

# The Changing Geographic Dimensions of Dartmouth

by

Vincent H. Malmström

Professor of Geography

When the United States took its first census in 1790, the center of population of the young nation lay in the rolling hills of Maryland, about half way between Baltimore and Washington, D.C. At that time, our country consisted of a narrow zone of settlement stretching from the coast of central Maine to the southern isles of Georgia, so it would not have been too far-fetched to have likened it to a giant teeter-totter whose demographic fulcrum, or balancing point, lay just a few miles outside of the newly-planned city which was to serve as its capital. As the young American state pushed out of the Atlantic seaboard, vaulted the Appalachian Mountains, and penetrated into the heartland of the continent, the wave of settlement moved ever westward -- and so too, of course, did its population center of gravity. By the time of the census of 1980, when our country not only reached "from sea to shining sea" but also embraced the Arctic reaches of Alaska and the Pacific isles of Hawaii, the demographic center of the continental United States lay about 25 miles southwest of St. Louis, Missouri. And, when the bicentennial census is taken in 1990, there is every prospect that, thanks to the continuing attraction of the "Sun Belt", the center of population will have moved farther to the south and west into the foothills of the Ozarks.

Although the founding of Dartmouth College preceded that of our nation by a dozen odd years, what has been its experience of "territorial expansion" since the days of Eleazer Wheelock? How has its "hinterland" or "tributary area" (the region from which it derives its student clientele) changed through time, and how has its geographic center of gravity shifted with the years? To answer those questions, I enlisted the assistance of a Dartmouth undergraduate in Geography, Ethan Spencer, '89, to compile for me the home town origins of the College's freshman class for every quarter-century from 1775 to the present. These data were then fed into a computer program that calculated the center of gravity for that year's student group and then proceeded to map their distribution by quartiles. Thus, it was possible to determine how far afield the "magnetic attraction" of Dartmouth actually extended; what proportion of its student body lived within a given radius of the Hanover Plain; and whether or not the College had "kept pace" in any meaningful manner with the westward growth of our country as a whole.

Of course, in any historical geographic study such as this, one of the key factors to keep in mind is that during the two centuries under review, there have been phenomenal advances in the technology of transportation and communications. When students enrolled at Dartmouth in Wheelock's day, they either arrived on foot, horseback, or stagecoach. If they chanced to read a "big city" newspaper, it was usually several days, if not weeks out-of-date; or, should they have been tempted to 'send home for more

money', the turn-around time would have been equally long -- even if the 'old man' was kindly disposed to the request.

However, by 1850 the fringes of northern New England were beginning to feel the impact of the steam railway and the telegraph, and half a century later such novelties as the automobile and the telephone had started to further alter the patterns of spatial interaction within the region. In each instance, of course, the lag time between the "center" and the "periphery" -- what the geographer calls "distance decay" -- meant that often several decades passed before a given innovation was in common enough use to really have made a material difference in the life-styles of the American masses. For example, widespread use of the automobile was dependent on the construction of improved highways, so what had dawned as a new means of mass transport at the start of the century did not really come to dominate the movement of people and goods until just prior to and following the Second World War. By the same time, the railroad was rapidly waning as a vehicle of passenger transportation (at least in our country) and the airplane was just beginning to emerge as a viable way of moving people both far and fast; the long-distance telephone had spanned not only the entire continent but the oceans as well; and radio and television were providing instantaneous access to all parts of the habitable world. Therefore, the means of hearing about Dartmouth, as well as of getting to and from Hanover, should have -- in theory, at least -- expanded to embrace almost every corner of the Earth. What, in fact, was the reality?

Before we can answer that question, we must confront a couple other facts of life: one is that, even if a prospective student hears about Dartmouth, he/she may still opt not to go there. Why? Obviously, and unfortunately, for many, because it is too costly, so economics raises its ugly head. Another reason may be that which the geographer calls "the intervening opportunity". For example, if another school exists which is (almost) as good as Dartmouth (or perhaps there may be some that are mistakenly adjudged as being "better") that are closer at hand, the would-be student may decide to go there instead. In this instance, Dartmouth is really being penalized for its somewhat "off-side" geographic location. On the other hand, there are those who appreciate that --precisely by reason of being where it is -- Dartmouth can afford him/her a far more beautiful and healthy physical environment than can any other institution in the Ivy League. But, how one measures the "attractive power" of forests, lakes, and mountains, or of autumn colors and winter snows, on a quantitative scale has yet to be convincingly demonstrated. A final fact of life, difficult as it may be to admit, is that despite all the advances of modern transport and communications, there are a large number of high-school graduates and their families out there who just haven't heard of Dartmouth. Here is the "distance decay" effect at its worst, for by the time one works his way some distance south of the Mason-Dixon line or west of the Great Lakes, what is a common household word in the Northeastern United States has become almost an unknown term in local parlance. (Of course, it's not Dartmouth that's to blame. By the time one gets that far out into the hinterlands, all too few Americans even know where New Hampshire is, much less the College!) So, for these reasons and perhaps several others that you can add, we can confidently expect that the "Dartmouth universe" has not expanded as rapidly or as widely as the national one.\*

\* All data for this study, apart for those for the years 1950 and 1975, were derived from the Dartmouth College and Associated Schools General Catalogue, 1769-1940, published by the College in 1940. Because students are listed by place of birth rather than by residence in the College's records, our model of spatial interaction will of necessity be less precise than that used to determine the center of gravity of population.

On the eve of the American Revolution, Dartmouth's entering class numbered a modest 17 in all. Of these, no fewer than 10 hailed from Connecticut, two came from Massachusetts and two were from New Hampshire, leaving three with birthplaces unknown. The Connecticut and Massachusetts students came principally from towns in or near the Connecticut valley region just a few miles to the south, as, of course, did most of the settlers of the Upper Valley as a whole, while the two New Hampshire students came from towns in the older settled regions of the southeast. Thus, in 1775 the center of gravity of the Dartmouth student body lay in Ellington, Connecticut, just south of the Massachusetts line, and nearly three-quarters of the students came from within 74 km, or 46 miles, of that point. (See Table 1.)

Table 1  
Summary of Spatial Interaction of Dartmouth College,  
1775-1975\*

Year	Class Size	Geographic Center of Gravity	Radii of Percentiles (in km)			% Born Outside N. Eng.
			25%	50%	75%	
1775	17	Ellington, Conn.	29	44	74	0
1800	31	New Boston, N.H.	53	71	94	3
1825	39	Lake Sunapee, N.H.	41	62	91	3
1850	63	Henniker, N. H.	53	65	91	10
1875	92	Woodstock, N. Y.	260	370	409	25
1900	164	Albany, N. Y.	201	234	234	18
1925	617	Bennington, N.Y.	409	519	591	58
1950	665	Bennington, N. Y.	383	519	558	63
1975	834	Cleveland, Ohio	565	747	896	70

\*Based on data derived from Dartmouth College and Associated Schools General Catalogue, 1769-1940. Hanover, N. H. : Dartmouth College, 1940. and on information provided by the Admissions Office.

By 1800, the freshman class at Dartmouth had nearly doubled in size, totaling 31 students in all. Of these, Massachusetts contributed 13 and New Hampshire, 11. Although Connecticut was not represented in that year, Vermont sent 4 students to the College,

Maine 2, and New York, one. Already, albeit in its own small way, Dartmouth was beginning to expand its sphere of interaction, for in that year the center of gravity of its student body lay in New Boston, N.H., near the center of Merrimack county, and now it took a circle of 94 km, or 58 miles, radius to encompass three fourths of the College's students.

As the Erie Canal opened in 1825, Dartmouth College was also opening its doors to an entering class of 39 young men. For the first time, New Hampshire itself now ranked as the largest supplier of students with a total of 20. Vermont was in second place with 12 and Massachusetts was third with 4. Connecticut and New York both sent one freshman to the College in that year, and one hailed from as far away as Pennsylvania. The birthplace of the 39th unfortunately went unrecorded, but again we can see how Dartmouth was gradually spinning its web ever more widely. In that year, when fully half of the entire class came from the two states on either side of the Connecticut River, the geographic center of gravity of the student body lay as close to the Hanover Plain as it was ever to get -squarely in the middle of Lake Sunapee, N. H.<sup>1</sup> However, with more local youths attending the College, the radius representing three-fourths of the student body actually contracted slightly to 91 km, or 56 miles.

By 1850, as the first tentacles of the railway system began penetrating the Upper Valley, the entering class at Dartmouth had swelled to 63. Almost half of these -- 28 -- came from New Hampshire, while Massachusetts sent 15 freshmen and Vermont contributed 10. Four students found their way from Maine, 3 from New York, and one journeyed from as far away as Delaware for his college education. In that year, too, the entering class numbered two foreign-born students, one coming from Quebec province in Canada and the other from Scotland. Interestingly, while many of the new students hailed from towns on or near the newly constructed railways, the geographic center of gravity shifted slightly southward and eastward to Henniker, N.H. While the college reached out farther to attract a quarter and a half of its incoming class, there was no change in the radius from which it drew three-quarters of its students, for this value remained at 91 km, or 56 miles. However, in that year, fully 10 per cent of the student body was born outside of New England

A quarter-century later, our nation had put the anguish of the Civil War behind it and the first transcontinental railway had already linked the expanding tide of settlement along the Missouri River with the Golden Gate of California. In 1875, as Dartmouth College opened its fall term, there were no fewer than 92 students enrolled. Fully one third (31) came from New Hampshire, 17 came from Massachusetts, Vermont provided 11, and Maine 10. Beyond the New England region, New York contributed 5 students and 1 each came from Pennsylvania and Maryland. Moreover, in that year Dartmouth's penetration of both the Midwest and the Deep South was evidenced by the fact that Ohio sent 5 students, Indiana 3, and Illinois and Wisconsin, one each, whereas North Carolina, Georgia, and Louisiana were likewise each represented by a lone student. The foreign-born student delegation still numbered only two, one from Quebec and one from Scotland, though our data makes it abundantly clear that they weren't the same two who had first enrolled in 1850.

The third quarter of the 19th century was a period of active territorial growth on the part of Dartmouth College, for by 1875 no less than one-fourth of the student body was drawn from states beyond New England. In that year, the geographic center of gravity had itself left New England -- if just barely -- being located in Woodstock, New York in the foothills of the Catskills. But by now the impact of the railway was dramatically clear; the radius of interaction of the College had grown more than four-fold, and it would take a circle of 409 km radius (254 miles) to embrace three-quarters of the student body.

When the freshman class of Dartmouth College assembled in 1900, it consisted of a robust group of 164 students, well over half again as large as it had been twenty-five years earlier. In that year, Massachusetts was the largest single contributor with 51, followed by New Hampshire with 48, and Vermont with 20. Maine ranked fourth with 11, and interestingly, Illinois edged into fifth place with 9, being trailed by New York with 7. Connecticut and Ohio were tied for seventh rank with 3 students apiece, while Pennsylvania came next with 2. Although none of the other states contributed more than a single student each, the list of contributors had now broadened to include Rhode Island, Minnesota, Missouri, California, and Washington. The foreign-born component of the entering class numbered one student each from Nova Scotia, Ireland, England, Italy, and the Azores.

The final quarter of the 19th century was obviously a period of consolidation for Dartmouth College, for while it was attracting students from an ever-wider radius, the great bulk of the classes were derived from a solid New England base. Thus, in 1900 the proportion of students not born in New England actually dropped to 18%, while the radius encompassing three quarters of the student body shrunk by more than half to 234 km, or 145 miles. Not too surprisingly, the geographic center of gravity of the College's incoming student population contracted northeastward, coming to rest in Albany, New York.

However, the College's most phenomenal growth took place in the quarter-century bracketing the First World War, for the entering class of 1925 had skyrocketed to a total of 617 students -- a relative increase of over 320% and an absolute increase of 425 since the turn of the century. Over a quarter of all the incoming-students arrived from Massachusetts (171), while New York contributed no fewer than 107. New Hampshire's relative share had shrunken badly, and its absolute contribution (48) was no greater than it had been in 1900. Now, the larger urban centers were truly beginning to dominate the composition of the Dartmouth student body. Connecticut (20), along with Michigan (14), Minnesota (13), and Iowa (12) were all comfortably ahead of Vermont with 10. In fact, Vermont's absolute contribution was now only half as great as it had been at the turn of the century. Dartmouth had clearly ceased being a small, regional school drawing on an essentially rural hinterland and had become an institution whose base of support was firmly anchored in the growing affluence of the American Manufacturing Belt. The number of foreign-born students still totaled only 12, five of whom came from England, 3 from Canada, and one each from Scotland, Ireland, Lithuania, and China. Now, well over

half of the student body (58%) came from beyond the confines of New England and it took a radius of 591 km, or 367 miles, to contain three-quarters of the incoming class. But perhaps even more dramatic was the fact that this circle now had its center in western New York state, just to the east of Buffalo near the town of Bennington,

When we take our next slice through time in 1950, the freshman class of Dartmouth had grown to 665 -- a relative increase of less than 8% and an absolute increase of only 48 students over 1925. Our nation and the world had just emerged from the trauma of a lengthy Depression and a costly war, so rather than being a period of active expansion in the life of the College, it was a time of consolidation. Five-eighths (63%) of the student body now came from outside New England, but the radius from which the bulk of it was drawn had actually contracted since 198. Thus, three quarters of all Dartmouth students came from within 558 km, or 347 miles, of a geographic center of gravity that had once more stalled in the same place it had been 25 years earlier -- Bennington, New York. Now the growing suburban fringes of Boston and New York were clearly the largest suppliers of Dartmouth students, with Massachusetts contributing 135, and New York state 116. New Jersey had climbed into third place with 60, followed by Connecticut with 55 and Illinois with 47. Pennsylvania and Ohio were tied for sixth place, each with 36 students, and New Hampshire and Vermont were weak runners-up with 25 and 23 students, respectively.

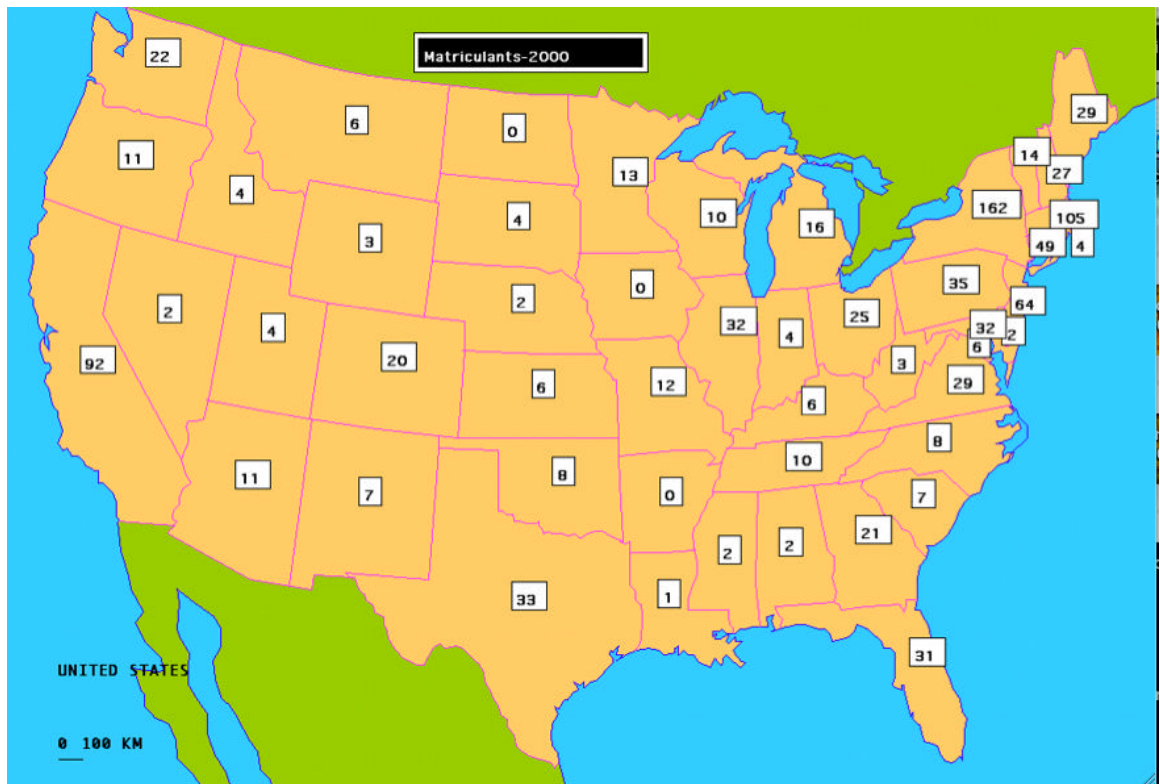
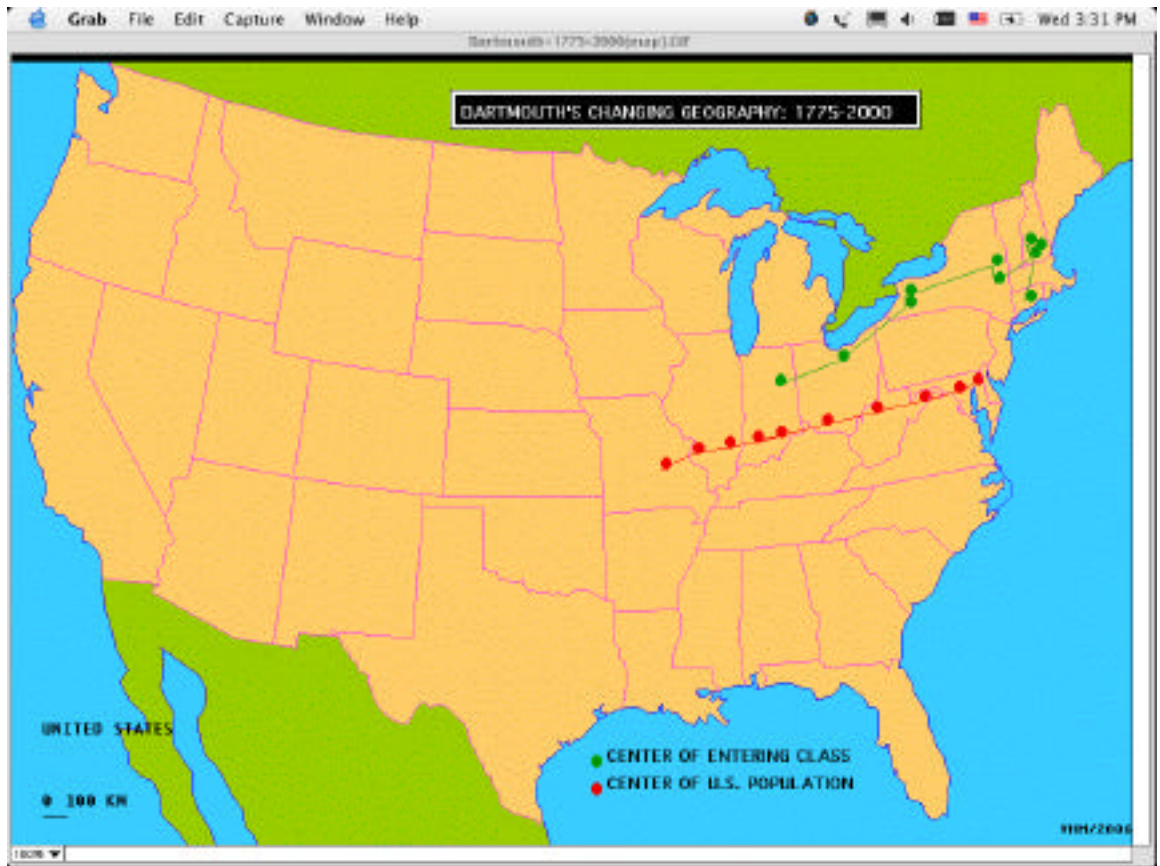
When Dartmouth College opened in the fall term of 1975, it welcomed 834 new students to its ever-growing family. No fewer than 70% of these now came from outside New England, with New York state having edged Massachusetts, 121 to 117, for first place. New Jersey was third with 57 but New Hampshire was back in fourth rank with 49. Connecticut contributed 40, Ohio and Illinois each 38, Pennsylvania 34, and even distant California made the top-ten with 33. Not only had the radius of interaction increased markedly -- now requiring a circle of 896 km radius, or 556 miles, to circumscribe the bulk of its student body, but its geographic center of gravity had moved convincingly into the Middle West, being centered on Cleveland, Ohio. Thus, in the two centuries in which we have traced Dartmouth College's expanding geographic orbit we have seen it grow areally 12-fold at the same time as its student body has grown almost 50-fold. From being a small school of parochial character, we have seen it evolve into an institution of quasi-national significance. It can still best be described as a "Northeastern" College, for its student body is not drawn from, nor does it mirror, the demographic mix of our country as a whole. Moreover, for many of the reasons discussed above, it cannot accurately mirror even the region from which it draws most of its student clientele.

Addendum: Since this study was completed in 1989, Dartmouth has passed another of the quarter-century "slices through time" that were selected as benchmarks in sampling the historic expansion of the College's student hinterland. Therefore, it seemed only fitting to update Dartmouth's "market area" as it was on the eve of the 21<sup>st</sup> century by examining the geographic origins of its entering class in the year 2000.

To be sure, there were no real surprises when the results were in. Like the center of the entire U.S. population, a predictable movement westward and southward of the

center of Dartmouth's student body had been anticipated. This was due in large part to the fact that California had moved into second place as a source of applicants and into third place as a source of matriculants. And, as this "growth pole" continues to exert its influence in the future, there is every reason to believe that it will increasingly "pull" Dartmouth's student center of gravity still farther toward the west and south over time.

One unexpected "bonus" of the 2000 national census was the publication on the Internet by the U.S. Census Bureau of a list of the centers of population of each of the individual states, correct to no less than six decimal places. For the purposes of this study, it might be argued that, had the Dartmouth student body faithfully reflected the overall distribution of the United States population, then these points would have provided us with the most accurate set of "centroids" we have yet had to plot Dartmouth's own "center of gravity", but unfortunately this is not the case. On the other hand, had we even had Dartmouth's student origins itemized by zip codes, rather than simply by states, this would have allowed us to map their distribution with far greater precision than has heretofore been possible, but such a breakdown of data is not yet available. We therefore have had to revert to the "one centroid, one state" formula which was used in our original study, hoping in the process that it would be reasonably representative of the spatial distribution in question but with no real assurance that it was. By way of illustration, had we chosen to retain the "centroids" used in the original study, the center of gravity of Dartmouth's entering class in the year 2000 would have come to rest very close to the city of Peru, Indiana, whereas had we selected the Census Bureau's population centers as our "centroids", it would have come down some 80 km (or 50 miles) to the south-southeast, near the city of Muncie instead. In any event, given our current measuring tools, imperfect as they are, we can confidently conclude that in the course of the 225-year span of Dartmouth's history encompassed by this study, when the College was founded, its narrow sphere of influence found its focus on the banks of the Connecticut River scarcely 120 miles to the south of the Hanover Green, whereas today its zone of spatial interaction finds its mid-point on the banks of the Wabash, nearly half a continent away.



[\(Back to Table of Contents\)](#)