The Kankakee "Marsh" of Northern Indiana and Illinois

INTRODUCTION

SYSTEMATIC studies in land utilization, such as have been undertaken in recent years by the Federal Departments of Agriculture and of the Interior, by the Michigan Land Economic Survey, and other state departments, together with the researches conducted by various public and private agencies, as reported in the bulletins of the New York Social Science Research Council, all reflect the need for a scientific analysis of the land-utilization problems of the United States.

Regions which at one time or another have experienced competing and conflicting claims to land use generally furnish excellent material for land-utilization studies. The Kankakee marsh reclaimed area of northern Indiana and Illinois is such an area. Here clashed the interests of the hunter-sportsman-conservationist group with those of the organized land companies and of individuals interested in the reclamation of the wetlands for agricultural use. The author's interest in the region was aroused several years ago as a result of public propaganda and a petition to the Federal Government by a group of the Izaak Walton League to restore at least a part of the original marsh-swamp, once nationally famous for its wild life, particularly wild fowl. Studies of this type especially recommend themselves today in connection with the nation's agricultural and conservational readjustment policies.

The Kankakee country represents essentially an intermorainal marsh reclaimed valley extending from South Bend, Indiana, southwestward to Momence, Illinois. Down the wide, flat-floored valley coursed the original meandering Kankakee River, now a series of straight ditches. Rising in the east within a few miles of the St. Joseph River, tributary to Lake Michigan, and itself forming a headwater branch of the Illinois River to the west, the Kankakee, with the St. Joseph portage, provided a strategic connecting link in the Great Lakes-Mississippi route of the early French explorers, fur traders, and missionaries.

Serving successively in its native state the Pottawatomie hunter, the pioneer trapper, the marsh-hay ranger, and the professional sportsman, the modern Kankakee, dredged, ditched, and drained, has added over a half-million acres to the famous drift farming section of the Central Plains.

The Kankakee is located in the more favorable humid section east of the Mississippi. Its summer isothermal position places it within the "a" subdivision of the Df climatic type of the Köppen system, and fairly well within the southern border of the Corn Belt.

Demographical relations are no less significant. Rimmed by a score of towns, the marsh at the eastern end is terminated by the industrial city of South Bend, while its western extremity is within 45 miles from the second metropolis of the country- Chicago (Map 20). Less than 150 miles from the center of population of the United States, its valley is

"within 3-24 hours by express or 5-36 by freight of at least half the population of the United States" (1, p. 34).

THE FUNDAMENT - THE "NATURAL" Kankakee

Marsh prairies of aquatic sedges and grasses, potential grazing areas; wild-rice sloughs, scenes of countless wild geese and ducks; flag ponds, lined with muskrat houses; a narrow but almost uninterrupted swamp forest, full of game, rimming a meandering river teeming with fish; the wet prairies, made humanly habitable by the interspersion of sandy island oak barrens surmounting the highest flood waters- such in brief is the physical setup which attracted the squatter pioneer from the East, who sought contentment in the solitude and seclusion of a marsh wilderness.

In the eyes of the reclamationist a half century later this same general scene reinterprets itself as an open prairie, practically unencumbered by a forest cover, with a flat valley floor, a high water table, and a presumably rich alluvial river bottom soil, located within 50-100 miles of the greatest stock and grain market in the world.

The cultural subtractions and additions incident to the drainage operations have modified almost beyond recognition the general aerial picture of the prereclamation period. Yet certain elements of the natural landscape and their influences on human culture persist in general outlines to this very day. Many of the marsh dunal islands, particularly the unoccupied ones, and much of the original "meander lands" along the Kankakee River are still marked as of old by timber growth of upland and swamp species respectively.

The "islands" presently encompassed by dry land continue to be the preferred sites of regional settlement.

GEOMORPHOLOGY

The conditions of the surrounding terrain in relation to the agricultural economy are as significant as the "islands" in respect to the human habitat. The latter, rising conspicuously in the form of sand dunes, were recognized at the outset as "barrens" and as generally unsuited to cultivation. But the soil conditions of the flattish marsh areas appear, for the most part, to have been known only superficially and classified categorically with the common types of river bottom and marshlands. Whatever typical surficial lowland characteristics they may otherwise exhibit, the subsoil and "islands" of the Kankakee are structurally unique. Sand, with local lenses of gravel or clay, constitutes the basic structural material of the valley, while mounds and ridges of typical wind-blown sand here and there commonly attain heights of from ten to fifteen feet, surmounting the seas of water-laid sand.

Reference to their hypothetical origin may help one to understand the situation. Occupying an intermorainal position, with the Valparaiso moraine on the north and the Maxinkuckee moraine on the east and southeast, these clastic deposits have been classed by Chamberlin (11, pp. 330-331) and Leverett (18, p. 338) as mostly outwash.[1] Part of the valley fill has been attributed to the postulated Kankakee outlet for the glacial waters escaping

from the Saginaw lobe by way of the St. Joseph channel at South Bend (18, p. 338; 20; 21, pp. 12-14). Bradley attaches great depositional significance to the former lake waters occupying the basin, which he denominates the "Old Lake Kankakee" (6, pp. 226-229). Since many of the sand mounds and ridges are elevated above the highest possible level of the postulated lake or of the actually known marsh waters, which must have been shallow in either case, the sand of the higher elevated spots are clearly aeolian in origin, as is attested by their form and characteristic dune structure.

HYDROGRAPHY

For some eight or nine months of the year water from one to four feet in depth covered an area from three to five miles wide on each side of the river (1; 12). The area thus assumed the characteristics of a lacustral river rather than of an ordinary marsh. Especially was this true at the time of the winter ice jams and spring freshets. Having an elevation of approximately 720 feet at its source at South Bend, the Kankakee River trailed its way tortuously along the very slightly sloping and much oversized valley to a point near Momence. Here, at an elevation of 615 feet, it encountered a natural dam of Silurian limestone outcropping in the riverbed. Within the small drop, then, of a little over 100 feet the river, totaling a meandering distance of some 250 miles, averaged a gradient of -only about 5 inches per

[1] *Though acknowledging the apparent "glacial" character of the continental "drift" deposits, the writer of this paper does not subscribe to all the implications of "Pleistocene glaciology."*

mile. The average gradient for the valley, 85 miles long, is about 15 inches (1).

The low gradient, the wide valley, the loose, easily eroded clastic sediments of the river bed, the swamp vegetation, and the frequently occurring floods thus together conspired to make of the Kankakee a notoriously rambling stream, ever abandoning old and establishing new channels. As a result, there was formed an intricate maze of meanders, oxbow lakes, sloughs, and bayous, similar to that depicted on the map by Ahlgrim (Map 22). Accordingly, the river did not prove a very satisfactory political boundary between the northern and the southern tiers of counties.

A glance at the Fundament map (Map 21) suggests that the marsh was not a single simple unit, but, like the swamp river, a complex affair - a maze of multiple marshes interspersed with sinuous sandy ridges of higher and drier land. Streams descending from the marginal moraine debouched into the stagnant marsh waters and formed deltalike distributaries and deposits (T. 33 N., R. 5 W.).

NATIVE VEGETATION

Roughly, three formations of the original native cover may be recognized: (1) the river swamp timber; (2) the marsh sedge and grass, including occasional small outliers of the swamp timber; and (3) the upland "barrens" or oak-timber association.

The Swamp

The swamp timber proper followed the course of the river from practically the western extremity of the "basin" halfway up to its source, averaging a width of perhaps scarcely a mile, but widening considerably in its middle course, where it attained the maximum of nearly three miles. The stand included trees of extraordinary size, two to three and even four feet in diameter, once an important source of lumber for northern Indiana. Ash, elm, maple, oak, and birch were the dominant species.

The Marsh

Rank sedges and grasses, fields of wild hay and wild rice dominated the marsh landscape, interrupted now by a swamp-timber outlier of pin oak and its tree associates, now by a pond or a lake of lily pads, reeds, cattails, and flags. The tall huckleberry and cranberry presumably were important seasonal contributors of food for man and bird. The occasional small tamarack swamp has disappeared; wild rice, once the harvest haven of wild fowl, was observed by the author in only two localities - in drainage ditches; marsh hay appears as a relict formation in small, widely scattered, poorly drained strips or spots, generally pastured, which the dredge and the plow have not as yet invaded.

The Uplands

The insular dunal and other upland areas, rising just above the shallow water or to conspicuous heights of as much as 25-35 feet, either supported only a thin herb or moss ground cover reflective of acid soil conditions or bore a stand of scrub or medium-sized timber consisting chiefly of black oak and white oak, the latter now mostly gone. As in the case of the wet marsh, the drier sandy uplands contributed in superabundance their seasonal offering for man and beast: dwarf huckleberry, blueberry, blackberry, and dewberry and hazel and other nuts.

SEQUENT OCCUPANCE FORMS AND FUNCTIONS

The transformation of the Kankakee "haven of wild life" into a "modern home for man" may be treated under four stages of settlement: (1) the period of the Indian hunter and the French trader; (2) the immigration of the pioneer trapper and the frontier farmer; (3) the epoch of the stock farmer and the sportsman fowler; and, finally, (4) the present joint occupance by the Corn Belt farmer and the river resorter. These stages have been graphically synthesized in the Silhouette Study (Fig. 20).

The first two stages are characterized essentially by human adjustment *to* the environment. The last one dominantly exhibits human adjustment of the environment. The third is characteristically expressive of a transitional condition in which the hitherto dictating influences of the marsh-swamp fundament became progressively weaker as the drainage net was perfected, leaving only remnants of the naturally induced culture forms reminiscent of an older and much more romantic period.

THE POTTAWATOMIE'S KANKAKEE

(-1840)

The French explorers, Charlevoix, La Salle, Tonti, and Father Hennepin, were the first to give an account of the characteristics of the Kankakee region. This valley they entered at its source near South Bend, Indiana, after experiencing much difficulty in locating the portage between the St. Joseph River, up which they had ascended from Lake Michigan, and the source of the Kankakee, which they regarded as the headwaters of the Illinois River. Here they came into contact with the Pottawatomie Indian, who found the marsh a refuge against the ferocious Iroquois of the East.

While some of the Indians appear to have settled more or less permanently on the marsh margin or on islands within the marsh or swamp, the majority seem to have migrated back and forth, in summer occupying the marginal moraine or Lake Michigan plain, and in winter retiring to the swamp (or marsh) island, as illustrated and described in the Silhouette Study (Fig. 20).[2]

At least six river, or near-river, island encampments are shown on the original Federal surveyors' plats.

Besides transportation, the river situation, like that of the Lake Michigan trading posts, favored communication with the French fur traders, who likewise came to use the swamp island sites as home and headquarters for carrying on their own trapping as well as for trafficking with the natives.

Encampments

Ball *(3, pp. 66-67)* reports a number of camps of Indians: "In the winter of *1835-36* about *600* had an encampment in the West Creek woodlands, where deer were abundant, and an encampment was there again the next winter." Another Indian camping ground was located south of the present Lowell. These would classify as marginal marsh situations, though the exact sites are not given. Among marsh island sites the author mentions Red Oak Island (Map 22), where in 1837-38 two hundred Indians had a garden and where there were two stores kept by French traders; also Big White Oak Island, south of Orchard Grove, where there was an Indian cemetery. Among the swamp island sites next to the river Werich (27) reports an "Indian Garden" at the mouth of Sandy Hook branch, tributary of the Kankakee (in Porter County), and another "Indian Island" a few miles farther down the river.

Trails and Roads

The trail routes, or pioneer roads, like the campsites, clearly reflect the influence of the terrain. Again referring to the Fundament map we observe that three main lines of communication crossed the marsh. Two of the routes, the central and the eastern, followed the sinuous trend of the ridges, where they most nearly approached the river; the one skirting the marsh on the west took advantage of an anticlinal ledge of limestone in the river bed which made fording easy.

The route through the heart of the marsh crossed at the Pottawatomie Ford, which was destined to become the most historic spot along the Kankakee River in the marsh proper. Here was established in 1836 the Eaton Ferry, which transferred the early travelers across the one and one-half mile marsh between the Porter County sandy upland area and the sand-ridge landing in Jasper County on the side of the river opposite.

The epoch of Indian occupation may be said to close with 1840. By the treaties of 1832 and 1836 with the Federal Government the Pottawatomies relinquished their claims to the lands of northwest Indiana. A few were permitted to remain, those that had been especially friendly to the authorities, but these were absorbed in the pioneer trapper group of the next epoch, which we have dated from 1840 to 1880.

2 J. Lorenzo Werich, a pioneer Kankakee hunter, whose mother settled with her parents within a few miles of the Kankakee in 1835 and whose father hunted in the marsh as early as 1852, writes to the author as follows:

"Indian Island near the Kankakee was the Indians' camping ground. During the hunting season of the fur-bearing animals, from early autumn to late in the spring, this island was their home.

"Along about the first of May they would pack their hides, furs, and with their squaws and children they would start for the Lake Michigan region to meet the fur traders. . . . The Indians would stay along the lakefront all summer, and early in the fall they would return to the camping grounds in the Kankakee swamps.
"About one mile up the river from Indian Island was another Indian camp ground, known as Indian Garden. The Indians in selecting a camp ground always located on a point of high land which was well fortified and could not be invaded by the enemy."

THE PIONEER'S KANKAKEE
(1840-80)

We are told that, after the initial marsh invasion by a sprinkling of French trappers and traders, the "upper basin of the Kankakee River was slowly taken over by the Danish and Swedish, and the lower by the English and some Germans" (16, p. 25). Ball (3), in speaking of the settlement of northwest Indiana, especially of the latitude of the Kankakee and north thereof, designates as the chief sources of immigration New England, New York, Pennsylvania, Ohio, Canada, the British Isles, Germany, Holland, and Scandinavian countries, with a few from south and central Indiana. Werich (27) refers specifically to the year 1833 as the time of the advent of the first white families from the East, the Morgans and the Dyes of Ohio, who settled in the neighborhood of Sandy Hook, referred to above. By the early 'fifties a number of pioneers had settled north of Knox, Starke County (14).

Though the immigrant farmer had a more or less fixed habitat, the pioneer squatter commonly practiced seasonal migration. He lived in a shanty on an island in the marsh or swamp during the winter trapping and hunting season and removed to the margin of the marsh in the summer, where he might "hire out" as a "farm hand" or find some kind of job in town.[3]

The island, though lonely, served its homesite function well. The sand base insured perfect drainage at all times; its vegetation, consisting of an upper story of oaks, a lower of scrub growth, and a ground cover of bush and herb, prevented the island from being blown away; the formation, a natural aquifer, provided a wholesome and abundant supply of water,

naturally filtered; the timber furnished shelter and firewood; the ground cover often included dense growths of huckleberry and blueberry. As previously pointed out, this site had every advantage for exploiting game, fur, and subsistence food products.

3 "The trapper built a shanty on a ridge or an island as the case might be and during the trapping season would live in his shanty. Along about April 10 or 15 he would take up his traps, store them in the shanty, pack up his furs, and move out of the swamp to his home wherever that might be. Along about October 1 the trapper would go back to his shanty. A few of the Kankakee trappers that had no other abode lived in their shanties during the summer season. Back in the 60's and 70's the border towns had many trappers." - J. L. Werich, communication.

Home of the Squatter Trapper

The typical trapper of the Kankakee occupied a shanty of one or two rooms most simply constructed of unfinished lumber and usually with a single entrance. It appears to have been a common practice for trappers to move about, remaining on one spot for only a few years, then going to another island, where a new shanty would be erected. Occasionally a more substantial structure would be built in the form of the familiar frontier log cabin .[4]

4 The frontier "fur, fowl, and fin" environment and seasonal economy is well portrayed in a crude but detailed diary (1852) by a certain Josiah Granger (24).

The distribution of such primitive shelters was of the most scattered type, a pattern definitely related to the dispersion of the island sites themselves. In the early days the population was exceedingly sparse; later on, when the trapping business assumed greater commercial importance, more trappers were attracted, until restrictive measures were adopted, including separate "trapping claims" laid out at right angles to the river (27, p. 87).

The revenue derived from game resources during this period can be only roughly estimated, on the basis of hunters' reports. Muskrats supplied by far the greatest bulk of fur marketed, but brought the low price of from 3 to 15 cents per pelt. However, what the pelts lacked in individual value was offset by their overwhelming numbers and ease of exploitation. It is reported that a trapper found muskrat houses so numerous that three or four could be speared from one position of the boat. Another trapper states that, after the great marsh fire in 1871 (incidentally the year of the great Chicago fire), he sometimes caught in a single night more than 80 "rats" in a line of 100 traps. In Lake County alone the annual catch during the period from 1834 to 1884 is said to have averaged between 20,000 and 40,000 (21, pp. 519-520).

Farm Economy of the Frontier

Farm economy, such as there was, and fur exploitation went hand in hand during the frontier occupancy of the Kankakee. So closely were they associated that the form and

function of the settlement of one were only a slight modification of the form and function of the other. The typical frontier farmer was also a hunter, and in no small measure supplemented his income and diet with the wild products of the marsh and swamp.
Though the ideal site of the trapper seems to have been a rather heavily wooded dune island in close proximity to marsh, swamp, and river, that of the farmer probably was the marsh margin, or marsh islands near the margin, and particularly those with a somewhat heavier soil.

Perhaps the outstanding fact of sequent occupancy and utilization of farm lands in the Kankakee from the earlier days down to the present is the progressive expansion from the higher and drier, though generally much poorer, island and ridge soils to the lower and generally increasingly fertile soil types as they became available by drainage. This does not mean that the general agricultural development necessarily involved the abandonment, by the early settlers, of the original, and in some respects still preferred, sites of settlement. It is, rather, expressive of the areal spread of occupation as related to the growing drainage net and the early island sites, which represent the original nuclear farmstead attachments in the area. "There was the usual tendency to occupy first the lighter and the forested soils, because they were easier to handle with the primitive instruments employed than the heavier soils and prairie lands, and in addition the timbered areas furnished game, firewood, and building material" (8, p. 1701).

Wild grasses and sedges figured very significantly in the simple farm economy. They constituted the chief, if not the only, source of hay as well as pasturage. If the season favored the farmer, he might without much difficulty harvest the hay by a hand scythe or a mower. But should it be a wet summer, sleds, drawn by horses shod with sandal-like shoes, had to be used to haul the hay out of the marsh; or it was carried out on a pair of poles by two individuals walking tandem fashion. If it was impossible to reach the farmstead, the hay was temporarily stacked on an island near by and removed later to the farm premises when conditions permitted. Sometimes it had to be cut on the ice, which resulted in forage of rather inferior quality.

The farm routine of pioneer days was characteristically built up around the seasonal offerings of nature: in spring and fall, wildfowling; in summer, wild-haying, fishing, and huckleberrying; in fall and winter, trapping, hunting, and chopping wood. The growing of corn, possibly supplemented by wheat and oats, and the planting of potatoes and other garden vegetables, together with a little ditching by hand in summer, and perhaps some timber clearing in the winter, rounded out the season's program. Ditching as a legally controlled enterprise received attention as early as 1852, and ditching by hand was reported in Lake County in 1854. But not until steam dredges had been brought into operation in 1884 (3) was there any considerable progress made in drainage. So the ditch may be said to be the key to an understanding of the economy of the Kankakee, of its chronologically and chorographically integrated forms and functions, just as in most regions roads furnish the index to regional development. With systematic ditching came systematic road building and the development of a coordinated ditch-road settlement pattern, which chiefly characterizes the next two periods.

THE RECREATIONIST'S AND THE RANCHER'S KANKAKEE (1880-1910)

The erection of large clubhouses for sportsmen (1878-79); the introduction of large herds of cattle for range feeding by Nels Morris, the Chicago packer, and by others (1880); the use of the steam dredge for the first time in the Kankakee (1884) - these may be taken as basic criteria for the recognition of a new epoch. By this time, we are told, nearly all old trappers had left the marsh. "Rats" and certain other fur-bearing animals were still abundant, but pelts were cheap, though some forms of animal life were becoming scarce if not actually exterminated, as in the case of deer (last one reported shot in 1880). But wild fowl and fish seemed as plentiful as ever and attracted large numbers of sportsmen from far and near, who found the marshes and river a veritable "hunter's and fisherman's paradise." Whereas this form of the recreation industry expressed itself in seasonal boom days for the otherwise thinly settled river territory, the stage was all set for a reclamation program of the marginal marshes. This involved at first ditch drainage, primarily to convert the wild-hay marshes into cattle ranges and grain fields to support a livestock industry.

Ditch digging, now expedited by the steam dredge, also facilitated road building, for the ditch spoil bank itself often served as an elevated roadbed of porous sands and gravel, excellently drained and passable throughout the year. Railroads, which were constructed across the swamp and marshes as early as the 'fifties and the 'sixties merely to connect the older and more settled and better developed Hoosier communities downstate with the coming metropolis of Chicago now actually figured in the Kankakee development along agricultural and recreational lines.

The "Hunter's Paradise"

Railroads thus opened up the once-secluded frontier empire of "fur, fowl, and fin" to the sportsmen of distant cities as well as of communities near by. As individuals and as organized clubs they came in numbers from Boston, New York, Philadelphia, Washington, Chicago, and other large cities. Though the sportsman's presence in the Kankakee is a matter now largely of a most glorious and romantic history, a few geographic landmarks remain: the abandoned Louisville Clubhouse near Baum's Bridge, where stands the historically famous relict houseboat of Lewis Wallace of Ben Hur fame; the Diana Club House near Thayer; the Alpine Clubhouse near English Lake; and the Cumberland Lodge in southern Lake County (see Map 23). The first three represent river sites characteristic of the times. The last has a marginal marsh-island, oak-grove situation.

Several considerations appear to have influenced the clubhouse sites. In the first place, the river itself was a most potent factor, if one may judge from the distribution pattern. It had its own peculiar charm in its beautiful winding and wooded course. By it many a hunter, fisherman, and river resorter entered the region. The general situation gave ready accessibility to both the hunting and the fishing grounds. Clubhouses, however, were not scattered at random along the river, but usually were located at points of vantage representing either favorable dry and elevated sites or transportation advantages of a road or a railroad crossing the river. The combined influence of communication and

favorable drainage conditions is illustrated by the agglomeration of clubhouses and tent camps, which were at Shelby and at Water Valley. At the latter site, still a popular summer resort, were the Chicago Sportsman Club, the Capitol Club of Indianapolis, the Indianapolis, the Rensselaer, and the Dally clubs, with the Diana Club just south of the river. The Baum's Bridge clubhouse site illustrates by way of general situation the potent influence of the tongue of high and ever-dry sandy upland "Plainfield" soils, extending southward to the river. This, together with a similar elevated belt on the south side of the river, forms a sort of ridge that bridges the marsh (Map 21). A most important trail of the aborigine, this crossroads of the river, swamp, and marsh was instrumental in making Baum's resort famous. Here located the clubs of Louisville, Pittsburgh, Rockville, Terre Haute, and Indianapolis (27, p. 106).

Among the clubs which established themselves in the Kankakee were the Columbian Hunting Club on Island No. 62 (named after the number of its membership) ; that of Logansport, Indiana, whose tent camp was pitched on Cornell Island; and the De Guila, Alpine, Prairie, Wallace, La Fayette, and Crawfordsville clubs. The smaller groups and the individual fowler or fisherman used tents, shanties, or cottages. A number were accommodated by farmers living on the marsh margin.

Catering to the general health-, rest-, or recreation-seeking resorters led to the establishment of a number of hotels, as at Thayer.

Reconstructing the former scene of the sportsman's Kankakee, we observe that the swamp rimming the river is sufficiently narrow to act only as a momentary screen to the completely changed yet hardly less charming view of the marsh without. Here, as far as the eye can see, is an expanse of marsh interrupted only by an occasional upland oak grove on a sandy knoll or ridge, or possibly by a cluster of closely set pin oaks rising out of the water, with their characteristic scraggy downward-bending dead branches. Miniature mounds with clumps of grass just emerging from the water betray the somewhat undulating character of the otherwise markedly far-flung flatness of the submerged terrain. Rank sedges and grasses (source of marsh hay) and flags mark the shallower stretches. With these alternate the wild-rice swales; the cattail, spadderdock, and smartweed slough; and the reed and lily ponds, water sites throughout the year.

Domes of earth and flags, the homes of whole colonies of "rats," dot the rims of sloughs, ponds, and poorly defined stream channels. The wild-rice and smartweed fields are the scenes of countless geese and ducks and other wild fowl which find here their ideal harvest by day, and in the neighboring swamp their haven by night. In a rather open spot sits a partly sunken sink-tub, forming an artificial blind screening the hunter. A natural screen almost hides from view the outlines of a pushboat with the hunter, gun in hand, at the bow. The pusher in the rear propels the boat by probing a long push paddle in the boggy and weedy shallow bottoms of the marsh. In the vicinity of a flag slough is seen another pushboat hunter thrusting a spear into a muskrat mound.

The seasonal arrivals of the various feathered migrants give an added animated aspect to the general picture portrayed above. "In the spring, ducks generally began to arrive

around the middle of February, or as early as February 1. Mallards and pintails were first to arrive, followed by teals and bluebills, then spoonbills, and finally the wood ducks, which came about the middle of March. Wood ducks often fed on the timber acorns; others were strictly marsh birds and would not go into the timber swamp except during a storm." [5] "Sand Hill cranes and brant were plentiful in early spring, and later came the jacksnipe, plover, and rail to stay till the water seeped through the sand on the higher marshes, where the prairie chicken could be heard calling at break of day." [6]

But hunting proved profitable as well as pleasurable. Catering to hunting parties was an important source of income to hotels and certain farmsteads. The tractless morass and swamp also called for pushers who could serve as guides. One such individual conceived the rather ingenious idea of making a geographic survey of the marshes on the ice during the winter (Map 22). Several hundred copies of this map were sold in blueprint form to the visiting hunters, who otherwise might, and did, lose themselves occasionally in the maze of the wild morasses.'

5 Interview with the veteran hunter Mark Anderson of Knox, Indiana, who hunted the Kankakee for fifty years.

6 Report of another professional hunter of the Kankakee, George Burk, of Valparaiso, Indiana.

7 Practically all the islands of any consequence in the Kankakee marsh were named, which indicates their geographic importance to the sojourning sportsman and to the native inhabitant. Not only did these named landmarks identify the home, club, and campsites, but they also served as guideposts to the hunter traveling in an otherwise tractless marsh.

Their nomenclature suggests an interesting study in toponomy. The names characterize many features of the topography and impart a certain amount of personal local color, as is revealed by sampling the several classes of names appearing on Ahlgrim's map and in Werich's work. There are, first of all, the "generic" topographic terms, such as "island," "ridge," "knob," "grove," and "garden." To these, in binomial fashion, are added the "specific" names likewise falling into several categories. Thus we have Indian Garden, French Island; Bissell Ridge, Wheeler Knobs; Little Grape Island, White Oak Island; Goose Island, Skunk Knobs; Long Ridge, Flat Island; Shanty Island, Bridge Island; Bogus Island, Island Six to Two.

Another set of terms identified water forms of the marsh, swamp, and river, for example: Flag Pond, Wild Cat Swamp, Sandy Hook Creek, Cornell's Bayou, Pottawatomie Ford, Frenchman Slough, South Marsh, Devil's Race Track.

8 Said by Richard Lieber, former head of the Conservation Department of Indiana, to be a typical "Hoosierism."

The Swamp and Marsh "Natural" Industries Lumbering

The axe encroaching on the swamp, the sickle advancing into the marsh, the barbed-wire fence enclosing the range, the plow breaking up the prairie sod where the steam dredge had dug wide and deep drainage ditches river-bound -- these are additional expressions of the human occupance of this period which we shall now consider.

Lumbering, already started in the last epoch, attained its greatest yet rather restricted development during this period. Among the most enterprising sawmillers at this time was A. H. Ahlgrim, who built sawmills successively near Thayer, Roselawn, and Water Valley. He still resides at Water Valley where he now operates a summer cottage resort.

As early as 1875 logs were rafted down the Kankakee River to Momence, and, since the timber swamp adjoins the river, this would seem to have been an ideal situation. But river rafting did not prove any too practicable, owing to the tortuous and snag-infested channel. The numerous spikes which had to be used to secure the rafts often proved a menace to the sawmiller. In the course of time stationary and then portable mills came to be located at the source of timber, the latter being particularly useful in the small and scattered oak-grove "islands."

The swamp elm, ash, maple, pin oak, and burr oak constituted the chief species marketed from the swamp. On the sand knobs and ridges white oak was extensively exploited. Fence posts and firewood have taken their share of the timber toll. The "setting out of fires" [s] has reclaimed some of the swampland for agriculture, but extensive tracts of fired timber are unutilized and present a pitiable spectacle of despoliation.

Marsh Haying

Marsh-hay exploitation at this time was a commercial venture on a large scale. With the subsidence of the high spring floods about the first of May the wild sedges and grasses were ready to be cut in July and August. What was not summer-pastured, or fed locally as winter forage, was baled by large steam presses and exported. The varieties of short and long, tender and tough sedges and grasses adapted the hay to various uses. From the upper shallower marsh sites and along the "islands" was cut the shorter, tender, more succulent, and nutritious feeding hay; the lower deeper marshes yielded rank and tough growths, which were shipped, to Chicago, for example, as bedding or packing hay.

Stock Grazing

The marsh-hay pastures and the "island" oak groves invited a cattle economy which was developed first and foremost by Nels Morris, the Chicago packer. Practically all the true Kankakee marsh and swamp lands of Jasper County and northeast Newton County, totaling 23,000 acres, were taken over by him. Thousands of head of cattle, many from Texas, were shipped in and grazed on tracts fenced into units the size of a section or so, imparting the aspect of a western ranch with its picturesque professional cowpuncher.

Other ranches included the well-known Brown estate in southern Lake County, partly protected from flood by a privately constructed dike or "levee"; and another ranch of about 5,000 acres near Thayer, Newton County.

THE RECLAMATIONIST'S AND THE RESORTER'S KANKAKEE (1910-)

The Kankakee is a quandary. If one were to ask today "What does the Kankakee represent?" the answer would probably be one of two opposing types: (1) It represents a land that "God forgot to finish," a man-reclaimed area of extraordinary fertility; (2) It represents a manhandled marsh, a failure as a reclamation project, a substitution of unproductive lands for the most ideally adjusted wild-life forms of plant and animal, so essential to the nation's conservation program. A survey of the physical and cultural setup should help in clarifying the situation. The regional quality of the Kankakee may be assayed (1) by comparing it with its neighboring morainal uplands and (2) by taking a qualitative-quantitative inventory of the resources of its component divisions.

The panoramic map (Map 23) may be said to express the sum and substance of the author's contribution to Kankakee chorography. Together with explanatory notes it records the essential results of both personal field survey and literary research. Its crop-cover analysis and land-soil synthesis are offered as a more or less self-contained unit.' It remains to interpret these data along with the questionnaire interviews in terms of the present human occupance and economy.

The area as delineated represents the river territory of some 620 square miles embraced within the so-called "Kankakee Grain and Pasture" agricultural division of northwest Indiana. This division practically coincides with the sandy "Maumee-Plainfield-NewtonMuck" soil province, to which the Kankakee proper adds the Swamp. Once an ancient lake bottom, the far-flung Kankakee terrain, interrupted only locally by sand knobs and ridges, conduced to readiness of cultivation in large field units. Quarter or half sections of corn divided by few fence lines are not uncommon. Large level field units favor tractor farming, and make for large farms, many of them a half section or more, as compared with the quarter-section farm on the rolling rimming moraine. But large farms involve large investments, particularly in the case of virgin bottom land held at initial high figures and subject to drainage assessments. The result is that the larger Kankakee farms show an extraordinarily high percentage of tenant operators, as high as 85-90 per cent in some localities, whereas on the neighboring uplands one half or more of the farms are operator-owned. Combined frequently with uncertain or short-term leases, such a system conduces to a more or less exploitative type of grain farming, without proper regard for the place of the animal industries in helping to maintain soil productivity. Once famous for its large ranches of beef cattle, the Kankakee today is noted for its cereal culture. Livestock consists chiefly of small dairy herds normally ranging from six to a dozen head and of swine about twice that number. The swing in latter years to dairying in the form of whole-milk production reflects the proximate position of the Kankakee with respect to Chicago. Its more distant position and poorer

quality of pasture, however, put it at a certain disadvantage as against the closer competing areas.

9 Natural cover and crops are represented by superimposed colors on the author's hand-colored map.

The Physical Setting

Climate

As indicated in the introduction, the Kankakee lies within the Koppen Dfa type of climate (Map 19). However, it assumes practically a borderline position between the severe-winter Dfa and the mild-winter Cfa types, the average temperature of only one month falling below 26.6° F., the critical figure used to define the D-C boundary. With a total of nearly ten inches of summer rainfall (two inches above the critical corn figure), in addition to an advantageous high water table, and with a growing season isotherm of over 71° F. (5° above the critical corn temperature), the climate is generally well suited for corn, the chief culture, except for certain frost hazards, as pointed out below.

Although statistical data for near-river locations are not available, those of Wheatfield are considered quite representative of general marsh conditions; the station has essentially a marsh situation and elevation, though its location is somewhat marginal to the marsh proper.

AVERAGE TEMPERATURE AND PRECIPITATION DATA
OF WHEATFIELD, INDIANA (19)
Length of record, 14 years
Average monthly temperature for the year, 49.7° F.
Total average annual rainfall 33.69 inches

	J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.
Temperature.	28.2	28.8	38.8	48.5	58.7	69.2	73.4	71.2	65.0	53.2	37.6	28.3
Rainfall	1.82	1.28	2.61	3.74	3.30	3.60	3.04	3.10	3.55	2.91	2.25	2.49

Comparison of the monthly, seasonal, and annual temperature and precipitation figures of Wheatfield with those of a typical upland border moraine station, like Valparaiso, about twenty miles due north, reveals a very close parallelism of climatic conditions.

The shorter frost-free season in the Kankakee as compared with the neighboring upland is no doubt chiefly due to air drainage, locally influenced further by muck soil.

Subsoil

The sandy and gravelly substratum deposited in the original Kankakee lake basin has proved at once the boon and the bane of its agriculture. Facilitating subsurface drainage, the light and porous subsoil is responsible for heavy leaching. Especially is this a vital factor when one considers the limited role livestock plays in the extensive cereal type of

farming, in which animal manures are quite negligible. Consequently fields planted to corn are now almost regularly fertilized (about 100 lb. of commercial fertilizer to the acre), as is practically true also of wheat.

Soil

The dozen or more different soil types, represented in part by a variable classification and scale in the several counties, may be reduced to a regional basis of five serial units: Plainfield, Newton, Maumee, Swamp, and Muck. Their areal spread is indicated below. Maumee, rated in general as an all-round good soil, comprises about three fifths of the Kankakee area, whereas Muck, covering an additional seventh, is a fertile organic soil well adapted to special crops, such as mint, corn, and certain truck products. The remaining approximate fourth embraces Plainfield and Newton, mostly lean, light-textured soils, and the Swamp, mostly representative of burned or partly cleared timber wastes.

Drainage System

As pointed out above, the chorographic development of the Kankakee is a function of the drainage ditch, without which the expansion of agriculture would have been impossible.

Dug by hand in pioneer days, then by oxen and horses, and finally by steam dredge, introduced at the beginning of the last epoch (1884), drainage ditches were extended farther and farther from the marsh margin into the river swamp. The Kankakee River itself finally was straightened in Indiana, first in its headwaters and then all the way to the state line (1906-17). In addition to the drainage ditch, the reclamation system locally includes tile drainage and levee protection (for example, Brown Levee in southern Lake County).

The most remarkable fact about the present drainage setup is its marked artificial character. This is strikingly expressed by the rectilinear pattern of the numerous ditches with straight angular courses and profiles (Map 24), frequently accentuated by highbanked spoil ridges flanking the ditches.

The reclamation program utilized in part the original natural channels of stream drainage, which were straightened and enlarged. Much more ditch mileage, however, is represented in the newly dug trenchlike drainage lines which in large areas conform to the regularity of a road pattern. Together these form an elaborate dissection of the Kankakee plain, in which practically each section lies within only a mile, or a mile and a half, of a drainage ditch, whereas the majority of sections regularly have one and occasionally two ditches transecting or flanking them.

Three general classes of drainage areas and associated types of drainage features may be recognized:

(1) Along the river is the swamp, for a convenient boundary of which we may take the high water line shown on Map 24. Within this area, which is generally still underdrained and subject to periodic overflow, we have first of all the Miller-Place-

Marble-Williams' ditches. Jointly they represent the dredged equivalent of the original meandering Kankakee. The straightened and deepened and widened channel follows only the most general trend of the early river and is for the most part flanked by high spoil banks. The digging of the big ditch and the dumping of the spoil material have all but obliterated the original river meanders, bayous, and oxbows, though occasionally one has been spared.

Associated locally with the main ditch are levees and parallel relief ditches, which could almost be regarded as a part of the river system; tributary swamp feeders enter the main line of drainage mostly at right angles, in trellis fashion.

(2) The marginal marsh whose drainage lines characteristically follow the parent natural stream channels have preserved somewhat the original dendritic pattern. These ditches, in their headwaters at least, follow rather closely the trend of the ancestral creeks which descended the marginal moraines and debouched their waters into the marsh.

(3) Finally, ditches of a third class may be regarded as artificial "extended consequents," which lead the water from the marginal marsh ditches into the main channel.

The lack of sufficient fall directly riverward resulted in the peculiar deflection westward of these lower marsh drainage courses. Examples of these drainage units running almost parallel to the river ditch are the Singleton and Brown ditches in Lake County and the Hodge ditch in Jasper County.

Ditches commonly are eight, fifteen, and twenty feet in width; a number of them are as much as a half chain wide. The river ditch in its lower course ranges from one and one-half to two chains in width. In addition, almost an equal space is occupied jointly by the berm and the spoil bank, although in some places the excavated material of the smaller ditches is leveled off and becomes part of the cultivated field.

Agricultural Forms

Crops

"Corn is King" in the Kankakee, apparently occupying more acreage than all other cultivable crops together. Oats ranks next, followed by wheat. Both plow pasture and forage crops are close rivals of wheat for third place. This order likewise expresses the normal sequence of crop rotation (c-o-w-p), though the cycle may stop with three or two crops. Thus plow pastures are renewed normally about every fourth year.

Cereal crop yields on the better Kankakee soils (Maumec-MuckSwamp) probably in general run from 25 to 50 per cent higher than on the bounding uplands, 35 to 40 bushels of corn to the acre being not uncommon. But the soils generally, as pointed out above, show a marked tendency toward depreciation. Thus they express a condition of both strength and weakness. Particular soil adaptations are discussed below under the several

soil-land heads. In addition to these influences, several crop concentrations are noted as influenced by factors quite independent of any particular soil type. The author's survey reveals a marked regional differentiation in the amount of acreage devoted to wheat in the eastern half as compared with the western. Proportionately much more wheat is raised east of La Crosse, or the Porter-Lake and Jasper-Starke county lines, than west of them. This condition seems to be related to the higher position and hence the drier condition of the tipper valley.

Mint is confined to the Muck areas or mucky phases of the Maumee east of the Hanna-North Judson line. Though the Kankakee soils collectively and individually are peculiarly well adapted for growing truck products, proximity to consuming centers or storage and marketing facilities results in local concentrations, such as at De Motte, North Judson, and particularly at South Bend.

The general friability of the Kankakee soils, like the levelness of the terrain, facilitates plowing and cultivation. Sticky clays or cloddy textures are practically unknown. On the other hand, certain types, such as the Plainfield or the lighter Muck, are so light that they will "blow." Roots of plants may thus be exposed or the whole plant dislodged. Furthermore, muck dust makes cultivation on windy days unpleasant for both man and beast. A farmer on muck ground remarked: "There was a time when we `drowned out'; there are times now when we `freeze out'; and then again we may `blow out'."

The general conditions of the subsurface drainage appear quite satisfactory (25). It is only natural, however, that in a dry season the ground water table level should be found too low on the sandy uplands, and in the wet season too high on the low swales. It appears also that, when droughts do occur, the crops on the upper sandier areas may "burn up" in a day or two, whereas on the bordering moraine uplands the effects are felt gradually.

Having to reckon with but few surface obstacles, except in the swamp, the ditch-digging program was primarily concerned with getting sufficient fall, an important item in a nearly level country where the coarse sandy sediments have a tendency to fill up the ditch. Associated with this phenomenon, the growth of cattails, bladderwort, and other aquatic forms check the current and, together with sand deposits, clog the drainage lines. Either of these conditions in time necessitates recleaning.

Pasture and Waste Lands

The Kankakee is identified with the so-called Grain and Pasture region of Indiana. In the Kankakee reclaimed area proper about one eighth of the cultivable area is in plow or rotation pasture, and with grain shares the better lands, the Maumee and the Muck. Much of the Kankakee pasturage, however, is relegated to the marginal, light, rolling, and partly wooded Plainfield and closely associated Newton. As much as 25 to 40 per cent of the Plainfield groves is pastured. This type of native pasture is of rather inferior quality, with a carrying capacity of one grazing unit to 5-10 acres.

A much smaller percentage of the Swamp is used for pasture on account of the inadequate drainage and the extensive cover of timber, brush, and rank weeds.

Contrasting with the regular rectangular grain fields and plow pasture, the outline of the native pastures is notoriously irregular, bounding a Plainfield ridge or knoll or enclosing an irregular brush or stump clearing in the swamp.

While most of the Swamp and much of the Plainfield timbered areas represent practically wasteland, the "broken" marsh and swamp areas have an insignificantly small acreage lying idle, as indicated by an x on the Chorography map (Map 23). The small widely scattered units amount to hardly three sections of all those mapped, or barely two per cent of the whole cultivable area of the inner Kankakee basin. Even some of this represents only temporarily fallow fields.

One of the most singular expressions of agricultural adjustments arising from the ditch-digging program in the Kankakee is the appropriation of ditch water for livestock. A large number of ditches are sufficiently below the ground water table to offer a more or less permanent supply of good water, though stagnation and heavy iron flocculations sometimes result when the water table gets too low, or when partial clogging of the ditch occurs, as mentioned above. But ditches were not designed to be "natural watering troughs" for stock to trample around in; in fact, there appears to be a regulation against the use of the drainage ditch for this purpose. At any rate, in nearly every case the ditch is outside the regular pasture bounds, and its water is made available to stock by extending the fence at certain points part way into the ditch.

Settlement and Circulation

Farmhouses average somewhat less than three to the square mile, or a total of some 1,800 for the region. Unlike the more or less even distribution on the marginal moraine country, the occupance pattern shows marked local concentrations, as will be brought out in discussing the respective types below.

The reclamation of the original Kankakee on a large scale was made possible mainly through the relatively few but extensive holdings of land companies or individuals who offered the land for sale undeveloped or improved. The ready-made farm unit tended to assume a standard type - a half section of land with a frame T or L structure of seven or eight rooms, or the cheaper square double-story type. As the Kankakee became more settled variable types were introduced.

More than half of the farmsteads of the Kankakee are located on a hard-surfaced highway of some kind, commonly of gravel or macadam, or, as in the case of superhighways, of asphalt-macadam or concrete. Only very few of the remaining farmers are more than a mile from an improved road. But under modern drainage conditions even the ordinary "dirt" road is seldom impassable, owing to the sandy base. The ready subsurface drainage, combined with the frequent availability of ditch-dredged

material for elevating the roadbed, has proved a great asset to the Kankakee road-building program.

Towns

With few exceptions the towns, as shown on Map 23, may be said to belong to the bordering moraines rather than to the inner basin proper. Their marginal position clearly is determined by the barrier influence of the early "marsh" to encroaching settlements.

Of the score of settlements that rim the basin, only one, that of South Bend at the head of the valley, is a ranking industrial community; it has a population of over a hundred thousand. Several of the larger towns have a population of from one to two thousand; most of them have less than five or six hundred inhabitants.

Grain elevators, a few warehouses for storage of truck products (in the east), and an occasional light industry, such as a picklepreserving plant at Knox, enter into the simple extracommercial core setup of the Kankakee trading centers.

Regional Subdivision

The Kankakee region may be regarded as made up physiographically of only two consolidated divisions: a narrow but practically continuous timber swamp in the river bottoms and the extensive marsh prairie of the flat-floored valley. A very general distinction may also be recognized topographically (geographically) between the eastern and western halves in that the former lies higher, has a greater average width but a narrower and finally disappearing swamp; features larger muck areas, with mint culture (altogether absent in the west); and produces proportionately more wheat and truck. On the other hand, practically all the river resorts and amusement centers were and still are in the western half.

Basis for Areal Differentiation

Except for the general divisions given above, the Kankakee does not appear to lend itself to a simple dissection into unified homogeneous units. Subregional treatment rather involves a recognition of a unit form as consisting of small patches of the landscape related in structure and origin, however discontinuous and dispersed they may be. The basis for such areal differentiation is found in the diverse land-soil formations of the valley. Comprising a dozen or more soil types, the soils for purposes of a regional classification may be reduced to five structural classes reflective of land surface as well as soil characteristics - Plainfield, Newton, Maumee, Swamp, and Muck.

Landform and Land-Use Patterns

PLAINFIELD: The Farmsteaded "Island." - The sandy and rolling Plainfield is at once next to the least and yet the most important topographic unit in the Kankakee. Aside from the Swamp, it embraces by far the greatest percentage of untilled land; however, it can claim more farmsteads per unit area than the other four units combined.

Occurring in the form of islands in the early wet marsh, the Plainfield still forms the most striking natural element of the prairie landscape in terms of both landform and natural vegetation. As indicated on Map 23, the insular units are quite regularly distributed and range in size from a mere knob large enough to accommodate a single small farmstead up to a square mile or more in area. The Plainfield as mapped includes a small amount of heavier clayey phases that do not form conspicuous rises. The areas definitely ridged or elevated are included in a dotted line on the map, representing the basal contour above which the roughly estimated average (or common) and maximum heights are recorded in feet. Thus an inventory of a score of recorded values for each of five counties shows an average of 5 and 10 feet for common and maximum dunal heights, respectively. Small knobs generally do not rise much over 5 feet; the higher ridges run from 15 to 20 feet, and, in extraordinary cases, from 30 to 35 feet in height. These elevated tracts assume the form of small circular or oval mounds (H 4, U 31); or long, narrow linear ridges (L 11, N 4); or very irregular outlines (D 19, V 5).[10]

10 Letters and numbers refer to strip and section location on the Chorography map (Map 23).

Forming the earliest sites of cultivation as well as habitation, the Plainfield is today agriculturally noted chiefly for its woodlot or herb pastoral economy. It is the only landform, aside from the Swamp, in which the area devoted to grazing is practically equal to or even greater than that devoted to wheat and oats combined, or to corn culture. Representing only about one fifth of the area of the fertile Maumee, it has nearly one half as much pastoral acreage. However, its grazing value, as was pointed out above, is much inferior, and in part represents actually waste land. Whereas the carrying capacity of the Maumee is probably around 12-2 acres per head, the Plainfield requires 5-10 acres. After the cereals beans, rye, forage crops, and truck follow in importance. In view of the general droughtiness of the lighter soils, which makes the growing of other forage and green manure crops difficult, soy beans (and locally cowpeas) prove a godsend to the sandy areas. Proportionately, the Plainfield has five times as much acreage in soybeans as the Maumee. The larger Kankakee soil province ranks first in the state in rye production. A characteristically poor soil crop, rye practically coincides in its distribution with the Plainfield.

The sinuous ridges of the Plainfield break up the horizontal as well as the vertical monotony of the Kankakee landscape. Cultivated fields are interrupted, winding fences bound the ridge pastures, and extensive unoccupied areas in one section (D 19) contrast with the numerous small closely set farmstead groves in another section (T 10). Plainfield houses average eight to the square mile and show a tendency to be agglomerative (E 16, 0 25, W 27, 34, 3). Though the former necessity for living here has passed owing to adequate drainage, the prairie "islands" supply natural shade trees and make for dry farm lots, even in the wettest season. Besides they command a view above and beyond the surrounding "cornscape."

MAUMEE: The Kankakee "Cornscape." - In terms of area or productivity the Maumee exceeds in importance not only any other Kankakee form but all the others combined. It

is the fundamental or basic structural unit of the Kankakee. Generally characterized by large continuous units, it is especially dominant in the eastern half, where, in the former "Grand Marsh" area, or southern La Porte County, and its adjacent parts in northern Starke County, it forms only a slightly interrupted unit of some 150 square miles, or nearly one fourth of the whole marsh.

Consisting largely of sandy loams and aggregating some three fifths of the whole area, it has a relative productivity several times this ratio. And so the Maumee may be truly said to be the "key to Kankakee agriculture." It seems quite equally adapted to the growing of all the Kankakee crops.

While averaging only two, or only one fourth of the number of farmhouses per square mile as compared with the Plainfield, the Maumee outranks the Muck-Swamp combined two to one. Since it represents the later lands in the Kankakee to be reclaimed, one would not expect to find remnants of pioneer homesteads on this type, as in the case of the Plainfield and. the Newton.

NEWTON: The Plainfield-Maumee Transition. - The Newton assumes an intermediate classification between the Plainfield and the Maumee in essentially all soil and topographic features. Lying characteristically between the higher Plainfield and the lower Maumee, it partakes now of the former characteristics, now of the latter, with transitional phases difficult to identify definitely with the one or the other.

Generally light in texture, similar to certain phases of the sandy Plainfield, the typical dark brown of the Newton is suggestive of the Maumee. Its natural cover now may partake of the Plainfield oak association, and again may represent a transition mixture of swamp pin oak and upland black-white oak, or occur in the form of a swamp outlier of pin oak. Marsh herb no doubt also entered locally into the original composition.

The crop-distribution analysis seems to suggest nothing much out of the ordinary, except a disproportionately large acreage of oats.

Averaging per unit slightly less than half the number of Plainfield farmsteads, the Newton does show definitely the effects of its elevation above the Maumee in having nearly twice as many houses relatively as the latter.

MUCK: The Mint Formation. - Constituting about 15 per cent of the area, the Muck occupies the former sites of shallow lake basins and swales and tributary valleys more or less permanently covered with standing water in which grew cattails, reeds, flags, aquatic sedges and grasses, and other forms of vegetation. The high organic content of "raw" muck (or peat) is illustrated by the shrinking which results when a farmer sets out a fire on this type. Such a practice is said to be beneficial in preparing the unbroken muck pasture for its initial crop of Hungarian millet, barley, or oats, after which it is ready for corn.

Distribution of the Muck is spotty and irregular, with a few large contiguous areas in southern Lake County (site of the former "Deep Marsh") in the English Lake district and in the eastern third of the valley.

Among the last lands to be drained, these Muck areas have lost practically every trace of their former herb (wild-rice) cover, and in its place we find an almost complete utilization for any combination of Kankakee crops. Only locally, where inadequate drainage permits rank weeds to choke out the cultivated products, do we find an idle field (135, U 30, river section).

Muck is mint ground, and here figures prominently in the reputation which Indiana holds as the first ranking state in mint production. For some reason mint has not yet invaded the large muck section of Lake County, and apparently has not advanced westward beyond the English Lake district. Mint economy fits in well with corn culture, for muck is excellently adapted to both crops.

Muck areas are distinctive not only for their low, level, black fields, but also for an almost complete absence of farmsteads. These average only about one half to the square mile, or about one fifth of the average of the valley, or one fifteenth of the Plainfield. Muck dust is a real nuisance to the farmer's home within as well as without, and so he locates on the edge rather than in the heart of a large muck field. On the other hand, one type of structure is almost uniformly a fixture of the muck-mint landscape - a mint still, which approximates the size of a small two- or three-room house.

SWAMP: The Timber Formation. - The Swamp proper follows the Kankakee River for two thirds of the distance from Momence to South Bend. It forms a belt generally less than a mile in width, but attains a maximum of some two or three miles in its middle course in northern Jasper and adjacent counties. In addition, several square miles of swamp land, mostly cleared, appears along the Yellow River, tributary of the Kankakee. A comparison of the Fundament map (Map 21) with the modern survey shows only slight changes in the former general pattern of timber distribution incident to the reclamation program. The original dominant species composition as reported in the survey notes of Uriah Briggs - "ash, elm, maple, oak, and birch" - has not changed, except locally where popple invades the clearings.

On the other hand, the type of stand or stocking of the timber has changed tremendously. Once including many towering and massive trunks up to three or four feet in diameter, the modern Swamp has only a very sparse sprinkling of maples, elms, and other species of merchantable log quality. The characteristic stand is made up of young timber under three or from three to six inches in diameter, with a sprinkling of timber six to twelve inches in diameter (K 9, N 28, S 5).

Repeated attacks by axe, fire, and fungus have produced a motley patched effect of black fire-charred or disease-ridden trunks mingled with scattered sprouting stumps, thick reproduction stands of single species, the whole interspersed with a brush undergrowth of rank shrubs and weeds. Locally the partly cleared areas are pastured. These take on more

of a grove aspect, are relatively free from underbrush, and occasionally form meadows with only here and there clumps of bushes.

Corn is practically the only crop of importance in the Kankakee swamp. Oats and wheat are represented sparingly, chiefly in the Yellow River territory; locally also a truck patch. The soil, of a generally light texture with an admixture of nonhumified wood, seems readily convertible into productive, corn land, but because of proximity to the river is mostly subject to overflow during times of high water. Late spring floods may thus unduly postpone the planting season.

Recreation and Conservation

The Swamp represents the last line of retreat for the recreationist. And by the final straightening out of the old meandering Kankakee in Indiana the resorter has lost all but a few remnants of the natural landscape which lends charm to such a river retreat. The name Kankakee itself seems doomed to extinction, since some people now refer to the Miller, Place, Marble, and Williams' ditches instead.

The deeply trenched and highly banked river ditch, a chain or two wide, with its rather rapidly moving current and load of sand, has little to offer in the way of river scenery or sport. Once nationally famous for its natural charm, for fishing and boating, the dredged Kankakee of today seems popular locally only for bathing where the current is not too swift. The effect of river straightening on resort developments is strikingly manifested by contrasted conditions on the two sides of the Illinois-Indiana state line. The Illinois Kankakee above Momence, with its essentially unmodified meandering course, can boast of nearly a score of resort establishments. These include some 275 cottages within the short distance of less than a dozen miles of river front; whereas, on the Indiana side, for a distance of over 85 miles, there are hardly a half-dozen resort groups, which number only some 125 cottages, including the unusually large Bohemian resort of about 80 residences.

The river resorts and recreation centers vary in morphological type, conditions of settlement, and points of attraction. We note the following: the pretentious Bohemian "Sumava Forest Resorts" just mentioned, a type of colony in Newton County with urban characteristics; the "None-Such" camp (A 22) featuring horse racing; the "Garden of Eden Golf Club" (C 13); and the resorts, picnic camp grounds, or dancing pavilions at or near river-bridge sites, such as at Baum's (0 26) and Dunne's (Q 15) and at Shelby (H 33).

Finally, the Kankakee State Game Preserve (Starke-La Porte counties) and the private Cameron duck farm (northeast Newton County) represent, we might say, the salvaged residue of the Kankakee swamp lands and wild life.

SUMMARY AND CONCLUSIONS

The Kankakee region of northern Indiana represents an intermorainal marsh reclaimed sector of the Corn Belt, with a unique historicogeographic setting.

A study of the conditions of the fundament reveals a threefold classification of primary land-surface forms: the herb marsh, the timber swamp, and the uplands consisting in part of sandy "barrens" and dunal oak groves. The uplands made possible the early habitation of the otherwise inhospitable marsh-swamp, a site influence in modified form still conspicuously noticeable in the present reclaimed Kankakee.

After a treaty by the native Pottawatomie with the Federal Government in 1832, providing for the relinquishment of the territory held by the Indian, the marsh wilderness entered upon a century of progress, paralleling the period of urban development of the neighboring metropolis, Chicago, less than fifty miles from its western extremity.

The drama staged in the Kankakee presents a succession of distinct areal scenes and groups of actors. The general theme, as disclosed by the several regional forms of occupance, features a continuous struggle between two forces - those intent on preserving the wild-life forms of plant and animal for their economic, recreational, and conservational utility, as against the group organized to further the program of reclamation. A network of drainage ditches tributary to the straightened, deepened, and widened Kankakee River attests to the complete dispossession of the former group, except locally along the river ditch.

A regional land-surface and soil survey of the reclaimed Kankakee suggests a fivefold physiographic division based on homogeneity of structural and genetic features. Except for the Swamp, these constitute an otherwise disordered pattern. They include the Plainfield, or farmsteaded "island" and woodlot-pasture formation; the Newton, the Plainfield-Maumee transition; the Maumee, the "cornscape"; Muck, the mint soil; and Swamp, the river-timber formation and resorter's retreat. These constitute approximately 13, 5, 60, 15, and 7 per cent of the area, respectively.

Rural settlement within the area is found to be most remarkably related to the diverse surface and soil influences. Farmsteads average a little less than three per square mile; the proportions of farmhouse distribution for these physiographic divisions approximate 22:1; 9:1; 5:1; 1.5:1; 1:1, respectively. Some four hundred resort cottages are found along the river ditch, mostly along the "natural" Kankakee on the Illinois side.

A sectional grid road system, 55 per cent hard-surfaced, makes for ready internal circulation and external contact with the rim of a score of towns which outline the boundary of the early marsh.

Agitation to restore parts of the once nationally famous "hunter's and fisherman's paradise" raises the questions, "Has the reclamation program justified itself?" and "Is partial marsh restoration practicable?"

Inventory of soils, crops, and occupance conditions seems to prove the general fitness of the Kankakee for agricultural use. The lands of marginal utility or waste areas are included chiefly in the narrow imperfectly drained Swamp, and the local spots of the droughty sandy Plainfield. Yet it is doubtful whether such a grand haven of wild life would ever again be permitted to be despoiled by man.

Salvaging areas for wild life presents both economic and engineering difficulties. Most promising is the swamp tract of some twelve sections of fire-scarred timber, chiefly in northern Jasper County.

In addition to the possible limited expansion of the swamp conservation and resorting program, we may expect other changes in the future: smaller farms, a larger animal industry, particularly dairying, and increased trucking. On the basis of the predicted unprecedented growth of the metropolitan district to the northwest, the Kankakee trucking areas may yet become "The Garden of Chicago."