

Farming in the North American Grasslands: A Survey of Publications, 1947–80*

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I
IN 1931 Walter Prescott Webb published *The Great Plains* in which he argued that the experience of pioneering in the Great Plains region was so different from that encountered in the eastern forest lands of the United States that the settlement process was checked, pending the development of new technologies and institutions.¹ Webb's book helped to inspire James C Malin, a young historian at the University of Kansas, to launch a major investigation of the history of the North American grassland, drawing upon a wide range of related scholarly disciplines and concentrating particularly upon the adaptation of Anglo-American agricultural settlement to the unique challenges of a sub-humid grassland environment. Webb proclaimed the Great Plains as a region characterized by at least two of the following characteristics — relative flatness, treelessness and aridity, a definition that placed most of the region between the Mississippi and the Rockies

under his scrutiny, as well as the grasslands of the Great Lakes states and major portions of the geographic provinces beyond the *cordillera*. The 'grassland' of particular interest to Malin stretched westward from the tall grass prairies of northern Indiana through the Grand Prairie of Illinois, thence flaring out to the northwest and southwest to merge with the more embracing grasslands of the 98th meridian states and so onward to the foothills of the Rockies. Much of Malin's detailed work concerned Kansas, where a unique series of federal and state census manuscripts and a magnificent collection of local newspapers at the Kansas State Historical Society allowed the development of particularly rich local studies.

Relying particularly upon these sources, Malin, between the years 1933–47, published a stream of intensive local studies of agricultural adaptation in Kansas. The best known of these publications is his classic article on the turnover of farm population in Kansas and the monograph, *Winter Wheat in the Golden Belt of Kansas*. In 1947 he published *The Grassland of North America: Prolegomena to its History*, a wide ranging investigation of the development of knowledge about the grasslands and in a section of this volume he summarized his studies of agricultural settlement. *The Grassland* was truly a seminal work and in this bibliographical article I shall summarize some of the major trends in the writing of the agricultural history of the prairies and plains that have been evident since its publication. Our focus will be particularly on the grassland area of most interest to Malin, embracing the prairie triangle and the southern and central plains region of the

*This is the first of a series of bibliographical articles on recent developments in American agricultural history. It is hoped to follow it in subsequent issues with discussions of other regions. The article is a condensation of one published originally in *The Great Plains Quarterly*, 1, Spring 1981, pp 105–31, and is reprinted here by permission of the editor of that publication [editor].

¹ Walter P Webb, *The Great Plains* (Boston: Ginn and Co, 1931). For recent secondary comment see: Gregory M Tobin, *The Making of a History: Walter Prescott Webb and the Great Plains* (Austin: University of Texas Press, 1976) and Necah Stewart Furman, *Walter Prescott Webb: His Life and Impact* (Albuquerque: University of New Mexico Press, 1976). Fred A Shannon, *An Appraisal of Walter Prescott Webb's The Great Plains: A Study in Institutions and Environment*, Social Science Research Council Bulletin 46 (New York: Social Science Research Council, 1940) is an elaborate commissioned critique that Webb refused to accept seriously.

central and northern plains and rocky mountain states.² Though less imperial than Webb's region it is one that includes significant portions of the modern corn belt, most of the central and northern small grain producing regions, and a certain amount of ranching country.

In the first half of *The Grassland*, Malin summarized findings in ecology, climatology, geology, geography, and the soil sciences that he considered essential to an understanding of the grasslands and adaptation to their environment, along with a summary of the observations on these matters by early explorers in the plains country. The second part of the monograph is entitled 'Historiography' and here Malin discussed, among other topics, the historical development of ideas about the grassland region and presented a series of chapters summarizing the conclusions concerning population, agriculture, land tenure, operator turnover, and farm organization that he had developed during the previous decade and a half. *The Grassland of North America*, therefore, provides a convenient summary of Malin's research on agricultural development and farming as it stood in the mid-1940's; thereafter, he devoted much of his writing, to other subjects.

Systematic study of the census returns in a sample of townships in the various rainfall belts of Kansas allowed Malin to generalize about the processes of settlement with a precision unmatched to that time. He discovered that settlers in Kansas de-

monstrated similar patterns of persistence, whether they lived in the generally humid climate of eastern Kansas or in the more arid regions of western Kansas. During the first few years, any particular census cohort of settlers showed a high rate of loss. After 10 years there usually remained only some 30 to 50 per cent of the new settlers of a decade earlier, or their direct descendants in the male line. Thereafter, attrition was less marked. Usually the outflow of settlers was relatively constant, irrespective of good times or bad. But in depression, the replacement flow of new settlers normally diminished, producing absolute decline in numbers of farm operators in some areas. Although Malin did not pay particular attention to the foreign-born farmers, he believed them to be highly persistent in the first generation, although conforming to the native-born patterns in the second and third generations. Most settlers, he discovered, came to Kansas from non-contiguous states, a fact suggesting that they encountered major problems in adapting their farm practices to the sub-humid climate of the central and western part of the state. Malin presented data that he interpreted in one presentation as demonstrating 'a relatively normal age distribution', among frontier settlers; elsewhere he described frontier male operators as 'conspicuously middle-aged'.

Malin emphasized the tendency of farm operators to enlarge their holdings in times of prosperity and for smaller size units to proliferate in times of depression. Various other considerations were reflected in the changing size of farms as well, he believed, including climate, changing systems of communication and transportation, and mechanization; the availability of financing later became important, particularly after 1910. He did not detect an ever-persisting tendency toward the development of larger farms from the settlement period onward throughout Kansas and was sceptical of the argument that the federal system of land disposal had provided plains country settlers with land units which were too small for

²Since it is possible to mention only part of the relevant literature, I refer the reader particularly to the following bibliographical guides, published by the Agricultural History Center, University of California, Davis: Earl M Rogers, comp *A List of References for the History of Agriculture in the Mountain States* (1972), *A List of References for the History of Agriculture in the Great Plains* (1976), *A List of References for the History of Agriculture in Iowa* (1979), and Douglas E Bowers and James B Hoehn, comps *A List of References for the History of Agriculture in the Midwest, 1840-1900* (1973). See also: Rodman W Paul and Richard W Etulain, *The Frontier and the American West* (Arlington Heights, IL: AHM Publishing Corp, 1977) and also note the 'Recent Articles', section published in the *Western Historical Quarterly*.

effective operation. He emphasized the problem of evaluating census estimates of farm size since the pioneers typically used the federal lands and those of non-residents as grazing commons. Farms in Kansas became permanently larger only after farm mechanization and the stabilization of population in the western communities was well under way.

Even in eastern Kansas, where the environmental setting clearly allowed the corn-livestock patterns of agriculture to which many of the Kansas settlers were accustomed, Malin found that the combination of farm enterprises had changed over time. Although the proportion of land planted to corn stabilized fairly early, the proportions of supplementary crops changed markedly through the nineteenth and early twentieth centuries. This tendency was more evident in central Kansas where climatic differences from year to year made it very difficult to decide upon the best long-run combination of crops. Malin discounted early reports of bumper crops as real estate 'booming'. He believed that the farmers themselves made the fundamental evaluations of regional agricultural capabilities and cropping combinations; the adaptation process, Malin believed, was a kind of 'folk movement'.

Malin argued that 'few' Kansas farmers of the nineteenth century could have produced much to sell. He suspected that the 'evils and abuses' of the economic system that contributed to the growth of farm protest movements were probably much exaggerated. 'In overall effect', he concluded, 'the hazards of weather on crops and prosperity were greater than the hazards of price.' But he also wrote that 'inadequate capital resulting in small badly equipped farms was almost as serious an obstacle to successful occupancy of the plains as the difficulties of adaptation'. Malin argued that tenant mobility was only slightly greater than that of owner operators. In general he was prepared to accept the economist's view that tenancy allowed the most effective combination and management

of land, labour and capital possible at a particular time.³

Malin was not infallible. His quantitative data suggest that he over-emphasized the normality of the frontier population structure and some of his other readings of quantitative data are arguable. He probably understated the contribution of the agricultural scientist to agricultural adjustment in the grassland after 1910. The significance of some materials that he introduced in his narrative was not adequately explained. It is also true that Malin was selective in his treatment of the history of the evolving agriculture of the prairie-plains. But taken as a whole, *The Grassland of North America*, is one of the relatively few *tours de force* in the historiography of western America.

II Post-Malin Surveys

Malin termed his summative volume on the

³James C Malin, *The Grassland of North America: Prolegomena to its History* (Lawrence, Kansas: James C Malin, 1947; currently available, Gloucester, Mass: Peter Smith, 1967, fifth printing with *Addenda and Postscript*). Although this volume presents an excellent summary of Malin's agricultural research the following are basic to a full understanding of his work: 'The Turnover of Farm Population in Kansas', *Kansas Historical Quarterly* 4 (November 1935), pp 339-72; 'The Adaptation of the Agricultural System to Sub-Humid Environment: Illustrated by the Activities of the Wayne Township Farmers' Club of Edwards County, Kansas, 1886-1893', *Agricultural History* 10 (July 1936), pp 118-41; 'Local Historical Studies and Population', in *The Cultural Approach to History*, edited by Caroline Ware (New York: Columbia University Press, 1940), pp 300-7; 'An Introduction to the History of the Bluestem Pasture Region of Kansas: A Study in Adaptation to Geographical Environment', *Kansas Historical Quarterly* 11 (February 1942), pp 3-28; *Winter Wheat in the Golden Belt of Kansas: A Study in Adaptation to Subhumid Geographical Environment* (Lawrence, Kan: University of Kansas Press, 1944). Three articles, initially published in *Scientific Monthly* during 1950, 1952 and 1953 appear in the *Addenda* to the *Grassland of North America* (1967) and in some degree present refinements in his thinking after the initial publication. For commentary see: Thomas H LeDuc, 'An Ecological Interpretation of Grasslands History: The Work of James C Malin as Historian and as Critic of Historians', *Nebraska History* 31 (September 1950), pp 226-33; Robert G Bell, 'James C Malin and the Grasslands of North America', *Agricultural History* 46 (July 1972), pp 414-24. The quoted passages are found in Malin, 'Local Historical Studies', pp 300, 305 in *The Cultural Approach*, edited by Ware; *The Grassland of North America*, pp 289, 307; 'Adaptation of the Agricultural System', p 140.

grasslands a 'prolegomena'. Gilbert C. Fite has come closest to accepting the challenge implicit in the word in *The Farmer's Frontier: 1865-1900*, part of the Histories of the American Frontier Series. But there were other agricultural frontiers in the United States during the same period and Fite could, therefore, devote only about half of his thin volume to the prairie and plains frontiers of the late nineteenth century. However, it is an excellent summary of the general behaviour of pioneer farmers. Fite was particularly effective in describing the vulnerability of the pioneers to the vagaries of prices and precipitation — the date when a settler occupied his claim might strongly influence his chances of success or failure. Fite's description of government relief efforts at the state and local level was a major contribution, and he caught the optimism of the boom time settler well. He described major adaptive efforts, including the search for appropriate crops, the adoption of summer fallowing, the growing understanding of the crucial importance of wheat as a crop in the central plains and beyond, and efforts to irrigate crops where surface or underground water supplies seemed to promise success. He commented perceptively about the operation of the land laws and the implications of debt.

The Farmer's Frontier is primarily a book of generalization, illustrated and enlivened by specific illustrations or cogent quotations. There are no turnover estimates to be found in these pages, nor foreclosure nor interest nor tax series. In his summary chapter, Fite noted that the 'basic problem was one of working out and adapting proper farm organization patterns to fit natural conditions on the Great Plains', but he did not develop this hypothesis as a central theme.⁴

Other authors have made significant recent contributions to our understanding of grassland agriculture. For the reader who wishes a capsule treatment of agricultural settlement in the plains country, Robert G Athearn and

W Eugene Hollon provide a choice in books that are essentially regional surveys. The authors of the more recent state histories of the region have generally included useful, but all too brief, reviews of agricultural development, and some summary articles are highly useful. Apparently prepared in ignorance of Malin's work, highly episodic in its use of historical material, and written with prescriptive intent, *The Great Plains in Transition*, published by the sociologist, Karl F Kraenzel in 1955, contains much interesting material and some very useful citations to sources.⁵ But deeper understanding of the growth of intensive agriculture in the grasslands is only to be gained by consulting the work of authors who have published more specialized articles and monographs.

III *Problems of Perception*

We understand the pioneer farmers' initial perceptions of the grassland much better today than a generation ago. At that time only Malin had addressed this issue in detail, but in his presidential address to the Association of American Geographers in 1968, Walter M Kollmorgen examined 'geographic perceptions colored by eastern conditions, which led to misguided efforts to project westward certain basic man-land relations that proved inoperative in the drier grasslands'. He argued that the incursion of settlers into

⁵ Robert G Athearn, *High Country Empire: The High Plains and Rockies* (New York: McGraw-Hill, 1960); W Eugene Hollon, *The Great American Desert: Then and Now* (New York: Oxford University Press, 1966). Among state histories, see Carl Abbott, *Colorado: A History of the Centennial State* (Boulder: Colorado Associated University Press, 1976); T A Larson, *History of Wyoming* (Lincoln: University of Nebraska Press, 2nd edn, 1978); James C Olson, *History of Nebraska* (Lincoln: University of Nebraska Press, 1955); Michael P Malone and Richard B Roeder, *Montana: A History of Two Centuries* (Seattle: University of Washington Press, 1976); Elwyn B Robinson, *History of North Dakota* (Lincoln: University of Nebraska Press, 1966); William F Zornow, *Kansas: A History of the Jayhawk State* (Norman: University of Oklahoma Press, 1957). Note the sketch by John T Schlebecker, 'Agriculture in Western Nebraska, 1906-1966' *Nebraska History* 48 (Autumn 1967); pp 249-66, and Earle D Ross, *Iowa Agriculture: An Historical Survey* (Iowa City: State Historical Society of Iowa, 1951) as illustrative of badly-needed types of surveys.

⁴ Gilbert C Fite, *The Farmers' Frontier, 1865-1900* (New York: Holt, Rinehart and Winston, 1966), p 233.

regions that should have remained as cow country were based on three misguided geographic perceptions concerning: rain-making; irrigation; and dry farming. Even reputable scientists and public officials argued that cultivated soil absorbed greater amounts of water than soil under grassland cover and that tree cover enhanced the moisture available. Some government scientists, as well as real estate promoters, greatly overestimated the irrigable potential of the high plains. The feasibility of dry farming was also greatly exaggerated, Kollmorgen argued; and federal approval of enlarged homestead legislation suggested that larger holdings alone were sufficient to guarantee the success of settlers in the high plains.⁶

Kollmorgen's address illustrated the very considerable interest that historical geographers displayed during the 1960's and 1970's concerning the perceptions and images that Americans entertained of the grasslands during the nineteenth century. Martyn J Bowden and others have concluded that eastern educational and *élite* circles believed during the 1840's and 1850's that the trans-Missouri West was a Great American Desert. But midwesterners and common folk generally continued to regard the area as a region of prairie-plains that could be settled in the same way that the great prairie triangle east of the Missouri was being settled. This finding challenges the contentions of Webb, Henry Nash Smith, and others that the conception of the plains as a desert markedly restrained the westward flow of settlement during the mid-nineteenth century. According to Bowden, the western state officials, railroad officers, and promoters who boomed the central and high plains regions after 1870, exaggerated the degree to which the desert image or myth had formerly held sway in their efforts to emphasize the striking climatic changes that attended cultivation.

⁶ Walter M Kollmorgen, 'The Woodsman's Assaults on the Domain of the Cattleman', *Annals of the Association of American Geographers* 59 (June 1969), pp 215-39. For the quotation, see p 216.

In general, historians in recent years have not greatly advanced our understanding of the ways in which settlers perceived the plains environment.⁷ However, David M Emmons' study of the boomer literature of the central great plains shows the influence of the research by geographers, and is a gracefully written and detailed account of the promotional efforts that influenced the thinking of many western settlers during the 1870's and 1880's.⁸

IV *The Mobility of Farm Populations*

Malin's view that midwestern settlers were highly mobile was corroborated in the research of A D Edwards, of the United States Department of Agriculture during the 1930's. In the 1950's and 1960's, Mildred Throne, William L Bowers and Allan G Bogue provided additional corroborative evidence in research dealing with the prairie regions of

⁷ Martyn J Bowden, 'The Great American Desert and the American Frontier, 1800-1882: Popular Images of the Plains', in *Anonymous Americans: Explorations in Nineteenth-Century Social History*, edited by Tamara K Hareven (Englewood Cliffs, NJ: Prentice-Hall, Inc, 1971), pp 48-79, and 'Desert Wheat Belt, Plains Corn Belt: Environmental Cognition and Behavior of Settlers in the Plains Margin, 1850-99', in *Images of the Plains: The Role of Human Nature in Settlement*, edited by Brian W Blouet and Merlin P Lawson (Lincoln: University of Nebraska Press, 1975), pp 189-201. The notes in these two articles include citations to other illustrations of the *genre* that are not cited here. See also G Malcolm Lewis, 'Changing Emphases in the Description of the Natural Environment of the American Great Plains Area', *Institute of British Geographers Transactions and Papers* 30 (1962), pp 75-90; 'The Great Plains Region and its Image of Flatness', *Journal of the West* 6 (January 1967), pp 11-26, and 'The Recognition and Delimitation of the Northern Interior Grasslands during the Eighteenth Century', in *Images of the Plains*, pp 23-44; Bradley H Baltensperger, 'Agricultural Adjustments to Great Plains Drought: The Republican Valley, 1870-1900', in *The Great Plains: Environment and Culture*, edited by Brian W Blouet and Frederick C Luebke (Lincoln: University of Nebraska Press, 1979), pp 43-59; Leslie Hewes, 'The Great Plains One Hundred Years after Major John Wesley Powell', in *Images of the Plains*, pp 203-14. Henry Nash Smith, *Virgin Land: The American West as Symbol and Myth* (Cambridge, Mass: Harvard University Press, 1950) has had tremendous scholarly impact, but was inadequately documented.

⁸ David M Emmons, *Garden in the Grasslands: Boomer Literature of the Central Great Plains* (Lincoln: University of Nebraska Press, 1971).

Illinois and Iowa. They reported turnover rates among farmers similar to those found in Kansas by Malin. They also found some tendency for persistence to increase within census cohorts after the initial ten years but to lesser extent than did Malin. Those least likely to be found in succeeding census enumerations tended to be younger, possessed of less property, and more frequently unmarried than those who remained. Actually such differences were not very striking, and perhaps these authors should have been most impressed by the small degree of the differences between movers and stayers.⁹

Malin and later scholars were less in agreement concerning the relation of ethnicity to migration. Bogue discovered impressive rates of turnover among some of the foreign-born farmers of Bureau County, Illinois, in the mid-nineteenth century, and Merle Curti discovered high turnover among the foreign-born groups in Trempealeau County, Wisconsin in an area on the fringe of the mid-continent grassland.¹⁰

More recently scholars have turned their attention to settler mobility in the central regions of Kansas and Nebraska. Richard G Bremer's study of agricultural change in the Loup River country of Nebraska presents farmer persistence data covering the years 1890–1970. Bremer used local assessment records to develop cohorts of farmers at 5-year intervals, selected to reflect the ethnic composition and topographical and social conditions of the region. The striking turnover rates again appear in this research

but Bremer was also able to estimate loss in the cohorts due to death. This factor, however, did not generally affect the turnover rate substantially during the first decade in which the cohort was under study. Nor did Bremer find persistence much affected by drought, economic boom or depression. But he did discover that there was some tendency for persistence to increase among the farmers over extended periods of time, a phenomenon linked to the ageing process among his farm operators. Bremer agreed with Malin's central contention, 'migration tendencies may not be explained solely in environmental terms', and concluded that 'intensive further exploration into this problem area is greatly needed'.¹¹

D Aiden McQuillan has examined the role of ethnicity in farming and tenure practices in nineteenth-century Kansas. In one article he contrasted the mobility of native Americans, Swedes, Mennonites, and French Canadians in the central region of the state. McQuillan prepared turnover data extending from 1875 to 1925 and found that the immigrants were 'slightly more stable than the Americans'. But the 'mobility rate for both immigrants and Americans was high' and 'differences between the foreign-born and native-born were always very small', as were 'differences among the three immigrant groups'. He suggested that the higher proportion of second generation farmers among the French Canadians might explain the greater mobility of that group.

McQuillan also investigated the personal determinants of migration. He calculated the average capital assets, age, and family size of migrants and persisters within his various sample and control groups. Then he was able to compare the group means in 210 different instances. Most of the comparisons demonstrated the familiar fact that wealthier and older farmers and those with most children were least apt to move. But the

⁹ A D Edwards, *Influence of Drought and Depression on a Rural Community: A Case Study in Haskell County, Kansas*. US Farm Security Administration Social Research Report 7 (Washington, 1939). Mildred Throne, 'A Population Study of an Iowa County in 1850', *Iowa Journal of History* 57 (October 1959), pp 305–30; William L Bowers, 'Crawford Township, 1850–1870: A Population Study of a Pioneer Community', *Iowa Journal of History* 58 (January 1960), pp 1–36; Allan G Bogue, *From Prairie to Corn Belt: Farming on the Illinois and Iowa Prairies in the Nineteenth Century* (Chicago: University of Chicago Press, 1963), pp 8–28.

¹⁰ Merle Curti, *The Making of an American Community: A Case Study of Democracy in a Frontier County* (Stanford: Stanford University Press, 1959), pp 65–77, 140–3, 218.

¹¹ Richard G Bremer, *Agricultural Change in an Urban Age: The Loup Country of Nebraska, 1910–1970* (Lincoln: University of Nebraska, 1976), p 139.

differences between the means were usually small and statistically insignificant.¹²

V *Land and Tenure Issues*

Popular media, historical fiction and local myth have exaggerated the degree to which settlers in the grasslands acquired land directly from the federal government and particularly the importance of the Homestead Law. In the tall grass country the cash auction and private entry procedures of the Land Act of 1820 and the preemption laws, particularly that of 1841, were the major federal acts invoked by settlers prior to 1860, although the flood of military land warrants authorized in the years 1847–55 changed the picture somewhat. Even in the central and high plains of the nineteenth century the Homestead Act was less dominant than suggested. Of course, the more serious students of the American land disposal system have always emphasized its complexity and described the special grant policies of the federal government — the wagon road, canal, railroad and state grants, as well as the swamp land, agricultural college, timber culture and desert land acts and the use of script or other miscellaneous methods of land disposal. In a much reprinted article of 1936 Paul W Gates suggested that the Homestead Law was crudely grafted upon a land system that was more attuned to the wishes of special interest groups than to those of the family farmer. Since many interpreted Gates's article as suggesting that the Homestead Law was a failure, he returned to the subject during the centennial observances of the statute. Now he pointed out that the 160-acre unit was appropriate in size for much

of mid-America, and that settlers using the law patented a relatively high proportion of entries there prior to the mid-1870's, as well as in California. Some 67 per cent of entry men were successful in Dakota Territory in that period, while 'slightly less than 50 per cent of the original homesteads were carried to patent' in the country generally.¹³

Prior to 1960, Gates maintained that the activities of large scale land speculators made it more difficult for settlers to obtain farms and contributed to the early development of tenancy and class structure in pioneer communities. But the more precise calculation of speculator profits by the Bogues and others suggested that the financial returns to speculators were probably similar to the returns on other forms of frontier investment over long periods of time, although sometimes very high in the short run. Seddie Cogswell, Jr, and Donald Winters found little connection between speculative activity in frontier areas of Iowa and later rates of tenancy there.

Revisionists also emphasized that the advertising of land speculators enhanced the flow of immigration, thus creating a market for the products of actual settlers, and paid their share, and perhaps more, of the taxes that supported frontier governments and schools. However, the older view persists, and Yasuo Okada's important study, *Public Lands and Pioneer Farmers; Gage County, Nebraska, 1850–1900*, published in 1971, is close in view to Gates's early positions. In 1978 Reginald Horsman concluded an address on the historiography of the public domain in

¹² The relevant articles are: D Aidan McQuillan, 'The Mobility of Immigrants and Americans: A Comparison of Farmers on the Kansas Frontier', *Agricultural History* 53 (July 1979), pp 576–96. Quotations appear on p 585. See also 'Territory and Ethnic Identity: Some New Measures of an Old Theme in the Cultural Geography of the United States', in *European Settlement and Development in North America: Essays on Geographical Change in Honour and Memory of Andrew Hill Clark* edited by James R Gibson (Toronto: University of Toronto Press, 1978), pp 136–69.

¹³ The most recent comprehensive summary of United States land disposal policies is Paul W Gates, *History of Public Land Law Development* (Washington US Government Printing Office, 1968) which contains a comprehensive bibliography. The articles which best illustrate his view of the homestead law are: 'The Homestead Law in an Incongruous Land System', *American Historical Review* 41 (July 1936), pp 652–81; 'The Homestead Act: Free Land Policy in Operation, 1862–1935', in *Land Use Policy and Problems in the United States* edited by Howard W Ottoson (Lincoln: University of Nebraska Press, 1963), pp 28–46; 'Homesteading in the High Plains', *Agricultural History*, 51 (January 1977), pp 109–33. The quoted passage is on p 37 of the latter article.

the midwest with the admonition that 'the time has come to revise the revisers'.¹⁴

Is there quantitative evidence to support the old views? To some degree Okada has tried to provide such data and, when further refined, they showed that speculation was associated with 27–44 per cent of the variation in tenancy found from township to township in Gage County in 1880. This is not a trivial relationship but Okada did not show that it was a long persisting one.¹⁵ Nor is the older view convincing in terms of simple economic theory. If land speculation had been

extremely lucrative, additional investors should have been attracted until competition for buyers forced the speculators to cut their offering price to levels commensurate with the productive value of the land.

Gates has himself retreated somewhat since 1960 from his earlier positions on speculation, tenancy, and the land disposal system generally. In 1964 he described American land policy as 'liberal, generous and enlightened . . . whatever its weaknesses'. Although his magisterial study of public land law development (1968) reiterated earlier positions in some respects, Gates attributed tenancy largely to the passing of land from one generation to the next rather than to speculation, except in Illinois and Iowa. And in 1977 he suggested that the various acquisition options in the federal land disposal system provided a 'flexibility' that allowed farmers to develop economic units on the High Plains despite the limited size of the homestead law unit.¹⁶

There has been some effort during the last generation to provide detailed studies of the operation of the land laws at the local level. Several scholars have analysed particular types of land alienation — homestead, timber culture, forest lieu land, script entries and so on. Some of these studies have mainly involved comparison of entries and patent totals at the state level; others were based on intensive examination of the pattern of land entry and proof in more restricted areas. Primarily such authors have evaluated the success of the law under study in contributing to the successful establishment of actual settlers. Contributing to somewhat broader perspective are the few studies that trace relationships between the various types of land disposal laws and elements of the farm development process. C Barron McIntosh, for instance, has studied the use of timber culture entries in the Sand Hills of Nebraska and concluded that the timber culture acts

¹⁴ Gates, 'The Role of the Land Speculator in Western Development', *Pennsylvania Magazine of History and Biography* 66 (July 1942), pp 314–33, and reprinted in Gates, *Landlords and Tenants On the Prairie Frontier: Studies in American Land Policy* (Ithaca: Cornell University Press, 1973), pp 48–71, along with other essays of interest to the agricultural historian of the grasslands. Allan G Bogue and Margaret B Bogue, "'Profits' and the Frontier Land Speculator', *Journal of Economic History* 17 (March 1957), pp 1–24; Robert P Swierenga, 'Land Speculator "Profits" Reconsidered: Central Iowa as a Test Case', *Ibid* 26 (March 1966), pp 1–28; *Pioneers and Profits: Land Speculation on the Iowa Frontier* (Ames: Iowa State University Press, 1968); 'Land Speculation and its Impact on American Economic Growth and Welfare: A Historical-geographical Review', *Western Historical Quarterly* 8 (July 1977), pp 283–302; Seddie Cogswell, Jr, *Tenure, Nativity and Age as Factors in Iowa Agriculture, 1850–1880* (Ames: Iowa State University Press, 1975); Donald L Winters, *Farmers Without Farms: Agricultural Tenancy in Nineteenth-Century Iowa* (Westport, Conn: Greenwood Press, 1978). Homer E Socolofsky has distilled many years of research and publication on the Midwest's most notorious landlord in *Landlord William Scully* (Lawrence: Regents Press of Kansas, 1979). Everett Dick, *The Lure of the Land: A Social History of the Public Lands from the Articles of Confederation to the New Deal* (Lincoln: University of Nebraska Press, 1970), Yasuo Okada, *Public Lands and Pioneer Farmers: Gage County, Nebraska, 1850–1900* (Tokyo: Keio University, 1971); Reginald Horsman, 'Changing Images of the Public Domain: Historians and the Shaping of Midwest Frontiers', in *This Land of Ours: The Acquisition and Disposition of the Public Domain. Papers Presented at an Indiana American Revolution Bicentennial Symposium, Purdue University . . .* (Indianapolis: Indiana Historical Society, 1978), p 80.

¹⁵ Okada, *Public Lands and Pioneer Farmers*, pp 103, 176, includes three townships in which his proxy for speculation (agricultural college and state internal improvement entries) did not appear. Inclusion of these observation points raises Pearson's r from .52 to .66 and r^2 to .44. Only examination of the alienation history in these townships can answer the question of whether it was appropriate to include them. But doing so still leaves more than half of the variance unexplained.

¹⁶ Gates, 'The Homestead Law in Iowa', *Agricultural History* 37 (April 1964), p 78, *History of Public Land Law*, p 771, 'Homesteading in the High Plains', p 109.

primarily fostered the use of dummy entrymen by cattlemen. Still more broadly focused is Okada's study of Gage County, Nebraska, in which he considered the various types of alienation and tried to link them to settlement processes generally, a very rewarding research design.¹⁷

Most historians have disregarded the secondary land market, although the evidence on farmer turnover suggests that many pioneers in a region must have acquired their land from other farmers. And persisting operators often enlarged their holdings. The processes by which the grassland farmers expanded holdings, exchanged them, sold them, or passed them on to sons, or other relatives, has been too little studied. Was the cyclical rise and fall in farm size that Malin detected prior to 1900 in Kansas and the long-term increase thereafter typical of other grassland states? How were these trends related to the plans of innumerable individual farmers, whose operations in many cases must have gone through stages dictated by a family cycle or life course in which young operators began with minimal holdings of land, added to them to utilize the growing pool of family labour and ultimately dissipated them as they assisted sons or sons-in-law to establish themselves? Of the farmer land holders listed in the federal censuses of 1860 and 1870 in an Iowa township, 43 per cent were involved in 6 or more land transactions during their years of residence there, while 18 per cent of

them participated in more than 10.¹⁸ Study is yet needed of the initial government land market and even more of the private market in farm land.

VI *Environmental Adaptation*

During the last 40 years of the nineteenth century, recurrent droughts made it clear that rain did not indeed follow the plough necessarily and that one year's precipitation was no forecast of the next. The farmers of the grasslands, therefore, adopted a number of ameliorative strategies: (1) environmental modification; (2) the use of irrigation or reclamation; (3) moisture conservation practices; and (4) changes in crop and livestock combinations, including the introduction of plant varieties from elsewhere that were particularly suited to the semi-arid environment.

(1) Rainmaking, or pluviiculture, found supporters during the dry years of the 1880's and 1890's, and cranks, crooks, and charlatans argued that bombardment with dynamite or gunpowder could break drought. Others released rain-producing gases into the atmosphere under appropriate financial arrangements. To the embarrassment of some, the Congress charged the Department of Agriculture with experimentation in this challenging field and its chief investigator, Robert Dryenforth, became known to derisive plainsmen as Robert Dryhenceforth.¹⁹

Potentially more valuable — though not all agreed — were efforts to effect environmental modification through tree planting. Thomas R Wessel and W H Droze have shown that interest in tree planting was a continuing theme in the plains country from the late nineteenth century to the 1930's. The settlers

¹⁷ Homer E Socolofsky, 'Land Disposal in Nebraska, 1854-1906; The Homestead Story', *Nebraska History* 48 (Autumn 1967), pp 225-48, 'Success and Failure in Nebraska Homesteading', *Agricultural History* 42 (April 1968); pp 103-8; Lawrence B Lee, 'The Homestead Act: Vision and Reality', *Utah Historical Quarterly* 30 (Summer 1962), pp 215-34; C Barron McIntosh, 'Forest Lieu Selections in the Sand Hills of Nebraska', *Annals of the Association of American Geographers* 64 (March 1974), pp 87-99, and 'Use and Abuse of the Timber Culture Act', *ibid* 65 (September 1975), pp 347-62. See also McIntosh 'Patterns from Land Alienation Maps', *ibid* 66 (December 1976), pp 570-82 for an interesting analysis of settlement in general in the Sand Hills of Nebraska. For an examination of a state grant see Agnes Horton, 'Nebraska's Agricultural College Land Grant', *Nebraska History* 30 (March 1949).

¹⁸ Bogue, *From Prairie to Corn Belt*, pp 50-3.

¹⁹ See, particularly, Walter Kollmorgen and Johanna Kollmorgen, 'Landscape Meteorology in the Plains Area', *Annals of the Association of American Geographers* 63 (December 1973), pp 424-41; Hollon, *Great American Desert*, pp 154-5; Clark C Spence, *The Rainmakers: American 'Pluviiculture' to World War II* (Lincoln: University of Nebraska Press, 1980).

themselves tried to establish shade trees, groves and hedges. Various land grant railroads encouraged the planting of trees, as did western state and territorial governments. Nebraska's efforts, including the proclamation of Arbor Day, were particularly notable, and western agricultural colleges and agricultural experimental stations developed experimental plantings. With the passage of the Timber Culture Act in 1873 the federal government officially approved the movement. Although that statute was repealed in 1891 federal interest continued. The Division of Forestry of the Department of the Interior, the Forest Service of the United States Department of Agriculture, and that department's dry land experiment stations all engaged in the search for varieties of trees and cultural practices that would enable settlers to develop timber lots, windbreaks, or shelter belts, and shade-protected farmsteads. In the mid-1920's the Bureau of Plant Industry of USDA began to supervise tree distribution programmes, and Congress approved an appropriation for the study of erosion control plantings in the South Dakota Sandhills at the conclusion of the decade.

The dust storms of the spring of 1934 prefaced notable departures in the resource policies of the Roosevelt administration. In July Franklin D Roosevelt promised to create a shelter belt of trees stretching from northern Texas to the Canadian border. It would check soil erosion, he suggested, and modify the effect of the plains country climate. Decried by sceptical experts and congressmen, the shelter belt subsisted largely on WPA funds under the supervision of the Forest Service until 1942 when oversight was transferred to the Soil Conservation Service. During the first 10 years of the project some 220 million trees were cultivated, of which 82 per cent survived. By 1944 the beneficial effects of the programme were generally recognized, wrote Allan J Soffar in 1975.²⁰

²⁰ Thomas R Wessel, 'Prologue to the Shelterbelt, 1870 to 1934', *Journal of the West* 6 (January 1967), pp 119-34, 'Roosevelt and the Great Plains Shelterbelt', *Great Plains*

(2) Irrigation activity would never dominate intensive agriculture in the grasslands east of the mountains as it did in the mountain and inter-mountain regions of the west. It became most important initially in the foothills on the western rim of the grasslands and in the upper valleys of the rivers that rose in the Central Rockies, particularly the Arkansas and the South and North Platte. In Colorado, the activities of the Union Colony Association in the Valley of the Cache La Poudre River in 1870, headed by Nathan C Meeker, agricultural editor of the *New York Tribune*, sparked a period of irrigation fever in the territory and new state in which co-operative groups and corporations developed a variety of projects and others died stillborn. Kansans of the western Arkansas Valley shared this enthusiasm and developed various small water diversions during the 1880's, only to discover that the activity of the Coloradans had exhausted their water supply. Similarly there was minor activity in the south-western corner of Nebraska during this decade. Wyoming for the most part was still cattle kingdom at the time and the few thousand farmers in that territory did not develop activity comparable to that in Colorado. Although the achievements of the early irrigators were not highly impressive, except perhaps in Colorado, the legislators and constitution makers in various western states and territories laid the foundation of systems of water law and administration during the 1870's and 1880's.

The disastrous years of the late 1880's and early 1890's brought interest in irrigation to fever heat in the western grasslands and the arid West and the emergence of an 'irrigation movement' in which skilful editors, like William E Smythe and Joseph L Bristow,

Journal 8 (Spring 1969), pp 57-74; W H Droze, 'Changing the Plains Environment: The Afforestation of the Trans-Mississippi West', *Agricultural History* 51 (January 1977), pp 6-22; Allan J Soffar, 'The Forest Shelterbelt Project, 1934-1944', *Journal of the West* 14 (July 1975), pp 105. By 1944 the project 'had evolved into a complete and valuable program'.

trumpeted the gospel.²¹ The promoters organized regional and national irrigation congresses and land speculators and land grant railroads added irrigation to the lures that they used to attract settlers into the region. Irrigation prophets of the 1890's saw a bright future not only for the irrigation district based on stream diversion and the impoundment of water in reservoirs but for well irrigation based on aquifers, particularly those with artesian properties, as in south-western Kansas and in the James river valley of South Dakota. But only in Nebraska, of the central and northern plains states, were there as many as 1000 irrigation farmers in 1900; and only in that state did the number expand substantially during the first 30 years of the twentieth century.

While reinforcing the trend toward irrigated agriculture in Colorado, Wyoming and Montana, the irrigation boom of the 1890's, also set the stage for the passage of the National Reclamation Act of 1902. Despite early projects on the North Platte and the Belle Fourche, the bulk of the Bureau's activity would lie beyond the western rim of the plains country. The promise of artesian wells was found to be limited. However, some farmers, as Sageser has demonstrated in Kansas, practiced petty irrigation on the basis of windmill pumping and, later, the use of the internal combustion engine. The impetus of the 'dirty thirties', great improvements in pumping equipment, and the use of cheap natural gas as a power source sparked a fantastic expansion of irrigation agriculture on the Texas high plains, and the example was noted farther to the north. The problems of the Bureau of Reclamation during its first quarter century constrained its staff from

beginning more than one additional project within the basin of the Missouri between 1907 and 1933. But in the New Deal years, and thereafter, dam building was authorized that had significant implications for some grassland farmers.

Despite the size of the reclamation bibliography, historians have thus far provided very uneven treatment of irrigation agriculture in the grasslands. There is no monograph dealing with the central and northern plains comparable to Donald E Green's treatment of irrigation on the Texas High Plains between 1910 and 1970, a volume that also includes a useful summary of the early years of irrigation on the high plains as a whole. However, Henry C Hart's *The Dark Missouri* is a mine of information about the development of water use planning and management by government agencies in the Missouri Valley to the mid-1950's.²²

Historians have perhaps done best in describing the changes in water law that westerners believed essential if they were to exploit the agricultural potential of this region most fully. In a series of excellent articles, Robert G Dunbar traced the development of the Colorado system of prior appropriation of irrigation water and irrigation district supervision and administration, and the extensive degree to which it spread to other states. More recently he has published a splendid account of the development of ground water appropriation law showing that 'the English rule of absolute ownership proved as unsatisfactory to water users in the dry climates of the West as had the riparian doctrine'. Even so, relatively few historians have given much attention to the revision of water law in the West, although it is one of the best examples of institutional innovation

²¹ A Bower Sageser, *Joseph L Bristow: Kansas Progressive* (Lawrence: University Press of Kansas, 1968). See also this author's 'Windmill and Pump Irrigation on the Great Plains 1890-1910', *Nebraska History* 48 (Summer 1967), pp 107-18. Smythe's career is described briefly by Martin E Carlson, 'William E Smythe: Irrigation. Crusader', *Journal of the West* 7 (January 1968), pp 41-7 and in Lawrence E Lee, 'Introduction', in *The Conquest of Arid America* by William E Smythe (Seattle: University of Washington Press, Americana Library, 1969), pp xvii-xliii. See also the state histories listed in note 7.

²² Donald E Green, *Land of the Underground Rain: Irrigation on the Texas High Plains, 1910-1970* (Austin, University of Texas Press, 1973); Henry C Hart *The Dark Missouri* (Madison: University of Wisconsin Press, 1957). For the best succinct account of the federal government's role in reclamation see Gates, *Public Land Law Development*, pp 635-98. But see also Michael C Robinson, *Water for the West: The Bureau of Reclamation, 1902-1977* (Chicago: Public Works Historical Society, 1979).

in that region. Legal scholars, however, have contributed articles to state law journals on the subject of state water rights that display varying degrees of historical content.²³

John Wesley Powell's contribution to an understanding of western aridity and his dramatic fall from position of revered prophet to reviled pariah has been much described, although perhaps still not as perceptively as his apparent importance justifies. Powell met his greatest defeat as a government scientist and bureaucrat when he failed to persuade the Congress that his plans for the survey of western irrigation resources were appropriate, and the explanation of his failure lies partly in his refusal to tell plains representatives and promoters what they wished to hear about the irrigation potential of their region. Of the two great publicists of the movement of the 1890's, Smythe and Bristow, we have as yet only a biography of Bristow, and but one chapter in it is devoted to the irrigation movement. Timothy J Rickard has argued recently that plainsmen believed that they would become part of a great irrigated western empire but were unable to reclaim sufficient acreage to serve as 'a base for a new economic system'. High failure rates among the irrigators, uncertain markets, engineering problems, and administrative difficulties all thwarted the visionaries of the 1890's and the early twentieth century. Noting that the national irrigation movement 'ended with very little success in 1914', Rickard concluded 'in the Great Plains . . . the utopian connota-

tions of irrigation were even sooner rejected'.²⁴

James C Olson has suggested that the observer looking eastward from the top of Scotts Bluff, must conclude 'that irrigation has supplied at least part of the answer to the problems involved in the occupation of the plains by an agricultural population'. But, in a concise review of the current history of 'The North Platte Oasis', L Carl Brandhorst emphasizes the frequency with which water supplies have proven inadequate in that irrigated district, the high variability of yields, and the additional production needs and cost factors experienced by irrigation farmers there. Powell's predictions and the 'boasts' of the Bureau of Reclamation remain unfulfilled, Brandhorst maintains, even in this highly touted region. R Douglas Hurt has described the increased use of irrigation in the more humid areas of Kansas as well as the intensification of agriculture that centre pivot irrigation has allowed in the western part of that state and elsewhere. He has also noted the problem of dropping water tables that has accompanied the increased use of well irrigation.²⁵ We seem particularly, however, to lack studies that bring out the unique character of farming beside the 'ditch'.

(3) Denied irrigation water by location, lack of resources, or other reason, many

²³ Robert G Dunbar, 'Water Conflicts and Controls in Colorado', *Agricultural History* 22 (July 1948), pp 180-86, 'The Origins of the Colorado System of Water-Right Control', *Colorado Magazine* 27 (October 1950), pp 241-72, 'The Search for a Stable Water Right in Montana', *Agricultural History* 28 (October 1954), pp 138-49, 'The Significance of the Colorado Agricultural Frontier', *Agricultural History* 34 (July 1960), pp 119-25, 'The Adaptation of Groundwater-Control Institutions to the Arid West', *Agricultural History* 51 (October 1977), pp 662-80. For the quotation, see p 680. Illustrative of the law journal approach are: William J Burke, 'Western Water Law', *Wyoming Law Journal* 10 (Spring 1956), pp 180-7, and Wells A Hutchins, 'Western Water Right Doctrines and their Development in Kansas', *University of Kansas Law Review* 5 (May 1957), pp 533-83.

²⁴ William C Darrah, *Powell of the Colorado* (Princeton: Princeton University Press, 1951), particularly pp 299-314; Wallace Stegner, *Beyond the Hundredth Meridian: John Wesley Powell and the Second Opening of the West* (Boston: Houghton Mifflin Co, 1954), pp 295-345. Important additional perspectives are provided by William Lilley, II and Lewis L Gould, 'The Western Irrigation Movement 1878-1902: A Reappraisal', in *The American West: A Reorientation*, University of Wyoming Publications, p 32, edited by Gene M Gressley (Laramie: University of Wyoming, 1966): 57-74 and Thomas G Alexander, 'The Powell Irrigation Survey and the People of the West', *Journal of the West* 7 (January 1968), pp 48-54. Timothy J Rickard, 'The Great Plains as Part of an Irrigated Western Empire, 1890-1914', in *The Great Plains: Environment and Culture*, edited by Blouet and Luebke 91, pp 93-4.

²⁵ Olson, *Nebraska*, p 329; L Carl Brandhorst, 'The North Platte Oasis: Notes on the Geography and History of an Irrigated District', *Agricultural History* 51 (January 1977), pp 166-72; R Douglas Hurt, 'Irrigation in the Kansas Plains since 1930', *Red River Valley Historical Review* 4 (Summer 1979), pp 64-72.

western farmers put their faith in the development of tillage methods that would use available moisture supplies most efficiently, practices that were dubbed dry farming, or euphemistically, scientific farming. Malin included a particularly useful discussion of the development of the listing process in *Winter Wheat in the Golden Belt of Kansas*. A major monograph on the subject of dry farming subsequent to 1890 did not appear until Mary W Hargreaves published *Dry Farming in the Northern Great Plains: 1900-1925* in 1957. In this well-researched narrative she described the geographic character of the northern plains beyond the 100th meridian, the emergence of Hardy W Campbell and other apostles of dry farming techniques, and the promotional forces that sustained them, as well as the modifications and counter-suggestions developed by Ellery C Chilcott of the USDA and other dry-land scientists. Hargreaves described in detail the general development of settlement in the eastern counties of Montana and the western counties of the Dakotas but her analysis of the farm regime lacked the richness of Malin's analysis, in part because farm-by-farm agricultural census information is not available for the student of twentieth-century agriculture in most western states.²⁶

We know the promotional story of the semi-arid plains country after 1900, including James J Hill's energetic admonitions, presented to the farmers at fairs and other farm gatherings in the 'empire of the two northers', urging them to 'rotate your crops; diversify into livestock; fertilize your lands with the manure the livestock will produce; select better seed; and learn how to prepare the ground and cultivate your land in the most scientific manner'. In a retrospective paper of 1976, Hargreaves concluded that, as late as the 1920's, dry farming for most settlers was merely 'farming in a semi-arid

region without irrigation'. She maintained that 'fallow practice was rare. . . . Cultivation even on cropland was scanty. . . . New crop varieties and improved strains were developed slowly and accepted reluctantly'. However, the combination of livestock enterprises with wheat growing was increasingly common.²⁷

Drought on the northern high plains between 1917 and 1921 turned the major thrust of settlement into the central and southern plains, Hargreaves suggests, and both regions had become disaster areas by the mid-1930's. But the dry farming region demonstrated its recuperative and productive power after 1940 when moisture again became adequate, and operators there drew upon the hard won experience of the farmers of the area and the accumulated wisdom of the dry land agricultural experiment stations. Improved fallowing practices, including stubble-mulching, light seeding, the use of fertilizers (and later herbicides), improved plant varieties including alfalfa strains, and judicious diversification in livestock enterprises in an agricultural economy that was characterized by great advances in mechanization and the development of increasingly large farm units, proved that the region had the capacity to be much more than a country of ranches. Even so, drought years after 1950, 'the filthy fifties', reaffirmed the fragile basis of cropland agriculture in the high plains. But also, according to R Douglas Hurt, these years demonstrated that the conservation techniques available to plains country farmers, and the programmes of emergency aid available from state and federal governments, were sufficient to prevent rural tragedy of the sort experienced during the 1930's.²⁸

(4) Farmers also tried to adapt to the grass-land environment by making changes in crop and livestock combinations, and in so doing

²⁶ Mary Wilma M Hargreaves, *Dry Farming in the Northern Great Plains, 1900-1925* (Cambridge: Harvard University Press, 1957). Full citations to relevant Malin works cited appear in note 4.

²⁷ Albro Martin, *James J Hill and the Opening of the Northwest* (New York: Oxford University Press, 1976), p 553; Mary W M Hargreaves, 'The Dry-Farming Movement in Retrospect', *Agricultural History* 51 (January 1977), pp 160-1.

²⁸ R Douglas Hurt, 'Return of the Dust Bowl: The Filthy Fifties', *Journal of the West* 18 (October 1979), pp 85-93.

they faced various decisions and difficulties. These decisions were rendered more difficult as the settler pushed westward through the central plains country because the yearly variations in precipitation there somewhat obscured the fact that wheat was a more reliable crop under subhumid conditions year after year than was corn. In political context Mary E Lease admonished farmers 'to raise less corn and more hell' during the 1890's, but the question 'wheat or corn?' was a long-standing one. Newcomers tried to duplicate the agricultural practices of their places of origin and operator turnover deprived new communities of hard won local experience. Farmers put their major faith in the corn crop in the prairie regions of Illinois and Iowa at a relatively early date, certainly by the 1870's, and combined that major crop with livestock enterprises involving hogs and beef cattle. But farther west, farmer juries remained locked in indecision on the issue of the proper combination of farm enterprises deep into the twentieth century. Studying Sherman County in north-west Kansas, Kollmorgen and Jenks reported, 'dry farming was not introduced in this section *until the late 30's* and farmers still needed to learn that the Corn Belt could not be stretched to western Kansas'.²⁹

Of particular interest is the recent essay of Bradley H Baltensperger, who studied the agricultural adjustments of settlers in the Republican Valley, between the 97th and the 102nd meridians, during the years 1870-1900. The initial agriculture of the settlers, he argued, was shaped primarily by the promotional picture of the region and by their experience in their former homes, mostly located in the corn belt. Using corn-wheat ratios, acreage in the sorghums and in broom corn, and interest in rain-making and irrigation activity as basic evidence, Baltensperger showed that the settlers demonstrated increasing tendencies to adjust their farm

operations as the locale shifted from east to west. Baltensperger's results are important and his research techniques can be used in studies of other areas and later periods of grassland development.³⁰

The adaptation of cropping patterns to the grassland environment also involved the search for better varieties of particular crops. Two agricultural scientists, K S Quisenberry and L P Reitz, have recently reviewed the considerable literature discussing the emergence of Turkey Red as the pre-eminent hard winter wheat variety of the central Kansas plains, and the development of related and descendant strains. In its evaluation of evidence this article is a model of its kind but Quisenberry and Reitz say little of the cultural and social concomitants of adaptation or of its economic implications for the individual farmer.

Crop improvement and adaptation occurred in various ways. Western settlers, both native and foreign-born, brought supplies of seed with them. Local farmers and seedsmen tried to acquire seeds of grain and grass varieties that would yield well in their localities. From almost the day of its beginnings in the US Patent Office, the United States Department of Agriculture was involved in the importation of seeds and plants. Initially, most seed importation was carried out through American consular offices or other governmental agencies abroad, but after the Department acquired cabinet status in the late nineteenth century this activity was enlarged and soon the secretary was dispatching special agents abroad. In 1950 Nelson Klose estimated that some 180,000 species or types of domestic plants had been imported under official aegis. The grassland farmer of today grows wheat, sorghums, alfalfa, broom grass, wheat grass, and other crops that owe much of their character to the 'plant explorers'.

But the domestic plant breeder's work has also been vitally important. At the turn of the

²⁹ Walter M Kollmorgen and George F Jenks, 'A Geographic Study of Population and Settlement Changes in Sherman County, Kansas', *Kansas Academy of Science Transactions* 54 (December 1951), p 459. Italics added by this author.

³⁰ Baltensperger, 'Agricultural Adjustments to Great Plains Drought: The Republican Valley, 1870-1900', pp 43-59.

century plant breeding was, for the most part, essentially plant selection — the development of varietal strains that were segregated and propagated by open pollination. But as the promise and techniques of hybridization became increasingly understood, the plant scientist became a truly creative figure, who could combine the characteristics of parent stocks so as to manipulate protein content, accentuate drought, disease and insect resistance properties, shorten the growing period, and increase yields. Historians have only skimmed the surface of this fascinating story.³¹

To what degree did government activity actually assist in the adjustments of the dry country farmer? One can hardly dispute Malin's notion of folk process, as far as the nineteenth century is concerned. Adjustment in the twentieth century appears to have been a different matter when the contributions of the plant scientists became very important. Government scientists, both state and federal, also performed a valuable service in criticizing the easy fantasies of the promoters and zealots concerning tillage practices and machinery

and in circulating information about developments that had apparently produced beneficial results. We need to know more about the work of farm management specialists in other grassland states but M L Wilson's research in farm organization and management practices in Montana during the 1920's was apparently outstanding. Paul Bonnifield, however, has argued that government scientists developed few if any of the adaptive cultural practices and innovations in agricultural machinery that emerged during the drought of the 1930's. Moreover, New Dealers were in error, maintains Bonnifield, in arguing that much of the plains region should be retired from cropland agriculture.³²

To what degree did foreign-born settlers try to transplant the agriculture of their old homes to the grassland? This region provides us with one of the most striking instances of the transfer of a uniquely appropriate crop to a region by a cultural group — the importation of Turkey Red wheat into central Kansas by the Mennonites. But did immigrants pursue patterns of agriculture over extended periods of time that were substantially different from those of native-born farmers? Terry G Jordan has compared the relative degree to which native-born and foreign-born settlers avoided the prairies in selecting farm sites and Allan G Bogue, Seddie Cogswell, Jr, Donald L Winters, and D Aidan McQuillan have all compared the farming patterns of the

³¹ Thus far historians have devoted most attention to the winter wheat of the central plains: Malin, *Winter Wheat*; Homer E Socolofsky, 'Kansas Wheat History', in *Marketing Kansas Wheat* (Topeka: Kansas State Board of Agriculture, 1959), pp 36–61; K S Quisenberry and L P Reitz, 'Turkey Wheat: The Cornerstone of an Empire', *Agricultural History* 48 (January 1974); pp 98–110; Robert G Dunbar, 'Turkey Wheat: A Comment', *Ibid*, pp 111–14. Of the other midwestern crops, corn development is treated in A R Crabb, *The Hybrid-Corn Makers: Prophets of Plenty* (New Brunswick: Rutgers University Press, 1947), and Henry A Wallace and William L Brown, *Corn and Its Early Fathers* (East Lansing: Michigan State University Press, 1956). For the story from the standpoint of the plant scientist, see Paul C Mangelsdorf, *Corn: Its Origin, Evolution and Improvement* (Cambridge, Mass Harvard University Press, 1974). There are brief treatments of other crop developments in Walter Ebeling, *The Fruited Plain: The Story of American Agriculture* (Berkeley: University of California Press, 1979), *passim*. The story of plant importation is told briefly in Nelson Klose, *America's Crop Heritage: The History of Foreign Plant Introduction by the Federal Government* (Ames: Iowa State College Press, 1950). John T Schlebecker, 'Pliant Prairie', *Montana: The Magazine of Western History* 8 (Winter 1958), pp 30–41 is a study of the adoption of sorghum in western South Dakota which could serve as something of a model in other needed investigations.

³² Karl S Quisenberry, 'The Dry Land Stations: Their Mission and Their Men', *Agricultural History* 51 (January 1977), pp 218–28; Merrill G Burlingame, 'National Contributions of the Montana Extension Service, 1893–1930', *Ibid*, 229–43. The various components of the *Addenda and Postscript* in the 1967 edition of Malin's *Grassland of North America* present his considered views on the relation between history, the environmental complex of the grasslands and public policy. Mathew Paul Bonnifield, *The Dust Bowl: Men, Dirt and Depression* (Albuquerque: University of New Mexico Press, 1979); Harry C. McDean, 'Federal Farm Policy and the Dust Bowl: The Half-Right Solution', *North Dakota History* (Summer 1980), pp 21–31. This review of literature is focused primarily on the central and northern plains and does not emphasize the Dust Bowl story, but see also Donald E Worster, *Dust Bowl: The Southern Plains in the 1930's* (New York: Oxford University Press, 1979).

foreign-born with those of the native-born. John G Rice and Robert Ostergren opened a new dimension in such research when they linked the subregional Scandinavian backgrounds of immigrant farmers in Minnesota to their farming practices in the new land. In this research, still highly exploratory, most authors have concluded that it is difficult to identify long-run contrasts in the major aspects of agriculture that are clearly traceable to residual cultural influences, although some short-run or minor differences between native-born and foreign-born farmers have been identified.³³

VII *Farming as Business*

Recent historical literature reflects a growing understanding that the survival of farmers on the plains has been an exercise in coping with natural risks that are much greater than those encountered in the eastern regions of the United States. One economic historian has used quantitative evidence to show that the amounts of crop land devoted to fallow and non-fallow cropping regimes in Saskatchewan have been proportional to the risk of drought in the immediate area, and this argument can doubtless be made concerning regions of the Great Plains below the 49th parallel as well. The fascinating study of suitcase farming in

western Kansas and eastern Colorado published recently by Leslie Hewes shows that this practice has been highly prevalent in the high risk region of the plains country. Many of the suitcase farmers carried on their wheat farming operations in conjunction with farm operations in more humid areas. If the non-resident enterprise failed in a particular year, these farmers presumably did better at their other base of operations.³⁴ A viable federal programme of crop insurance emerged during the 1930's, and various aspects of the farm price support programmes of that decade and thereafter have provided an institutional answer to the problem of risk.

Historians have been more comfortable in describing the institutional structure of land laws and transportation developments, and the general characteristics of farming operations in the plains country, than in describing farming as a changing business in which the operator's success or failure hinged upon his skill in combining the factors of production in an uncertain economic and climatic environment. Malin emphasized the small scale of the average western farmer's investment and returns during the late nineteenth century. In general, since World War II, the writings on agricultural history dealing with the tall grass country have included more of this kind of analysis than has been true in the discussion of agricultural development in the short grass regions. The writing of the Bogues on agriculture in the prairies of Illinois and Iowa, and of Drache and Murray about farming in the Red River Valley, give a clearer picture of the financial side of farming than is available in general for the western grasslands. Even so these authors have gone less far than is possible or desirable. None of them have made

³³ Terry G Jordan, 'Between the Forest and the Prairie', *Agricultural History* 38 (October 1964), pp 205-16; Bogue, *Prairie to Corn Belt*, pp 211-12, 236-8 (summarizing material from an earlier article); Cogswell, *Tenure, Nativity and Age*, pp 75-8; Winters, *Farmers Without Farms*, pp 77, 88, 135; D Aidan McQuillan, 'Mobility of Immigrants and Americans', p 591; John G Rice, 'The Role of Culture and Community in Frontier Prairie Farming', *Journal of Historical Geography* 3 (April 1977), pp 155-75; Robert Ostergren, 'A Community Transplanted: The Formative Experience of a Swedish Immigrant Community in the Upper Middle West', *Ibid* 5 (April 1979), pp 189-212. The literature is discussed in Robert P Swierenga, 'Ethnicity and American Agriculture', *Ohio History* 89 (Summer 1980), pp 322-44.

³⁴ Leslie Hewes, *The Suitcase Farming Frontier: A Study in the Historical Geography of the Central Great Plains* (Lincoln: University of Nebraska Press, 1973); 'Early Suitcase Farming in the Central Great Plains', *Agricultural History* 51 (January 1977), pp 23-37, see Kenneth Norrie, 'Dry Farming and the Economics of Risk Bearing: The Canadian Prairies, 1870-1930', *Ibid*, pp 134-48, for both a theoretical and substantive exploration of the risk factor in farm decision-making in the Canadian Plains region.

full use of the range of simple tools of quantitative analysis that are available.³⁵

Drache carried his interest in big farming forward in a later study of which the most relevant section described the business operations of Tom Campbell and the Campbell Farming Corporation on the Crow Reservation in Montana during the 1920's and early 1930's. This work is a paean in praise of bigness, mechanization and cost accounting. Critics have suggested, however, that Drache disregarded the subvention that the wheat king obtained when his creditors allowed him to wind up his first years of bonanza operation with a substantial write-off of debts outstanding. Covering a broader range of farm businesses is Robert E Ankli's article, in which he argued that 'no size of farm was adequate' in the drought-stricken wheat regions of the northern Great Plains and Canadian prairies during the 1930's unless long-run average yields could be made.³⁶

We do know a good deal more about one of the more important cost factors in western settlement and farming — land credit — than was true in 1947. Borrowing by note and mortgage on farm land was always an extremely important element of credit to

which historians initially gave little systematic attention, although many noted that foreclosures had been a potent source of agricultural unrest in the history of the United States, and particularly so among plains farmers of the 1880's and 1890's. In 1955 this writer examined the use of land mortgage credit from Illinois to western Kansas and Nebraska during the second half of the nineteenth century in the book, *Money at Interest*. Combining case studies of representative lenders and local borrowing experience, this study described the details of the mortgage business more fully than anyone had done hitherto, noted the recurrent waves of foreclosure that affected farmers during the 1850's, 1870's and 1890's, and charted the behaviour of interest rates. Noting the unsatisfactory aspects of the credit system, including the gouging by local agents, and the suffering entailed in the boom and bust agriculture of the frontier, this writer also pointed out the striking decline of interest rates during the last 30 years of the century and the fact that the relatively short duration of mortgages allowed interest rate adjustments. He noted that money lenders appeared almost as much betrayed by the fickleness of climate and the imperfections of the economic system during the 1880's and 1890's as the settlers themselves.³⁷

Since the publication of this work a number of other authors have published studies of western money lending in this same era. Most of these authors, have not altered the picture drawn in *Money at Interest* appreciably. Although his data conform to the general patterns verified by other authors, Okada, on the other hand, interpreted them more pessimistically, stressing the fact that mortgages might be renewed several times, and emphasizing the higher interest rates specified in secondary instruments. He was perhaps on firmer ground, when he qualified the emphasis on the local sources of western

³⁵ Allan G Bogue, *From Prairie to Corn Belt*; Margaret Beattie Bogue, *Patterns from the Sod: Land Use and Tenure in the Grand Prairie, 1850-1900* (Springfield: Illinois State Historical Library Collections, 34, 1959); James W Whitaker, *Feedlot Empire: Beef Cattle Feeding in Illinois and Iowa, 1840-1900* (Ames, Iowa State University Press, 1975); Hiram M Drache, *The Day of the Bonanza: A History of Bonanza Farming in the Red River Valley of the North* (Fargo: North Dakota Institute for Regional Studies, 1964); Stanley N Murray, *The Valley Comes of Age: A History of Agriculture in the Valley of the Red River of the North, 1812-1920* (Fargo: North Dakota Institute for Regional Studies, 1967). See also relevant sections in Clarence H Danhof, *Change in Agriculture: The Northern United States, 1820-1870* (Cambridge: Harvard University Press, 1969).

³⁶ Hiram M Drache, *Beyond the Furrow: Some Keys to Successful Farming in the Twentieth Century* (Danville, Ill: Interstate Printers and Publishers, Inc, 1976), pp 95-166, and 'Thomas D Campbell — The Plow of the Plains', *Agricultural History* 51 (January 1977), pp 78-91; Terry L Anderson, 'Bonanza Farmers and Subsistence: A Response', *Ibid*, pp 104-8; Robert E Ankli, 'Farm Income on the Great Plains and Canadian Prairies, 1920-1940', *Ibid*, pp 92-103.

³⁷ Allan G Bogue, *Money at Interest: The Farm Mortgage on the Middle Border* (Ithaca: Cornell University Press, 1955).

mortgage funds found in some recent writers. Apparently there will continue to be differences of opinion in this area of research.³⁸

None of the authors of mortgage studies have analysed commission charges intensively; they have discussed interest charges solely in current rather than constant dollar rates and have paid little attention to the changing relations between prices paid and prices received by farmers. Additional case studies and, particularly, examination of the use of chattel credit would be highly desirable.

Our knowledge of farm finance is much clearer than our understanding of agricultural labour. None of the Agricultural History Center bibliographical guides bearing on the grasslands use 'labour' or 'agricultural labour' as a heading or subheading. In an early study

of late nineteenth-century agriculture, Fred A Shannon devoted some 9 pages to the subject of agricultural labour, drawing primarily on two government publications and, in a later survey of agriculture during the Civil War, Paul W Gates devoted the bulk of his chapter on labour and machinery to the latter topic. In a study that touches only upon the eastern part of the grasslands, David E Schob, however, has recently presented a great deal of information concerning the individual labourer in the years 1815-60. But this author also left various important issues unresolved. None has approached the topic from the standpoint of the management of the complete labour pool available to the farmer, including his own contributions, the relation of that pool to the changing seasonal working regimes and the rural family life course. But Robert M Finley has made an interesting beginning in arguing that farming a 160-acre homestead required more inputs than individual settlers possessed. A definitive history of migrant or seasonal labour in this region is lacking. The contributions of farm women are finally receiving attention, however. Although much of the recent activity has involved the publication of diaries or other source materials, the work of Mary W Hargreaves, Julie R Jeffrey and Glenda Riley provides the foundation for an analytical approach to women's work and its place in the larger picture of the farm economy.³⁹

³⁸ Two writers have challenged the adequacy of Bogue's work: O Gene Clanton, *Kansas Populism: Ideas and Men* (Lawrence: University Press of Kansas, 1969), p 259; Lawrence Goodwyn, *Democratic Promise: The Populist Movement in America* (New York: Oxford University Press, 1976), pp 610, 629. Neither writer had done any research in relevant county records or business manuscripts and they seriously misrepresented the depth and scope of the research in *Money at Interest*. Other treatments based on research in primary sources are: Glenn H Miller, Jr, 'The Hawkes Papers: A Case Study of a Kansas Mortgage Brokerage Business, 1871-1888', *Business History Review* 32 (Autumn 1958), pp 293-310; Margaret B Bogue, *Patterns from the Sod*, pp 185-222; Jay Ladin, 'Mortgage Credit in Tipton County, Indiana, 1865-1880', *Agricultural History* 41 (January 1967), pp 37-43; Robert F Severson, Jr, James F Niss and Richard D Winkelman, 'Mortgage Borrowing as a Frontier Developed: A Study of Mortgages in Champaign County, Illinois, 1836-1895', *Journal of Economic History* 26 (June 1965), pp 147-68; W Turrentine Jackson, *The Enterprising Scot: Investors in The American West after 1873* (Edinburgh: Edinburgh University Press, 1968); Larry McFarlane, 'British Investment in Midwestern Farm Mortgages and Land, 1875-1900. A Comparison of Iowa and Kansas', *Agricultural History* 48 (January 1974), pp 179-98; Russell Berry, 'British Investment in Iowa and Kansas, 1875-1900: Comment', *Ibid.* William G Kerr, *Scottish Capital on the American Credit Frontier* (Austin: Texas State Historical Assoc, 1976). Okada, *Public Lands and Pioneer Farmers*, pp 146-59. Real estate taxes as a farming cost remain virtually unstudied, but see Bogue, *Prairie to Corn Belt*, pp 187-92, and Robert P Swierenga, *Acres for Cents: Delinquent Tax Auctions in Frontier Iowa* (Westport: Greenwood Press, 1976), primarily a study in investment but emphasizing the farm finance aspects of tax liens as well.

³⁹ Fred A Shannon, *The Farmer's Last Frontier: Agriculture, 1860-1897* (New York: Farrar & Rinehart, Inc, 1945), particularly pp 140-5; Paul W Gates, *Agriculture and the Civil War* (New York: Alfred A Knopf, 1965), pp 222-47; David E Schob, *Hired Hands and Plowboys: Farm Labor in the Midwest, 1815-60* (Urbana: University of Illinois Press 1975); Mary W M Hargreaves, 'Women in the Agricultural Settlement of the Northern Plains', *Agricultural History* 50 (January 1976), pp 179-89; Glenda Riley, 'Images of the Frontierswoman: Iowa as a Case Study', *Western Historical Quarterly* 8 (April 1977), pp 189-202; Julie R Jeffrey, *Frontier Women: The Trans-Mississippi West, 1840-1880* (New York: Hill and Wang, 1979), particularly pp 51-78; John M Faragher, *Women and Men on the Overland Trail* (New Haven: Yale University Press, 1979), pp 40-65 and *passim*.

Nor have historians developed the story of farm technology in the grasslands to the degree that is essential. Although Webb emphasized the problem of fencing and the importance of barbed wire our understanding of its importance to the farmer still requires development. Rodney O Davis expertly showed the way in which an institutional solution to the fencing problem, the local herd law, was used for a time in Kansas. Various authors have elaborated on the basic work of Clarence Danhof in the prairie regions but the authors of the most elaborate study of barbed wire are much more concerned with matters of manufacture and design than its significance on the farm. Scholars have discussed the development and implication of farm machinery in the horse-power era more fully than the mechanically-powered equipment of the twentieth-century, though Hurt has provided us with a good description of the dry land farming equipment that came into use during the 1930's.⁴⁰

VIII Conclusion

There has been much wide ranging and highly significant publication about the agricultural history of the region since Malin published the *Grassland of North America*. But historians should be embarrassed by the degree to which geographers have picked up the challenges in that book; Kollmorgen, Bowden, McIntosh, Brandhorst, McQuillan, Baltensperger, Rickard, Jordan, Rice, Ostergren, Hewes, and others listed in the notes to this article come from a discipline that numbers far fewer members than does history. Particularly in matters of environmental perception, it is they who are truly Malin's heirs. Economists also have been well represented in these pages. Historians, however, have not surrendered the field. Nor should they, because even a cursory examination of the achievements since 1947, or better still, that plus a re-reading of Malin's *Grassland* should convince them that there is still a great deal to be done.

⁴⁰ Rodney O Davis, 'Before Barbed Wire: Herd Law Agitations in Early Kansas and Nebraska', *Journal of the West* 6 (January 1967), pp 41-52; Clarence H Danhof 'The Fencing Problem in the Eighteen-Fifties', *Agricultural History* 18 (October 1944), pp 168-86; Henry D and

Frances T McCallum, *The Wire That Fenced the West* (Norman: University of Oklahoma Press, 1965); R Douglas Hurt, 'Agricultural Technology in the Dust Bowl, 1932-40, in *Environment and Culture*, edited by Blouet and Luebke, pp 139-56.

