

Quantitative Social-Scientific History

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QUANTITATIVE social science launched its invasion of American history during the years 1957 to 1961.¹ In 1957, Lee Benson, a historian schooled in sociology, published a sweeping critique of "impressionistic" treatments of nineteenth-century American elections and called on historians to expand their definition of primary sources beyond newspapers and manuscripts to include quantifiable data. Four years later Benson added practice to preachment, relying heavily on a quantitative analysis of election returns to produce a brilliant and original interpretation of American politics in the 1830s and '40s. In a paper delivered in 1957, two Harvard economists, Alfred H. Conrad and John R. Meyer, reinvigorated the discussion of an old historical problem and initiated the new "econometric history" by demonstrating the profitability both of slavery and of applying modern economic theory and techniques to history. By 1960, the "cliometricians," as they were jibingly labeled, were holding annual conferences at Purdue to coordinate research efforts and criticize each other's papers. A year before, the historian Merle Curti, assisted by several other historians and his psychologist wife, Margaret, published a quantitative historical study of community social structure and mobility, which, along with the work of Stephan Thernstrom, inspired legions of students to take up the "new social history."²

1. Of course, historians, especially economic historians, have always counted or used such implicitly quantitative phrases as "more," "less," "most." But the rapid development in social science theory and statistical methods in the postwar era and the continuing revolution in data-processing technology have given a qualitatively different cast to quantitative history in the last two decades.

2. Benson, "Research Problems in American Political Historiography," reprinted in his *Toward the Scientific Study of History* (Philadelphia, 1972), 3-80, and *The Concept of Jacksonian Democracy: New York as a Test Case* (Princeton, 1961); Conrad and Meyer,

The response of the historical profession's elite was rapid, but by no means single-minded. To the sometimes strident demands of the devotees of the new history that traditionally trained historians "retool, rethink, reform, or be plowed under," as one older economic historian caricatured the new program, some historians at first reacted with fright, irrationality, and something close to panic. Arthur Schlesinger, Jr., whose description of Whig and Jacksonian electoral coalitions had failed Benson's systematic numerical tests, retreated behind a hastily erected wall of dogma. "Almost all important questions," Schlesinger proclaimed, "are important precisely because they are *not* susceptible to quantitative answers." In a presidential address to the American Historical Association, Carl Bridenbaugh issued a jeremiad against the infiltrating priests of the new religion, warning his fellow historians never to "worship at the shrine of that Bitch-goddess, QUANTIFICATION."³

Others kept their wits a bit better, declaring the historical faith broad enough to encompass another sect. Reminding his readers that enthusiasm for social science had repeatedly waxed and waned within the American historical profession in the twentieth century, C. Vann Woodward suggested that "rhetorical indignation and the neo-Luddite posture of our conservatives are not effective responses. Smashing computers is not quite the answer." If Woodward seemed to yearn for a revolution that would overthrow the contemporary regime of historical craftsmen who were "even more addicted than those of earlier generations to over-specialization and narrowness of subject matter," whose "monumental patience" produced such "unimpressive conclusions," he was doubtful about the revolutionaries' prospects for victory and skeptical of their utopian visions.⁴

A third response to the social-scientific proselytizers, especially popular among graduate students and younger historians, was fraternization and—usually timid—collaboration. Thus, a traditionally trained historian who found Guttman scaling helpful in his study of the mid-

nineteenth-century British Parliament, William O. Aydelotte, nevertheless carefully qualified his endorsement of the use of quantitative methods. "Quantification," he remarked in a set of essays advocating its employment in historical study "is merely an ancillary tool, one of several, that can, for certain classes of questions, be of some help." From 1965 to 1970, 120 historians, many of them no less hesitant than Aydelotte, attended summer seminars in historical data analysis at the University of Michigan.⁵

Nonetheless, by 1970 the noisy initial skirmishes were over. Formidable beachheads of research had been established in social and political history, while in economic history the cliometric generals had won decisive victories. The econometric historians were powerful enough to take over the strongest disciplinary journal, the *Journal of Economic History*, while their social and political counterparts started new ones—the *Journal of Social History* (1967), *Historical Methods* (1967), and the *Journal of Interdisciplinary History* (1970). The body of work based on the analysis of quantitative data was impressive. In political history, the "ethnocultural thesis" rested on examinations of patterns of voting returns in ethnically and religiously homogeneous geographic areas; the theory of "critical elections," on correlations of election returns by area across time; and various hypotheses about the behavior of particular legislative bodies, on Guttman scaling and factor analyses of roll calls.⁶ In social history, scholars tabulated the extent to which individual family heads remained in the same area or the same occupational rank over time; demographers charted changes in marriage, birth, and death rates, as well as in family size and type, while other social historians graphed patterns of wealth and landholding and alterations in those patterns.⁷ Economic historians

5. Aydelotte, *Quantification in History* (Reading, Mass. 1971), 34; Robert P. Swierenga, "Clio and Computers: A Survey of Computerized Research in History," *Computers and the Humanities*, v (1970), 5.

6. Benson, *Concept of Jacksonian Democracy*; Paul Kleppner, *The Cross of Culture: A Social Analysis of Midwestern Politics, 1850-1900* (New York, 1970); Michael F. Holt, *Forging a Majority: The Formation of the Republican Party in Pittsburgh, 1848-1860* (New Haven, 1969); Ronald P. Formisano, *The Birth of Mass Political Parties: Michigan, 1827-1861* (Princeton, 1971); Walter Dean Burnham, *Critical Elections and the Mainsprings of American Politics* (New York, 1970); William O. Aydelotte, "Voting Patterns in the British House of Commons in the 1840s," *Comparative Studies in Society and History*, v (1963), 134-163; Joel H. Silbey, *The Shrine of Party: Congressional Voting Behavior, 1841-1852* (Pittsburgh, 1967); Thomas B. Alexander, *Sectional Stress and Party Strength: A Study of Roll-Call Voting Patterns in the United States House of Representatives, 1836-1860* (Nashville, 1967).

7. Stephan Thernstrom, *Poverty and Progress in a Nineteenth Century City* (Cambridge, Mass., 1964); John Demos, *A Little Commonwealth: Family Life in Colonial Plymouth* (New York, 1970); Philip Greven, *Four Generations: Population, Land, and Family in*

"The Economics of Slavery in the Antebellum South," in Robert William Fogel and Stanley L. Engerman, eds., *The Reinterpretation of American Economic History* (New York, 1971), 342-361; Curti, *The Making of an American Community: A Case Study of Democracy in a Frontier County* (Stanford, 1959).

3. All of the quotations are from C. Vann Woodward, "History and the Third Culture," *Journal of Contemporary History*, III (April 1968), 29-30.

4. Woodward, "Third Culture," 30, 24. For a similar response, see Harold D. Woodman, "Economic History and Economic Theory," *Journal of Interdisciplinary History*, III (1972), 323-350. The "sectarian" epithet is in widespread use. See, for example, J. H. Hexter, "Fernand Braudel and the *Monde Braudelien*," *Journal of Modern History*, XLIV (1972), 386.

used statistical techniques and neoclassical theory in their often strikingly novel treatments of economic growth, slavery, human and non-human capital formation, demographic and technological change, and fiscal and monetary policy.⁸ More self-consciously theoretical than the others, the cliometricians developed the explicit counterfactual model. Usually trained as economists, they sprinkled their work liberally with regression equations and complex supply and demand curves.⁹ By contrast, scholars in the other two fields typically identified themselves with the concerns and more literary style of history, in which most of them had received their degrees. By the end of the 1960s, then, a growing band of quantifiers had moved beyond propagandizing and built a scholarly edifice that was grand enough to inspire a new review article industry.¹⁰

In the 1970s, quantifiers gained legitimacy in the historical profession, greatly extended their range of topics and geographical areas, and, for the first time, became visible to the lay public.¹¹ In 1974 and 1975 heavily quantitative works by Stephan Thernstrom and Robert W. Fogel and Stanley L. Engerman won Bancroft prizes, and other books that relied largely on numerical evidence captured honors disbursed by the American and Southern Historical Associations.¹² Fogel

Colonial Andover (Ithaca, N.Y., 1970); Kenneth A. Lockridge, *A New England Town: The First Hundred Years* (New York, 1970); Jackson Turner Main, *The Social Structure of Revolutionary America* (Princeton, 1965).

8. Fogel and Engerman, *Reinterpretation: Purdue Faculty Papers in Economic History, 1956-1966* (Homewood, Ill., 1967).

9. Robert W. Fogel, "The Specification Problem in Economic History," *Journal of Economic History*, xxvii (1967), 283-308; Lance E. Davis, "Specification, Quantification, and Analysis in Economic History," in G. R. Taylor and L. F. Ellsworth, eds., *Approaches to the Study of American Economic History* (Charlottesville, Va., 1971), 106-120.

10. For a sampling, see Allan G. Bogue, "United States: The 'New' Political History," *Journal of Contemporary History*, iii (1968), 5-28; Jerome M. Clubb and Howard W. Allen, "Computers and Historical Studies," *Journal of American History*, liv (1967), 599-607; Morton Rothstein et al., "Quantification and American History: An Assessment," in Herbert J. Bass, ed., *The State of American History* (Chicago, 1970), 298-329; Fogel, "The New Economic History: Its Findings and Methods," in Fogel and Engerman, *Reinterpretation*, 1-12.

11. Harry S. Stout, "Quantitative Studies and the American Revolution," *Computers and the Humanities*, x (1976), 257-264.

12. Thernstrom, *The Other Bostonians: Poverty and Progress in the American Metropolis, 1880-1970* (Cambridge, Mass., 1973); Fogel and Engerman, *Time on the Cross*, 2 vols. (Boston, 1974); Joan W. Scott, *The Glassworkers of Carmaux: French Craftsmen and Political Action in a Nineteenth-Century City* (Cambridge, Mass., 1974); Thomas B. Alexander and Richard E. Beringer, *Anatomy of the Confederate Congress: A Study of the Influences of Member Characteristics on Legislative Voting Behavior* (Nashville, 1972); F. Sheldon Hackney, *Populism to Progressivism in Alabama* (Princeton, 1969); James T. Lemon, *The Best Poor Man's Country: A Geographical Study of Early Southeastern Pennsylvania* (Baltimore, 1972).

and Engerman's belligerently cliometric *Time on the Cross*, which has reportedly sold more than 20,000 copies, was the subject not only of many popular reviews but of news stories in *Time* and *Newsweek*.¹³ American scholars pushed the quantitative frontiers back into the Middle Ages and out to China, Japan, Africa, Latin America, and Eastern Europe.¹⁴ When an article on the styles of Vivaldi, Zenó, and Ricci containing not only five reproductions of paintings but also two tables and four graphs appeared in a journal founded to disseminate the new history, it was a pretty good sign that quantification had arrived.¹⁵

A less impressionistic indication of its growing acceptance was the increase in the extent to which articles published in mainstream professional journals were based on quantitative data. Table 1 is a table of tables.¹⁶ Since not every "quantitative" article is equally quantitative, and since the number of pages in each journal differs somewhat from issue to issue and from year to year, even excluding book reviews, bibliographies, social notes, and advertisements, I formed an index of the amount of quantitative material published by simply counting the number of tables and dividing that figure by the number of pages devoted to original articles, research notes, and review articles. Table 1 contains the results in tables per page, multiplied by 100 for ease of reading, for eighteen years' worth of issues of five leading journals, which together roughly represent the scholarly interests of most pro-

13. For a sampling, see *Atlantic*, August 1974, 78-82; *Commentary*, August 1974, 68; *New Yorker*, September 30, 1974, 128-130; *Newsweek*, May 6, 1974, 77; *Time*, June 17, 1974, 98-100.

14. Val R. Lorwin and Jacob M. Price, eds., *The Dimensions of the Past: Materials, Problems, and Opportunities for Quantitative Work in History* (New Haven, 1972); Gilbert Rozman, "County-level and Prefectural-level Population Data in Eighteenth and Nineteenth Century China," and David M. Deal, "County Level Economic Data in Twentieth-Century China," both delivered at the December 1978 meeting of the American Historical Association.

15. David Burrows, "Style in Culture: Vivaldi, Zenó, and Ricci," *Journal of Interdisciplinary History*, iv (1973), 1-23.

16. There is no accurate way to estimate the number of quantitative or social-scientific historians, for three reasons. First, publications that might be characterized as quantitative history appear in too wide a range of historical and social-scientific journals to keep track of—in the *American Economic Review* and the *American Political Science Review*, in *Social Science Quarterly* and *Political Science Quarterly*, in *Population Studies* and *Computers and the Humanities*, as well as in many of the hundred or so strictly historical journals. Second, many of the historians who employ quantifiable data or notions drawn from social science do so only occasionally and do not consider themselves "quantitative" historians, or shift their identities depending on the nature of their current research. Third, many social scientists who deal from time to time or even most of the time with data drawn from the past do not consider themselves primarily historians. It therefore makes more sense to speak of changes in the use of numerical methods rather than in the size of a nonexistent "community" of quantitative historians.

Table 1. Tables per page ($\times 100$) in five leading historical journals, 1961-78

Year	AHR	JAH	JMH	JSH	W&M	All five journals
1961	1	00	0	3	2	1
1962	0	0	1	1	4	1
1963	0	1	1	1	1	1
1964	0	1	9	9	2	1
1965	0	0	1	0	4	1
1966	3	0	0	1	3	2
1967	00	2	0	4	4	2
1968	5	2	00	3	5	3
1969	5	5	2	4	4	
1970	1	10	1	7	2	4
1971	2	4	3	1	10	4
1972	3	3	5	4	5	4
1973	3	7	1	5	9	5
1974	4	6	5	7	5	5
1975	1	5	3	3	4	3
1976	3	10	1	7	7	6
1977	1	11	2	5	2	4
1978	2	6	5	8	8	6
1961-64	00	00	00	2	2	1
1965-69	3	2	1	2	4	2
1961-69	2	1	1	2	3	2
1970-73	2	6	2	4	6	4
1974-78	2	8	3	6	5	5
1970-78	2	7	3	5	6	5
1961-78						
Number of tables	151	291	119	203	398	1,162
Number of pages	7,636	7,012	6,215	5,523	8,830	35,216

Note: One zero indicates that no tables appeared at all. Two zeroes mean that fewer than 0.5 table was printed for every 100 pages of text.

fessional historians in America: the *American Historical Review*, the *Journal of American History*, the *Journal of Modern History*, the *Journal of Southern History*, and the *William and Mary Quarterly*. Their combined circulation in 1978 was approximately 48,500.¹⁷

17. The eighteen-year period was chosen to balance the numbers of volumes before and after 1970. Any graph or matrix containing at least six cell entries of actual numbers was counted as a table, whether it appeared in footnotes, appendices, or text, and whether it was labeled as a figure or table or not. Matrices or figures not based on real numbers were ignored, as were all equations unless the latter were grouped together to form a table. It was not feasible to weight tables by the number of entries, but, in general, the size of tables grew over time. Since all entries in Table 1 are based on raw data rounded off to two decimal places, the multiyear figures at the foot of the table may differ slightly from averages of the yearly figures.

The most striking feature of Table 1 is the growth in tables per page from the beginning to the end of the period. From 1961 to 1964, three of the five journals averaged less than one table for every 100 pages of text, and the overall average was slightly over one. In thirteen of the forty-five journal-years during the 1960s, no tables were published in any issue. By contrast, each of the journals averaged more than one table for every 200 pages for every year during the 1970s, and the overall average nearly quintupled from the 1961-64 period to that of 1974-78. A chi-square test on that part of the table containing yearly data for each of the five journals reveals that the chance was less than one in a thousand that such a pattern would have been produced if the average number of tables per page had been the same in every year—that is, had they not grown with the passage of time. To obtain a better indication of the trend, we can relax a few statistical assumptions and run a linear least-squares regression of the ninety tabular entries for individual journals for individual years on time ($t = 1, 2, \dots, 18$). The resulting parameter estimates are

$$\text{tables/pages} (\times 100) = 0.280 + 0.302 (\text{time}).$$

Thus, in each year during the 1960s and 1970s, the average journal which printed 500 pages of text published one and a half more tables (5×0.302) than it had the previous year.¹⁸ The time trend by itself explains 32.7 percent of the variance in the number of tables per page. More complex equations and procedures could be tried, but the assumptions have already been strained a good deal, and the result is clear enough—the amount of published material that displayed a quantitative bent expanded markedly after 1965.

A few differences between journals may also be noted. The *AHR*, which serves the widest audience and covers the broadest range of geographic areas and longest time span of the five, published the fewest tables, and the *JMH*, which concentrates on European history, the next fewest. United States historians of Europe and non-Western countries are apparently less prone to quantify than are Americanists. The fact that the *William and Mary Quarterly*, a journal of colonial America, printed more tables than any of the other four demonstrates the plentitude of pre-1800 quantitative data for this hemisphere, while the fact that the *JAH* and *JSH* showed the most marked growth in the number of tables belies the rather conservative reputations of those journals.

18. The intercept term or the number of tables printed per 100 pages in 1961 predicted by the equation is 0.280. If the trend continues, in 1985 the average journal will print 7.5 tables per 100 pages ($0.280 + 24 \times 0.302 = 7.528$).

Table 2. Tables per page ($\times 100$) in three specialized American journals and two European journals, 1961-78

Year	<i>JEH</i>	<i>JIH</i>	<i>JSoch</i>	<i>ANN</i>	<i>VSWG</i>
1961	9			9	
1962	17			6	
1963	12			5	
1964					
1965					4
1966					6
1967			11		9
1968			9		
1969			8		
1970		6	8		
1971		10	11		
1972		12	12		
1973		13	10		
1974		15	18		
1975	18	20	13		
1976	19	17	8	24	14
1977	20	20	18	12	16
1978		17	10	9	13
1961-69	13		9	7	6
1970-78	19	15	12	15	15
Number of tables	580	762	579	596	160
Number of pages	3,520	5,224	4,901	4,845	1,611

Note: The *Journal of Social History* and *Journal of Interdisciplinary History* were founded in 1967 and 1970, respectively. The other three journals were sampled for three years each from each decade.

Table 2 charts the number of tables per page for selected years of five organs of social scientific history. The *Journal of Economic History*, the *Journal of Interdisciplinary History*, and the *Journal of Social History* are based in the United States, although they publish articles on the history of a great many countries and often contain papers by foreign scholars. *Annales: Economies, Sociétés, Civilisations* is the leading French journal of historical social science, and *Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte* is West German. All of these journals published more tables per page than the five mainstream American journals, and all showed an increase in the number of tables from the 1960s to the 1970s. The gap between the mainstream and specialized journals, however, closed a bit over the period, as a comparison of Tables 1 and 2 shows. As expected of the leading journal in the area most identified with quantification, the *JEH* published more (and longer) tables than any of the others. The sample of the *JEH*, *ANN*, and *VSWG* is too small to determine whether there were any significant differences in

the journals of various countries, but the numbers appear to be fairly close. The quantitative revolution is not confined to America.

But quantification may involve more than simply counting and calculating elementary descriptive statistics. If the number of tables seemed to reach a plateau during the 1970s, they were increasingly sophisticated, as regression and correlation coefficients, Lorenz curves, and discriminant, probit, and logit analyses began to supplement raw counts of data. Tables 3 and 4 chart the growth in the number of "sophisticated" tables, that is, those that presented more than counts, percentages, and simple measures of central tendency and dispersion.

As a comparison of Tables 1 and 3 shows, historians in America have increasingly realized the usefulness of counting, but relatively few seem to have reached the level of an introductory one-semester statistics course, or at least few authors and editors believe that their readers have. The contrasts among journals and between the beginning and end of the period parallel those in Table 1. The number of "sophisticated" tables rose from none in 1961-64 to 84 in 1974-78, and nearly five-sixths of that increase came in two journals, the *JAH* and *W&M*. Even so, the five journals averaged only one sophisticated table per 100 pages in the last period.

Table 4, which displays the number of sophisticated tables per page in the more specialized American and foreign journals, demonstrates both the general growth in expertise and an important distinction between social historians on the one hand and economic and political historians on the other. The *JEH*, which averaged only three sophisticated tables per year in the early 1960s, progressed to twenty-six per year in the late 1970s. The *JIH*, which publishes in all three subfields of social scientific history, averaged only slightly fewer methodologically advanced tables per page in the 1970s than the *JEH*. The nature of the data typically available made it apparent much earlier in economic and political than in social history that one had to go beyond mere counting to get interesting results.¹⁹ For much economic and

19. Thus, social historians do not appear to have noticed the extensive effort by sociologists, political scientists, and economists to overcome the so-called ecological fallacy. Through the use of regression and other techniques, it is possible to tease a great deal more reliable information about individuals from aggregate data than had been thought possible. For examples of the most recent work on the topic, see John L. Hammond, "New Approaches to Aggregate Electoral Data," *Journal of Interdisciplinary History*, 1x (1979), 473-492; Laura Irwin Langbein and Allan J. Lichtman, *Ecological Inference* (Beverly Hills, Calif., 1978), and Langbein and Lichtman's paper, "Comparing Tests for Aggregation Bias: Party Realignment in the 1930s," Presented at the 1979 meeting of the Midwest Political Science Association.

Table 3. Number of "sophisticated" tables per page (× 100) in five leading historical journals, 1971-78

Year	AHR	JAH	JMH	JSH	W&M	All five journals
1961	0	0	0	0	0	0
1962	0	0	0	0	0	0
1963	0	0	0	0	0	0
1964	0	0	0	0	0	0
1965	0	0	0	0	00	00
1966	0	0	0	0	0	0
1967	0	0	0	0	0	0
1968	00	00	0	0	0	00
1969	0	0	0	0	1	00
1970	0	5	0	0	0	1
1971	0	0	0	00	1	00
1972	0	0	0	1	1	00
1973	0	1	0	0	00	00
1974	0	2	00	00	2	1
1975	00	2	0	0	00	1
1976	2	1	0	3	0	1
1977	0	7	0	0	0	1
1978	0	2	0	0	0	00
1961-64	0	0	0	0	0	0
1965-69	00	00	0	0	00	00
1961-69	00	00	0	0	00	00
1970-73	0	1	0	00	1	00
1974-78	00	3	00	1	00	1
1970-78	00	2	00	00	1	1
1961-78	00	1	00	00	00	00
Percent of all tables, 1961-78	6	27	1	6	8	11
N	9	78	1	13	31	132

Note: Zero means no tables at all. Two zeroes mean less than 0.5 tables per 100 pages.

political data are available only for aggregates, such as counties, states, or industries, while information that is recorded for individuals is often either too bulky and intricate to yield its pattern to simple procedures, as in the case of legislative roll calls, or indecipherable without more complex treatment, as in the use of price-quantity pairs to estimate supply and demand curves. While the degree of statistical expertise requisite for the practice of economic and political history may have somewhat slowed progress and raised barriers to entry into these branches of the discipline, there have been benefits as well. Because political and especially economic historians are used to em-

Table 4. Number of "sophisticated" tables per page (× 100) in five specialized journals

Year	JEH	JIH	JSocH	ANN	VSWG
1961	0			1	
1962	2			0	
1963	00			0	
1964					
1965					0
1966					0
1967			0		0
1968			1		
1969			0		
1970		0	0		
1971		2	0		
1972		4	1		
1973		7	00		
1974		00	00		
1975	4	1	0		
1976	4	4	0	1	0
1977	3	2	3	1	00
1978		3	2	00	0
1961-69	1		00	00	00
1970-73		3	00		
1974-78		2	1		
1970-78	4	3	1	1	00
1961-78	3		1	1	00
Percent of all tables, 1961-78	15	18	5	5	1
N	88	137	33	31	1

ploying more advanced techniques, they find it much more natural than social historians do to posit multivariate explanations and attempt to sort out the separate influences of many independent variables on some dependent variable. Since their data sets often contain information not only on individual actions but on the social settings of behavior as well, those who study politics or the economy are, ironically, rather more prone to emphasize the importance of variations in the social context of human acts than are social historians.

That social history would benefit from the application of more complex statistical techniques to data collected at both the individual and aggregate levels appears plain.²⁰ That social historians are mov-

20. For an example, see Michael P. Weber and Anthony E. Boardman, "Economic Growth and Occupational Mobility in Nineteenth Century Urban America: A Reappraisal," *Journal of Social History*, 11 (1977), 52-74. The situation in social history has not changed much since 1970. See Rothstein, "Quantification and American History," 312.

ing in this direction is not so clear. Although Table 4 evidences a slight trend toward a higher level of methodological expertise in the social history journals, throughout the period the *JSocH*, *ANN*, and *FSWG* published far fewer sophisticated tables than the *JEH* and *JIH*, and in all three social history journals, the percentage of tables that went beyond counting and other simple measures fell below that in four of the five mainstream journals (compare the penultimate rows in Tables 3 and 4).²¹

What has quantitative social-scientific history achieved in the two decades since its emergence? First, its practitioners have shown that old topics may be viewed in novel ways or that old evidence may be supplemented by material unusable before the advent of modern data-processing equipment. Now, for the first time, the attitudes of the pre-survey electorate, (i.e., pre-1935) rather than just those of politicians and newspaper editors, have become prime objects of attention.²² Instead of looking at cities or rural communities only from the limited points of view of those who left written records, we can follow the life courses of groups of ordinary people, seeking to explain their differing experiences by variations in the areas where they lived, the economic conditions they faced, their ethnic and class positions, and so on.²³ Fundamental facts about the lives of slaves, peasants, and proletarians, as well as of slaveholders, gentry, and bourgeoisie, can, through the use of social-scientific theory and statistics, be analyzed rigorously.²⁴

Second, infected by the social scientists' penchant for overt generalization, historians are beginning to talk more readily about new topics, of systems and structures, rather than merely events: of the traits of broad political eras, rather than single elections; of the

21. For good discussions of the primarily descriptive use of quantification in France, see Price and Lorwin, *Dimensions of the Past*, 97-139, and Robert Forster, "The Achievements of the Annales School," *Journal of Economic History*, xxxviii (1978), 58-76.

22. Lee Benson, "An Approach to the Scientific Study of Past Public Opinion," in his *Scientific Study of History*, 105-59.

23. See, for example, many of the essays in two volumes edited by Tamara K. Hareven, *Anonymous Americans: Explorations in Nineteenth-Century Social History* (New York: Greenwood Cliffs, N.J., 1971), and *Family and Kin in Urban Communities, 1700-1930* (New York, 1977), and the citations in Hareven's introductory essay to the latter volume, 1-15.

24. Fogel and Engerman, *Time on the Cross*; Tamara K. Hareven and Maris A. Vinovskis, eds., *Family and Population in Nineteenth-Century America* (Princeton, 1975); William O. Aydelotte et al., eds., *The Dimensions of Quantitative Research in History* (Princeton, 1972), 56-225; Roger L. Ransom and Richard Sutch, *One Kind of Freedom: The Economic Consequences of Emancipation* (Cambridge, Eng. 1977).

structure of wealth holding, rather than individual stories of mobility or riches; of the determinants of economic growth, rather than the experiences of single firms; of changes in the forms of collective violence, rather than unique strikes.²⁵ Family reconstitution and statistical studies of other available demographic records allow historians to recover an implicit history of patterns of births, marriages, and deaths which was unknown to those actually living at the time.²⁶ What could be further from the traditional narrative of events, or more basic to the existences of the masses of people?

This is not to claim that historians who draw on the techniques of the social sciences always seek to make large generalizations, or that they usually try to perform rigorous tests of alternative explicit mathematical models.²⁷ Indeed, my impression is that most recent books and essays by historians who count are overloaded with mere description, insufficiently theoretical, or shackled to questions posed by traditional historiography; and several essayists have warned that quantitative history may devolve into "mindless empiricism" or "quantitative antiquarianism."²⁸ To borrow terms from Thomas Kuhn,

25. Good recent reviews of the political history literature include Philip VanderMeer, "The New Political History: Progress and Prospects," *Computers and the Humanities*, xi (1977), 265-278; Allan G. Bogue, "Recent Developments in Political History: The Case of the United States," in *The Frontiers of Human Knowledge* (Uppsala, Sweden, 1978), 79-109. See also Paul Kleppner, *The Third Electoral System, 1853-1892: Parties, Voters, and Political Cultures* (Chapel Hill, N.C. 1979); J. Morgan Kousser, *The Shaping of Southern Politics: Suffrage Restriction and the Establishment of the One-Party South, 1880-1910* (New Haven, 1974); Lee Soltow, *Men and Wealth in the United States, 1850-1870* (New Haven, 1975); Jeffrey G. Williamson, *Late Nineteenth-Century American Development: A General Equilibrium History* (Cambridge, Eng. 1974); Charles Tilly, ed., *Historical Studies of Changing Fertility* (Princeton, 1978); Charles Tilly et al., *The Rebellious Century, 1830-1930* (Cambridge, Mass., 1975).

26. Charles Tilly, "The Historical Study of Vital Processes," in Tilly, ed., *Changing Fertility*, 3-55; and Maris A. Vinovskis, "Recent Trends in American Historical Demography: Some Methodological and Conceptual Considerations," *Annual Review of Sociology*, iv (1978), 603-627, are the best introductions to the literature.

27. Some early enthusiasts seemed to believe, either naively or optimistically, that working with quantitative data and computers would necessarily compel historians to "follow the scientific method." See Robert P. Swierenga, "Computers and American History," *Journal of American History*, lx (1974), 1061, and Richard Jensen, "Quantitative American Studies: The State of the Art," *American Quarterly*, xxvi (1974), 227.

28. Quotations from Charles Tilly, "Computers in Historical Analysis," *Computers and the Humanities*, vii (1973), 334; and John B. Sharpless and Sam Bass Warner, Jr., "Urban History," *American Behavioral Scientist*, xxi (1977), 224. See also Joel H. Silbey, "Clio and Computers: Moving into Phase II: 1970-1972," *Computers and the Humanities*, vii (1972), 79; Jerome M. Clubb, "The 'New' History as Applied Social Science: A Review Essay," *ibid.*, ix (1975), 250-251; and my review of Kleppner, *Third Electoral Era*, forthcoming in *Journal of American History*. A systematic content analysis of 349 articles published from 1967 to 1976 in ten history journals found that only 37 percent of the articles contained explicit hypothesis tests and that even in the three most social-

without a "Copernican Revolution" in a discipline, how can one expect the products of one period of "normal science" to differ very much from those of the next? It may be, however, that some of Kuhn's critics are correct, that we should not expect changes to be so radical and swift, but rather to arrive gradually and piecemeal, that the very criticisms aimed at conservative quantifiers will eventually produce a consensus about a new paradigm for historical study, and that we can best project the eventual trend in social-scientific history by concentrating on the most advanced segments of the profession.²⁹

A focus on that group, the economic historians, reveals a third achievement of social-scientific historians. Despite the sometimes fratricidal battles among quantifiers, many of their arguments can, at least in principle, be fairly satisfactorily resolved. That some of their disputes do not involve nonterminating matters of opinion raises the possibility—which has been discussed for decades, if not centuries—that history may become, at least in part, a science.³⁰ To take the most notorious example, in the wake of the cliometricians' cockfight over *Time on the Cross*, too many onlookers failed to notice that most of the arguments were about methodological specifics: Was the sample representative? Were the assumptions for the estimates reasonable? Were the basic data biased? Were the best statistical procedures employed? Were the inferences logical? Despite the fact that many details were obscurely presented in their hastily prepared second vol-

scientific of the journals (*JEH*, *JIH*, and *JSocH*), only 44 percent of the articles were analytical in this sense (D. N. Sprague, "A Quantitative Assessment of the Quantification Revolution," *Canadian Journal of History*, xiii [1978], 177-192).

29. Critiques of Kuhn's *Structure of Scientific Revolutions* (Chicago, 1962) include Stephen Toulmin, "Does the Distinction between Normal and Revolutionary Science Hold Water?" in Imre Lakatos and Alan Musgrave, eds., *Criticism and the Growth of Knowledge* (Cambridge, Eng., 1970), 39-48; and John Urry, "Thomas S. Kuhn as Sociologist of Knowledge," *British Journal of Sociology*, xxiv (1973), 469. It may be, of course, that the historical discipline is in a prescientific stage, and that it is the initial acceptance of a paradigm, rather than replacement of one by another, that is at issue. Or perhaps history is not sufficiently like physics, on which Kuhn's notions were primarily based, for the concept of paradigm shifts to be strictly applicable to the discipline.

30. By "scientific" here, I mean not that historians will discover universal laws but merely that they will establish a widespread consensus among scholars on a set of important if narrow facts (for example, that slavery was profitable for the average slave owner), that their findings will be replicable, and that systematic research that builds on earlier firmly grounded results is possible. In this sense, history has always been scientific to a degree. The difference is that much social-scientific theory, especially in economics, is based on explicit assumptions and statistical methodology on explicit rules of inference, and that the range of facts that can be established by such means is comparatively wide. A similar distinction is drawn in Stanley L. Engerman, "Recent Developments in American Economic History," *Social Science History*, 11 (1977), 78.

ume, Fogel and Engerman willingly provided their data, clarified their equations, and retraced their processes of reasoning for the benefit of even their most antagonistic critics. Since both sides shared a commitment to the same basic theory and rules of statistical inference, the debate produced some light as well as much heat. Although important differences of interpretation may well remain if the controversy is ever concluded, it seems likely that nearly all economic historians will eventually agree on the basic facts about slave living conditions, as they do now on the question of whether or not slavery was profitable (it was).³¹ In contrast, it is much more difficult to resolve disagreements based on impressionistic evidence, since it is much harder to exchange *Verständnisse* than computer tapes. Most of the major points in *Time on the Cross* are verifiable or falsifiable; most of those in Eugene Genovese's *Roll, Jordan, Roll*, with which it shared the Bancroft Prize, are not.³²

The fourth achievement of quantitative history has been the accumulation of intellectual capital, the amassing in machine-readable form of several enormous and numerous smaller data sets that will pay intellectual dividends for years to come. In economic history, the regional, sectoral, and national accounts estimates of the National Bureau of Economic Research studies and the Parker-Gallman, Bateman-Foust, and Ransom-Sutch census samples have laid the foundations for impressive scholarly edifices, and the groundbreaking studies of American wealth by Lee Soltow and Alice Hanson Jones should soon foster similarly rapid development.³³ In political history, the massive file of electoral and congressional data at the

31. Some historians have read Robert W. Fogel's coy essay "The Limits of Quantitative Methods in History," *American Historical Review*, lxxx (1975), 329-350, as implying fairly severe restrictions on the ability of such methods to transform the discipline. Read carefully and in conjunction with *Time on the Cross* and his later essay, "Cliometrics and Culture: Some Recent Developments in the Historiography of Slavery," *Journal of Social History*, xi (1977), 34-51, the "limits" seem to be set at a very large, if finite, number.

32. Paul A. David et al. *Reckoning with Slavery: A Critical Study in the Quantitative History of American Negro Slavery* (New York, 1976); Donald N. McCloskey, "The Achievements of the Cliometric School," *Journal of Economic History*, xxxviii (1978), 23; Eugene D. Genovese, *Roll, Jordan, Roll: The World the Slaves Made* (New York, 1974). For a lovely, if less explosive, example of the productivity of cliometric controversy, see Robert E. Gallman, "The Statistical Approach: Fundamental Concepts as Applied to History," in Taylor and Ellsworth, eds., *Approaches*, 63-86.

33. NBER, *Trends in the American Economy in the Nineteenth Century* (Princeton, 1960) and *Output, Employment, and Productivity in the United States after 1800* (Princeton, 1966); William N. Parker, ed., *The Structure of the Cotton Economy of the Antebellum South* (Berkeley, 1970); Alice Hanson Jones, *American Colonial Wealth: Documents and Methods*, 3 vols. (New York, 1977); Soltow, *Men and Wealth*; Ransom and Sutch, *One Kind of Freedom*.

University of Michigan's Inter-University Consortium for Political and Social Research, initially set up by Lee Benson, Warren E. Miller, and others, has buttressed a great deal of scholarship.³⁴ In social history, Theodore Hershberg's 2.5 million computerized records at the Philadelphia Social History Project, the large number of social and geographic mobility studies inspired by Thernstrom's work, and the considerable body of European and American demographic data, especially Ansley Coale's European Fertility Project and the large data file now being developed by Robert Fogel and his collaborators, appear to foreshadow increasing returns.³⁵ It must be noted, however, that a great many computer-ready data remain in the hands of individual researchers, despite repeated arguments that their centralization would be of major benefit to the scholarly community.³⁶ Such centralization would facilitate the replication, with somewhat different methods or objectives, of individual studies, as well as the linkage of diverse data sets in order to provide better tests of hypotheses. Surely a comprehensive program to secure these widespread holdings and make them accessible to all scholars should become a crucial priority of professional committees on quantification and funding agencies.

The limited exposure of a great many historians to social-scientific theory and statistics, and the thorough training of a much smaller number, constitute the fifth accomplishment of quantitative historians. In 1971, David S. Landes and Charles Tilly concluded in *History as Social Science* that "the history student of today must learn social science statistics, computer techniques, model-building, and ancillary skills."³⁷ To gauge the profession's progress toward that goal, I sent questionnaires to the approximately 125 history departments that

34. The ICPSR's historical and contemporary archive holdings are detailed in its *Guide to Resources and Services, 1978-1979* (Ann Arbor, Mich. 1979).

35. Theodore Hershberg et al., "Occupation and Ethnicity in Five Nineteenth-Century Cities: A Collaborative Inquiry," *Historical Methods Newsletter*, vii (1974), 174-216; *ibid.*, ix (1976), 43-181; Thernstrom, *Other Bostonians*, 223; Larry T. Wimmer, "The Economics of Mortality in North America, 1650-1910," *The Center for Historical Population Studies Newsletter*, Spring, 1979, 12-13. For citations of the numerous studies of Coale and other demographers and historians, see Michael R. Haines, "Age-Specific and Differential Fertility in Durham and Easington Registration Districts, England, 1851 and 1861," *Social Science History*, ii (1977), 23-52.

36. Price and Lorwin, *Dimensions of the Past*, 24-25; Preston Cutler, et al., "Report on the Status of Mathematical Social Science and the Roles of the National Science Foundation and the Mathematical Social Science Board" (n.p., 1976), 33; J. Morgan Kousser, "The Agenda for 'Social Science History,'" *Social Science History*, i (1977), 390.

37. Landes and Tilly, eds., *History as Social Science* (Englewood Cliffs, N.J., 1971), 75. For similar positions, see Swierenga, "Computers and American History," 1067-68; Rothstein, "Quantification and American History," 315.

have graduate programs, and received at least partially completed replies from eighty-three of them. Fifty-three of these departments, which accounted for 64 percent of the returned questionnaires and 42 percent of those sent out, offered a course in methodology or statistics. Nearly all such courses, which enrolled an average of eight students each, lasted for a single quarter or semester and were taught by historians. The statistics component of these courses was elementary, compared to analogous ones in the social sciences: none required calculus, only forty-two took the student through bivariate regression, thirty-three introduced multivariate regression, and only eight went on to more advanced levels. Introductory graduate-level methods courses in economics and increasingly in psychology, sociology, and political science presume a knowledge of elementary calculus, linear algebra, and some probability theory, and proceed well beyond ordinary least-squares regression analysis. On the theoretical side, only eight history departments had offerings in social-scientific theory, but thirty-one encouraged their students to take theory courses in other departments.

While nineteen schools offered graduate subfields in quantitative history or permitted the substitution of quantitative training for a language requirement, and perhaps 500 students have taken methodology courses in departments outside history over the last few years, only five departments that responded to the questionnaire required all students to take at least one methodology course. Clearly, there was something of a generational split over quantification, for while the respondents, who were usually the "house quantifiers" in each department, reported that students in 71 percent of the schools were more interested in taking methods courses or reading historical works based on statistics than their predecessors a few years ago, only 22 percent thought that their faculty colleagues enthusiastically supported attempts to provide students with statistical training. Of the students who had taken methodology courses, about 64 percent were in United States history, 22 percent in modern European, 5 percent in pre-modern European, and 4 percent in Latin American; the rest were scattered or in unspecified fields.

In addition to departmental offerings, approximately 750 graduate students and younger professors have attended the summer training programs that began at the University of Michigan in 1968, the Newberry Library in Chicago in 1972, and The Johns Hopkins University in 1976. All offer short (four to eight weeks), intensive introductory statistics courses for historians at approximately the same level as most regular term courses. In addition, the Newberry gives courses con-

temporarily in numerous areas of social history and provides encouragement and continuing advice to its 400 alumni, a small number of whom go on to take more sophisticated methods courses in social science departments. Michigan's summer program, which caters to political scientists, concentrates much less of its attention on historians than does the Newberry's, but provides many more advanced statistics courses, of which a small but growing number of historians take advantage. Tiny compared to the other two, the Hopkins program, while open to all, essentially serves Hopkins graduate students.³⁸

While the training currently available may be sufficient to overcome the "math anxiety" that haunts many historians and to enable them to read and evaluate many books and articles now being produced in social and political history, a four-week or one-term course that avoids calculus and linear algebra can hardly prepare anyone to comprehend fully most present scholarship in economic history or the more advanced pieces in other fields, to conduct serious and technically advanced statistical research, or even to proceed to more complex topics through self-education, since a grounding in mathematics is necessary to grasp such methods firmly. Those who brave disciplinary boundaries and adjust to another field's jargon and set of concerns will probably emerge more thoroughly trained than students who do not venture outside history departments; but the often stiff prerequisites for social science statistics courses and the lack of encouragement for such training from senior professors revealed in my survey will inhibit all too many history students and younger faculty from taking full advantage of programs offered in other departments.

Moreover, the present structure of rewards offers students little incentive to become really well trained. Since history departmental search and promotion committees, as well as referees and editors for journals and presses, usually have too little methodological or theoretical expertise to distinguish between accomplished and journeyman quantifiers, rational students and younger faculty members will invest just enough of their energy in acquiring such skills to be sure of satisfying the committees and publishers. Those untenured historians spurred to improve their skills by a simple desire to learn and understand will rarely be able to divert enough time from their teaching duties and publishing imperatives to become expert at theory or

38. Information on the summer programs was graciously provided by Jerome M. Clubb (Michigan), Louis Galambos (Johns Hopkins), and Richard Jensen (Newberry). In addition, summer institutes at Cornell in 1967 and Harvard in 1973 taught approximately fifty more students.

statistics. Tenured historians will usually be too absorbed in substantive projects to upgrade their skills or will rationalize their unwillingness to retool by muttering the dogma about old canines and new tricks. In the short term, the profession might overcome these structural problems by adding competent methodologists from history or social science departments to search and promotion committees (just as a small but increasing number of journals and presses are employing the services of methodologically expert referees) and by prevailing upon funding agencies to set up a program of two-year postdoctoral training fellowships for historians.³⁹

In the longer term, history departments are condemning many of their graduates to technological obsolescence by not requiring that they take even token methodology courses. By offering only elementary statistics and very few theory courses, departments are fostering dilettantism—as such historians as Lawrence Stone acknowledge and approve. Asserting that historians can and "should" dip into social scientific fields merely to seek "a specific idea or piece of information," that "there is nothing wrong with poking about in a social science," and that the most historians "can usually hope to achieve is the somewhat superficial overview of the enthusiastic undergraduate interested in the field," Stone opposes more thorough statistical and theoretical training for graduate students in the discipline and in this connection openly disdains "that most idiotic of proverbs that a little knowledge is a dangerous thing."⁴⁰ Sad to say, Stone's advocacy of amateurism is echoed in practice by too many social scientists, whose dabbling in history is no more productive of creditable historical social science than historians' dabbling is of excellent social-scientific history.⁴¹

39. To attract the very best students away from the security of immediate tenure-track positions, the postdoctoral program would at first have to offer stipends at higher amounts than entry-level jobs pay. To train people well, the program would have to require that students master at least some calculus and linear algebra before beginning it; otherwise, the first year would be devoted to completing what should be prerequisites, the second to polishing the thesis and job seeking, and little would be accomplished except a reduction in unemployment. Each postdoctoral student should be attached to both history and social science departments so that he or she can obtain both guidance (from historians) and the most advanced course training (from social scientists).

40. Stone, "History and the Social Sciences in the Twentieth Century," in Charles F. Delzell, ed., *The Future of History* (Nashville, 1977), 18-19, 36-37.

41. A theoretical social scientist once constructed an elaborate mathematical model to determine which house of Congress would act first when trying to overturn a veto by the president of the United States. He abandoned the paper when informed, while delivering it at a conference, of the constitutional provision (Art. I, Sec. 7) dictating that the first attempt to override had to occur in the house in which the bill originated.

By shuttling students off to other departments to take theory and methods courses, then, history departments are missing an opportunity to integrate social-scientific and traditional historical training, a combination that would benefit both sides. Yet only two of the history departments rated in the top ten in the recent Ladd-Lipset survey (Michigan and Wisconsin) offer graduate students the option of taking rigorous programs in theory or methods as a normal part of the history regimen, while two of the remaining eight (Princeton and Stanford) do not even give introductory methodology courses in their departments.⁴² No doubt sweeping changes in historical graduate training will come first in less established schools, where those opposed to or skeptical of quantification are less firmly entrenched—at such places as Carnegie-Mellon, with its new “applied history” program, or the California Institute of Technology, where social-scientific history is beginning to be offered as a field of concentration in an interdisciplinary Ph.D. degree program.⁴³

Since it is impossible in a short essay even to list all of the uses historians in America have made of quantitative methods in the 1970s, I shall try to make a limited assessment and to project future trends by focusing briefly on the eight volumes published at the time of this writing under the auspices of the History Advisory Committee of the Mathematical Social Science Board.⁴⁴ The products of conferences in which most of the leading quantifiers took part, these volumes contain samples of some of the profession’s most quantitatively advanced work. The varied topics addressed in these collections of essays—fertility, the family, race relations, slavery, mobility, the cities, the British economy, electoral and legislative behavior, and public policy—indicate the wide scope of current research. Because there has been no coordinated direction of research (as there has in France), because the subjects themselves are so diverse, and because social-scientific research in all

42. The Ladd-Lipset ratings are in *The Chronicle of Higher Education*, January 15, 1979, 6. The facts about departmental offerings come from the questionnaires and university catalogs.

43. Landes and Tilly, *History as Social Science*, 33–34, made a similar point with different examples.

44. Donald N. McCloskey, ed., *Essays on a Mature Economy: Britain after 1840* (Princeton, 1971); Aydelotte et al., eds., *Dimensions of Quantitative Research*; Stanley L. Engerman and Eugene D. Genovese, eds., *Race and Slavery in the Western Hemisphere* (Princeton, 1975); Leo F. Schnore, ed., *The New Urban History: Quantitative Explorations by American Historians* (Princeton, 1975); William O. Aydelotte, ed., *The History of Parliamentary Behavior* (Princeton, 1977); Joel H. Silbey et al., eds., *The History of American Electoral Behavior* (Princeton, 1978); Tilly, *Changing Fertility*; Hareven and Vinovskis, *Family and Population*.

of these areas began relatively recently, these volumes do not consist of summaries or even preliminary syntheses. Indeed, with one partial exception, there are no real textbooks yet in social-scientific history, even though several books of readings and two very elementary statistics texts for historians appeared in the early 1970s.⁴⁵

The essays in the MSSB volumes reflect the three major uses that historians have made of mathematics and statistics: exploring the basic patterns in previously unexamined data, challenging or confirming older descriptions or explanations, and offering tentative interpretations or new frameworks to guide future research. In uncharted areas, nearly any explorer who counts counts; that is to say, even simple methods can yield significant findings. For example, the compilation of data on the country-by-country destinations of African slaves by Philip D. Curtin and others and the computation of rates of return on the British slave trade by Roger Anstey carry profound implications for questions of comparative slave treatment and the value of slave lives in the Americas, as well as the origins of British capitalism. By charting the lines of House and Senate careers, H. Douglas Price throws new light on the growth of political professionalism in the United States, with all the implications of that development for problems of power and policy. Other papers use more complex statistical techniques in an essentially inductive, exploratory manner.⁴⁶ Thus, Kathleen Neils Conzen employs factor analysis to sort out the socioeconomic traits of residential areas of antebellum Milwaukee; William O. Aydelotte, Guttman scaling to determine the extent and timing of the split in the British Conservative party in the

45. The partial exception—because it focuses entirely on economic growth—is Lance E. Davis et al., *American Economic Growth: An Economist's History of the United States* (New York, 1972). Several fine books of readings include Robert P. Swierenga, ed., *Quantification in American History: Theory and Research* (New York, 1970); Don Karl Rowney and James Q. Graham, Jr., eds., *Quantitative History: Selected Readings in the Quantitative Analysis of Historical Data* (Homewood, Ill., 1969); Fogel and Engerman, *Reinterpretation*; Joel H. Silbey and Samuel T. McSeveney, eds., *Voters, Parties, and Elections: Quantitative Essays in the History of American Popular Voting Behavior* (Lexington, Mass., 1972); and Lee Benson et al., eds., *American Political Behavior: Historical Essays and Readings* (New York, 1974). The two statistics texts are Charles M. Dollar and Richard J. Jensen, *Historian's Guide to Statistics: Quantitative Analysis and Historical Research* (New York, 1971), and Roderick Floud, *An Introduction to Quantitative Methods for Historians* (Princeton, 1973).

46. Given the inductive uses to which historians often put complex statistical techniques, it is virtually astounding that they have paid so little attention to the Tukey techniques of exploratory data analysis. For examples of what such techniques can do, see Burton Singer, “Exploratory Strategies and Graphical Displays,” *Journal of Interdisciplinary History*, vii (1976), 57–70; and John L. McCarthy and John W. Tukey, “Exploratory Analysis of Aggregate Voting Behavior: Presidential Elections in New Hampshire, 1896–1972,” *Social Science History*, ii (1978), 292–331.

1841-46 Parliament; and Nancy H. Zingale, a combination of analysis of variance and correlational analysis to unravel the skeins of voting behavior in Minnesota.⁴⁷

Other contributors operationalize and test the notions of impressionistic historians and popular thinkers. Peter H. Smith finds the 1916-17 Mexican Constitutional Convention delegates neither young nor underprivileged, and his skillful delineation and explanation of convention cleavages, based on the techniques of factor analysis and automatic interaction detection, disclose that no consistent social patterns lay behind splits among the delegates. Gerald H. Kramer and Susan J. Lepper attempt to disentangle the effects of incumbency, seniority, and presidential coattails from those of economic conditions in determining votes for American congressmen through a complicated set of regression analyses. Gilbert Shapiro and Philip Dawson systematically analyze the content of French revolutionary *cahiers* and correlate the results with an index of ease of entry into the nobility in an effort to determine whether bourgeois and aristocrats who lived in areas of relatively free social mobility were more or less likely to be revolutionary than denizens of less fluid jurisdictions.⁴⁸

Finally, some of the papers, especially those by economists, import mathematicizable theories from other disciplines and specify their implications for historical problems. Two examples will suffice. In a brilliant synthetic essay, Richard A. Easterlin blends sociological theories with those of the so-called new home economics to concoct a model of family fertility decisions, thus providing a rational structure of individual choice for demographic history, which is perhaps the least theoretical field of social-scientific history. In another paper that is likely to reshape much empirical work, Joseph A. Swanson and Jeffrey G. Williamson develop an abstract mathematical discussion of the locational decisions of firms which draws attention to quite different determinants of comparative urban growth than previous theories had.⁴⁹

The MSSB volumes typify the vanguard of the field in other ways as

47. See the essays by Curtin and others in Engerman and Genovese, eds., *Race and Slavery*, 3-130, 495-506; Price, in Aydelotte, ed., *Parliamentary Behavior*, 28-62; Conzen, in Schnore, ed., *Urban History*, 145-183; Aydelotte, in Aydelotte et al., eds., *Dimensions of Quantitative Research*, 319-346; and Zingale, in Silbey et al., eds., *History of American Electoral Behavior*, 106-136.

48. Smith, in Aydelotte, ed., *History of Parliamentary Behavior*, 186-224. Kramer and Lepper, in Aydelotte et al., eds., *Dimensions of Quantitative Research*, 256-284; and Shapiro and Dawson, in *ibid.*, 159-191.

49. Easterlin, in Tilly, ed., *Historical Studies of Changing Fertility*, 57-133; Swanson and Williamson, in Schnore, ed., *New Urban History*, 260-273.

Table 5. Some characteristics of the eight Mathematical Social Science Board volumes*

Discipline of authors	Percent pages by	Tables/page × 100	"Sophisticated" tables/page × 100	Number of theoretical tables, graphs
History	37%	31	6	5
Economics	24	18	3	33
Interdisciplinary	15	22	8	0
Political science	10	21	10	1
Sociology, anthropology	8	22	2	0
Demography, geography	3	20	6	4
Unidentified	2	32	0	0
Total	99	25	6	43
N	2,775 (pages)	681 (tables)	161 (tables)	43

*Volumes listed in footnote 44.
†Not included in other columns.

well. As a comparison of Table 5 with the earlier data on scholarly journals will show, these books contain a higher proportion of numerical tables per page than either the mainstream or the specialized magazines, and a much higher proportion of the MSSB tables go beyond counts, percentages, and measures of dispersion and central tendency. Moreover, the eight works contain a good many of what might be termed "theoretical tables": supply and demand curves, simulations, hypothetical demographic patterns, and the like. Finally, historians did not dominate the conferences on which these tomes are based. Only a minority of the pages were filled with articles written solely by people with Ph.Ds in history. Approximately the same amount of space represented contributions by economists and collaborators from two or more fields. The volumes thus reflect an observation perhaps more strikingly symbolized by the fact that the president of the Social Science History Association in the third year of its existence (1979-80) was a political scientist, Warren E. Miller: quantitative social-scientific history is genuinely interdisciplinary.

Indeed, its interdisciplinary character has always been its strength and is now the guarantee of its continued vigor. The importation of new and fruitful theories, methods, and modes of thought always stimulates a field's development, and social-scientific history is the entrepôt for the products of many disciplines: economics, political science, sociology, demography, geography, and even some segments of anthropology. The frequent collisions between, for instance, economists armored with theory and historians who habitually, and all too often (from the economists' point of view) correctly, question whether the assumptions of some theory are met in the particular

context usually result in improvements in both models and history. Furthermore, although declining job opportunities and the consequent cuts in the quantity and probably the quality of history graduate students have decreased the role of graduate training in fostering the transition to a quantitatively literate profession, the employment situation is better in social science departments.⁵⁰ As a result, the number of professionals interested in historical social science should continue to grow, regardless of trends in the number of historians. And since the average social scientist will be better trained in theory and statistics than the average historian, the intellectual quality of social-scientific history may well rise whether or not history graduate training becomes more quantitatively rigorous. Finally, if these prognostications are even approximately correct, they raise a serious dilemma for the historical profession in America. The social-scientific merchants have developed not only an extensive trade, but a large demand within the historical community for their valuable products and a comprador class to look after their interests in the new territory. Isolationism would be ill advised even if it were possible.⁵¹ Can the average citizens of the increasingly colonized country afford to remain semiliterate in the traders' language?

50. So far as I know, there have been no systematic surveys of graduate-student quality over time, and even firmly based impressions must await the publication of first books by the generation of the late 1970s; but rational risk-averse American students who desired either to maximize their future income streams, guarantee some minimum level of economic security, or have sufficient leisure to pursue intellectual activities with a minimum of impediments would have been ill advised to choose a career in history rather than economics, sociology, law, or business after about 1970.

51. For such advice on history's alleged ills, see Jacques Barzun, *Clio and the Doctors: Psycho-History, Quanto-History, and History* (Chicago, 1974).

I want to thank my colleagues John F. Benton, Lance E. Davis, Nicholas Dirks, Daniel J. Kevles, and Terrence McDonald for comments on this essay, although they would not want to be held responsible for the resulting document.

My general viewpoint and many specific points so closely parallel those in the excellent set of review essays edited by Allan G. Bogue and Jerome M. Clubb for *American Behavioral Scientist*, xxi (1977), 163-310, especially Bogue and Clubb's "History, Quantification, and the Social Sciences," *ibid.*, 167-186, that I can no longer sort out those ideas that I had independently from those I stole from that set of essays. To avoid repetition I shall display the booty without further acknowledgment.