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Adding Another Notch to America's Corn Belt

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by
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Photographs and maps by authors unless otherwise noted

O.E. Baker produced one of the earliest maps of the Corn Belt in 1927 (Figure 1). It was described as a region ''in which corn is produced in great quantities and is more important than any other crop'' (Baker 1927, 447). Baker's rationale in developing this region consisted of climatic-based northern and western boundaries within which corn thrived, and topographic and soil-related boundaries to the east and the south.

In 1950, in an attempt to better understand the physical and economic forces that were driving agricultural practices, the U.S. Department of Agriculture produced a bulletin that described ten farming regions of the U.S. (USDA 1950). Corn was the dominant crop within their Corn Belt region, but the *process* of rotating corn with oats, wheat, soybeans, and hay and pasture crops, along with feeding most of the grain to livestock, was what held that region together.

Geographers have long studied the Corn Belt. In *The Middle West*, James R. Shortridge (1989) discussed the meanings and many cultural and historical interpretations of the Midwest and the Corn Belt. To quote John Fraser Hart (1991) in his review of the book, ''Shortridge believes that the Midwest has been idealized as an area of pastoral virtue between the technological East, with all its attendant urban-industrial evils, and the raw unstable ebullience of the frontier in the sparsely populated West; the East is old and stodgy, and the West is young and brash, but the Midwest, like the Mother Bear's chair in the story of Goldilocks, is just right.''

John Hudson's book, *Making the Corn Belt*, delivers a more statistically robust, ''old-fashioned and textbookish'' regional approach to describing the spatial and socio-economic evolution of the Corn Belt (Hudson 1994, vii). In it, he follows the region from its infancy in the Scioto and

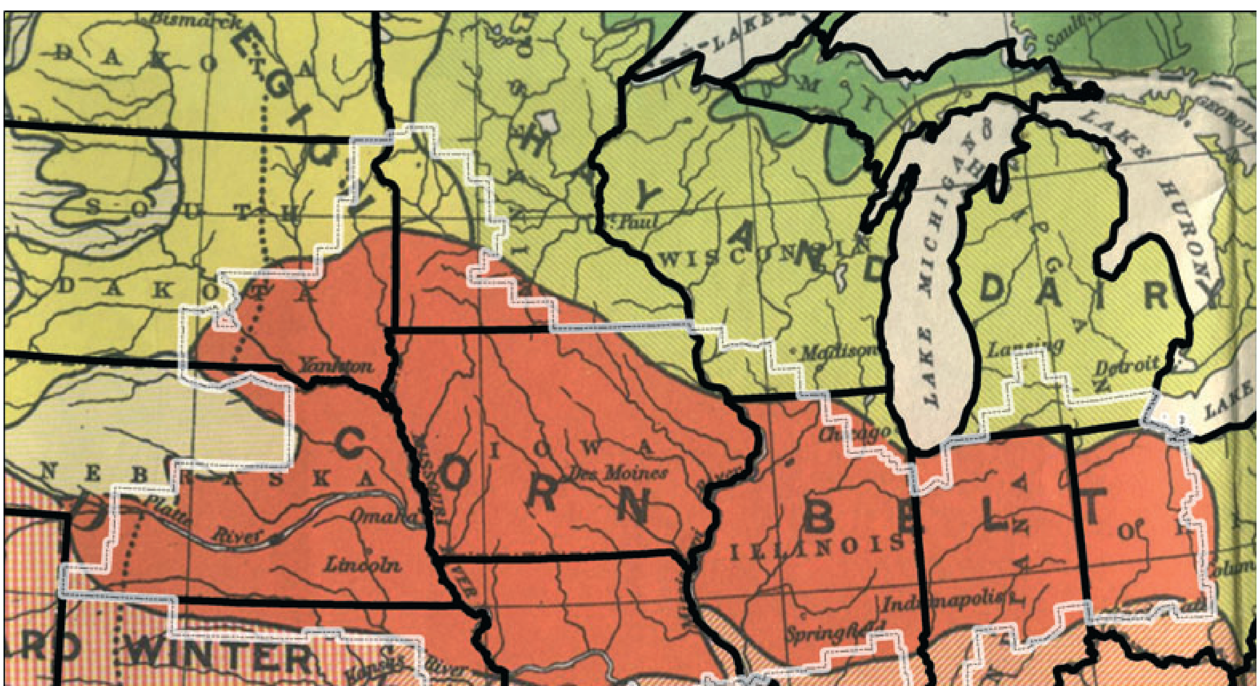

Figure 1: Attempts at mapping the Corn Belt have been made throughout the past century. This map shows two previous Corn Belt boundaries from O.E. Baker (background map) and the U.S. Department of Agriculture (white line). Source: Baker 1927; U.S. Department of Agriculture 1950.

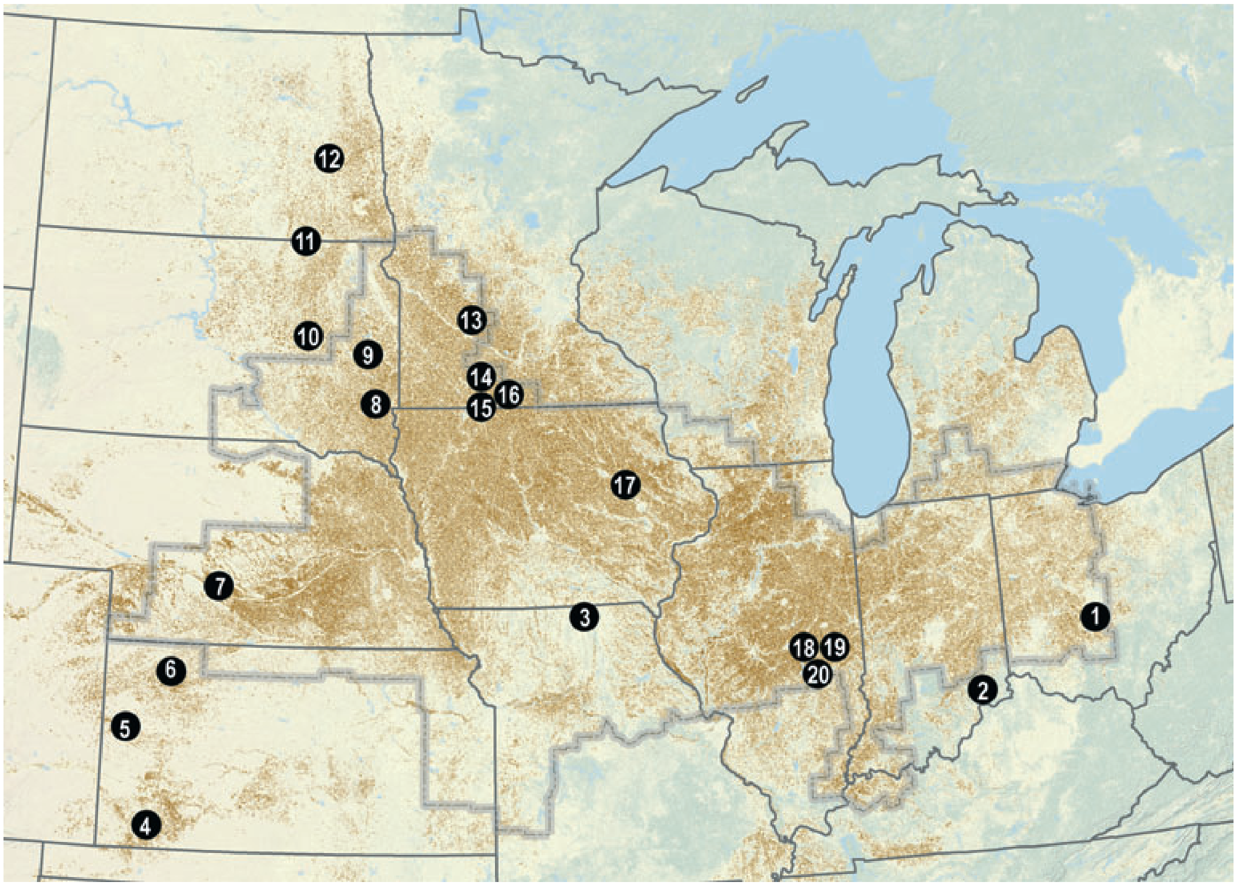

Figure 2: *The numbers on the map correspond with photos shown on subsequent pages. Areas in brown indicate where corn was grown in 2009 based on the USDA Cropland Data Layer – a dataset derived from satellite imagery that shows various crops being grown in the U.S. For reference, and to show the need for a new Corn Belt boundary, the antiquated 1950 version is shown (gray outline). Source: U.S. Department of Agriculture 1950; USDA 2010b.*

Miami Valleys of Ohio to its expansion into the Dakotas. Hudson describes themes related to settlement, technological advancements, and the increasing complexity of agro-economics and specialization found in today's Corn Belt.

Hudson's contemporary, John Fraser Hart, has devoted much of his life to studying the rural landscapes of the United States. In 1991 Hart published *The Land That Feeds Us,* which describes farming in the major agricultural regions east of the Great Plains (Hart 1991, xi). In his article *Change in the Corn Belt* (Hart 1986), he used the U.S. Department of Agriculture 1950 Corn Belt boundary as the spatial framework to describe the changes the region had undergone between 1950 and 1982. Themes discussed included the hybridization of seed, the changing size of farms, the specialization of farmers, domestic and international agro-economics, and the changes seen on the rural landscape as a product of those changes, specifically the shift ''from a mixed crop-and-livestock farming area to a highly specialized cash-grain-farming area'' (Hart 1986, 51). Specialization and agro-economics were the two culprits that have changed how agriculture in the Corn Belt functioned in the mid-1980s when Hart wrote his article. Today, those same forces continue to impact this region's agricultural outlook and *how* it functions. *Where* those forces are playing out and *who* is affected have, however, changed.

Over the past century reams of paper, barrels of ink, and millions of keystrokes have been devoted to the study of the Corn Belt, yet not since 1950 has anyone attempted to redefine its boundary. As Hart said in 1986, ''The Corn Belt is in turmoil. Its traditional system of mixed farming, which had flourished for almost 150 years, has been replaced since World War II by highly specialized types of agriculture'' (Hart 1986, 51). To see how this region has changed, and more importantly to begin the process of mapping a new Corn Belt boundary, we decided to do what any good, self-respecting geographer should do – we went for a drive (Figure 2). We talked with farmers, we felt in our hands the difference between Illinois and Kansas soil, we witnessed how slow a center-pivot irrigation unit actually moves, and we smelled the distinct odor of confinement-barn hogs (which *does not* smell like money, as many hog farmers would lead you to believe). Future research will involve the use of these qualitative themes, discussions with farmers, and notes from the field to help us select and analyze quantitative, GIS-based Census of Agriculture variables that we will use to create a new county-level Corn Belt boundary.

We found that farmers both within the core and along the periphery of today's Corn Belt continue to be influenced by myriad external forces. Two themes that we heard and saw evidence of time and time again were 1) increased production and 2) the phrase ''we're going to grow what makes the most economic sense.'' The photos selected for this article are representative of those two themes, highlighting both the ubiquitous and the unique features of today's Corn Belt.

Photo 1: *Near the birthplace of the Corn Belt, just south of Columbus, OH, along the Scioto River, exurban development in the eastern portion of the Corn Belt has begun to transform thousands of acres of cropland into developed uses. In their decade-long land change analysis project, members of the USGS Land Cover Trends team (USGS 2011) have shown that the eastern Corn Belt, as a function of its high population density, has experienced these conversions at much higher rates than the central and western Corn Belt. Photo used with permission of the USGS Land Cover Trends Project.*

Photo 2: *The eastern Corn Belt still exhibits traits of what most of the region used to be; smaller farms, mixed cropping systems that include wheat, hay and pasturelands, all alongside today's main crops of corn and soybeans. This photo, from southeastern Indiana's Jefferson County, shows a typical scene of eastern Corn Belt agriculture. Photo used with permission of the USGS Land Cover Trends Project.*

Photo 3: *Parts of southern Iowa and northern Missouri, once considered to be a part of the Corn Belt by both Baker and the USDA, have poorer soils, steep slopes, and are not as conducive to large-scale, corn-based agriculture as areas further north. While inclusion in the 1950s Corn Belt was correct, the geographic limitations of southern Iowa and northern Missouri prohibited farmers from expanding as they did elsewhere. Much of the land formerly used for row crops has been converted to pasture and/or perennial hay production, and in the most recent agricultural census (USDA 2010a), soybeans were the dominant crop both in acreage and in value.*

Photo 4: *Corn atop the Ogallala Aquifer under center pivot irrigation near Sublette, KS. From 1950 to 2009, U.S. Department of Agriculture (2010a) statistics show that corn production in Kansas increased from 85 million to 561 million bushels. This increase was driven by massive increases in irrigation. Ditch irrigation began in Kansas as early as 1881 near Garden City (White 1994). From 1959 to 1987, western Kansas' share of the Ogallala water pumped from the six-state region (including Nebraska, Colorado, Kansas, New Mexico, Oklahoma, and Texas) increased from 5.4% to 15.5%. Irrigated acres nearly quadrupled from 1959 to 1978, then decreased slightly in 1987 due to lower crop prices, higher energy costs, less water availability, and farm programs that encouraged irrigators to set aside highly erodible land (Kromm and White 1991).*

Photo 5: *Three generations of the Mai family who farm near Sharon Springs, KS. The Mai family farms just over 2,000 acres of land that they have in a three-year wheat/corn/fallow rotation. Ten years ago, the Mai's Ogallala water ran out, so they switched to 100% dryland cropping practices. Though yields have decreased, they have continued growing corn, most of which is sold and sent south to the many beef cattle feedlots in and around the Garden City area.*

Photo 6: *This spilled corn in Seldon, KS is an indicator of the amount of new corn acres that are now found west of the 100th Meridian. In 1950 there were 48,000 acres of irrigated corn that produced 17 million bushels in Corn Belt counties west of the 100th Meridian. In 2007, within those same counties, there were 2.6 million acres of irrigated corn that produced 596 million bushels (USDA 2010a).*

Photo 7: *In Cozad, NE, 247 miles west of Omaha, we find the 100th Meridian and huge concrete blocks that are the base for massive corn bunkers used to hold each year's harvest. This line of longitude corresponds with the 20-inch annual precipitation boundary. East of this line more than 20 inches of annual rainfall occurs, and most crops can be grown without irrigation. West of it less than 20 inches of rainfall is found, making irrigation essential.*

Photo 8: *(a) A field north of Hartford, SD enrolled in the Conservation Reserve Program (CRP) in 2002. In 1985, as part of the Farm Bill, the USDA began the CRP to help retire marginal land and return it to grassland cover in an attempt to thwart soil erosion. By 1990 South Dakota had 1.8 million acres of land enrolled in the CRP. Though acreage declined to 1.4 million acres throughout the early 2000s, it wasn't until 2007 when massive amounts of CRP land began to return to crop production (USDA 2011). Photo used with permission of the USGS Land Cover Trends Project. (b) The same field in 2010 is now planted to soybeans. In the CRP, most land was returned to grasslands in ten-year contracts. The first renewal period (around 1996–97) saw most contracts renewed as farmers could still receive CRP payments that rivaled the amount of money they could get by farming the land. In 2007, however, things changed. High crop prices encouraged many landowners to not renew their CRP contracts for a second time. From 2006 to 2010, more than 800,000 acres of CRP returned to cropland (U.S. Department of Agriculture 2011). In 2010 the USDA, after a four-year hiatus, offered its first new CRP signup, but because of the disparity between CRP payments and current crop prices, it still makes the most economic sense for farmers to farm their land instead of enrolling it into the CRP.*

Photo 9: *Field tile is used to drain water from cropland in many Corn Belt counties such as this pasture in Brookings County, SD that was subsequently converted to cropland. Though the same drainage laws apply throughout the entire state, the higher valued and better quality land in the far eastern part of the state (such as in Brookings County) warrants the cost of installing drainage tile. As you go further west, and soil quality declines, the cost-benefit of installing tile to crop production declines.*

Photo 10: *A South Dakota Wheat Growers elevator near Wolsey, SD that was being retrofitted to allow handling of the area's growing corn crop. Corn production in the James River Valley (in east central South Dakota) has spurred other Wheat Growers facilities to update their storage capacity as well. Near Andover and Roscoe, huge rail shuttle facilities with a mile of loop rail, and capable of receiving 20,000 bushels of corn per hour are being constructed. Their total storage capacity will be 3.1 million bushels and will have the ability to fill a 110-car train in about 12 hours. The $87 million, two-phase project, called ''Connecting to Tomorrow'', will upgrade 11 South Dakota grain facilities and one in North Dakota, all with the goal in mind of decreasing the distance producers need to drive to reach rail lines connected to the Pacific Northwest export market (Schmit 2010).*

Photo 11: *New grain storage facility on the border between North and South Dakota on state highway 281. In 1950, North Dakota produced 9.3 million bushels of corn. By 2006, North Dakota was producing 155.4 million bushels, and only two years later, North Dakota nearly doubled its output to 285.2 million bushels (U.S. Department of Agriculture 2010a). Grain storage sites such as these can be seen throughout the Corn Belt as yields continue to increase.*

Photo 12: *By the late 1950s, more than 90% of the corn planted in the U.S. was hybridized (Roepke 1959), and plant geneticists continue to modify corn to produce higher yields and to profitably grow in areas with fewer growing degree days. While corn has been increasing in southeastern North Dakota as new cold-tolerant varieties have been developed, soybeans have increased even more dramatically. From 1997 to 2007, North Dakota added 1.7 million new corn acres and just over 2 million new soybean acres (U.S. Department of Agriculture 2010a). Erwin Miller, a USDA employee from Finley, (80 miles northwest of Fargo) said that 75–85 day corn is becoming more common, and along with the economic incentives of growing corn, is one of the major reasons why more North Dakota farmers are growing increased amounts of corn and soybeans today.*

Photo 13: *Olivia is the largest town and the county seat of Renville County, MN. Renville County leads the state with more than 42 million bushels produced on 285,000 acres. In 1973, the state senate of Minnesota proclaimed Olivia the ''Corn Capital of the World''. Olivia is a town of only 2,300 residents, yet it is home to nine seed research facilities including Mycogen, Monsanto, and Dekalb Seed.*

Photo 14: *Trains hauling grain to the Twin Cities where it would be loaded onto Mississippi River barges once frequented many small town elevators, like this one in Odin, MN. Today, the rail lines bypass elevators of this size, as the facility does not have the capacity to fill the unit trainsthat now continue (quickly) on their way to larger facilities. Storage space in these small town elevators are today leased or owned outright by local farmers and used for their grain storage needs.*

Photo 15: *Valero Renewables, near Welcome, MN, is an ethanol plant that has been in business since June 2009. It is one of the largest ethanol facilities in the U.S., with the capacity to process 40 million bushels of corn into 110 million gallons of ethanol per year. Its byproduct, distillers grain, is then sold to farmers and used to supplement livestock feed.*

Photo 16: *While cattle have all but disappeared from most Corn Belt counties, especially in the historic core of the region, pork reigns supreme. These two hog barns, each capable of holding 1,000 head, are located in Martin County, MN, the state's leading hog producing county. In 2007 Martin County farmers sold 2.1 million hogs that were raised on only 183 farms – or 105 hogs for every resident of the county (U.S. Department of Agriculture 2010a). These barns are fully automated, climate controlled, hog-producing machines, and those living downwind know all too well the ''sweet'' smell of success.*

Photo 17: *Technological advancements in crop genetics have been responsible for the increased yields seen throughout the Corn Belt. These, along with narrower rows, closer spacing of plants, and a farming culture that is dependent upon herbicides, pesticides, and nitrogen fertilizer has resulted in yields of over 220 bushels per acre. Test plots, like this one from east central Iowa, are used to demonstrate the various traits of hybridized corn such as stalk and root strength, ear size, pest, disease, and stress tolerance, yield, maturation time, tolerance of local climate, adaptability to soil types, and performance on differing tillage practices.*

Photo 18: *Opened in 1969 by Cargill, this grain elevator in Tuscola, IL can store 7.5 million bushels of grain in its permanent storage bins, with an additional 4 million bushels stored in its ground-based bunkers. According to John Thomas, an employee at Cargill's Tuscola elevator, over the past few years, 98% of this corn has been shipped south on the Canadian National rail line to New Orleans for international export through the Gulf of Mexico.*

Photo 19: *This is a new rail facility south of Arcola, IL for both liquid and dry fertilizer storage. According to the U.S. Department of Agriculture (2010a), over 65% (265 million acres) of all U.S. cropland was treated with some type of commercial fertilizer, lime, or soil conditioner. In the Corn Belt region, over 72% (115 million acres) of all cropland was treated in 2007.*

Photo 20: *(a) This is Dalane Allenbaugh, his combine, and his semi truck. Dalane lives in Mattoon, IL and farms just over 600 acres of corn and soybeans. The equipment he uses exemplifies how continued technological advancement allows him and one hired-hand (his future son-in-law) to easily work those 600 acres. Dalane runs the combine and his hired hand runs the grain cart. Simultaneously Dalane can feed grain from the combine's grain tank into the grain cart while continuing to harvest. When the grain cart is full its contents are emptied into one of two waiting grain trucks. When full, the hired hand delivers the grain to a local elevator while Dalane continues harvesting. (b) The inside of a combine looks more like a video game controller than a farming implement. Global positioning systems, automated steering devices, and yield monitors give the 21st century farmer up-to-the-second information on yield, moisture, and soil quality of the grain and ground over which they are passing. All of this technology has one purpose: to aid the farmer in obtaining maximum production.*

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