

## PATTERN OF LAND OCCUPANCY IN THE MEXICAN LAGUNA DISTRICT

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The purpose of this paper is to present the results of one day of field study last summer. The field work illustrates a method in which details about a small area are included as an important part of reconnaissance in a large area; and the interpretation illustrates a point of view focussing on the pattern of land occupancy as a central feature of geographic analysis.

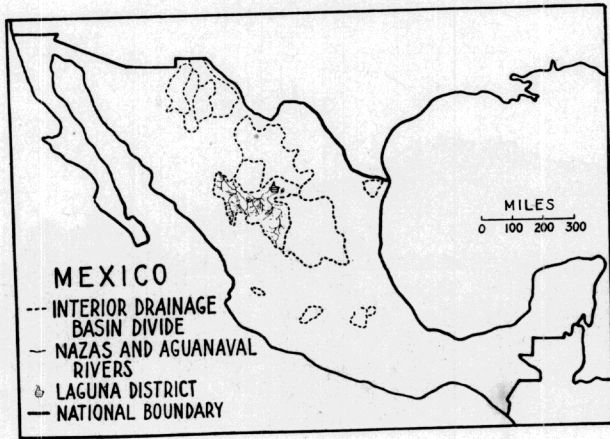


FIG. 1.

Most of northern Mexico is too arid for agriculture without irrigation. The places that are not too arid are too rugged, being only the upper slopes of the higher mountains. Therefore, the best agricultural possibilities are in the utilization of mountain rainfall to irrigate plains.

An indication of aridity is seen in extensive areas of interior drainage (Figure 1). All of these areas have some rainfall and some streams within them, but most of them consist of desert basins and low dry mountains with little rainfall and few streams. The one containing the greatest area of high mountains is the basin of the Nazas and Aguanaval Rivers. Seasonal rainfall in the Sierra Madre Occidental is collected by a network of headwater

streams and poured down the two river valleys and out of the mountains into the broad basin of the Laguna. The amount of water delivered at the mouth of the two canyons is greater than that at any other place in any of the interior basins. This is the natural basis for the greatest irrigation district in the Northern Plateau.

Where the rivers break from the mountains, canals lead off from them to distribute water to fields laid out on the desert plain (Figures 2 and 3). The pattern is simple and distinct: the run-off from thirty thousand square miles of mountains, accumulated and carried down by two rivers, distributed by a network of canals over the plain.

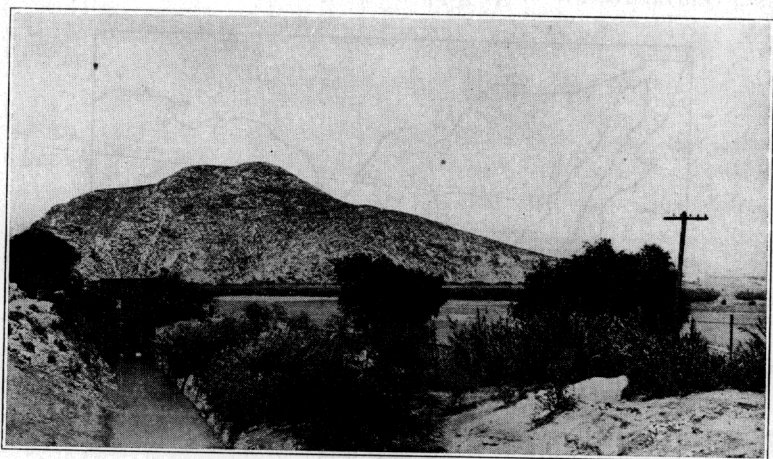


FIG. 2. Nazas River and irrigation canal headgate. Laguna District downstream to the right, mountains upstream to the left.

The features of the pattern include not only the canals ramifying from the rivers, but also the fields which they water and which produce crops, and property divisions with their water rights laid out for systematic development of agriculture (Figure 4). The greater subdivision of property in the area of irrigation is evident. The pattern includes also a network of transportation lines supplying the needs and carrying out the products of the fields, villages to house the workers, and commercial centers to serve the area (Figure 5). The chief city is Torreon at the point where the rivers leave the mountains. These features and many more fit into their places in the whole complex pattern of land occupancy.

Some details of the pattern may be illustrated by the one plantation of Tlahualilo, a property unit organized as a producing unit (Figure 4). The plantation occupies a basin of almost flat land, 30 miles long and 10 miles wide, between low mountain

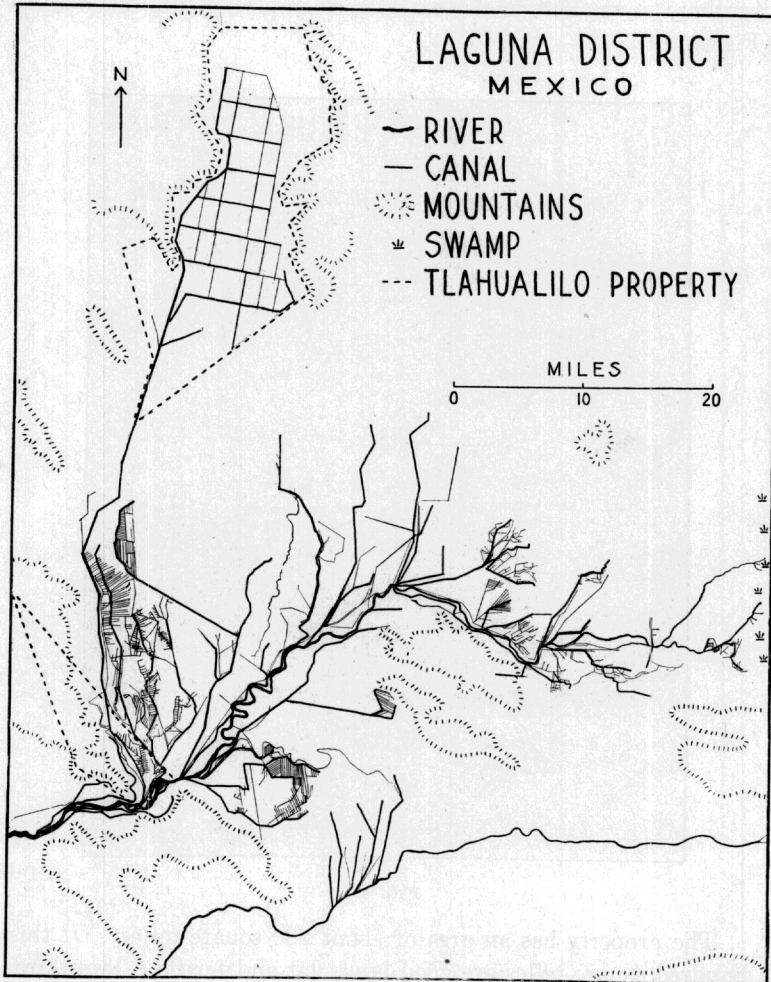


FIG. 3.

ranges. It has rights to a share of water from the Nazas River, part of these rights being derived from ownership of another plantation at the mouth of the Nazas Canyon which happened to possess large water rights but very little good land. The Tlahualilo

canal traverses fifty miles of desert plain from the Nazas River to the plantation (Figure 3) at the hardly sufficient gradient of five inches per mile, passes along the higher western edge of the property, and delivers its water to secondary canals, which in turn distribute to smaller canals and ditches emptying into diked fields (Figure 6).

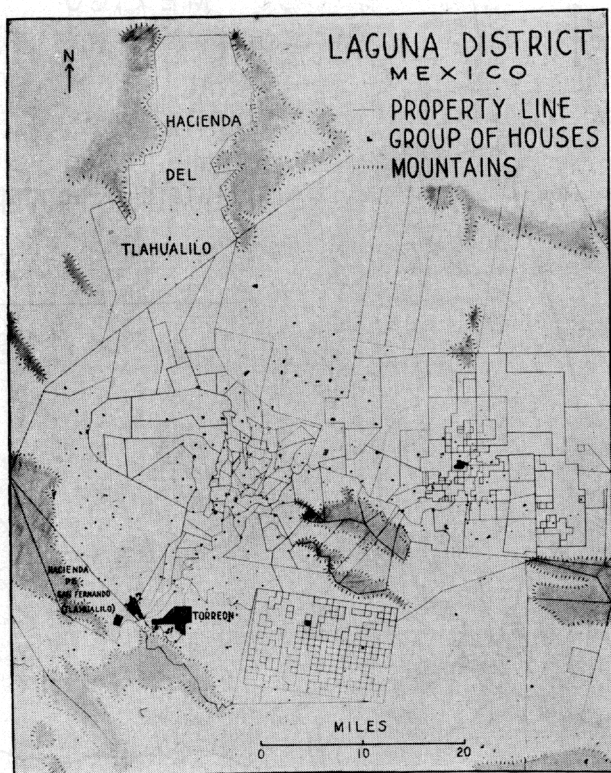


FIG. 4.

The property has an area of about 280 square miles. Of this, a hundred square miles are good land, flat and fertile. Two-thirds of this good land, about 45,000 acres, are prepared for irrigation, restriction to this amount being due to the limitation of available water. The area has been reduced somewhat in recent years by reason of the confiscation of some water rights for the benefit of smaller farms.

The plantation is managed from a central headquarters town. But being too large for central control of farm operations, its agricultural land is divided for farming purposes into twelve *ranchos*, some of them irregular in form where broken by hills or property boundaries, but the others of standard size, approximately 2.5 miles square, containing about four thousand acres, a convenient farming unit. (These are distinguished in Figure 6 as squares bisected by a secondary canal.)

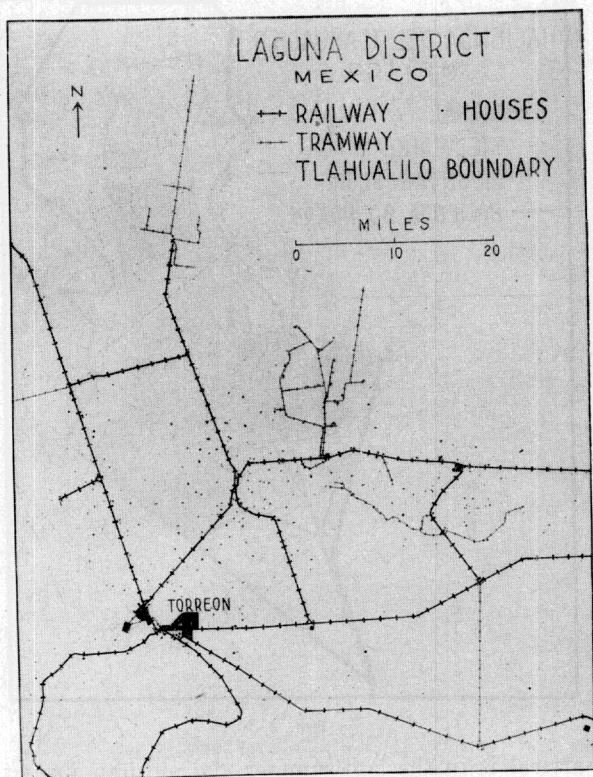


FIG. 5.

For convenience of cultivation each *rancho* is divided into fields of thirty acres, there being 128 such fields in a *rancho* of standard size. They are rectangles 500 meters long and 250 meters wide, (the smallest divisions shown in Figure 6), in each *rancho* 16 rows of them with 8 fields in each row (Figure 7). These thirty acre units are as large as practicable for effective irrigation,

larger than would be possible except on smooth land. Every field is bounded by dikes and reached by irrigation ditches.

Only about half of the fields are available for cultivation at one time. This is due to the seasonal distribution of water. The rainy season in the mountains is sharply defined, in the late summer. Run-off is rapid and there are no large storage reservoirs either in the mountains or on the plain. Consequently, the water must be applied directly to the fields when it arrives. The regular

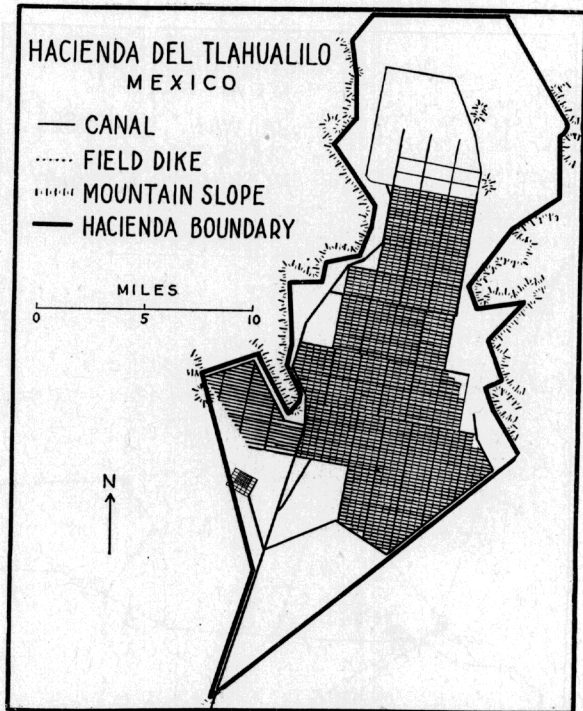


FIG. 6.

time of arrival is in the late summer and autumn just at harvest time, too late to irrigate a growing crop and too early to flood fields occupied by a maturing crop. Therefore, there must be empty fields ready to receive it. Thus fields which have lain fallow are flooded and practically become storage reservoirs of enough moisture to grow their crops the following season, while the harvest fields which are not flooded lie fallow in their turn. With minor crop exceptions, the system requires twice as much land as can

be productive at one time, but since land is plentiful as compared with water, this is not a serious handicap; in fact, it is of some value for soil conservation.

On each *rancho* half of the fields are flooded about three feet deep between August and November. By December the water has soaked in and by February the soil is dry enough for plowing and harrowing. In March and April crops are planted. Cotton is the preëminent crop (Figure 8). No other plant is so suitable, considering the amount of moisture available, the character of the growing season, frost free from March to November, and the marketable commercial product. It occupied 18,000 acres in 1928, almost 90 per cent of the crop land.

Wheat is a desirable supplementary crop, planted after cotton harvest in early winter, maturing before irrigation flooding the following summer, thus using labor at slack times and occupying fields which otherwise would be left idle, and in addition providing a marketable product. Unfortunately, it requires irrigation in January when only a small and uncertain amount of water is available, after the annual flood has subsided. It occupies less than 10 per cent of the land, 2,000 acres in 1928.

Fodder is needed for the work animals of the plantation, and some fields are given over to produce part of the supply. Sorghum fits in well under the circumstances; alfalfa fits less well, requiring more regular irrigation through the year than is generally possible.

Thus an average crop distribution in one *rancho* would be: 1,800 acres of cotton in 60 fields, 1,500 acres of fallow land in 50 fields, 300 acres of wheat in 10 fields, and 240 acres of forage in 8 fields.

The activities of each *rancho* focus in a village (Figure 9), presided over by an administrator under whom are ten foremen, each bossing a gang of ten field laborers. The village contains houses for the laborers and their families, stables for the mules, sheds for farm implements, stacks of fodder, reservoir for domestic water supply, a school, and tram line connection with the outside world of the plantation.

At cotton-picking time the working force is augmented by women and children and floating labor to about four hundred on each *rancho*. Pickers transport their bags of cotton by donkey from the fields to the *rancho* village, where it is credited to them and whence it is carried by tram to the ginnery at the general headquarters of the plantation.



FIGS. 7-9. See explanation on opposite page.

The headquarters town is the central focus for the whole *hacienda*. In it is the manager with his staff of assistants, engineers, chemist, entomologist, meteorologist, doctor, school superintendent, clerks and skilled workers, to man the offices, ginnery and compress, oil mill, machine shops, power house, waterworks, hospital, and school. There are also club houses, playgrounds, theatre, postoffice, stores, a garrison of soldiers, and the terminus of a railway connecting the plantation with the outside world of Mexico.

Tlahualilo is unique and not typical of the Laguna District in size and organization. Most of the properties have less than one thousand acres of irrigated land, and the few others which have large acreage are not operated as units but are divided among tenant farmers. But in agricultural practices Tlahualilo affords a good example of the utilization of natural resources in the region. Moreover, the great *hacienda* is in itself a notable feature of the pattern of land occupancy.

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FIG. 7. (Top) Tlahualilo looking east from the mountains on the western border. Unirrigated desert in the foreground, main canal across the picture in the middle distance, irrigated fields bordered by dikes and canals in the background.

FIG. 8. (Middle) Cotton field early in August, Tlahualilo. Secondary canal bordered by poplar trees at left.

FIG. 9. (Bottom) Headquarters of a rancho, Tlahualilo. Water supply reservoir in foreground.