represents a yea vote and 0 a nay vote. The model projects this n -dimensional space onto a lower dimensional space so that it can be represented graphically. Like the projection of the three-dimensional globe onto a two-dimensional map, the process necessarily introduces error. Poole and Rosenthal have dem-

³ The term “spatial” here and throughout this paper refers to the placement of legislators into an abstract Euclidean space; it does not refer to real geographical space.

onstrated that this error is modest, with approximately 80% of all legislative votes accounted for in just a two-dimensional space. While each higher dimension results in less error, the returns are diminishing above two dimensions, as are graphical representation possibilities (Poole & Rosenthal, 1991).

Such multidimensional scaling techniques have been in use since the 1950s (Kruskal, 1978), but have been used sparingly by geographers since the quantitative revolution (for some exceptions see Gatrell, 1983; Gatrell & Smith, 1984; Aitken, 1990). The Poole and Rosenthal model takes advantage of further insights and increases in computing power since early models to provide a more consistent and robust solution, as validated by bootstrapping analysis and Monte Carlo simulation (Poole & Rosenthal 1985, 1991).

The input to the model consists of a matrix with the legislators as rows and the roll call vote results as columns. Each cell contained either a single digit representing a “yea” or a “nay”, or a blank entry signifying the absence of a vote. Since there were 100 House of Representatives members and 337 votes cast, the House matrix consists of 33,700 entries. (Only the results from the House are reported in this paper; results were also calculated for the 33 member Senate but were similar enough to have been excluded for reasons of redundancy.) A graphic representation of the model output is shown in Fig. 3. Legislators close to one another in this imaginary



Legislator's home district:

- G German dominant
- g major German presence
- e modest German presence
- E little to no German presence

Federalists (23) highlighted
All others (77) Democrats.

Fig. 3. Position of House of Representatives members in roll-call voting space, 1825–26 session.

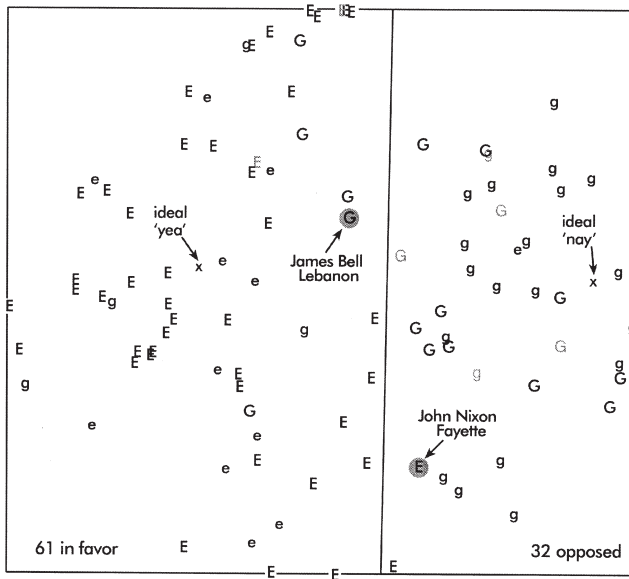
roll-call voting space tended to vote similarly; legislators far from one another tended to vote dissimilarly. Legislators towards the edge of the plot are more extreme in their positions and thus more predictable in their voting behavior, while those towards the center are less predictable, and can be viewed as swing voters. Any straight line drawn through the plot that divides the voters into two groups is known as a “cutting line”. For a given vote, the cutting line is defined as the line equidistant from the ideal “yea” and “nay” locations.

The legislators are indicated by political party affiliation and the “Germanness” of their home county in Fig. 3.⁴ There is a well-defined split between voters from German and English counties, and an ideal cutting line is shown that classifies 91 of the 100 members according to this division. Party affiliation, cited by Poole and Rosenthal (1985) as the typical organizing framework of Congress throughout most of its history, offers less in the way of explanation. The minority Federalists are scattered throughout the House plot, and no cutting lines can be drawn to separate them meaningfully from the Democrats. This time point does correlate to one of the periods in American history where party structures were weakened and in flux (Ammon, 1970), but unlike most of the country, Federalism persevered in Pennsylvania (Klein, 1940). Even so, national party distinctions did not necessarily map themselves onto state issues. Both parties advertised themselves in Philadelphia as “the party of internal improvements” prior to the 1825 election, and campaigned on similar platforms (Poulson, 1825; Philadelphia, 1825).

The vote to establish the Pennsylvania Canal is shown again in Fig. 4. The cutting line for this vote is not very different than the ideal German–English line from the previous figure, and only contains two modeling errors: James Bell of Lebanon was expected to vote for the canal based on his graphical position, but in fact he voted against it; John Nixon from Fayette did the opposite. Given that this line so cleanly bisects the distribution, this vote rates as one of the most typical of the session. In fact, with some 40 roll-call votes directly related to the canal and another 43 votes on taxation, most of which involved generating new tax revenues to subsidize the internal improvements fund, this issue *defines* the primary dimension of the model. Hence the German–English context is the most critical distinction in the political geography of Pennsylvania in 1825–26.

Sectional divisions are apparent on the *y*-dimension. The presence of capital-letter Es at the extreme top and bottom of Fig. 4 suggests that there were voting differences within English counties that equaled the most extreme English–German divisions. To present a better visualization, I transferred the legislators from points in abstract roll-call voting space to vectors in concrete geographical space. In Fig. 5, the legis-

⁴ Political party affiliations are taken from the election returns published in the *Pennsylvania Intelligencer* (1825). I developed a four-category measure of “Germanness” using the 1850 census of religion, taking the ratio of Lutheran, German Reformed, Mennonite, Moravian, Dunker and Union denominations to all specified denominations for each county (Bureau of the Census, 1853). This is the earliest point at which such comprehensive data exists. The results compare closely with the data from the Lutheran and German Reformed synod minutes used in Fig. 1. I did not consider the minutes alone to be sufficient for a quantitative measure as they only list the locations of churches and/or the hometowns of present ministers.



Errors (2) highlighted
Non-voters (7) faded.

Fig. 4. Position of cutting line for House of Representatives vote to commence the Pennsylvania Canal.

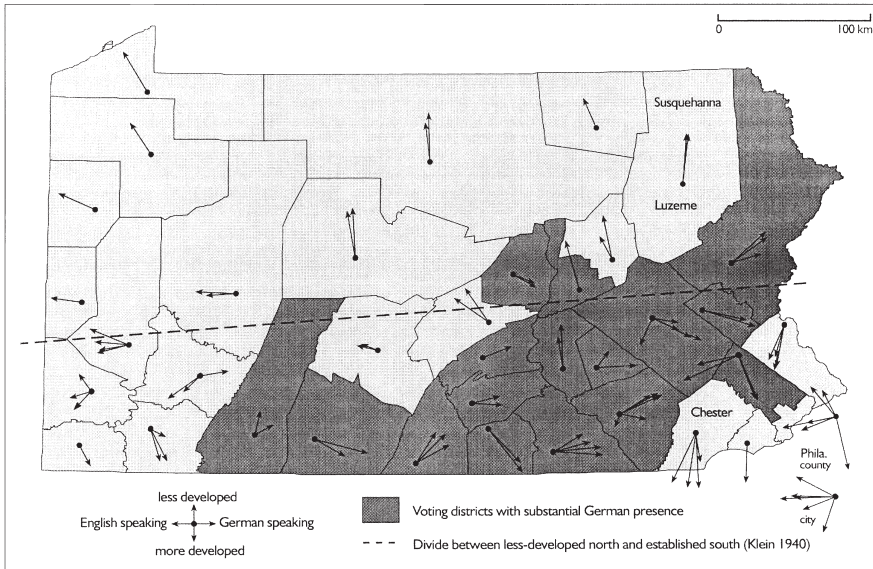
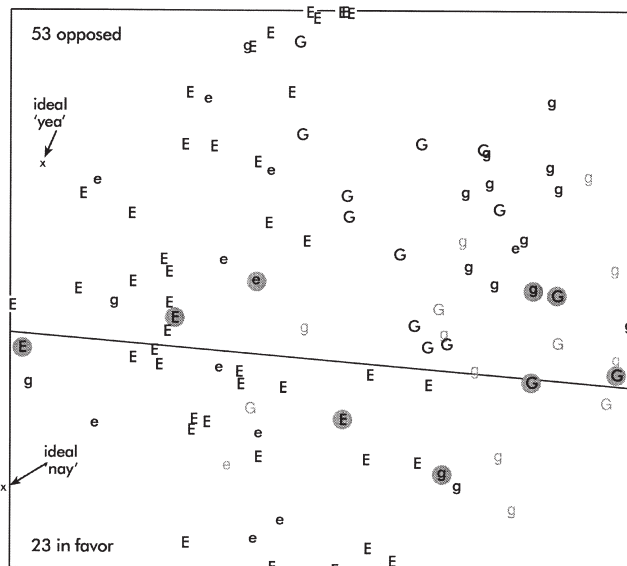


Fig. 5. Vector representation of roll-call voting space, 1825-26 House of Representatives.

lators are placed in their correct county locations, and the vectors represent the transfer from cartesian to polar coordinates. Thus the three slightly overlapping Es at the extreme 12 o'clock position in the previous figures, all representing legislators from Luzerne and Susquehanna counties, are translated into long vectors pointing in the 12 o'clock direction in Fig. 5. The length of the vector is proportional to the distance from the center of the plot, thus the longer the vector the more "extreme" the legislator.

The geographic patterns here are striking. Counties and regions tend to have the same directionality, though a smattering of political mavericks is readily apparent. While the most strongly German counties tend to point to the right, English counties variously point left, up, or down. Counties with downward-pointing arrows, in general, are in the older, more heavily populated and more agrarian counties in the southern tier and the southeast. Counties with upward-pointing arrows tend to be in the less-populated, less developed newer counties of the northern tier and north-central part of the state. This map reveals that Chester and Luzerne/Susquehanna counties are as far apart politically as any German county is from any English county. This north–south sectional division was noted by Klein (1940); Fig. 5 includes his suggested division line.

An example of this sectional division is presented in Fig. 6, a vote on an unfavorable amendment to the bill chartering the Lackawanna and Susquehanna Railroad. This proposed railroad was to serve newly developing coal regions in the north–



Errors (9) highlighted
Non-voters (24) faded.

Fig. 6. Position of cutting line for House of Representatives vote pertaining to the chartering of the Lackawanna and Susquehanna Railroad.

central part of the state, and the amendment would limit the amount of coal-bearing lands that the railroad itself could own. Representatives of the southern and south-eastern counties were the sponsors of this amendment.

Other issues that split along sectional lines included subsidies for colleges, river improvements, and miscellaneous acts of local legislation, such as relief to particular Revolutionary War veterans or repair of specific roads and bridges. While some of these issues contained a fiscal component, they involved sufficiently small dollar amounts that they did not attract a systematic German opposition.

A breakdown of legislative votes by topic and the manner in which the votes were split, along with two statistics that measure the explanatory quality of the model for these voting categories, are shown in Table 1. “Percent correct” is simply the percentage of votes explained by the model. The model does not attempt to maximize this statistic, however; instead, it maximizes the *weighted* number of correct votes. Weights are based on distance from the ideal points; hence, in general, “extreme” legislators are weighted more heavily than moderate ones. Geometric Mean Percentage (GMP) incorporates this distance-weighting and the table is ordered by this statistic. The table reveals that the canal and taxes dominated the legislative session, and that these votes tended to be split along ethnic-cultural lines; topics of lesser fiscal magnitude were more likely to follow a sectional pattern.

One exception to this generalization were the votes related to criminal and judicial law. Most of these votes concerned the Eastern State Penitentiary under construction in Philadelphia, both its administration as well as the nature of crimes that were deserving of punishment by solitary confinement. The legislators from German counties were opposed to the fabulous cost of the complex (though no new outlays were considered in 1825–1826) as well as the “modern” social principles upon which it was founded. Another exception is found over the issue of slavery, which did not fit well into either of the dimensions of the model. Still technically legal in Pennsylvania by virtue of a 35-year old grandfather clause, the number of slaves in Pennsylvania could be counted in the dozens. Even so, the Legislature could not muster enough votes to enact abolition, and anti-abolitionists were to be found representing

Table 1
Summary of roll-call analysis, 1825–26 House of Representatives^a

Topic	Votes	Vote split	% correct	GMP
Pennsylvania canal	40	German–English	84	71
New taxes	43	German–English	85	70
Corporate charters	41	Sectional	78	65
River improvements	21	Sectional	78	63
Establish/fund colleges	28	Sectional	76	62
Criminal and judicial law	18	German–English	76	60
Local legislation	40	Sectional	74	60
Slavery	20	No pattern	65	55
Total	337		76	62

^a Only topics receiving at least 17 roll call votes (5% of the total) are listed.

all parts of the state. Such a result corroborates Poole and Rosenthal's (1997) findings at the national level that slavery was the single issue that consistently cut across traditional liberal-conservative axes.

Conclusion

The link between regional ethnic and linguistic differences and political behavior is one that has been historically neglected (Murphy, 1993). Nineteenth-century Pennsylvania provides a case in point, where bilingualism has been seldom invoked in explanations of historical and geographical processes. Specifically, existing histories of the Pennsylvania Canal make no mention of the Germans as a group and scant mention of any opposition to the canal at all, except with respect to the argument over competing technologies. Recent work in human geography attentive to cultural difference and sites of resistance suggests a reinterpretation of the historical geography of Pennsylvania along these lines, a reinterpretation that is borne out by empirical evidence via Poole and Rosenthal's (1997) model.

Poole and Rosenthal's (1996) study on the voting behavior of United States senators led them to conclude that sectionalism was unimportant, except in the broadest sense between the United States north and south. This paper, in contrast, provides evidence that ethnically and economically based sectional differences were very apparent at the state level at a critical point in the development of the American political culture. By extension, a legislative spatial model has the potential for widespread applicability in measuring the political affinities of geographic blocs, highlighting issues where ethnicity or language plays a defining role.

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