

RECKONIN' THE RECTANGULAR SURVEYING SYSTEM

By Kathleen J. Koch

GRADE LEVEL: Secondary

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DESCRIPTION:

Before Thomas Jefferson proposed a land ordinance, in 1784, which would provide for a more exact method of surveying the land in the new country of the United States of America, surveyors had an inexact method of titling the land. Descriptions of land purchase were based on natural features which Jefferson realized were not permanent. These features included trees, rocks, stream meanders, and mounds of earth. In 1785 the Congress of the Articles of the Confederation enacted a land ordinance that established not only a scientific method of surveying but it also established the position of Geographer of the United States, a position held by Thomas Hutchins and which ceased to exist upon his death.

Hutchins established the Geographer's Line of demarkation as being a wooden post at the high water mark on the north bank of the Ohio River at the western boundary of Pennsylvania. He reported this point as being $40^{\circ}38'02''N$ but was actually $40^{\circ}38'27''N$. This baseline extended across the Northwest Territory of the United States to the Mississippi River and, eventually, across the Western United States.

Hutchins and his staff of deputy surveyors established essential meridians for the westward surveying. The First Principal Meridian was located at $84^{\circ}51'W$ or the western boundary of Pennsylvania. The Second Principal Meridian was established at the mouth of the Kentucky River or a due north line at $86^{\circ}28'W$. The mouth of the Ohio River was used to establish the Third Principal Meridian at $89^{\circ}10'W$.

OBJECTIVES:

1. The student shall be able to use the given latitudinal and longitudinal data to draw the Geographer's Line at $40^{\circ}38'N$, the First Principal Meridian at $84^{\circ}51'W$, the Second Principal Meridian at $86^{\circ}28'W$, and the Third Principal Meridian at $89^{\circ}10'W$.
2. The student will be able to synthesize the data to list the states through which the Geographer's Line transects from Pennsylvania to the Mississippi River.
3. The student will be able to establish the states of the Old Northwest Territory in which the three Principal Meridians transect.
4. The students will become aware of how orderly the idea of the rectangular surveying helped to better establish land titles.
5. Through comparison of Indiana County Maps, the student will recognize that Indian Treaties affected the rectangular surveying system in the counties that make up the Gore of Indiana.
6. Through comparison of Vigo and Clark Counties students shall be able to recognize how previous land surveys--prior to the 1785 Land Ordinance, affected the rectangular surveying system in those counties.

GRADE LEVEL: 4-12

RELATED SUBJECTS: geography, American history, social studies, world history

MATERIALS NEEDED:

- | | |
|------|--|
| 4-6 | Reproduced map of the United States showing latitude and longitude from an atlas |
| 7-12 | Reproduced map of the United States, preferably blank, showing latitude and longitude |
| 4-12 | Reproduced map of your state (or one of the Old Northwest Territory)
Straight edge
Red and blue colored pencils
#2 lead pencil-- STRESS NO PENS! |
| 9-12 | Reproduced examples of Indiana counties affected by Indian treaties and previous surveying on the rectangular surveying system |

PROCEDURES:

1. Distribute the worksheets to each student. On the blackboard list the Geographer's Line ($40^{\circ}38'N$), and the three Principal Meridians ($84^{\circ}51'W$, $86^{\circ}28'W$, and $89^{\circ}10'W$). Discuss what these lines are--latitude and longitudes.
2. Have students place their straight edge on the map and draw the Geographer's Line, with a red pencil, from the western boundary of Pennsylvania to the Mississippi River. Have the students label this line.
3. Next, have the students locate and draw the three Principal Meridians using the blue pencil. They should then appropriately label these lines.
4. Using the state map, locate the Geographer's Line, tracing over it with the red pencil, and the respective Principal Meridian, marking it on the map with a blue pencil. Using the map scale, mark off the map in six by six miles grids, using a #2 lead pencil, keeping in mind the colored lines as being baselines or reference lines.
5. Have the students compare their grids to the actual grid of their county.

MODIFICATION:

For advanced levels of education have the students mark the township and range for their state. This is a good exercise to show how the numbering system was established. An excellent follow-up to this exercise is to have the students draw an ideal township of six miles by six miles and divide it into thirty-six sections. They should then number their squares **boustrophedonically** (literally, "as the plow follows the ox"), starting from the northeast corner. They should then color in the sections 8, 11, 26, and 29, noting on them "Reserved for Congress 1785." Using a second color, have

students color in sections 15, 21, and 22 and label them "Reserved for Congress 1796." On section 16, use a third color and label it "Reserved for education, Land Ordinance of 1787."

Another variation would be to have the students draw the Geographer's Line across the United States. They should then try to figure out where to establish Principal Meridians west of the Mississippi River. Consult a United States Geological Survey Topographic Order Form for correct meridians.

EVALUATION:

The following questions can be used to interpret the understanding level of the exercise.

1. From which state did the Geographer's Line begin?
2. Through which states did the Geographer's Line originally transect?
3. Which state(s) are involved with the three Principal Meridians?
4. The Geographer's Line has been shown to deviate S2°W to S3°W from the original line in some states. Why would this happen? (ANSWER: You cannot draw a straight line on a curved surface without correcting for an error.)
5. On the Indiana county maps, some of the grids are not congruent to the six-by-six-miles grid. Can you speculate why? (ANSWER: French surveying system used in the Vincennes area and Clark's Grant were set at a 45° angle to the rivers; the lands ceded by the Indians after 1785 could only be surveyed after the respective treaties were signed by the tribes and the United States government.)
6. How would the surveying system compare to the states east of the Allegheny-Appalachian Mountains and Kentucky before 1816?
7. Can you name two historical men whose lives, and families, were affected by inexact surveying, causing them to leave their homes in Kentucky? (ANSWER: Daniel Boone and Thomas Lincoln)

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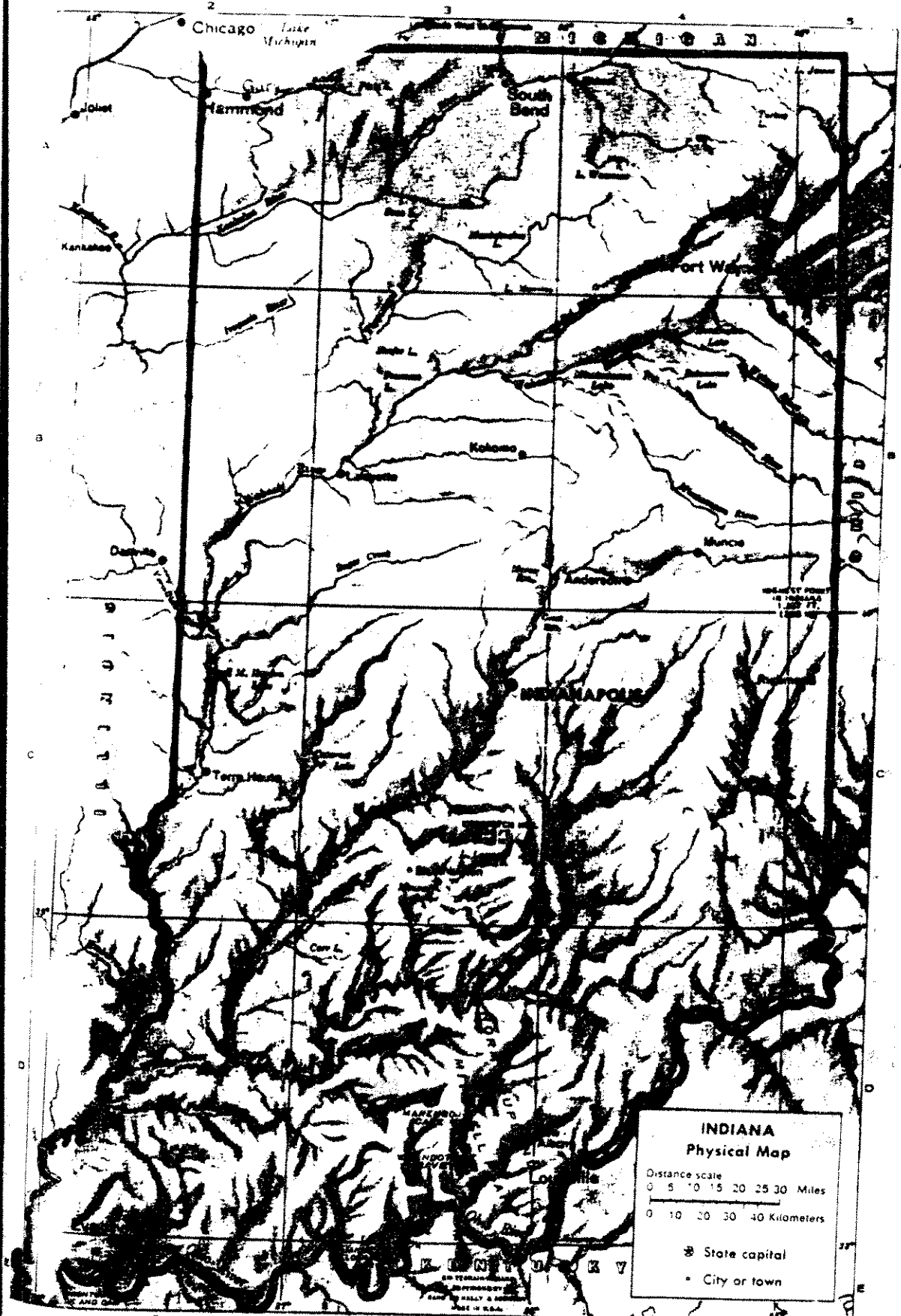
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Land Regions of Indiana

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Mississippian R.	B 4
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Muscatuck R.	D 3
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INDIANA
Physical Map

Distance scale
0 5 10 15 20 25 30 Miles
0 10 20 30 40 Kilometers

State capital
City or town

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