PATTERNS ON THE AMERICAN LAND

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BIOGRAPHICAL SKETCH

Vernon Carstensen - Born in Cherokee County, Iowa -- not far from Correctionville, so named because of the nearby correction line -- in 1907. He received his B.A. from Iowa State Teachers College in 1928 and the M.A. in 1933 and Ph.D., in 1936 (American History) from the State University of Iowa. He has served on the faculty of Central Washington College, the University of Wisconsin and the University of Washington. He also was a visiting professor at the University of Oregon, the University of California in Berkeley, and the University of Stockholm, Sweden. He is a member of a number of historical associations and the author of books and articles mostly dealing with aspects of the history of American agriculture and the history of the Public Domain.

At present he is a member of the Advisory Committee for the National Archives and the Advisory Committee on Bicentennial State Histories of the American Association for State and Local History.

ABSTRACT

This paper deals with the great Land Ordinance of 1785 which first provided for the rectangular survey of the Public Domain and with some of the economic, political and social consequences of the rectangular survey.

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In the few minutes that I have I want to talk mostly about the land law adopted by the Congress in 1785 and some of the consequences of that law. The great Land Ordinance of 1785, you may recall, provided for the rectangular survey of a portion of the land in the first public domain -- land that lay west of the Appalachian Mountains. Subsequently, the rectangular survey was extended to most of the first public domain and then to the other territory acquired by the Republic on its march to the Pacific. The patterns imposed on the American land by the rectangular survey influenced enormously the economic, political and social life of the people who came to make their farms and villages and cities on a land marked out in squares of townships and sections, quarter sections and forties. All of this land could be quickly and easily located by settler, banker, loan shark and, if need be, sheriff and truancy officer.

Hildegard Binder Johnson, in her engaging book, Order on the Land, published earlier this year, tells us that 69% of the land in the forty-eight states is contiguously covered by the rectangular survey and another 9% is intermittently covered. Of the 1.8 billion acres once in the Public Domain, 1.3 billion acres have been surveyed into townships and sections. This underscores the fact that once the idea of the rectangular survey was fully accepted, institutional and bureaucratic mechanisms were created that pushed the straight lines west from Ohio with unswerving determination. Almost nothing stood in the way. The straight lines were spread over the prairies, the foothills, the mountains, over the swamps and deserts and even over some of the shallow lakes. Like bees or ants or other well-organized societies, Americans, once they fixed upon the

rectangular survey, were unswerving in their devotion to the idea.

It is an interesting fact, however, that despite the large influences the surveys have had on the organization and development of American society, American historians have exhibited only a tepid interest. Geographers have done a little better. Foreigners more than Americans have been impressed by the system. There are three very good monographs on aspects of the survey system: William D. Pattison's Beginnings of the American Rectangular Survey System 1784-1800, Norman J.W. Thrower's Original Survey and Land Subdivision, A Comparative Study of the Form and Effect of Contrasting Cadastral Surveys, and Hildegard B. Johnson's Order Upon the Land, The U.S. Rectangular Land Survey and the Upper Mississippi Country. Two of the authors, Thrower and Johnson, are foreign born. Thrower began his education in England, Johnson grew up in metropolitan Berlin. Pattison says that H.C. Darby of the Geography department, University College, London, encouraged him to examine the surveys. Robert Burns really had something when he said,

> Oh wad some power the giftie gie us
> To see ourselves as others see us.

Men in their long history of occupying and using fragments of the earth's surface had only rarely, before 1785, devised systems under which the land was marked out in a rectangular pattern. There are a great number of reasons; probably one of the most important is that land had been occupied and used for a long time before notions of individual ownership attained much importance. The Romans and the Dutch had made limited use of rectangular patterns and there were scattered proposals aimed toward this end in some of the American Colonies. In New England the town system was devised under which a parcel of land marked out by straight lines was granted to those designated as the town proprietors. The proprietors were authorized to divide the land within the town among those who were attracted to the town. For the most part, land in the colonies was granted and claimed in irregularly shaped parcels. Land title was based on metes and bounds surveys, the consequences of which still show up with great clarity to the air traveler when he comes in for a landing at Dulles Airport in Virginia. Such a system, although it had the initial advantage of permitting men to select only good land, or what they thought was good land, invited a host of misunderstandings about boundary lines between individual holdings. This in turn sustained community feuds, often through several generations, and it was a boon for the emerging legal profession. It also permitted land to shake through the survey and to remain unclaimed, a condition that still exists in some of the original colonies.

The Revolution had hardly begun before the representatives of the thirteen colonies began to argue over ownership of the lands that lay west of the Appalachian Mountains. Seven of the colonies had claims of one sort or another to lands west of the mountains; the other six had none. Those with no claims, under the leadership of Maryland, argued that the western lands would be won from England by the common expenditure of blood and treasure and hence should be owned by the new Confederation. At length this position was accepted and the colonies with land claims in the west ceded their western lands to the central government. The success of the Revolution and the ceding of the western lands brought into existence the first Public Domain. The first Public Domain embraced the vast region lying west of Pennsylvania, north of the Ohio River, east of the Mississippi, and south of the Great Lakes. Cession of the lands south of the Ohio would not be completed until after the turn of the century.

However, with the creation of the first public domain, the old Northwest, the Congress of the thirteen colonies, now transmuted into states, faced the necessity of determining a system of land description to be used in this new western territory and also of fixing on the terms and conditions under which the land could be acquired by individual owners. These men in the Congress of 1784 and 1785 confronted a situation virtually unprecedented in human history in that they were empowered to make the law governing the survey and distribution of a vast territory before it was occupied. But they were not to be given much time. Already intruders were entering these lands despite Indian resistance and official objection. These squatters would argue that occupation of the land would give them title to it -- an idea Easterners rejected but one that provided the basis for the Pre-emption Acts and the Homestead Law of 1862. Moreover, the Congress needed money and it was widely believed that sale of the lands would promptly supply that money.

In 1784 Thomas Jefferson had proposed a plan for the survey of the western lands into 10-mile square townships, but nothing came of his proposal. In April, 1785, the Congress took up debate on what was to become the Land Ordinance of 1785 and labored mightily, probably noisily. Near the end of April, William Grayson, a member from Virginia, wrote George Washington about the debate. "I think there has been as much said and wrote about it (the land law) as would fill forty Volumes, and yet we seem very far from a conclusion...." But three weeks later the law was completed. It was formally approved on May 20, 1785.

Among other things, this law provided that Indian title must be extinguished before the land could be surveyed and offered for sale. Provision was made for the survey of a small portion lying immediately to the west of Pennsylvania. This land, remembered in history as the Seven Ranges, was to be surveyed into six miles square townships. Every other township was to be further divided into 36 one-mile square sections, each of 640 acres, more or less. Thus, half of the land in the Seven Ranges was to be offered for sale at public auction in lots of 640 acres. The other half was to be offered in township lots, each to consist of a parcel of land six miles square. Section 16 in each of the townships was to be reserved for the use of the common schools. There were many other provisions in this law, but the purpose here is to note the formal beginning of the rectangular survey. It was applied initially to a slice of land 42 miles wide adjacent to the western boundary of Pennsylvania and extending from the Ohio River north to lands still held by the Indians.

The first surveys proceeded slowly. It was difficult to enlist surveying parties, to direct them, to supply them. Some were harassed by Indians. There were few buyers for the small amounts of land offered for sale. For a period it appeared that the rectangular survey might be dropped.

Congress, still hard pressed for money, entered into contracts with land speculation companies and sold or attempted to sell vast tracts of land in the Ohio country. In 1787 a new Constitution was drawn up to replace the Articles of Confederation. Upon approval by the people, a new government under the Constitution came into existence. No steps were taken immediately to extend the rectangular survey beyond the Seven Ranges. In 1792 proposals were made to re-adopt the rectangular survey, but not until 1796 was it fully re-established. Thereafter, the rectangular survey was extended to cover the remainder of the old Northwest Territory, the Southwest Territory, and other areas acquired by the U.S.: the Louisiana Territory; the Floridas; the lands acquired from Mexico; the Oregon Settlement, and the Gadsden Purchase. The survey would also be extended to Alaska. A system of base lines and meridians was devised

early in the nineteenth century, along with a more systematic means of dealing with correction lines. Moreover, the clamor of settlers led the Congress to establish land offices in areas being settled and to reduce the minimum size of plots of land to be offered for sale. In 1785, the law had provided that 640 acres was the smallest parcel that could be offered. In 1800 this was reduced to 320 and subsequently the minimum size was reduced to 160, then 80, and later to 40 acres.

Once the grid survey system was adopted, the new government had to find ways of finding surveyors, some trained and some untrained, to perform the work of marking out the land. Surveyors were early instructed to maintain field notes in which they recorded useful information about land cover, the quality of the soil, location of salt springs, salt licks and other minerals, the existence of water power sites, evidence of Indian or white occupation such as dwellings or cultivated fields, and evidence of ancient occupation, as well as a number of other things. Some surveyors were careful observers, some were not, but the survey from the beginning became a kind of crude land inventory. Surveyors themselves were often among the first to examine the land closely and some used their experience later to serve as land agents to sell government and other land to settlers and speculators. The survey itself made it relatively easy for non-resident speculators to locate land. Surveyors complained endlessly about their hard lot. They were not paid enough; their work was exhausting and debilitating; they were compelled to work in miasmic swamps; they were daily attacked by myriads of mosquitoes and black flies; they were molested and threatened by Indians; in some areas they could find nothing at hand to mark corners permanently and sometimes they discovered that vandals pulled out their stakes or destroyed their monuments; they were almost never well-housed and well-fed.

The idea of perfect squares spread out upon the curved surface of the American land worked, but of course the results were far from accurate. Some surveying parties had excellent direction and good instruments. Such men turned in good plats and field notes and they left clear marks on the land. Others didn't, as examination of the land surveys show. Some townships came out long, some short. There are scattered records showing that surveyors sometimes tired of measuring each side of a section or a township with a chain. The distances could be stepped off -- provided, of course, the stepper kept count of his steps. In the prairie country of the midwest there are stories about measuring these lines from a wagon or even a buggy drawn by horses. A piece of rope was tied around the rim of a rear wheel. The chainman having measured the circumference of the wheel could sit in back and count the number of revolutions and thus measure the land being surveyed. The surveys also show places where the due north lines or the east-west lines tilt substantially. There were always explanations. Men were inattentive, instruments were defective, there were unexpected compass deviations. I like an informal explanation that was given me by an old surveyor to explain some skewed sections in the Yakima Valley. He claimed that these lines were a direct result of the camp supplier's having accidentally included a plentiful supply of whiskey with other food supplies packed in to the surveying party. The skewed lines, he declared, were the happy result that flowed from the whiskey and perhaps from a tiny compass deviation.

By whatever the obstacles, whatever the errors in execution, the survey lines have spread out from Ohio west to the Pacific, north to the forty-ninth parallel -- indeed, they have in a way spilled over into Canada -- and south to the Gulf of Mexico. And, as I mentioned earlier, nearly 78% of what had been the public domain has come under the rectangular survey.

Farms and farming were directly and extensively influenced by the rectangular survey. This is exhibited in a host of ways, - perhaps most conspicuously in the establishment of a system of public roads. Pretty much throughout the colonies the first roads and trails followed natural features of the land, usually the ridges. In the New England towns and elsewhere, the office of road-viewer came into existence.

The road-viewer was charged with marking out new roads. This officer often appears in the local governments in the Ohio country, but increasingly in the 19th century his duties disappear. In 1804 Congress reduced to 160 acres, or one quarter of a section, the minimum size of a parcel of land that could be purchased at a government land office, and for reasons not entirely clear, the 160 acre plot, the quarter section, came to be viewed as the ideal size for the family farm. This meant that there would be four farms per section, each requiring access to a public highway. The simplest and easiest way to attain this end was to provide a road allotment along the section lines -- a roadway from 4 to 6 rods wide. Federal land law made no provision for such a road allotment, and few states or territories seem to have required them by law, but such road allotments are increasingly made. Farmers much preferred to yield 33 to 50 feet on the edge of their land for a necessary road rather than have their farm divided by a road. Thus, from central Ohio west to the plains the section lines often became roadways, and the survey lines were often followed inflexibly over hills, through swamps, across rock outcroppings. Where the correction lines interrupted the straight north-south movement of the survey lines the road made the two right-angle turns needed to keep it precisely on the survey lines. These jogs, as they were often called, offered no particular hazard when the roads served horse-drawn vehicles, but with the coming of the automobile and the truck they became increasingly dangerous. Many have been removed, but the present-day driver on the country roads of the Midwest in the vicinity of correction lines still needs to be alert lest he sacrifice his car and maybe himself to the rigidities imposed by the surveys of a century and a half ago.

Norman Thrower, in his monograph, compared the economic development of the area in Ohio under the rectangular survey with that surveyed largely under metes and bounds. He found, among other things, that the area under the rectangular survey, with the regular road allotments that virtually assured each landowner of access to a public road, enjoyed a brisker and probably more complete economic development than that of the area covered by the metes and bounds survey.

Sooner or later, usually later, the farmer built his "line fence" around his square or oblong piece of land. Before the 1870's in the midwest, that is before the invention of barbed wire, farmers faced some difficulty in finding abundant, cheap fencing material. Rock and stone fences could be built where material was available, but to do this required an enormous amount of work. Rail fences were widely used where wood was abundant, but rail-splitting for an eighty-rod fence was no small task. From the 1850's on, the Lake States pineries provided cheap boards for fencing, but such fences took time to build and in the end were not cheap. In the 1830's farm journals of the midwest advertised living or hedge fences, one of the most popular being the osage orange. It was claimed that an osage orange hedge row, once developed, was impenetrable even by hogs. But the living fence also had disadvantages. It required annual trimming and, even worse, the osage orange often suffered winter kill.

When barbed wire came into general use some farmers removed the hedge rows, others permitted them to grow wild. Such hedge rows often spread to a width of 20 feet or more and attained a height of twenty to thirty feet. The trunks might attain diameters of 8 inches or more, and in the 20th

century a farmer hearty enough to cut the hedge could obtain a supply of nearly indestructible fence posts. Some of the last hedge rows in the middle-west were harvested in the years following World War II for material to make bows to serve a new generation of bow and arrow men and women. I suppose you could say that they were the accidental beneficiaries of the rectangular survey.

Glidden patented barbed wire in 1873 and thereafter barbed wire (always "bobbed wire" in the midwest) often in conjunction with woven wire, became the standard material for fence building. Orderly farmers who built barbed wire fences, both as line fences and to mark out interior fields for hay, corn, small grain and pasture, often followed the practice of setting fence posts one rod or 16-1/2 feet apart. Thus the farmer had an easy way of determining the size and acreage of his fields. This method served until supplanted by the aerial photographs first widely used in connection with the administration of the farm program of the New Deal.

I should mention, parenthetically, that the officials of the Census Bureau who began to supervise counting in 1790 seem never to have communicated with the land office. When farms began to be counted in 1850, the Census Bureau seems to have ignored the land survey entirely and counted farms according to acreage, but in multiples that had no relation to units of the land survey. The census counted farms of 3 to 10 acres, 10 to 20, 20 to 50, 50 to 100, 100 to 500, 500 to 1000, and over 1000. Only an asphalt farmer or an urban statistician can use such data without shuddering. Then, as now, the numerous arms of the federal government were not always aware of what the others were doing.

Rectangular fields not only encouraged but virtually decreed straight line tillage, no matter what the terrain. It became a matter of pride among good farmers in the midwest to be able to plow a straight furrow. Many of us remember that President Truman's mother boasted that no one in western Missouri could plow a straighter furrow than her son Harry. Similarly farmers gloried in straight rows of corn, particularly in corn fields that lay adjacent to a well-travelled road. The establishment of the Soil Conservation Service in the late 1930's combined with the disappearance of the check-row planters, has largely freed the corn cultivator from the tyranny of the section line as it has most farm tillage.

Out of the rectangular survey came words still widely used. Farmers talk about their "line fences" or their "lines" rather than the boundaries of their farms; they have "forties" or "eighties" or quarter sections or half sections. I remember a conversation with several wheat raisers in the Red River Valley a few years ago. None had a farm or a ranch. One had a "section out west of town," the other had a "couple of sections."

The forty acre plot, usually called simply a forty, was the widely used unit of the timber country. In the records of the Lake States forests and the rain forests of the Pacific Northwest, I have encountered reference to the round forty - a dimension not much used by surveyors. Loggers were often called timber thieves merely because they took logs from the Public Domain. The holder of a round forty was a man who owned the land from which he cut his logs, but he was uncertain about exactly where the boundary was located. John Ise, in his history of public forestry policy, mentions one logger in the State of Washington who managed to cut logs on his round forty for forty years and still not run out of timber. The round forty was one of the most productive units on record.

The rectangular survey did much to control the farmer in what he did.

It was also important in the establishment of local and county government. Increasingly as settlement spread west, counties came to be outlined in terms of the survey townships and the civil government often organized within the survey township. The rectangular survey also had great influence in the platting of towns and, I suppose, all who are aware of the survey have encountered sectional or township lines that still mark a street or avenue with unbending commitment. In this connection I like N.E. 45th in Seattle which marks the northern boundary of the University of Washington Campus. That street was compelled to end at the top of a high, steep hill until money could be found to build a long viaduct to the more level ground to the east. I also like Marin Avenue in Berkeley, California which proceeds firmly down the steep slope of the Berkeley hills without wavering. In Madison, Wisconsin, the State Capitol was built on one section corner, and the main building of the University of Wisconsin (named Bascom Hall) covered the section corner one mile to the west. State Street lies on the section line between. Each year for many years some members of the beginning surveying class in the School of Engineering drew the assignment of locating the section corner under Bascom Hall. The assignment offered real difficulties but capable students usually managed to get into the basement and locate the corner.

The survey township often became the basic unit for a host of purposes. Taxes were assessed and collected, data was collected for state and federal census, election districts were established and elections held, local road building organized, and a host of other things. But perhaps most significant of all was the part the survey township played in the establishment of the common schools. The land law of 1785 had provided that section 16 in each township was to be reserved for the use of the common schools and that provision holds throughout the history of the public domain. In the middle of the last century, section 36 was also granted to the schools. Thus, in each survey township 1/18th of the land was reserved for the use of the common schools, whenever that area came to be settled. To a very large extent disposition of these lands was left in the respective states and the history of the management of these lands is a melancholy story in almost all of the states. The lands were sold early and cheap, and the funds all too often were wasted, if not actually stolen. Some 19th Century public officials seemed unable or unwilling to say somebody stole the money. Instead they would report that so-and-so was guilty of <u>defalcation</u>. Even so, these lands were of immeasurable importance. They provided the occasion for making provision for common schools early in the history of the settlements, and even though the lands or the funds derived from them were wasted, friends of publicly supported education could and did insist that the community or the state or both make restitution, generally by means of a millage tax to support the schools. Thus, provision was made for the foundation units of that educational system which emerged in the United States, a system of public education based on the common schools, extended through high schools, to the state supported university, which usually was also a consequence of a land grant.

I want to conclude by borrowing a paragraph from something written in another connection.

> "No one will ever know how much the straight lines of the rectangular surveys contributed to the public peace during the Nineteenth Century. Over five million farms were marked out on the public lands between 1800 and 1900. Had this been attempted under the loose and chaotic arrangements of the metes and bounds system -- the crazy-quilt system of Virginia -- interior America might have erupted in bloody land-boundary disputes so violent and widespread as to make the Tennessee and Kentucky feuds seem minor local disturbances. Robert Frost has told us that good fences make good neighbors. He might also have told us that clean survey lines make for peaceful land settlement. Certainly those who look steadily at this vast and rapid occupation of the enormous resources of America, and who try to see it whole, must wonder that an often polyglot and miscellaneous people could divide all of these rich resources so peacefully under the rules laid down by their Government or by the numerous associations they helped to form. Of course there were some sneaky characters, some cheaters, and there was some bloody conflict but the remarkable thing is that there was so little. Perhaps our vision of our past should picture a mild West, not the wild and lawless West so much doted on by romantic writers." (V. Carstensen, Land of Plenty, 1975.)

If this is true, I suppose you surveyors and your predecessors must bear some of the blame and take some of the credit.