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DIABETES MELLITUS AND OKLAHOMA NATIVE AMERICANS: A CASE STUDY OF CULTURE CHANGE IN OKLAHOMA CHEROKEE

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DIABETES MELLITUS AND OKLAHOMA NATIVE AMERICANS: A CASE STUDY OF CULTURE CHANGE IN OKLAHOMA CHEROKEE

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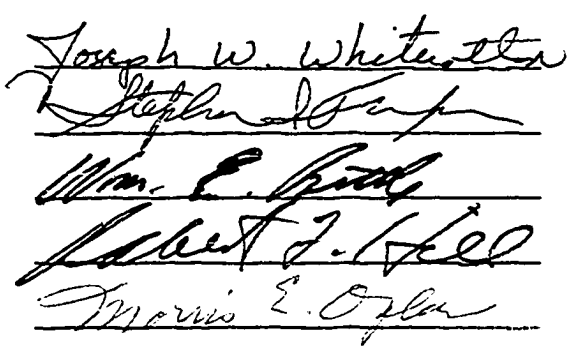

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DIABETES MELLITUS AND OKLAHOMA NATIVE AMERICANS: A CASE STUDY OF CULTURE CHANGE IN OKLAHOMA CHEROKEE

CHAPTER I

INTRODUCTION

The basic problem of this dissertation is the identification of factors which may underlie the high rate of diabetes mellitus among the Oklahoma Cherokee. Other Native American populations in North America will also be discussed for comparative purposes.

Physicians and medical scientists have noticed a dramatic increase in diabetes mellitus since 1940 among most Native American populations. By the 1960s, the disease had reached epidemic proportions. For example, by 1965 there were over two deaths due to diabetes among Native Americans for every one death from diabetes of a person of European background in Oklahoma. Such figures appear to be especially significant since this disease is thought to have been rare among Native Americans prior to 1940.

Since most, if not all, of the research on this disease has been conducted by physicians and epidemiologists, this study attempts to isolate historical and cultural factors relevant to the increase of this disease. It is the opinion of the author that anthropological method

and theory could refine the variables which physicians and medical researchers use when conducting their studies of diabetes. This study also attempts to remedy the general lack of the anthropological perspective in the study of Oklahoma Native American health care problems.

Diabetes Mellitus and Its Treatment

Joslin's Diabetes Mellitus (Marble et al. 1971:2) provides us with a definition of this disease:

> Diabetes Mellitus is a chronic, hereditary disease characterized by an abnormally high level of glucose in the blood and the excretion of that sugar in the urine. The basic defect is an absolute or relative lack of insulin which leads to abnormalities of metabolism, not only of carbohydrates but also of protein and fat.

There are two major forms of diabetes; juvenile-onset and maturity-onset. The juvenile form usually appears in childhood and the onset is often abrupt. In many cases, juvenile diabetes is first diagnosed when the patient is in a dibetic coma, but other characteristic complications may also be present. On the other hand, maturity-onset diabetes usually does not produce symptoms until after the age of thirty. The time of onset is often difficult to identify because of the slow manifestation of symptoms (Marble et al. 1971:2).

The complications of diabetes are mainly vascular in nature and lead to a marked disability in the large vessels of the brain, heart, and kidneys, and of small blood vessels especially in the extremities of the feet and in the eyes. Initial characteristics of maturity-onset diabetes are excessive urination and thirst (Marble 1971:2).

The treatment for most cases of juvenile-onset diabetes--this being one of the more severe forms of the disease--consists of insulin

injections (Marble et al. 1971:2). For the maturity-onset variety, there are at present three major forms of treatment. In mild cases, the treatment may consist of dietary restrictions. This dietary restriction may be supplemented with oral hypoglycemic agents. A third method of treatment is with subcutaneously injected insulin.

Since very few cases of juvenile-onset diabetes exist among Native Americans, maturity-onset diabetes will be the form discussed in this paper unless noted otherwise.

Oklahoma Native Americans and Diabetes Mellitus

According to the State Health Department, diabetes has been a leading cause of death among Oklahoma Native Americans since 1953. Since 1943, the average number of deaths in Oklahoma per year per 100,000 population has been 15 for whites, 22 for blacks and 27 for Indians. For each of the past 34 years there has been an average of one white person who died from diabetes as compared to two Indians in proportion to their population. In the last census year, 1970, there were 2,559,200 whites as compared to 98,400 Indians living in Oklahoma. These statistics are compiled from the yearly reports of the Oklahoma State Health Department and will be discussed in detail in a later section.

The earliest study calling attention to the high rate of diabetes among Oklahoma Native Americans was published by Bernard Sochet (1958). He was serving as General Medical Officer at the United States Public Health Service Indian Hospital in Lawton, Oklahoma, when he and the staff had the impression that more diabetic patients were being seen than would be expected. The Lawton Indian Hospital, at that time, was an 80-bed general medical facility. The charts of all the patients diag-

nosed as having diabetes mellitus between January 1, 1951, and December 31, 1955, were analyzed.

Two non-Indian hospitals, in the same population area as Lawton Hospital, were studied in comparison during the same five-year period: The Comanche County Memorial Hospital, a 100-bed general hospital, and the Southwestern Hospital, a private 70-bed hospital. At the Comanche County Memorial Hospital, out of 11,540 admissions for all reasons, 68 were diagnosed diabetes mellitus giving a percentage rate of 0.6%. At the Southwestern Hospital, out of 13,337 admissions, 178 were diagnosed diabetes mellitus, resulting in a rate of 1.3%. Lawton Indian Hospital, during this same period, had 9,978 admissions, and 430 were diagnosed diabetes mellitus, giving a rate of 4.4%. Shochet noted that there were approximately four times as many admissions for diabetes mellitus at the Indian Hospital as at the other two hospitals in the area (Shochet 1958:460).

Shochet identified the characteristics which are now considered typical of diabetes in many other Indian groups. Sixty-eight percent of the diabetic Native Americans were female as compared to 32% male. Seventy-six percent of the diabetic patients were between the ages of 50 and 80, with the average age being 57.3. Fifty-two percent of the diabetics were found to be obese, although this percentage is low in comparison to other studies. As with other Indian groups, there was no case of juvenile-onset diabetes among the patients admitted to Lawton Indian Hospital (Shochet 1958:461-462). He concludes that the diabetic rate for the Lawton area is consistent with the statewide rates of age-adjusted death released by the Oklahoma State Department of Health for the period from

1949 to 1951. These rates, as noted by Shochet (1958:459), were 32 per 100,000 for the Indian population, 16.7 for the black population, and 13.3 for the white population.

By 1965, attention was also given to the problem of diabetes among Southeastern Oklahoma Indians by C. Drevets at the United States Public Health Indian Hospital in Talihina. Drevets (1965) centered his study on all of the Choctaw people over one-quarter blood who were in-patients or out-patients from September 1, 1956, to August 31, 1961. The vital statistics about the 7,950 patients were assembled, and the results of a fasting blood-sugar test on the 241 identified diabetics, as well as the data on their dietary histories and family histories, were analyzed.

Drevets' major finding (Drevets 1965:329) was that the prevalence of diabetes in full-blooded Choctaws of all ages was 53.2 per 1,000; but in Choctaws of less than full-blood, the rate was 18.3. (Juvenile diabetes was not investigated during this time period.) Seventy-seven percent of all the women and 63% of all the men were more than 10% above average weight. This was compared to the standard for healthy, non-diabetics, who were overweight in 53% of the cases for females and 45% for males (Drevets 1965:325).

There was no significant difference between the full-bloods and mixed bloods in the frequency of diabetic complications. Other than having high blood sugar, 83% of the diabetics had no known complications. In the remaining 17%, there was one or more of the following complications: gangrene, acidosis, retinopathy, nephropathy, and neuropathy. The most frequently observed complication was gangrene, which occurred in 6.6% of

the cases (Drevets 1965:326). According to the family-history data obtained from 200 patients, 18% of the males and 32.5% of the females had a family history of diabetes (Drevets 1965:324). All these data indicate that 30.3% of the Choctaw Hospital population had diabetes.

In a 1963 survey of chronic disease among the Seminoles of Oklahoma, Mayberry and Lindeman compared the health of Oklahoma Seminole to Seminole who had remained in Florida. This was done by means of a physical examination of a sample from each of the two populations, and a review of the death certificates of Seminole who had died between the years 1950 and 1959. Mayberry and Lindeman were interested in all health problems, and while the rate of diabetes was not as high as coronary heart disease, stroke and hypertension, it was significant enough to be studied in some depth. From the glucose tolerance tests, the researchers concluded that diabetes appeared to occur more often in both groups of Seminole than in samples of neighboring whites. Obesity and diabetes were also more common among the Seminole than among the whites; but on the other hand, blood cholesterol levels and blood pressure determinations were similar.

Shortly after the above survey of health problems among the Seminole, another investigation of diabetes among the same groups was conducted by another set of researchers. Elston and his colleagues (1974:31), on the basis of a field study made between 1964 and 1966, concluded that the two Seminole groups differed in their rates of elevated blood sugars. The Florida Seminole who were considered diabetic by this analysis comprised 16% of the population, whereas in Oklahoma the rate was 26%.

This study by Elston and his asscciates used the blood glucose test and family pedigrees to determine if there was a genetic explanation for diabetes. They found that there was a significant difference between the sexes, and that increased body weight and age are positively correlated with high blood sugar content. Of the Florida Seminole, 29% of the men and 39% of the females had high blood sugar, compared to 29% of the men and 44% of the females in Oklahoma. They tested several genetic hypotheses, and the one which best fitted the data was an autosomal gene locus with a recessive allele frequency of 41%. (This recessive gene governing diabetic inheritance was first postulated in 1933 by Pincus and White.) But given the limited two-generational depth of the family pedigrees, the Elston group states that there is no simple genetic hypothesis which will explain all the available data. In an analysis of nutrition of the two Seminole groups, Elston (1974:29) noted that both had a diet high in carbohydrates and fat.

The high rate of diabetes among the Florida Seminole was also confirmed by Westfall and Rosenbloom (1971), whose study in 1969 calculated that the diabetes death rate adjusted to the United States annual diabetes death rate per 100,000 would give a rate for the Florida Seminole of 95 per 100,000. This figure is five times the diabetic death rate of the United States as a whole. In 1969 they estimated the prevalence to be 19.7% of the population of 1,400 Seminole. Seventy-three percent of the diabetics were obese, having over 20% more body weight than ideal for their height and frame.

In 1966 there was a brief report on diabetes among Northeastern Oklahoma Indians who attended the clinic at Pawnee Indian Hospital. The

incidence rate of diabetes for the annual patient load of this Indian Hospital facility was 11.7% (White 1966:21).

Diabetes was reaching epidemic proportions by the 1960s. A health status report on diabetes that was issued in 1955 by the Division of Indian Health, United States Public Health Service, claimed that in that year there was no difference between the rate of deaths due to diabetes between whites and Indians in the United States. But this in-house report cited by West (1974B:843) goes on to state that by 1963 the diabetic death rate for persons between forty-five and fifty-four years of age was 12.1 per 100,000 for the United States population as a whole, while the Indian rate had risen to 59.3!

This increased rate of diabetes among Oklahoma Indians drew special attention in 1967 from the Chief Statistician of the Oklahoma City Area Office of the Indian Health Service, who conducted the first general survey of Indian diabetics in Oklahoma. Of the 65,000 Indians receiving care from the Indian Health Service in 1967, 2,016 diabetic cases were reported (West 1974B:845).

In the late 1960s, Kelly West, a physician and epidemiologist, began a study of diabetes among Oklahoma Indians. He visited each of the major Indian hospitals, which at that time were in Tahlequah, Talihina, Tishomingo, Claremore, Pawnee, Shawnee, Clinton and Lawton. Even after considering the under-reporting by many Indians, he came to the conclusion that by the early 1970s there were from 5,000 to 6,000 Oklahoma Indian diabetics. This would represent 5 to 6 percent of the total population of Indians, even though 46% of the Indian population was under the age of twenty, and therefore not prone to diabetes. He contended that

95% of the diabetics were over 34 years of age, and 15% of those over the age 34 have diabetes. At that time, he considered half of the Indian population as full-bloods, who had a higher rate of diabetes than the mixed bloods. The ratio between males and females was roughly 4:6 in both the Plains Indians and the Five Civilized Tribes (West 1974B:845-846).

In still another study of twenty-two tribes in Oklahoma, West (1974B) tabulated Indian Health Service records, census records and tribal rolls. He concluded that in fifteen tribes the diabetic rates were clearly higher than those of the white population of the United States. He further concluded:

> In full-bloods of all tribes, rates of known diabetes appear to exceed 12 percent in those over thirty-four years of age. Although rates of known diabetes exceed 15 percent for this age group in some tribes, it has not yet been possible to ascertain whether the modest differences observed among tribes are really significant (West 1974B:846).

The fifteen Oklahoma tribes that he estimated to have a high rate of diabetes were the Choctaw, Kiowa, Comanche, Pawnee, Seminole, Caddo, Cherokee, Creek, Chickasaw, Cheyenne-Arapaho, Osage, Sauk-Fox, Kickapoo and Shawnee. Those tribes in Oklahoma with "probably high" rates were the Ponca, Otoe, Potawatomie, Ft. Sill Apache, Delaware, Wichita, and Kiowa-Apache. No Oklahoma tribe was considered to have a low rate, as did the Eskimo, the Athapascan Indians of Canada and Alaska, or the Navajo, Hopi and Apache of Arizona (West 1974B:844).

In the early 1970s, West conducted blood glucose tests in three communities of Oklahoma Indians. Included in this test were Cherokee in the Tahlequah area, Seminole and Creek in the Shawnee area, and Kiowa and Comanche from the Lawton area (West 1974B:847).

The glucose intolerance test is a fairly standardized test used

to indicate the amount of glucose or sugar which is passed through the body without being utilized. In this test 1 gram of glucose per kilogram of body weight, (or usually around 75 grams), is ingested by the individual after fasting for several hours. After 30, 60, and 120 minutes, blood is drawn and a chemical analysis is made to place a value on the amount of glucose in the blood.

In these three communities, all the subjects tested by West were adults over 30 years of age who did not know they were diabetic. In a group of 124 Cherokee with a mean age of 51, 20.2% had two-hours blood glucose values exceeding 149 mg. per 100 ml., the amount which indicates the diabetic state. The test was then administered in the same community of Tahlequah to an age-matched group of whites. Only 8% of the whites had elevated glucose readings of the same degree as 20.2% of the Indians (West 1974B:847).

The second community, that of the Seminole and Creek, also had a mean age of 51; and of the 89 volunteers, 19% had elevated glucose values. In the third group, the Kiowa and Comanche, 11% had abnormal blood glucose (West 1974B:847).

From these studies of Indian Health Service records and the three communities, West concludes:

> In the aggregate our observations on the rates of occult and known diabetes suggest that roughly one-third of Oklahoma full blood Indians over thirty years of age have diabetes (West 1974B:847).

Native Americans and Diabetes Mellitus

Although not dealing with Oklahoma Indians, a significant study is that made by Stein and his associates (1965) concerning diabetes and

the Cherokee of North Carolina. The research was carried out at a time when the main purpose was still limited to the documentation of the high rate of diabetes in Native Americans. The researcher used the standard glucose tolerance test with blood samples taken at intervals. They were only able to collect data from a sample of the population, but their findings indicated that the rate of diabetes for those over 34 years of age was in excess of 25%—the highest rate reported in any population up to that time.

A number of other studies dealing with Indians of the Southeastern United States also confirm the high rate of this disease. Johnson and McNutt (1964) conducted their studies with the Alabama-Coushatta Indians of Texas. They performed a physical examination in addition to the most thorough family pedigree analysis and genetic study for that period of time. They found a diabetic rate of 10% of the population. Their genetic analysis concluded that the occurence of the affected individuals in each generation gives the appearance of autosomal recessive inheritance. But they further state that the frequent instances of diabetes with neither parent affectively rules out this simple interpretation (Johnson and McNutt 1964:120).

In 1971, the Choctaw of Mississippi, another southeastern tribe, were found to have diabetes in 20% of the population over 34 years of age (West 1974B:843).

The Seneca of New York and the Passamaquoddy of Maine have also undergone tests for diabetes. The Seneca were reported by Frohman and associates (1969) and Doeblin and associates (1969) and the Passamaquoddy by Ede (1966). They indicate that each of these Native American groups

has a high rate of diabetes.

Relatively low rates of diabetes among Eskimo were reported by Schaefer (1969), and low rates were also found among the Athabaskan Indians of Alaska by Mouratoff and colleagues (1969). Their results indicated that these Indian groups were well below the average for the United States population.

The Native Americans of the greater Southwest have come under a great amount of attention by medical scientists in regards to the diabetic rate. Between 1934 and 1939, Joslin (1940) conducted a survey of diabetes in the state of Arizona. He found that the rate between Indians and whites was relatively the same at 10%. He did indicate that, of the Indian diabetics, the Pima had a higher rate. Subsequently, Miller et al. (1968) studied the Pima between 1965 and 1967 and found them to have one of the highest rates yet found for a population. Twenty-seven percent of the women and 19% of the men were discovered to have diabetes. Furthermore, there was an extraordinarily high rate of 68.% for the women between the ages of 55 and 64.

Since Joslin's study in 1940, Seivers (1966) and B. Cohen (1954) have brought attention to the increasing rate of this disease among Southwestern Indians. The Cocopah of Arizona were identified in 1969 by Henry et al. to have a diabetes rate of 34%.

Recently there has been a great deal of research with the Pima by P. Bennett and associates. Some of the publications dealing with the Pima and diabetes are Genuth et alia (1967), Prosnitz and Mandell (1967), Saiki and Rimoin (1968), Comess et alia (1969, Levine et alia (1970, Reid et alia (1971), and P. Bennett et alia (1971). This trend toward an

accelerating increase of diabetes among Native Americans was also documented by Hill and Spector (1971:242). They compared the vital statistics of United States whites and non-whites with American Indians. They noted that there was an increase of 40% in the crude death rates between 1955 and 1967 among American Indians, which was considerably greater than the percentage increase for the other groups.

At a 1968 World Health Organization meeting dealing with biomedical challenges presented by the American Indian, Niswander (1969:133-136) discussed the problems of diabetes and the American Indian. Since at that time there were no nationwide data compiled on this subject, he obtained tabulations from the records of the United States Public Health Service, Division of Indian Hospitals. The 250,000 discharge diagnoses of a four-year period from 1963 to 1967 were analyzed to obtain the number of diabetic cases. For the 46 Indian hospitals in the United States, a mean frequency of 2.2% of the discharges dealt with diabetes. From several surveys of diabetes and the general non-Indian hospitals throughout the United States there was a 1 to 1.5% discharge rate. For several Indian hospitals there was a twenty-fold difference between the highest and the lowest. Niswander's analysis is noteworthy:

> The highest diabetes group is composed of several different tribes, but most conspicuous are the so-called five civilized tribes from the southeastern portion of the country. All had relatively highly developed agriculture prior to European contact. Also notable among this group are several of the southwestern agricultural tribes including the Pima. It might be suspected that these early agriculturalists would be the ones most susceptible to acculturation and hence would have undergone the most significant changes in dietary patterns.
>
> The low-diabetes group is notable for including all of Alaska—the Aleuts, Eskimos, and various Alaskan Indians—and also the Athabascan-speaking Navajo and the closely related Apaches. I think it is noteworthy that the Alaskan natives and the Navajo are

> probably the least acculturated of all the Indians remaining in the United States (Niswander 1969:134).

Also, from these data, he found a significant correlation between diabetes, gall bladder disease and a high average birth weight. He theorizes from this that in addition to genetic composition there may be complex environmental factors involved. In a note of speculation Niswander suggests:

> . . . that virtually all Indians may be of a genetic constitution especially susceptible to diabetes, and its expression is the result of dietary and nutritional factors associated with present-day reservation life (Niswander 1969:134).

The Increase of Diabetes Mellitus in Oklahoma

In 1974 Kelly West reviewed the literature dealing specifically with diabetes and native populations of the New World. He came to the conclusion that this disease, which is now very high in most populations of North American Indians, was a rarity prior to 1940. This conclusion was based upon his review of medical reports by civilian and military physicians serving Native Americans in Oklahoma from 1832 to 1939, for which time he found no evidence of the presence of diabetes (West 1974B:841). This absence of diabetes was noticeable in view of the fact that United States Indian Hospitals had been serving the native populations. West further states that Native Americans were often treated by the same physicians who were finding diabetes common in white patients. West interviewed several hundred Oklahoma Native Americans, over seventy years of age, from more than twenty different tribes. Only one instance of diabetes in a Native American prior to 1936 could be recalled. Of the 700 diabetic patients treated as outpatients at the Lawton Indian Hospital in 1973, none had exhibited symptoms of diabetes prior to 1940. The head

nurse at this same hospital had been working there in 1935 and 1936, she could not recall seeing any patients for diabetes during those years (West 1974B:842).

No study of North American Indians has analyzed long-term historical and cultural changes which may underlie the increase of diabetes. Most of the studies, including those in Oklahoma, have been oriented to a specific and limited set of years. Some studies have tried to analyze the past by means of family histories, but these were aimed only at genetic analyses. Due to a lack of an appreciation of culture-historical factors, no publication attempted to assemble the statistics for the length of time that the Oklahoma State Health Department has been keeping record of deaths due to diabetes.

Cleave and Campbell (1969) attempted a historical study using death certificates to document the increase in deaths due to diabetes and the increased consumption of sugar. But they were dealing with gross national figures on consumption of this carbohydrate and diabetic deaths. With this in mind, the statistics dealing with the deaths due to diabetes in Oklahoma were compiled. These data were collected from the yearly reports of the Oklahoma State Health Department and are complete for the years 1943 to 1976 (See Table #1 and Diagram #1).

From Diagram 1 we can see that there was definitely an increase in deaths due to diabetes starting before 1943 and reaching a peak between 1963 and 1969. In 1966 the Indian death rate had reached its peak at 49.5 deaths per 100,000 Indians, whereas the white population only suffered 16.8 deaths due to this disease—this is a difference of almost 300%. At no time in this 33 year history was the Indian rate below that of the

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TABLE 1

DEATHS DUE TO DIABETES IN THE STATE OF OKLAHOMA
1943 THROUGH 1976 BY RACE, NUMBER AND RATE

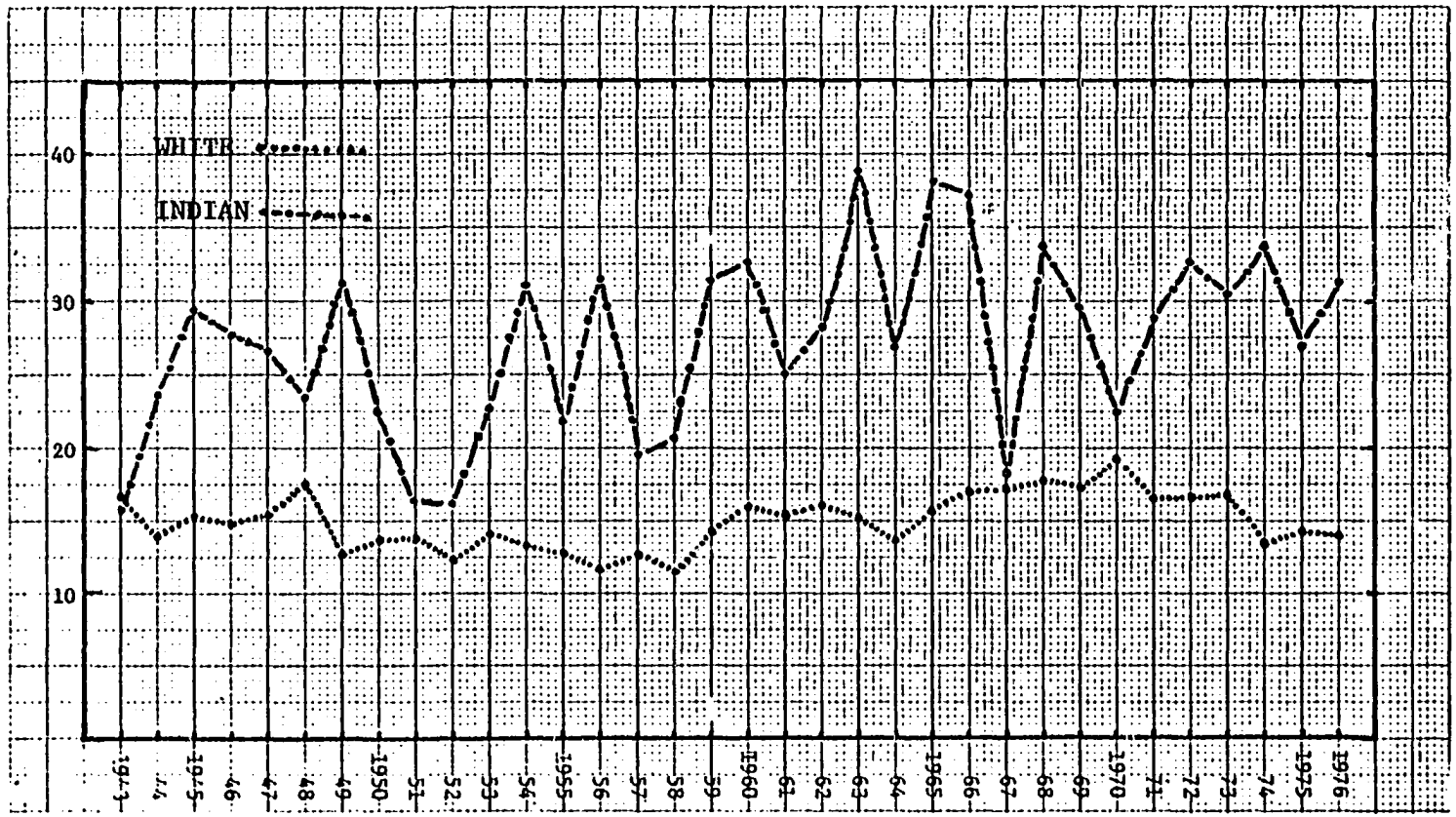
	State Total			White			Black			Indian		
Year	Population	#	Rate	Population	#	Rate	Population	#	Rate	Population	#	Rate
1943	2,305,510	382	16.6	2,083,346	349	16.8	161,847	23	14.2	60,320	10	16.6
1944	2,295,202	327	14.2	2,076,308	290	14.0	159,513	23	14.4	59,385	14	23.6
1945	2,284,894	356	14.6	2,069,270	318	15.4	157,179	21	13.4	58,450	17	29.1
1946	2,274,586	344	15.1	2,062,232	303	14.7	154,845	25	16.1	57,515	16	27.8
1947	2,264,278	353	15.6	2,055,194	314	15.3	152,511	24	15.7	56,580	15	26.5
1948	2,253,970	393	17.4	2,048,156	351	17.1	150,177	29	19.3	55,645	13	23.4
1949	2,243,662	298	13.3	2,041,118	259	12.7	147,843	22	14.9	54,710	17	31.1
1950	2,233,351	308	13.8	2,034,079	274	13.5	145,503	22	15.1	53,769	12	22.3
1951	2,242,844	312	14.0	2,041,722	277	13.6	146,261	26	17.7	54,861	9	16.4
1952	2,252,337	300	13.3	2,049,365	255	12.4	147,019	36	24.5	55,953	9	16.1
1953	2,261,830	340	15.0	2,057,008	288	14.0	147,777	39	26.4	57,045	13	22.8
1954	2,271,323	316	13.9	2,064,651	274	13.3	148,535	24	16.2	58,137	18	31.0
1955	2,280,816	315	13.8	2,072,294	268	12.9	149,293	34	22.8	59,229	13	21.9
1956	2,290,309	283	12.4	2,079,937	245	11.8	150,051	19	12.7	60,321	19	31.5
1957	2,299,802	316	13.7	2,087,580	267	12.8	150,809	37	24.5	61,413	12	19.5
1958	2,309,295	277	12.0	2,095,223	241	11.5	151,567	23	15.2	62,505	13	20.8
1959	2,318,788	344	14.8	2,102,866	298	14.2	152,325	26	17.1	63,597	20	31.4
1960	2,328,284	398	17.1	2,110,511	338	16.0	153,084	39	25.5	64,689	21	32.5
1961	2,351,381	379	16.1	2,128,349	327	15.4	154,965	35	22.6	68,067	17	25.0
1962	2,374,478	408	17.2	2,146,187	344	16.0	156,846	44	28.1	71,445	20	28.0
1963	2,397,575	396	16.5	2,164,025	328	15.2	158,727	39	24.6	74,823	29	38.8
1964	2,420,672	373	15.4	2,181,863	298	13.7	160,608	54	33.6	78,201	21	26.9
1965	2,443,769	426	17.4	2,199,701	350	15.9	162,489	45	27.7	81,579	31	38.0
1966	2,466,866	467	18.9	2,217,539	377	17	164,370	58	35.3	84,957	32	37.7
1967	2,489,963	439	17.6	2,235,377	383	17.1	166,251	40	24.1	88,335	16	18.1
1968	2,513,060	469	18.7	2,253,215	403	17.9	168,132	35	20.8	91,713	31	33.8
1969	2,536,157	466	18.4	2,271,053	391	17.2	170,013	47	27.6	95,091	28	29.4
1970	2,559,253	513	20.0	2,288,890	444	19.4	171,894	47	27.3	98,469	22	22.3
1921	2,609,800	459	17.6	2,320,060	384	16.6	181,420	44	24.3	108,320	31	28.6
1972	2,633,000	473	18.0	2,354,900	391	16.6	176,800	49	27.7	101,300	33	32.6
1973	2,633,000	474	17.8	2,381,700	400	16.8	178,900	43	24.0	102,400	31	30.3
1974	2,709,000	413	15.2	2,422,800	328	13.5	182,000	50	27.5	104,200	35	33.6
1975	2,712,000	413	15.2	2,426,000	342	14.1	182,000	43	23.6	104,000	28	26.9
1976	2,766,000	417	15.1	2,474,000	346	14.0	186,000	38	20.4	106,000	33	31.1

NOTE: Rate is per 100,000 population.

SOURCE: Number of deaths per year 1943-1970 from Public Health Statistics - State of Oklahoma. Volumes 1943 through 1970. 1971-1976 from Oklahoma Health Statistics. Yearly population figures obtained by incrementing from census years 1940, 1950, 1960, 1970. Rates calculated by author.

DIAGRAM 1

DEATHS DUE TO DIABETES - STATE OF OKLAHOMA 1943 THROUGH 1976
WHITES AND NATIVE AMERICANS



NOTE: Rate is per 100,000 population.

SOURCE: Number of deaths per year 1943-1970 from Public Health Statistics - State of Oklahoma. Volumes 1943 through 1970. 1971-1976 from Oklahoma Health Statistics. Yearly population figures obtained by incrementing from census years 1940, 1950, 1960, 1970. Rates calculated by author.

white population, except in the year 1943 at the beginning of the increase. It is also noticeable from these data that the Indian and black deaths increase through time, while the white deaths remain relatively constant.

From this review of the literature and data, it should be evident that there has been a dramatic increase of diabetes among most native North Americans. This increase began in the 1940s and is today a major health care problem.

Cultural Change and Diabetes Mellitus

Other than a few paragraphs dealing with ideal cultural background, there has been no systematic study of the cultural changes which may underly this physical disability among Native Oklahomans or Native Americans in general.

With this objective in mind, the researcher, as part of an interdisciplinary team, studied a region of the Oklahoma Ozarks which had been settled by Cherokee Indians and later by Euroamericans. We were involved with a complete culture historical analysis of the different strategies of adaptation to the area made by historic peoples.[1]

These data were primarily for the use of prehistoric archeologists to formulate hypotheses about possible prehistoric adaptations. We centered our analysis upon land use and different cultural groups. In doing this we derived our data from historical sites, where people lived at particular points in time, and what they were doing to maintain themselves in the mountainous environment. We were also interested in the health care problems the people had had through time, and how they may have obtained health care, given particular problem situations.

As mentioned in the initial statement, this paper intends to

identify cultural changes which could account for the onset of diabetes mellitus among Native Americans in the 1940s. We also question why the Cherokee, after over two hundred years of interaction with Euroamericans, started to have this increase of diabetes only in the 1940s. If rapid culture change was a factor in the increase, why would it not have happened many years before?

Rapid culture change has been implicated as a cause of diabetes by several researchers. The most notable of such research deals with Yemenite Jews who moved to Israel. This study by Cohen and associates (1972) is similar to the study on culture change by Wise and colleagues (1970), who deals with Australian Aborigines. Both of these researchers contend that a rapid change of culture results in a high frequency of diabetes. Hong and colleagues (1973) single out the factor of rapid culture change as the cause of a temporary case of diabetes in a migrant Korean who moved to the United States. Cohen's study of the Yemenite Jews mentioned above, as well as the work by Cleave and Campbell (1969), denote that this rapid cultural change commonly results in the increase of carbohydrates--mainly refined sugars. Cleave and Campbell studied groups of Indians who had moved from India to Africa, and Zulu who moved from their native lands to urban environments. All of these studies deal with different cultural groups adapting to rapid changes in their environments and the resulting diabetes.

Eaton's (1977) landmark crosscultural analysis of diabetes focussed attention on cultural factors which may be related to diabetes. This medical anthropologist's summary of the literature and conclusions drawn from the crosscultural materials serves, in many ways, as a start-

ing point for this paper. Eaton (1977:56) states that the crosscultural evidence indicates that the increased incidence of diabetes is found in both non-western and western societies undergoing rapid culture change. Her summary is that:

> . . . maturity-onset diabetes mellitus may be linked to the following acculturational trends: (2) dietary change which introduced refined sugar into the diet and increased the refined carbohydrate content; (b) decreased energy expenditure (resulting in obesity) created by sexual redivision of labor and the adoption of a more sedentary lifestyle; and (c) increased emotional and traumatic stress levels perpetuated by adaptational stress. As a result, increased incidence of diabetes should be expected as cultures undergo lifestyle evolution from hunter-gatherer to agrarian to urban to industrial societies (Eaton 1977:49).

In relating these studies to the Cherokee culture change in Oklahoma, we know that the depression of the 1930s was generally a difficult time for every Oklahoma resident, and many people moved out of the state as a result. Also it was known that many Indian men fought in World War II, and they were influenced by the lifestyles they saw while abroad. These veterans would have introduced new ideas to the family on their return; these ideas could possibly have included new medical and health care behavior, new likes for different foods, and possibly a different lifestyle in general. But these obvious changes were not considered great enough to contribute to the major culture change thought necessary to initiate the onset of diabetes on such a large scale. If the analysis resulted in no indication of a major cultural change, then the gradual introduction of highly refined foods and the industrial lifestyle would have to be considered the major factors.

There are over 65 Native American groups in Oklahoma (Wright 1951), and like almost every tribe in Oklahoma, the Cherokee had been forced to settle here by the U. S. Government. The Cherokee were settled

in the eastern part of Oklahoma between 1818 and 1838—100 years before the onset of the diabetes epidemic. If rapid cultural change is a factor, why didn't diabetes come to light in the early research literature? The Cherokee were one of the earliest tribes to be removed to Oklahoma, whereas the western tribes of the United States were settled in western Oklahoma nearly 50 years later. Most of these tribes, the Cheyenne and Arapaho, Kiowa, Comanche and Apache finally settled after much hostility during the 1880s and 1890s. These people had previously been non-agriculturalists and subsisted mainly on hunting buffalo and the gathering of plants. Why should these non-agriculturalists, who were settled in Oklahoma at a much later date, have the same date of onset of the diabetes epidemic as do the eastern Oklahoma groups?

More concisely, the questions dealt with below are the following: Why do we find an increase in the rate of diabetes among the Cherokee of Oklahoma after 1940? Secondly, what cultural or environmental factors may be involved in this increase? If we can successfully answer these questions, we may be better able to account for the onset of diabetes in the 1940s among the wide range of Native American groups in Oklahoma and the United States.

CHAPTER II

THE LEE'S CREEK AREA AND THE ANTHROPOLOGICAL PERSPECTIVE

Lee's Creek begins as a spring in the Ozark Mountains of Arkansas and winds its way to the southwest, entering Oklahoma in northeastern Sequoyah County. After combining with the water of Little Lee's Creek, which flows from the north, it reenters Arkansas, meeting the Arkansas River near the present city of Fort Smith. A 64 square-mile area of the Lee's Creek drainage within Oklahoma is the region under study in this report. In the historical period this area was first utilized by the Osage and Quapaw Indians, and later by Cherokee and Euroamerican settlers. With the use of historical documents, historical archeology and ethnography, this section attempts to reconstruct a detailed culture history of the land-use patterns of these different people from 1818 to 1978.

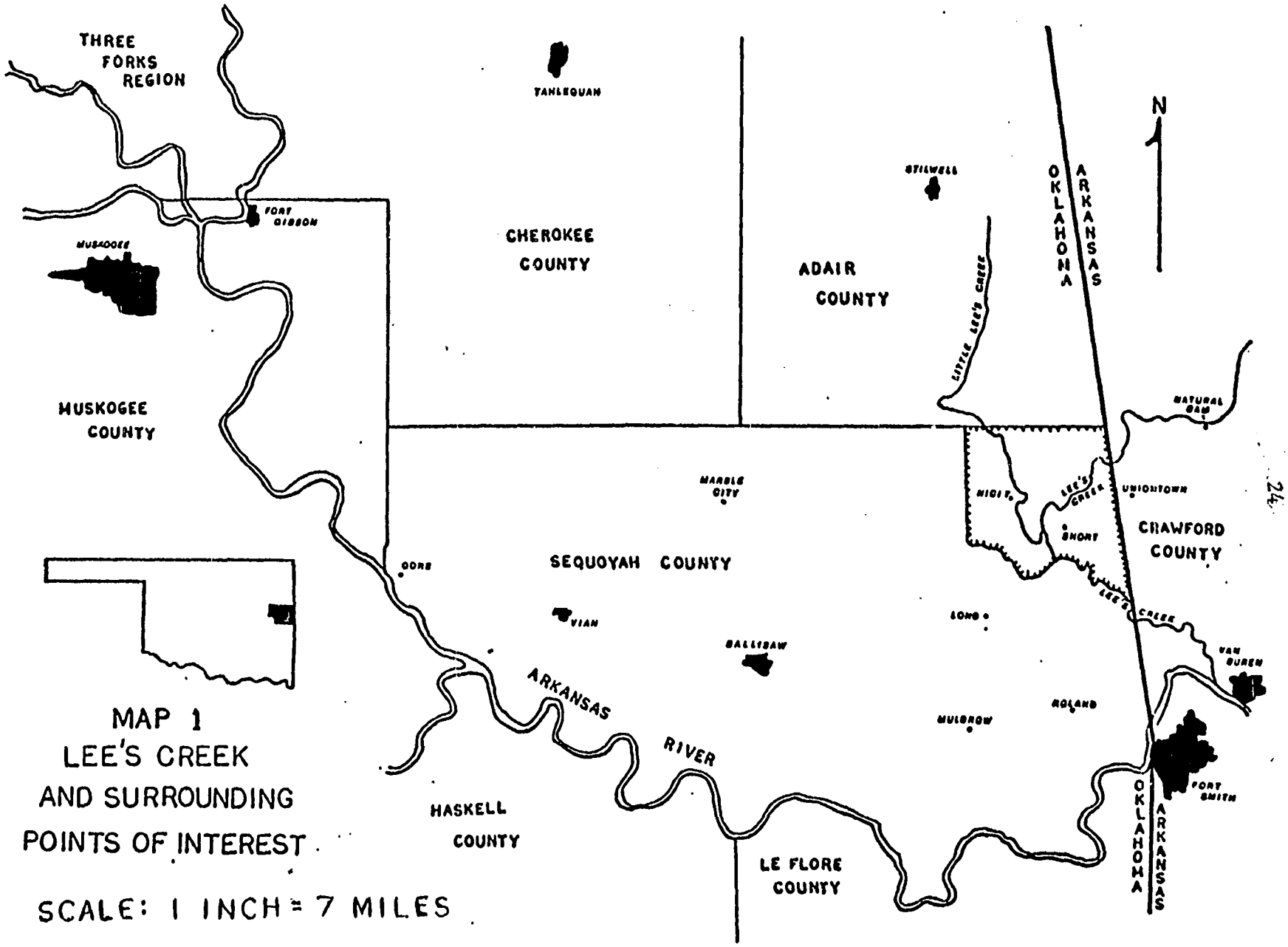
Today the area is the home of approximately 600 people, most of whom are the descendants of the earlier Cherokee and Euroamerican settlers. This is an undeveloped rural section of Oklahoma without industries or large scale forms of employment, where log cabins, wooden shacks and brick homes stand side by side. The people either commute to one of the large cities for work, or cut timber and hay, or raise cattle. A few people find employment with the large land owners who are just now beginning to intensively farm the land, which was once owned communally by the Cherokee Nation.

The Lee's Creek Study Area Defined

The specific area of this study is the Lee's Creek drainage located within Oklahoma. Several times during the study period, this target area was reduced in size as more limiting parameters were defined. The first of these limits was the Oklahoma-Arkansas state line (See Map #1). Since 1828, when Lovely's Purchase was made by the United States, this boundary has been politically meaningful. When the Arkansas Cherokee were moved to Lovely's Purchase, this boundary became also a cultural one, which Hewes (1944) described as a "cultural fault line". Today the Arkansas side of Lee's Creek is within the Ozark National Forest, and its development is controlled by the United States Government.

The Sequoyah-Adair county line serves as the northern limit of the study area. This line divides counties which have been in existence since 1907, when Oklahoma became a state, and is the same line as that used by the Cherokee Nation, beginning in 1839, to separate Skin Bayou and Flint District. Today, the land to the north of this boundary is sparsely populated, with Little Round Mountain and Big Round Mountain limiting settlement (See Map #2). This county demarcation also enables the researchers to restrict the historical document research to a single county. Thus, more data from a single county can be obtained, and the problem of comparability between the two counties, and even the two states, is held to a minimum.

The western drainage of Big Lee's Creek extends to the south side of Brushy Mountain by Polecat Creek and around the north by Sonny Gile Hollow. It was found, in the historical documents and in the fieldwork, that Brushy Mountain impedes communication and transportation direct-

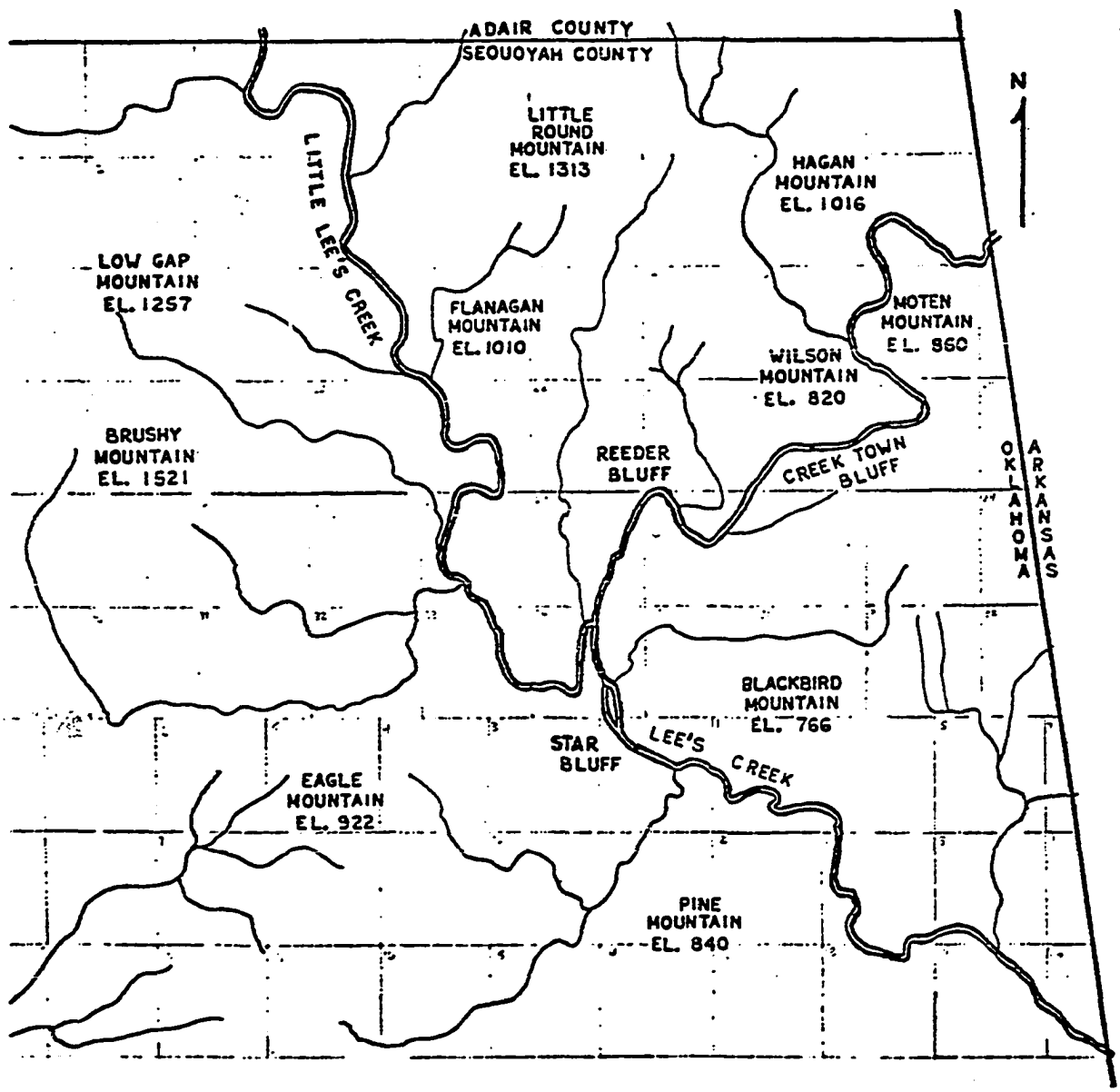


MAP 1
LEE'S CREEK
AND SURROUNDING
POINTS OF INTEREST

SCALE: 1 INCH = 7 MILES

MAP 2

LOCAL NAMES FOR MOUNTAINS AND BLUFFS



SCALE: 1 Inch = 1-3/4 Miles

ly to the west. Thus, we delimited our study area to a line running north-south one-half section into township 13 north, 25 east. The people who reside on top of Brushy Mountain are to the west of this line and interact with people to the west and south more than with the people of the Lee's Creek area. The people of the western end of Polecat Creek interact to the south and west. Only one house is presently in this section of Polecat Creek, and the resident stated that she seldom, if ever, visited Nicut or Short, even though she is a long-time resident.

The southern boundary of the study area was not so easily defined, as this has been the major avenue of communication and transportation to other districts. The edge of the uplands to the south of Polecat Creek demarcates the study limits to the east of highway 101. The top of Eagle Mountain, which is the main entrance into the drainage, is included in the study area from just east of the junction of 64b and highway 101. This line is then extended to the south to include the northern half of sections nine and ten, which roughly corresponds to the uplands of the drainage into Briar Creek. This line, including the northern half of section ten, meets Briar Creek on the east. Briar Creek then serves as the boundary going to the northeast until it flows into Lee's Creek. Lee's Creek forms the southern boundary of our study all the way to the state line. It was found, by collecting oral history, that little interaction occurred from the study area to the south of Lee's Creek and east of Briar Creek. Few people settled in this vicinity to the south of Lee's Creek, and when they did, most of their interactions were to the south toward Roland, Liberty, and Long.

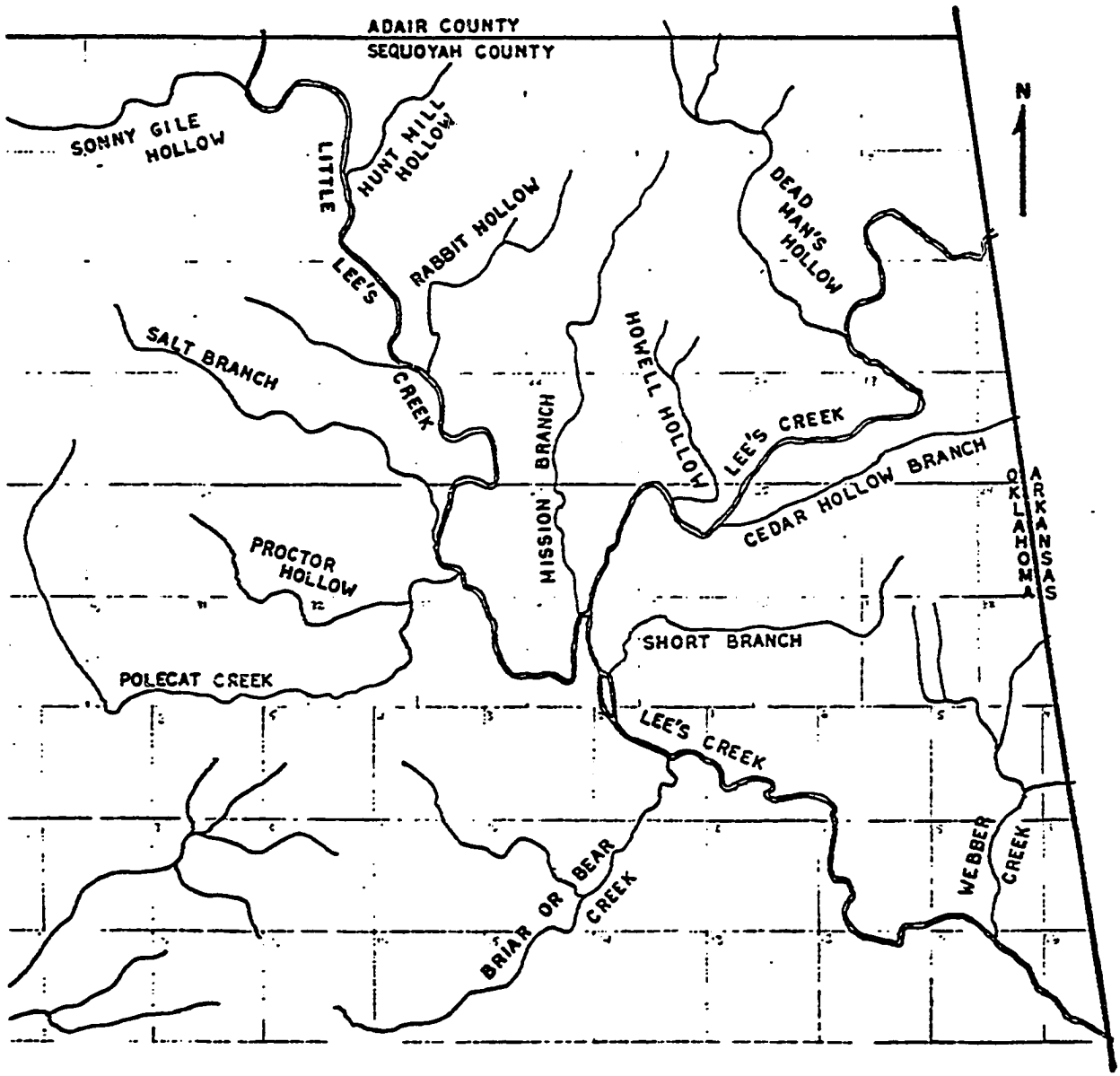
The people of the Lee's Creek area identified themselves with

certain localities usually named after creeks (See Map #3). In giving directions and in speaking of places, these creeks often functioned for the locals as would street signs that city people use to organize direction and location. Lee's Creek or Big Lee's Creek served as the major reference point as does Little Lee's Creek in the northwest part of district. We found that not only do these creeks act as reference points, but also that these two waterways form major boundaries. It seems that the creeks are major factors in the communication and transportation system. During rainy season, these creeks eliminate certain avenues of communication; thus, they determine to some extent the kinds of interaction which take place. When it rains, it usually does not rain over the entire sector, but only over certain portions. Especially in the spring, thunder storms may drop water only on the upper reaches of a single creek; consequently, only this creek will be flooded, dumping its waters into Little Lee's or Big Lee's. There is also the occasion when it does not rain in the immediate vicinity at all, but rains in Arkansas, 20 miles away, thereby raising the water level of Big Lee's Creek within the study area. Even today, with modern vehicles, interaction is still limited by the flood waters of the creeks.

The three settlements of Short, Belfonte, and Nicut, which are the most populated areas today, serve as major reference points (See Map #4). There are other reference points such as "Copic" for the tract north of Nicut on both sides of Little Lee's Creek, "Oakdale" for the tract north of Lee's Creek, and east of Copic, and "the people at the mouth of Webber" for the tract to the southeast of Short, but north of Lee's Creek--this last tract is also known as "Rocky Point" and "Johnson School

MAP 3

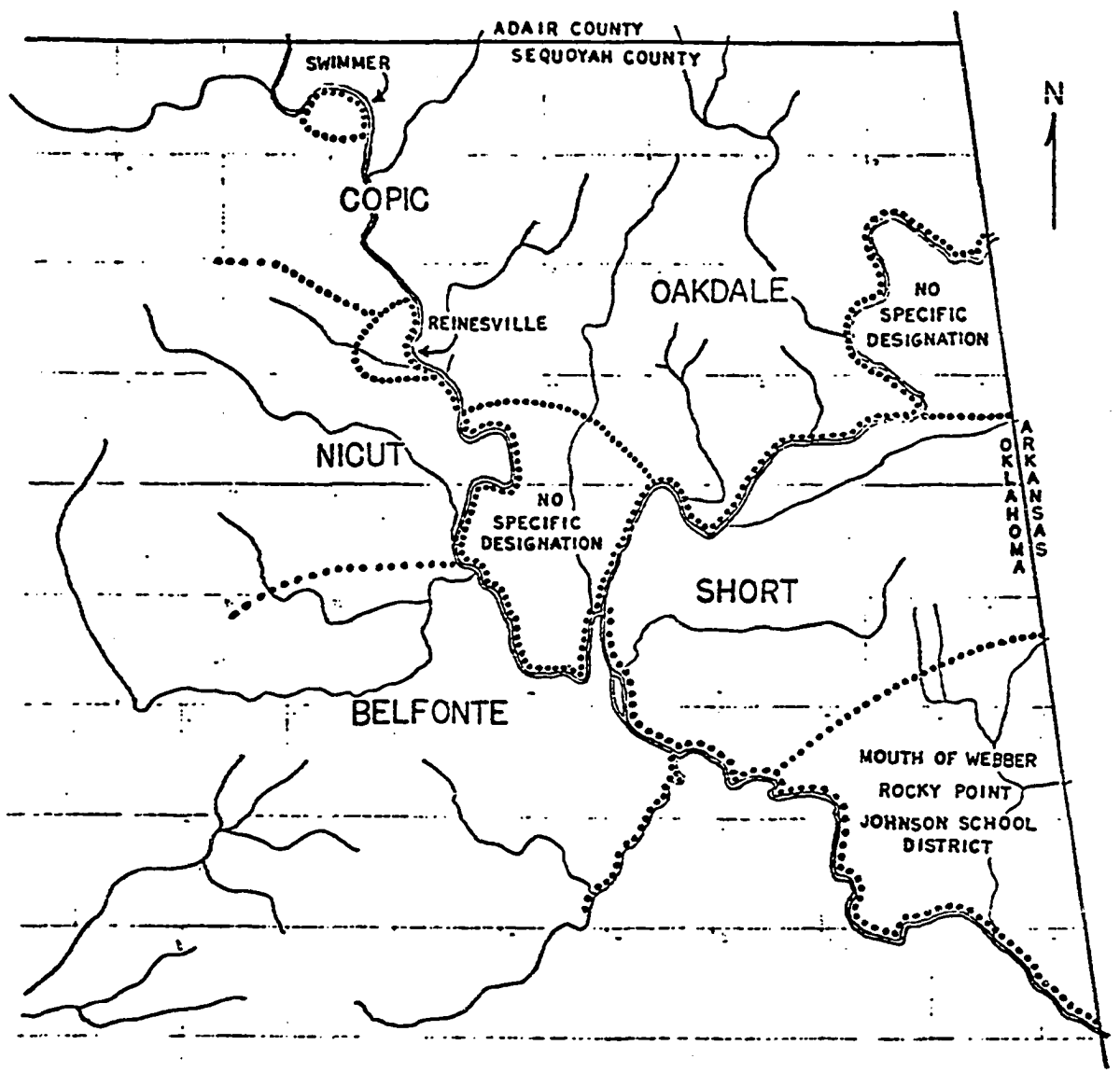
LOCAL NAMES FOR CREEKS AND HOLLOWS



SCALE: 1 Inch = 1-3/4 Miles

MAP 4

LOCAL TERMS USED FOR GENERAL AREAS WHEN REFERRED TO
IN CONVERSATION AND HISTORICAL DOCUMENTS



SCALE: 1 Inch = 1-3/4 Miles

District". The former school districts in existence during the 1930s and 1940s are also used today by the local people as reference points. "Copic", "Oakdale", "Short", "Johnson", and "Belfonte" refer to these old districts.

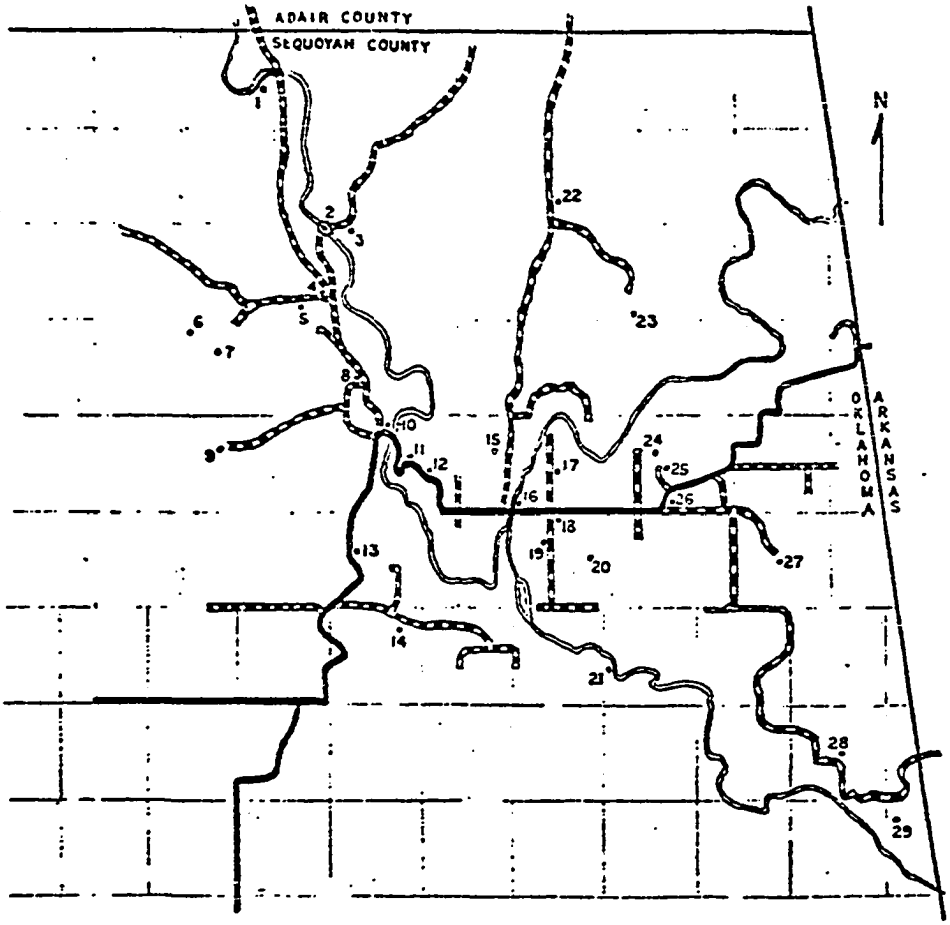
Today the major focal points are centered upon the places of business and churches which serve the region. Nicut is the central point for the western section and a general store is located there. Most of the residents of Nicut live north of the store, along the road (See Map #5, Place #8). Short is presently not centered by a store, as the stores have been closed since the early 1970s. The residents are now living along highway 101 all the way to the state line.

One grade school serves the study area which is Belfonte School, located in the center. Belfonte School is a county school and includes the grades 1-8; students in grades 9-12 are transported to Muldrow High School, over 15 kilometers to the south.

Lee's Creek is just one of the rivers which drain the Ozark Mountains. It is located in the southwestern portion of the Boston Mountains which extend east 240 kilometers into north central Arkansas (See Map #6). To the north of the Boston Mountain system, the Ozark Plateau extends to the north and east 320 kilometers into Missouri. Adair, Cherokee, Delaware, Mayes and Sequoyah Counties contain the Ozark region in Oklahoma, and it is these five counties which the Cherokee originally settled after their removal from the Southern Appalachians (See Map #7). These counties and the Ozark region are bounded on the south and southwest by the Arkansas River and on the northwest by the Grand or Neosha River.

MAP 5

HISTORICAL PLACES

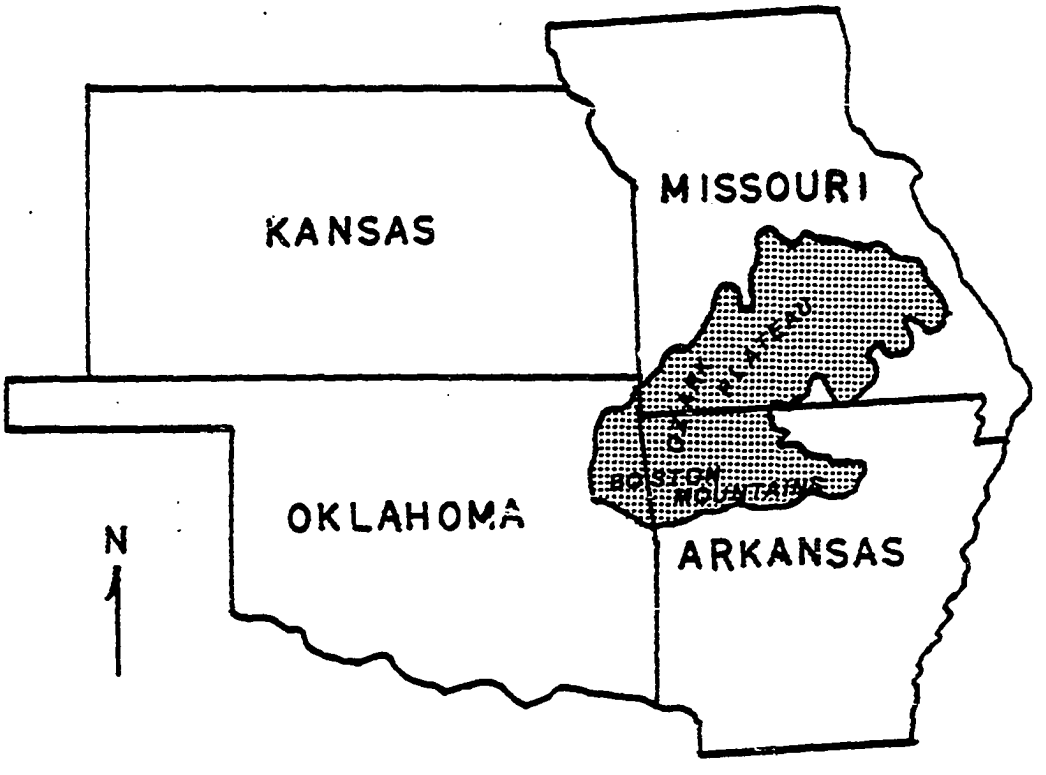


SCALE: 1 Inch = 2 MILES Roads in 1978 - Paved Gravel

1. Site of Swimmer
2. Copic Slab
3. Site of Copic School
4. Site of Reinesville
5. Fellowship Church
6. Stink Springs
7. Salt Springs
8. Verona-Nicut
9. Haney Ranch Headquarters
10. Salt Branch Quick Stop
11. Site of Seabolt Stage Stop
12. Seabolt Cemetery
    Lee Creek Assembly of God Church
13. Josiah Seabolt Log Cabin
14. Belefonte Baptist Church
    Belefonte Cemetery
15. Site of Lee's Creek Mission
16. Site of Parris General Store 1936-1946
17. Duncan Log Cabin
18. Parris Mound, Site of Parris General Store- Post 1946
19. Shakespear, Indian Territory Smith Ranch Headquarters
20. Mandy Downing Cemetery
21. Starr Cemetery
22. Curtsinger Ranch Headquarters
23. Oakdale School House
24. Josiah Vann Log Cabin
25. Site of Short Post Office
26. Short Baptist Church
27. Shakingbush Log Cabin
28. Johnson School House
29. Allison Cemetery

MAP 6

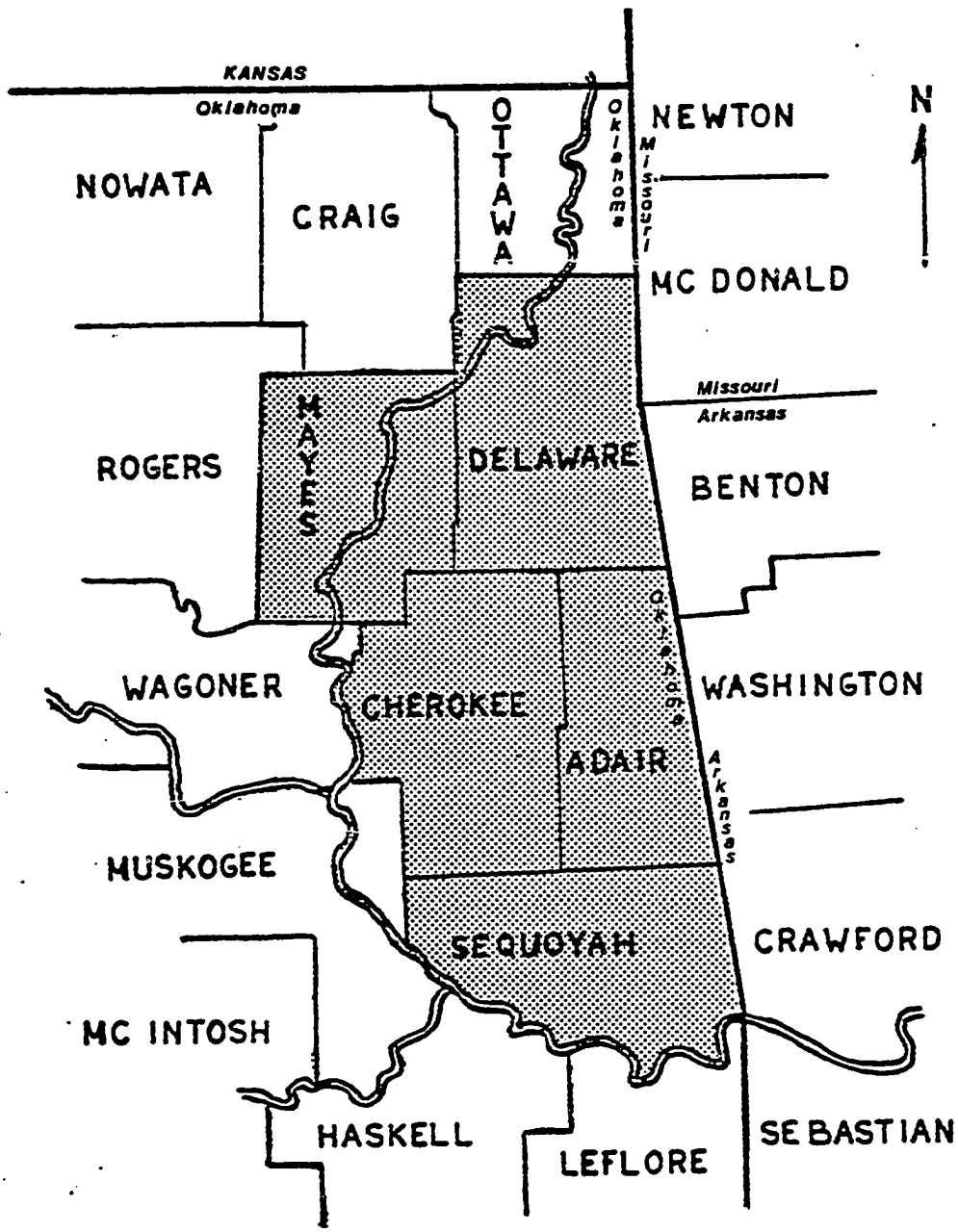
THE OZARK MOUNTAINS OF ARKANSAS, MISSOURI AND OKLAHOMA



SCALE: 1 Inch = 150 Miles

MAP 7

THE FIVE COUNTIES OF THE OKLAHOMA CHEROKEE OZARKS
AND SURROUNDING COUNTIES



SCALE: 1 inch = 20 miles or 32 kilometers.

The Perspective of Ecological Anthropology

The Oklahoma Ozark region provides researchers with an interesting study domain because we may examine the adaptation or cultural change which occurred when a historic population moved into the area from a similar environmental region in the eastern states. Man's interaction with his physical environment and the behavioral responses related to his success or failure in maintaining his population comprise the focus of analysis for this study. Within the discipline of anthropology, this kind of approach is referred to as ecological anthropology, or cultural ecology. Steward (1955:31) formulated this field within anthropology and stated as its object of study "the interaction of physical, biological, and cultural features within a locale or unit of territory . . .." With this approach primary attention is to those "features which empirical analysis shows to be most closely involved in the utilization of environment in culturally prescribed ways" (Steward 1955:37). The fundamental procedures of this approach are the analysis of the interrelationship between exploitative or productive technology and environment. Secondly, the analysis of " . . . behavior patterns involved in the exploitation of a particular area by means of a particular technology . . ." (Steward 1955:40). Thirdly, this "procedure is to ascertain the extent to which the behavior patterns entailed in exploiting the environment affect other aspects of culture" (Steward 1955:41).

The basis of ecological anthropology is the view of man as one of the many life forms adapting to the physical and social environment. This view is derived from Charles Darwin's (1966) concept of biological evolution and natural selection. Current usage of the term adaptation

refers to either physiological or evolutionary processes. Physiological adaptation is maintenance of homeostasis or stability within organisms during their lifetimes in response to changing environmental parameters. Evolutionary adaptation is transgenerational change in the direction of maximized efficiency over a very long period of time. The first usage of adaptation is expressed here by Rappaport:

> . . . The process by which organisms or groups of organisms, through responsive changes in their own states, structure, or compositions, maintain homeostasis in and among themsleves in the face of both short term environmental fluctuations and long term changes in composition or structure of their environment (Rappaport 1971:60).

The second meaning of adaptation deals with a species or population responding to environmental fluctuations resulting in a genetic change. This genetic-evolutionary definition:

> . . . concerns feedbacks from interactions with the environment back into the gene pool of organisms, leading to selective survival of particular traits that result in change in the organism so that it may better cope with specific environmental features (J. Bennett 1976:248).

The process of natural selection which Darwin (1966:91) proposed as leading to the differentiation of life forms involves the competition between organisms and their survival relative to one another. Alland (1967:4) provides us with a statement of the natural selection process:

> Where competition exists for such things as space or food, those organisms most fit to survive and reproduce in a particular environment will reproduce and survive in great numbers than less well-adapted forms. If the competitive process continues unabated for some time, the less well adapted forms will be reduced to insignificant numbers or be entirely eliminated from the population.

This ecological approach which Steward is credited with establishing in anthropology has been utilized by anthropologists in the study of man in many diverse environmental regions.

The Cross-Cultural Study of Mountainous Regions

More specifically, this culture historical study of the Lee's Creek drainage is based upon the ecological studies of mountainous or alpine communities. Barth's pioneer paper (1956) dealing with different ethnic group adaptation in Swat, Pakistan, is fundamental to the understanding of the Cherokee and Euroamericans in the Oklahoma Ozarks. Barth reported on three major ethnic groups in a mountainous habitat of Pakistan and noted that the different groups, even though they were in the vicinity for hundreds of years, maintained an ethnic separation along with an economic interdependence. Each group had adapted to a different ecological niche, or "the place of a group in the total environment, its relations to resources and competitors" (Barth 1956:1079). He found that the distribution of the ethnic groups is based upon the "specific ecological niches which the group, with its particular economic and political organization, is able to exploit" (Barth 1956:1088). His major contribution to this discussion is the understanding that different cultural groups are able to reside in the same geographic locale but still maintain cultural separation.

Rhoades and Thompson have studied cross-cultural adaptations to mountainous regions throughout the world and have formulated patterns which are recurrent in the successful adaptation to this land form, regardless of cultural background. They find three qualities of alpine regions which human populations are faced with:

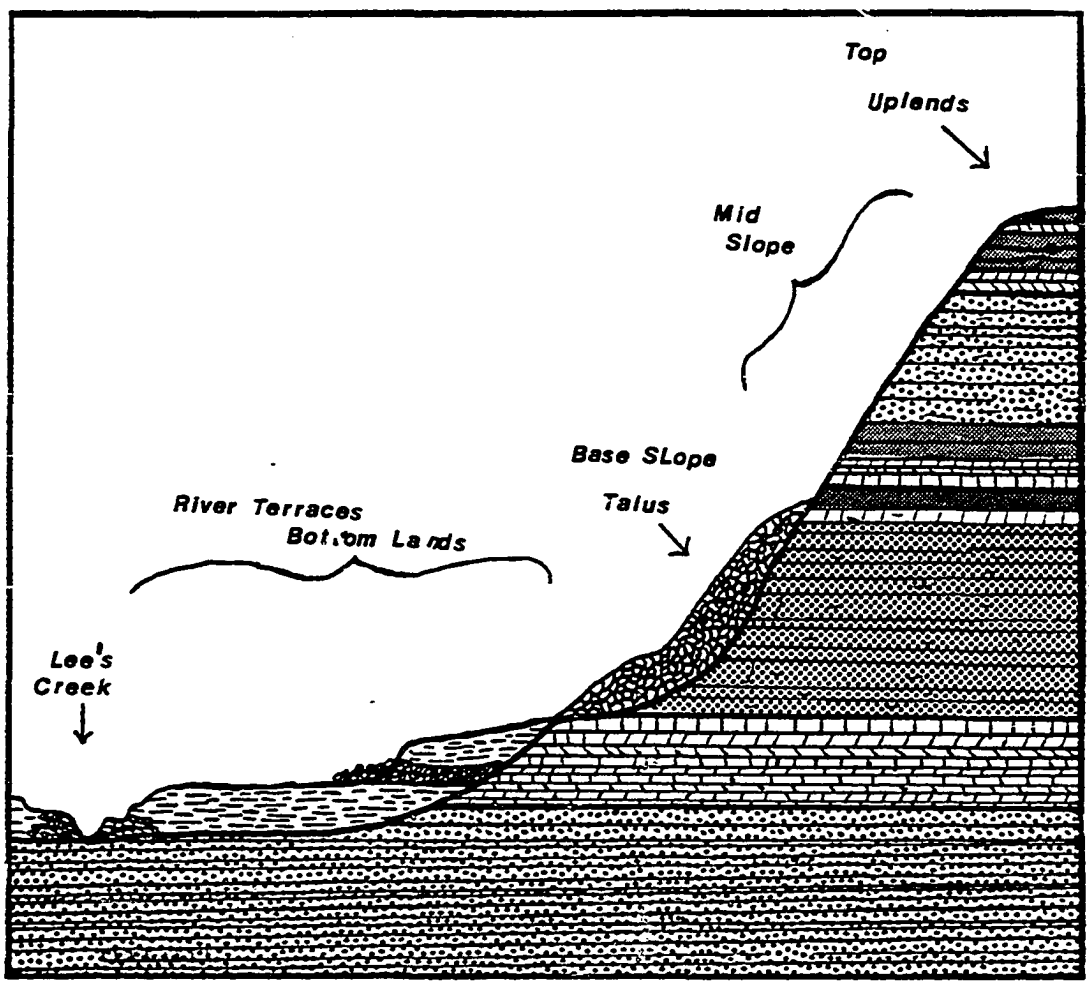
> 1) vertical biotic zonation; 2) irregular biotic distribution; and 3) the geologic features of slope, elevation, and ruggedness of surface configuration. Any long-term adaptation by human or animal populations must involve strategies for coping with these mountain universals (Rhoades and Thompson 1975:543).

The contributors to this field of study usually consider mountainous regions as those having elevations of 5,000 feet or more. The elevations in our study area ranged only from 460 to 1,521 feet, so that the gradient in the Oklahoma Ozarks is not great enough to make distinct vertical biotic zones such as occur in alpine regions. The study area does have several vertical ecological zones whose resources the local population has to exploit in order to supply themselves with life's necessities.

From the geological and botanical portions of the interdisciplinary study of the Lee's Creek drainage, we can discern several zones which are of importance in understanding man's adaptation. These reports will be published in the Phase One, Part Two report of the Parris Mound Archeology Project. Four geological zones (represented in Diagram #2) are found throughout the drainage: The bottom lands, the base slope, the midslope, and the top or uplands. The bottoms contain the creek or river and alluvial deposits which form up to four river terraces in some parts of the valley. The base slope is talus characterized by a sloping pile of rocks and soil which are fragments of the upper portions of the mountain. The midslope, in many places quite steep, forms the largest portion of the original geologic formation. The top or the uplands are the tops of the mountains where, in many cases, level land is located. This generalized picture of the geology picture varies according to the location of the river. Map #8 illustrates the sectors of the study area which are bottom lands. In those places where the river turns and cuts into the bluffs, the bottom lands are not existent, and the talus or base minimal. Where the river is a distance from the slopes, the bottoms are extensive. Along the smaller creeks, little bottom land is in existence, but the

DIAGRAM 2

GENERALIZED ECOLOGICAL ZONES OF THE LEE'S CREEK AREA

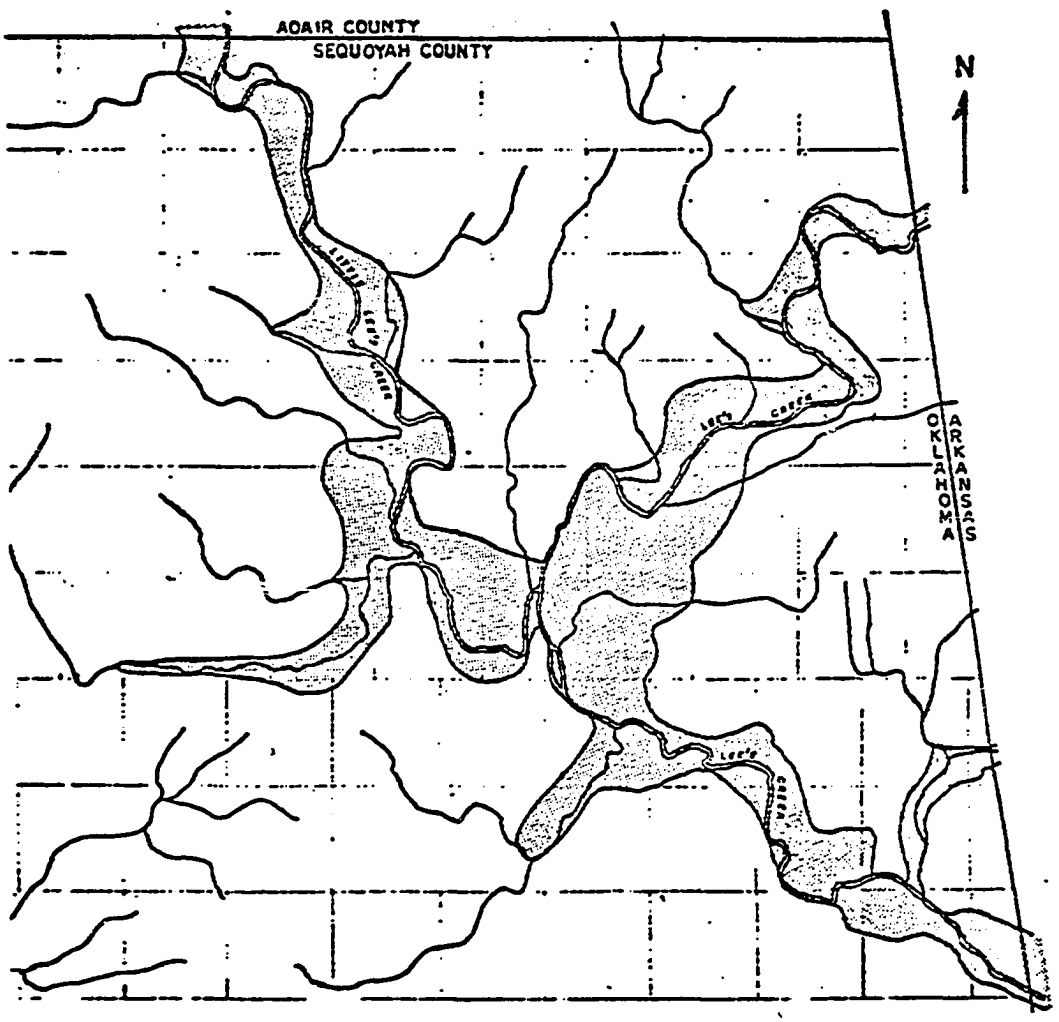


No Scale.

SOURCE: Adapted from "Schematic Section of Lee Creek". In Guy Muto, Parris Mound Archeology Project, Phase One.

MAP 8

THE BOTTOM LANDS OF LEE'S AND LITTLE LEE'S CREEK



Shade zone indicates Bottom Lands

SCALE: 1/2 Inch = 1 Mile

general morphology of the slope is still similar to that illustrated in Diagram #2.

The botanical study of the drainage was accomplished by collecting a controlled sample along a line which ascended two of these slopes. One slope in the vicinity of Polecat Creek transected a north-facing slope, and the other was on the south-facing slope of Blackbird Mountain. Even though these two slopes received different amounts of sunlight, they were surprisingly similar botanically. K. Fruedenrich conducted the botanical survey, and her report quoted here from the Parris Mound Archeology Project Report #1, Part 2, gives us an idea of the ecological zones of the region, specifically Blackbird Mountain:

> The talus area was gently sloping with intermittant rock outcrops and the forest canopy was dominated by Spanish Oak, with lesser positions of importance shared equally by Sweet Gum, Post Oak and Sugarberry. The forest was dense with an average of 539 trees per acre. The average basal area of the trees in this zone was 378.3 cm^2. The shrubs present were Redbud, Elm, Honey Locust, Flowering Dogwood along with Spanish Oak, Blue Beech and Sugarberry. The herbaceous layer was sparse and was made up predominantly of Poison Ivy, Cane, Black Snakeroot, Greenbriars and various species of grapes. Many of the species present in the canopy were also in the herbaceous layer.
>
> The midslope region of the Blackbird Mountain was dominated by extensive sandstone outcrops. With an average of 297 trees per acre, the forest was open. The trees in this zone were by far the largest on this slope with a basal area average of 427.4 cm^2. Spanish and post Oaks shared dominance of the forest canopy, with Shumard's Red Oak also present. The understory was composed of Red ceder, Flowering Dogwood as well as Post and Spanish Oaks, Blue Beech, Hickory and Sweet Gum. Sweet Gum on a forest slope is characteristic of the Appalachian plateaus and is suggestive of a mesophytic forest. The herbaceous layer was nearly non-existant on the steep rocky floor. It was mainly composed of Black Snakeroot, Greenbriars, Red Maple saplings as well as many of the canopy trees.
>
> At the top of the mountain, the area was open and parklike with only 274 trees per acre. The trees of this zone were also the smallest encountered. Post Oak was the most common tree with hickory also important to the canopy. The understory was com-

> posed of Oaks, and Hickories along with Flowering Dogwood and Winged Elm. The herbaceous layer consisted of various species of grass as well as Poison Ivy and Prickly Pears.

Even though the geological zones are not as distinct as in alpine habitats, the conceptual foundation of the ecological studies of mountainous regions does provide a better understanding of the cultural adaptations to the Ozarks. With this conceptual approach of adaptation to a mountainous terrain, we entered the field with certain cultural behavior specifically in mind, as did Netting in his study of alpine land use:

> Given the relatively inflexible constraints of topography, altitude, and climate as well as a limited assemblage of subsistence devices, what strategies could be used by the community or its members to promote and insure survival (Netting 1972:135)?

Friedl (1974), by providing the detailed study of Kippel, a village in the alps, also enables us to conceptualize how the changing cultural behavior of people in mountainous conditions is limited by the physical environment. His study provides a view of a community of people who have changed as new ideas and technology entered the valley environment over the past one hundred years.

This view is also provided us in a book by Cole and Wolf (1974), whose study of two alpine communities gives us an appreciation of the development of similar behavior to the mountain environment by two different cultural groups. Their study is important because of their conceptual understanding of how these communities can operate as dynamic systems, within the larger economic and political systems of central Europe. Their study is an application of ecological principles which had been developed by anthropologists studying isolated non-western societies. They were able to use the ecological framework in the study of the two communities within the context of the developing industrialized society.

The Ecological Perspective and Disease

The analysis of several ethnic groups in a common environment to discover how different behavior may effect the disease processes was suggested by Alland in 1970. His recommendation for field situations which can discern the necessary behavior patterns is one of the reasons this present study was attempted. The medical anthropologist should:

> . . . choose field situations in which several ethnic groups inhabit the same ecological zone. The behavioral systems and methods of economic exploitation of such groups will differ. The epidemiological patterns characteristic of each group can be expected to differ as well, hopefully, at least in part, according to variables imbedded in the behavioral system (Alland 1970:185).

This ecological perspective in the study of disease is thought to be beneficial to the study of diabetes and diseases in general. Armelagos et al. (1978:83) consider that:

> . . . the traditional approaches to an understanding of the disease process in human population have been limited. Earlier approaches to the understanding of disease within contemporary and prehistoric human populations failed to consider ecological factors which played an important role in the disease profiles of these groups. The ecological perspective provides an integrative approach to understanding the interaction of the individual, the environment and the population in the disease process. It should be useful in the prediction of outcomes in specific clinical or epidemiological situations, and also in the reconstruction of homo sapiens' past disease experiences.

Fieldmethods

This cultural historical analysis is based upon the use of methodologies usually employed by the three distinct fields of history, archeology and ethnology.

The use of historical documents by anthropologists has become known as "Ethnohistory" (Sturtevant 1966, Washburn 1961, Leacock 1961). Ethnohistory is basically the use of historical documents to provide his-

torical depth for anthropological problems. In this study, as many historical documents as possible were scrutinized in order to reveal specific pieces of information about the Lee's Creek area. In addition to published sources, the research involved many unpublished materials which are in the possession of the Oklahoma Historical Society's archives, the Western History Collection of the University of Oklahoma and other libraries. Old maps, aerial photographs, censuses, Cherokee tribal rolls and allotments, Sequoyah County land records, and abstract maps, all added to the historical picture to be presented.

Historical archeology also provided the time-depth necessary for this kind of study. The author utilized his experience from a previous historical archeological analysis made at a site fifty miles to the west of Lee's Creek (Cheek 1976, Wiedman 1976B).

By the use of historical archeological methods we located old homesites and places of historical use. With historical archeology we could analyze the sites, acknowledging the information revealed by the scattered foundations, broken bottles and porcelain. We tried to use what man left behind, after his use of the locale, as a source of culture historical information.[2]

Ethnography, or written description of human behavior, has been the foundation of anthropology since the work of Malinowski and Boas in the early 1900s. This approach to data collection has been recently reviewed by Chapple and Spicer (1979) as the central value that anthropology has to add to scientific method. "Ethnography is the seeing and hearing of how human beings behave in interaction with one another and is the first hand familiarity with the empirical basis of our generalizations"

(Chapple and Spicer 1979:9).

Ethnographic methods were utilized by living in the district from April to August, 1978. The author lived in the locale from April 18 to August 4, 1978. Paula Norton and Michael Ferguson helped greatly in the roles of research assistants and friends. Paula Norton was in the neighborhood from June 3 to July 29th, and Mike Ferguson from May 31 to July 24, 1978. Without them, I could not have covered as much of the terrain as I did, or even interacted with as many of the local people as was actually possible.

Ethnographic methods of interviewing living individuals about the past was a prime method of data collection. This interviewing was centered upon the individuals' location in the habitat at particular points in time, thus placing historic sites into a series of population movements. Interviews also incorporated genealogical information in order to place the person in the social and cultural context necessary for an ethnological analysis--but more importantly, to place the people of the past into a historical continuum. Information about occupation, education, and health care were also assembled along with cultural data about the family and community. This collection of oral history was also beneficial in linking the data from historical documents to archeologically located sites.[3]

The ethnographic method of participant-observation aided us in our understanding of how the people worked and lived together in a dynamic relationship. It also enabled us to see certain social institutions functioning to meet the present needs of the people. Some of these institutions, such as churches, stores and cattle roundups, are similar to those of many years ago, thus connecting the present to the past.[4]

The data obtained from these three research methodologies enabled the researchers to cross-correlate and validate various pieces of information. Each of these methodologies generates questions which cannot be answered by a single methodology, but are better answered in terms of one of the alternative methods.

The best way to explain how these three methodologies perform in the data collection process is to provide an example.

On the morning of June 6, 1978, a local resident, who was greatly interested in helping us, arrived at the house. He announced that he knew of a house site where his grandparents have lived--one which he failed to show us on previous days. (We found that local interest in our historical analysis was motivating to many local individuals who helped us throughout the field work period.) On this particular day he arrived telling us of a homesite which he had heard about earlier in his life and had passed over many times while hunting. This site was also brought to his attention because in talking with his relatives about helping us, this site was mentioned.

After driving for a distance we parked the truck beside the dirt road and entered the woods following the depressions in the ground which were the only remains of what had been the main east-west wagon road through the drainage for 100 years. After heading southeast for about 300 meters in the direction of Duncan Ford, we left the trail where we came to the southern edge of Reeder Bluff, and a drop to the river of 20 meters. We turned south and followed the edge into a clearing, (we found clearings in the trees usually to be an indication of past human habitation), and the guide felt that the house site should be nearby.

After walking back and forth over the terrain, he almost gave up as no building parts remained. A metal bed spring was then located, however, and on close scrutiny under the ground cover and surrounding trees, the cultural remains of people now gone were revealed. Two more bed springs were located--in addition to metal cans, old leather shoes, mason jar lids, glass bottles, a thin car tire, burnt glass, porcelain and stoneware fragments. All of these items added to our knowledge of the site.

During this time, I was recording the historic artifacts, and listening to the oral history communicated to me. Our guide said that his grandmother and grandfather, along with their children, lived at this site for several years in the late 1930s. They left the house in the early 1940s, moving across the river into a log cabin. On moving they took all their children with them, except for one daughter who moved into the house with her husband. This young family moved out of the house after a short residence and headed to California, never to return except for visits. They left in the 1940s and made Ervington, California their new home. Thinking they would return, they left many household items; but shortly after leaving, the house burned with everything in it. No other house had been built at this site since then, and it was the only house to be built at that location. Making a record of all this information, with a list of the historical events, involved both ethnographic and historical archeological methods.

One of the items found at the site was a screw-top, molded medicine bottle. A mold mark on the bottom and a 10cc to 80cc measure on the side indicated a fairly recent manufacture and a medicinal use. This twelve-centimeter tall bottle, when turned just right to the sun's rays,

revealed an old stamp or decal indicating the words:

Medical & Surgical Hospital
Muldrow, Oklahoma
Telephone #2

On returning to our field headquarters, I located "The History of Sequoyah County 1828-1975", a book assembled by the Sequoyah County Historical Society, which is composed of many community and family histories. Under the heading "Health Care", I found the information that I wanted, since I knew that there was no hospital in Muldrow today, and my informant had never known of one. Nan Henshaw (1976:18) writes:

> The Muldrow Hospital in Muldrow was built by Doc Welch Shamblin, who was born in Benton County, Arkansas, the seventh son of Jack and Mary Shamblin. It was commonly believed in those days that the seventh son would become whatever he was named. Therefore they named him Doc. The family moved to Indian Territory in 1904. Doc Welch Shamblin did become a doctor. He set up his first office at Old Remy about 1907. He also had an office in Roland for a period of time. He moved to Muldrow about 1937 and built a fifty-bed hospital on Main Street in 1938. He closed his hospital in Muldrow and moved to Sallisaw about 1944. There he built a hospital and practiced medicine until his death in 1953.

With the use of ethnography and oral history, we located the house site, identified who lived there and for how many years. From the historical archeology, we were able to verify the oral history by noting the types of artifacts located on the surface, and fitting these data into our knowledge of the changing technologies utilized in the region. Historical archeology also took into account the medicine bottle, which when placed into the context of the written history of the county, confirms the oral-history date of the site in the late 1930s and early forties. More specifically, the hospital which issued the medicine was only in operation from about 1938 to 1944; thus, the use of the bottle would have been 1938 or later.

Not all processes of data collection utilizing the three research methodologies were as clear-cut as this example. But they did work in a very harmonious way to reveal what would have been unknown if only one method had been used.

The researchers resided with the Parris Mound Archeology Project, south of highway 101 and east of Lee's Creek (See Map #5, Place #18). From this location, we went out into the surroundings gathering information related to the culture-historical aspects of land use. We followed the "networks of interaction" of the people who came to the field headquarters and others whom we met during our stay. This means that we attempted to cover the territory around Parris Mound as far out into the defined study area as was possible, using the local people as guides. This strategy worked exceptionally well, as the persons who guided us were well acquainted with the locales in which they were brought up, and they knew where the historic sites were, who lived there, and the approximate time of use. They also identified sites which would never have been identified by the traditional archeological method of walking the terrain. Many sites had been scavenged for firewood and building materials, whereas others had been bulldozed for new pasture land. During our four months in the field, we were able to cover the subregion of Oakdale, Short, and the mouth of Webber quite sufficiently. The environs to the north and west of Nicut and Belfonte were not covered nearly so well for historic sites. Oral history was good for all of the study area, but the historic sites became very difficult to survey as the summer became hotter and the ticks became more numerous. Also, further into the summer, the sites became covered with thorny briars and blackberries, which limited our survey of the surface

and even our walking over the immediate terrain. These factors limited the amount of information received relative to the time expended, so we then devoted more time to ethnography and the collection of oral history.

CHAPTER III

THE EARLY HISTORIC PERIOD UP TO 1828

The earliest recorded European explorer to survey the general clime of western Oklahoma was Coronado in 1541. At approximately the same time DeSoto was exploring northwestern Arkansas and eastern Oklahoma. DeSoto in his travels is supposed to have crossed the Arkansas River about fifteen miles upstream from Fort Smith. This crossing is identified by Ragland (2-8-57:7) as probably being Wilson Rock located south of Muldrow. Neither Coronado nor DeSoto, who claimed the land for Spain, established any settlements. One hundred and forty years later in 1682, Robert deLa Salle traveled up the Mississippi River Valley and claimed the region for France. The French established settlements in the Mississippi region, thus confirming French control. The territory they claimed as Louisiana territory included all of Oklahoma except the Panhandle.

During this time of French rule traders were active in exchanging European goods to the Native Americans for furs, hides and other resources. A number of traders traveled through the Lee's Creek and Sequoyah County area to conduct business with the Caddo to the south and Osage to the north. The Osage lived in large villages during the 18th century, in the lower part of Missouri. During this time it is believed Osage hunting parties entered the Lee's Creek area. In 1718 a trading post was in the vicinity of present Gore, Oklahoma, which is 60 kilometers

west of the Lee's Creek area. Starting around 1741 the Arkansas River became a well-traveled route between the French Mississippi region and Spanish territories to the west (Ragland 2-8-57:7).

In 1763 Spain gained possession of the territory, then relinquished the territory to France in 1800 without any major settlements. By 1802 the French trader, Pierre Chouteau, persuaded a large portion of the Osage tribe to move from Missouri to the Three Forks region of Oklahoma. They located their villages in the valley of the Verdigris and Neosha (Grand) Rivers. This point is 75 kilometers west northwest from the Lee's Creek area. France controlled the region until 1803, when it was sold to the United States as part of the Louisiana Purchase.

Spanish influence was minimal, but French influence in the region can be seen by the many French words used as place names. Sallisaw is from the word "Salaison", referring to salt provision; the town of Vian is from "viande", meaning meat; and the word Ozark is from the French reference to these mountains as "Aux Arcs", meaning the arches. On Lee's Creek the name of the community of Belfonte is supposed to be from a French derivation. The resident Joe Fears writes:

> Belfonte (or Bellefonte as it was originally spelled), is a French word meaning "beautiful water." This indicates that the name, like many in eastern Oklahoma, was given by some of the numerous French traders who ascended the Arkansas River and its tributaries to trade with the Arkansas and Quapaw Indians when this area was a part of French Louisiana (Fears 1976:63).

The Eastern Cherokee

It is necessary at this time to move our analysis from the Lee's Creek area of the Ozarks, to the southern Appalachian Mountains where the Cherokee lived before moving to Oklahoma.

The Cherokee resided in the Great Smoky Mountains of the southern Appalachians. This terrain of rugged mountains made travel difficult and partially isolated the Cherokee from one another. By the eighteenth century, four groups of Cherokee were recognized, with sufficient age to denote dialect differences. In the area of present-day Georgia and South Carolina, on the eastern slopes of the Appalachians, lived the Lower Cherokee. They inhabited the upper reaches of the Savannah River where the land is rolling plateau with streams cut into valleys 50 to 150 feet deep. This group of Cherokee were first influenced by the Euroamerican settlements along the Atlantic coast, especially the colony southeast at Charleston, South Carolina. Two groups of Cherokee, the Middle and Valley Cherokee, were within the abrupt and insulating mountains in very narrow valleys of the Tennessee and Hiwassee Rivers. The fourth group, the Overhills, lived on slopes to the northwest of Great Smoky Mountains where the Tennessee River drains to the west. Here they lived in valleys as abrupt as 500 feet. The Overhill-Cherokee traveled frequently to the north and east into Virginia and west into the Ohio River valley (Gearing 1962:1).

Cherokee settlements were situated wherever there were sufficient flat lands for gardens. In the early 1700's, Gearing (1962:1) estimates that there were as many as 20,000 Cherokee in 60 settlements ranging in size from two households to populations of over 500 persons. Each of their square houses were built of logs plastered with clay. Bark or wooden shingles served as a roof. These houses were up to three rooms and two stories high; they were occupied by several nuclear families related to one another through the women (Gearing 1962:1-2).

The women did the gardening of corn, beans, peas, melons, cabbages and pumpkins while the men provided meat and fish. The villages had a political system based around the four ceremonial seasons of each year. Each village was divided into lineages, based upon relationship through the women; it was these units which provided the political base of the Cherokee. Not until the 1750s did the Cherokee band their villages together in a tribal state political system. Prior to the early 1700s there was no formal political system beyond the village. By the early 1700s villages began to band together, forming aggregates of politically independent villages, but even then there was no systematic coordination at the tribal level. This development of the Cherokee tribal state is the topic of Gearing's 1962 study of the Cherokee.

Basic cultigens of the Cherokee were corn, beans and squash; the same cultigens which were common to most agriculturalists of North America. The people in the southeastern United States, including the region inhabited by the Cherokee in historic times, are known to have grown these three cultigens since 500 A.D. Corn was introduced into North America through diffusion from its place of domestication in Meso-Mexico. Archeologically the lower Appalachians were part of the Mississippian culture complex. The region of northern Georgia and Alabama, eastern Tennessee and western South Carolina included what archeologists consider the Middle Mississippi and southern Appalachian Mississippi areas. The Mississippian period lasted from 500 A.D. to about 1400 A.D. and was characterized by large ceremonial mounds, ornate pottery and stone tools, woven fibers and large populations cultivating land along river bottoms, hunting deer and other mammals (Jennings 1974:246-264).

The Cherokee speak an Algonquian language and are thought to be distantly related to the Iroquois of the New York area. After Mississippian times, it is argued the Cherokee may have moved into the southern Appalachians locality from the northwest, but like most groups south of the Great Lakes, they would still have relied upon a hunting and corn based horticultural system (Jennings 1974:213, Spenser and Jennings 1965:406-407).

William Bartram, a famous American botanist and naturalist, traveled through the Cherokee Country of Georgia, Tennessee and the Carolinas in the middle 1770's. His descriptions of the region are some of the most exact and detailed we have for that time. His statement to be quoted here gives us an idea of the settlement pattern, land use and food production of a large settlement of Cherokee, sixty years before they were forced to remove to Indian territory:

> After riding about four miles mostly through fields and plantations, the soil incredibly fertile, arrived at the town of Echoe, consisting of many good houses well inhabited. I passed through, and continued three miles farther to Nucasse, and three miles more brought me to Whatoga. Riding through this large town, the road carried me winding about through their little plantations of Corn, Beans, etc. up to the council-house, which was a very large dome or rotunda, situated on the top of an ancient artificial mount, and here my road terminated. All before me and on every side, appeared little plantations of young Corn, Beans, etc. divided from each other by narrow strips or borders of grass, which marked the bounds of each one's property, their habitation standing in the midst (Bartram 1928:284).

In this village he is taken in by the Chief and describes the food fixed for his consumption.

> My venerable host gracefully and with an air of respect, led me into an airy, cool apartment; where being seated on cabins, his women brought in a refreshing repast, consisting of sodden venision, hot corn cakes, etc. with a pleasant cooling liquor made of homony well boiled, mixed afterwards with milk; this is served up, either before or after eating, in a large bowl, with a very large spoon or ladle to sup it with (Bartram 1928:285).

James Mooney (1975:221) tells us that the horse was not frequent among the Cherokee until 1740, and the cow not until possibly 30 years later. Mooney tells us of the reception of the cow by the Cherokee, and also the introduction of other food products. The cow:

> was not in such favor as the horse, being valuable chiefly for food, of which at that time there was an abundant supply from the wild game. A potent reason for its avoidance was the Indian belief that the eating of the flesh of a slow-moving animal breeds a corresponding sluggishness in the eater. The same argument applied even more strongly to the hog, and to this day a few of the old conservatives among the East Cherokee will have nothing to do with beef, pork, milk or butter. Nevertheless, Bartram tells of a trader in the Cherokee country as early as 1775 who had a stock of cattle and whose Indian wife had learned to make butter and cheese. In 1796 Hawkins mentions meeting two Cherokee women driving ten very fat cattle to market in the white settlements. Bees, if not native, as the Indians claim, were introduced at so early a period that the Indians have forgotten their origin.. The De Soto narrative mentions the finding of a pot of honey in an Indian village in Georgia in 1540. The peach was cultivated in orchards a century before the Revolution, and one variety, known as early as 1700 as the Indian peach, the Indians claimed as their own, asserting that they had it before the whites came to America. Potatoes were introduced early and were so much esteemed that, according to one old informant, the Indians in Georgia, before Removal, "lived on them." Coffee came later, and the same informant remembered when the full-bloods still considered it poison, in spite of the efforts of the chief, Charles Hicks, to introduce it among them (Mooney 1975:221-222).

Arkansas Cherokee

Throughout the time of French and Spanish rule in the Ozark region, the Cherokee of the Lower Appalachian area were moving west fleeing the English colonists. They settled in an area north of the Arkansas River in what is today north central Arkansas. After the Louisiana Purchase by the United States in 1803, these Cherokee were once again confronted by the United States' expanding frontier.

> After the Battle of New Orleans had closed the war with Great Britain in 1815, there was considerable movement of white settlers, traders, and trappers up the Arkansas and Red Rivers; traders from

> New Orleans located at Arkansas Post and as high up as the mouth of the Verdigris and at points on the Red River as high as the Kiamichi. Sutlers and camp followers of the army, and merchants of New Orleans who had stocks of goods left on their hands by the termination of the war, swarmed into the Indian country on the Arkansas and Red Rivers to dispose of them and for a time by the competition improved the Indian trade which Major Lovely said had been "plunder in the first degree." Discharged soldiers suddenly thrown out of employment, in quest of adventure, homes, and bounty lands, thronged to this new country (Foreman 1975:138).

After the Louisiana Purchase the United States arranged for the Cherokee to legally settle in this north central part of what is today Arkansas. The Osage claimed this land as their hunting territory, and raiding between the two Indian groups became a regular occurrence.

To control this battling the United States government authorized a fort be established between the two groups. A military engineer, Stephen H. Long, selected a site at Bell point on a hill where the Poteau River flows into the Arkansas. This fort, built in 1817, was named after Colonial Thomas A. Smith of the United States Riflemen. In October of this same year the Cherokee raided Osage villages in the Three Forks region, while the warriors were absent. They destroyed the large Osage village, killing many children and old men and taking women as captives.

The Beginning of Indian Territory

With this defeat the United States obtained a treaty with the Osage for their hunting grounds, in what is present day eastern Oklahoma; which has since become known as Lovely's Purchase. On September 25, 1818, the treaty was signed which purchased this land from the Osage for a total of $4,000. The treaty reads as follows:

> Article 1. Whereas the Osage nations have been embarrassed by the frequent demands for property taken from the citizens of the United States, by war parties, and other thoughtless men of their several bands, (both before and since their war with the Cherokees,) and

> as the exertions of their chiefs have been ineffectual in recovering and delivering such property, conformably with the condition of the ninth article of a treaty, entered into with the United States, at Fort Clark, the tenth of November, one thousand eight hundred and eight; and as the deductions from their annuities, in conformity to the said article, would deprive them of any for several years, and being destitute of funds to do that justice to the citizens of the United States which is calculated to promote a friendly intercourse, they have agreed, and do hereby agree, to cede to the United States, and forever quit claim to, the tract of country included within the following bounds, to wit: Beginning at the Arkansaw river, at where the present Osage boundary line strikes the river at Frog Bayou; then up the Arkansaw and Verdigris, to the falls of Verdigris river; thence, eastwardly, to the said Osage boundary line, at a point twenty leagues north from the Arkansaw river; and, with that line, to the place of beginning (Kappler 1902:II:167).

In relation to contemporary place names the territory included in Lovely's Purchase was bounded on the south by the Arkansas River up to a point six miles north of present day Muskogee, then east to the present Oklahoma-Arkansas boundary, and then down the state line to the Arkansas River.

Lovely's Purchase at this time was located in the territory of Missouri which had been established in 1812. However, in 1819, the lower part of Missouri was organized into the territory of Arkansas, and the Lovely Purchase became a part of Crawford County, Arkansas territory.

Thomas Nuttall (1821) traveled up the Arkansas River in 1819 and his journal serves as one of the earliest descriptions of the region by a natural scientist. He was a botanist who identified many plants and trees in this part of the United States. His description of the Cherokee along the Arkansas, east of Fort Smith, gives us an impression of their situation.

> . . . At a distance of about five miles from the first Cherokee village, called the Galley, Mr. D. and myself proceeded to it by land. The first two or three miles presented elevated and rich alluvial lands, but in one or two directions bordered by the backwater. At length we arrived at the Galley Hills, a series of

> low and agreeable acclivities well suited for building. Here the Cherokees had a settlement of about a dozen families, who, in the construction and furniture of their houses, and in the management of their farms, imitate the whites, and appeared to be progressing towards civilization, were it not for their baneful attachment to whiskey (Nuttall 1821:123-124).
>
> Both banks of the river, as we proceeded, were lined with the houses and farms of the Cherokees, and though their dress was a mixture of indigenous and European taste, yet in their houses, which were decently furnished, and in their farms, which were well fenced and stocked with cattle, we perceive a happy approach towards civilization. Their numerous families, also, well fed and clothed, argue a propitious progress in their population. Their superior industry, either as hunters or farmers, proves the value of property among them, and they are no longer strangers to avarice, and the distinctions created by wealth; some of them are possessed of property to the amount of many thousands of dollars, have houses handsomely and conviently furnished and their tables spread with our dainties and luxuries (Nuttall 1821:124-125).

He spent from January to September in the Fort Smith area. However, he did not travel north of Fort Smith into the mountains around Lee's Creek. On his map of the area is the designation of "Lee's Creek", which indicates that this term was in use at this early date. No contemporary person was able to provide oral history regarding the derivation of this name. Shirk (1974:139) believes that Lee's Creek was named for a trapper with the Thomas Nuttall expedition.

Many Euroamerican settlers knew of the United States acquisition of Lovely's Purchase as a buffer zone between the Osage and Cherokee, and filtered into the area to settle. Many of these settlers came from south of the Arkansas River, after that land had been assigned to the Choctaw in 1820.

In regards to Euroamerican settlement of Lovely's Purchase; the Osage who had ceded the land to the United States thought it was going to be settled by these whites, not by their enemies the Cherokee. Royce (1975:118) even indicates that the Osage encouraged Euroamerican settle-

ment. The Osage

> . . . had repeatedly solicited whites to settle on it, alleging that the main object of the cession on their part was to secure the convenient approach of civilized neighbors, who should instruct the men how to cultivate the ground and the women to spin and weave, that they might be able to live when the forests should afford no further supplies of game. They were therefore much irritated when they found civilized settlements prohibited, in order to protect the introduction and establishment adjoining or upon this territory of their inveterate enemies, the Cherokees.

With the continued raids between the Osage and Cherokee, the intrusion of Euroamerican settlers in the Lovely's Purchase, plus the expected movement of eastern Indians into the area, the United States thought it necessary to establish another military post in the vicinity. Colonel Mathew Arbuckle on April 20, 1824 selected a site for the new post in the three forks area, on the east side of Grand River two miles above its confluence with the Arkansas. Fort Gibson then became the focal point of activity throughout the later part of the 19th century; when the Cherokee, Creek, Choctaw, Seminole and Chickasaw were resettled in the eastern portions of Indian Territory. Fort Gibson is about 75 kilometers west northwest of the Lee's Creek area (See Map #1).

A major factor in the settlement of the Lee's Creek area was the military road established between Fort Smith and Fort Gibson. The United States Congress in 1825, authorized the building of a 208 mile road between Little Rock, Arkansas and Fort Gibson. In 1826, the 16 foot wide road was surveyed and by November of the same year completed. The course of the road changed many times during its use and is difficult to establish precisely, as are the courses of most roads and trails of the area. In 1957, H. D. Ragland examined records, maps and local stories to outline the route of this thoroughfare.

> According to these accounts and records, the road crossed the Arkansas River just west of Fort Smith and took a northerly direction along the west bank of the river. It continued on taking about the same path as the present county road, leaving Hales Chapel (Blue Mouse) Schoolhouse a little to the left, and present Remy, about one-half mile to the south. It continued in a westerly direction passing about one-half mile south of Akins; across Prices Chapel School yard; and on west to the Dwight mission area. It crossed the mountains going by way of Mackey's Salt Works, located in present TenKiller lake about a mile above the dam; and continued in a northwesterly direction across Greenleaf Prairie to Fort Gibson (Ragland 2-22-57:8).

The military road provided an overland route, just south of the study area, to Fort Gibson for men and provisions. Also of importance in respect to transportation was the use of pirogues or dugout canoes and keel boats. These were used by trappers and traders in transporting goods up and down the Arkansas River. In 1824 the first steamboat reached Fort Gibson carrying one hundred men to the newly established fort.

In 1825 the official boundary of Arkansas Territory was extended west to a line running north-south near present Muskogee and this tract was included in the northwestern county of Arkansas Territory known as Crawford County. On April 25, 1826, the United States Congress, upon the recommendation of a delegate from Arkansas, passed an act directing that the land in Lovely's Purchase be properly surveyed and advertised for sale. From this survey three townships were laid off; Nicks, Hope and Prospect. This land was incorporated as "Lovely County", by the Arkansas Territory legislature on October 13, 1827. "Nicksville", the county seat, was established thirteen miles above the confluence of Sallisaw Creek and the Arkansas River. This site was on the military road between Fort Smith and Fort Gibson, on the west side of Sallisaw Creek. Several log cabins were built at this location, and on April 25, 1828, a post office was

established which was called "Nicksville" (Ragland 2-15-57:10). As the county seat, Nicksville became the center of political control over the Lee's Creek area of Oklahoma. It is not known whether any Euroamerican settlers chose the Lee's Creek area at this time as their home. These settlers established small farming homesteads, and worked lead mines and salt springs for export products.

From this survey of the historical information previous to 1828, we find that during the last years of Osage use of the region it was also utilized by Euroamerican settlers. The Spanish and French use of the region was mainly in obtaining furs and hides from the native population. The Osage use of the Lee's Creek area was mainly for hunting, and no reference was found to indicate any settlement by them. For the period from 1818 to 1828 we see Euroamerican settlers moving into the vicinity and establishing homes in the general region; however, we are not positive of settlement in the Lee's Creek area. This Euroamerican settlement included a legal basis as "Lovely County, Arkansas Territory", with a county seat and three districts. Land use would have been centered upon small farms; the growing of corn and raising of a few cows and pigs. These settlers would have taken advantage of the salt springs; one of which is located in Salt Hollow, west of Little Lee's Creek.

CHAPTER IV

CHEROKEE SETTLEMENT OF LEE'S CREEK AREA 1828-1838

In 1828, the Cherokee agreed to remove from their settlements in Arkansas to the lands in what is now eastern Oklahoma. This western division of Cherokee had separated from the Eastern group beginning in the late 1700's.

In May of 1782, a delegation of Cherokee, fleeing from the encroachment of European influence in their native lands, applied to the Spanish government. Don Estevan, governor of Louisiana, granted their request for permission to settle on the west side of the Mississippi River (Starr 1910:129).

However, the major movement of Cherokee to Arkansas territory occurred after 1808. By this time there was a division among the Cherokee between a northern group in Tennessee and South Carolina and those farther down in Georgia and Alabama. The northern group had readily accepted the civilization policy of the United States government by accepting farm tools, spinning wheels and looms, whereas the southern group was hostile to these white innovations and they still preferred the hunting way of life.

In 1808, a delegation of Cherokee went to Washington requesting that a line be drawn between the two groups, so that the northern Cherokee could divide their lands in severalty and become citizens of

the United States, while the southern group could continue their hunting way of life as long as the game should last. During this meeting between United States government officials and Cherokee delegates it was proposed to the Southern group that if they wanted to continue the hunting way of life, land could be provided west of the Mississippi. This plan was approved by President Jefferson and a delegation of Cherokee from the Southern group inspected the Arkansas River lands in the summer of 1809. These delegates brought back favorable reports of the land, and a large portion of Cherokee decided on removing to Louisiana territory.

The land which they were offered in Louisiana territory was north of the Arkansas River and south of the White River. It was bounded on the east by a line running between these two rivers from the present Batesville to Lewisburg, Arkansas and on the west by a line to be established at a later date. The western line was dependent upon the surveying of the lands in Georgia and Alabama as equal amounts of land were to be exchanged. Since the Northern group of Cherokee, who remained in the east, protested the ceding of any land to the United States, the surveying of this land was delayed. This delay created difficulties with the Western Cherokee because their western boundary was not delineated. Before the end of 1819, it was estimated that 6,000 Cherokee had emigrated to the Arkansas territory (Mooney 1975:95). Mooney also gives this description of the Cherokee:

> In 1819 the whole Cherokee population had been estimated at 15,000, one-third of them being west of the Mississippi. In 1825 a census of the eastern Nation showed: native Cherokee, 13,563; white men married into the Nation, 147; white women married into the Nation, 73; negroe slaves 1,277. There were large crops of every staple, including cotton, tobacco and wheat, and some cotton was exported by boats as far as New Orleans. Apple and peach orchards were numerous, butter and

> cheese were in use to some extent, and both cotton and woolen cloths, especially blankets, were manufactured. Nearly all the merchants were native Cherokee. Mechanical industries flourished, the Nation was out of debt, and the population was increasing. Estimating one-third beyond the Mississippi, the total number of Cherokee, exclusive of adopted white citizens and negroe slaves, must then have been about 20,000 (Mooney 1975:104).

The western boundary of the Cherokee lands in Arkansas, after being surveyed, was not satisfactory to the Western Cherokee or the Euroamerican settlers of Arkansas. In 1828, a delegation of Western Cherokee went to Washington to state their grievances. This delegation selected by the chiefs and head men of the tribe on December 28, 1827, included Black Fox, John Rogers, Thomas Graves, Thomas Maw, George Morris, Tobacco Will and George Guess (Sequoyah). This delegation had no authority to cede any land but were forced to negotiate a treaty, whereby they exchanged the land in Arkansas for seven million acres in what is now Oklahoma, and also for another tract which was to be their outlet to hunting land to the west. Even though the members of the Western Cherokee did not consider this delegation to have the authority to cede land, the United States government recognized the treaty as binding, and the tribe was forced to move before July, 1829.

The Euroamerican settlers who had moved into Lovely's Purchase were then ordered to move out, abandoning their improvements. They protested this order by holding a meeting at the Nicksville courthouse on May 27, 1828, where they drew up a formal protest which had no effect on the decision of their removal. By 1828, there was an estimated 3,000 individuals on the land designated as Lovely's Purchase (Foreman 1975:224). Governor Izard of Arkansas territory gave the Euroamerican settlers in Lovely's Purchase 90 days to remove or lose the right of pre-emption which

was offered them by the United States Congress. This pre-emption right offered each head of family, widow, or single man over twenty-one years of age who lived west of the Cherokee line, two quarter sections of land elsewhere.

The Cherokee moving into the Lee's Creek area were not only confronted by Euroamerican settlers, as mentioned above, but possibly by Creek Indians who were supposed to have settled further west.

Conflict between the Creek Indians and Cherokee arose when the Creek, by treaties in 1826 and 1827, ceded all their land in Georgia and agreed to move to Indian Territory. Some of these Creek settled along the northern bank of the Arkansas in the Three Forks region. These were the same lands which the United States assigned to the Western Cherokee by the treaty of 1828. These Creek settlements were mostly to the northwest of the Lee's Creek area but there is some evidence that a Creek settlement may have been north of Short, Oklahoma. Many of the people in the Lee's Creek area do not recall the origins for local names, especially that of "Creek Town Bluff". One elderly informant said that it was because "a group of Creeks settled there a long time ago and the Cherokee had a battle with them to remove them from the area". Further search of historical documents would have to be made to verify this aspect of land use by the Creek and possibly archeologically recovered materials would aid in this aspect. A site located on the north side of Lee's Creek and north of Creek Town Bluff was located which had indications of an old settlement. No informants through oral history methods had any information about this site.

In speaking of the Western Cherokee settlement of their new

lands in what is now Oklahoma, Grant Foreman states:

> . . . and when they arrived in their new home some of the whites were still in possession of choice locations on the Illinois River and other places desired by the Indians. However when the movement got underway in 1829 the Cherokee ascended the Arkansas River and settled principally along the north side of that stream above Fort Smith. First there was the fertile bottom land along Lee's Creek, on which Sequoyah had his salt works, and which crossed the eastern Cherokee line before entering the Arkansas. Above that, at Skin Bayou, Sanders and one of the Rogers, probably James, made a considerable settlement. At the mouth of the Saliseau, now called Sallisaw, George Justice had his establishment. Chief John Jolly built his home on the east bank of the Illinois River about a mile above the mouth; Walter Webber's place gave his name to the falls nearby in Arkansas River (Foreman 1975:227-228).
>
> f.n. Some of them located on the military road running down from Fort Smith to Fort Gibson (Foreman 1975:227).

Formation of a Cherokee Government in Indian Territory

Shortly after arriving in the Lovely Purchase lands the Western Cherokee established a council house and grounds near the home of Chief John Jolly between Vian and Gore. This capital of the Western Cherokee was referred to as "Tahlonteeskee", after their chief in Arkansas previous to John Jolly. A government was set up based upon their government established in Arkansas. Three chiefs, elected by a General Council, served for a term of four years each. The General Council consisted of the National Committee and the Council. Each of these two bodies were made up of two representatives from each of the four districts. These four districts were the Sallisaw, Lee's Creek, Illinois, and Neosho districts. Elections were held every two years for district and national offices. In 1834, the elections for the Lee's Creek district were held at the home of Little Charles, on Skin Bayou. Elected officials on the district level included two judges, and two light horse members who served as police for the im-

plementation of laws. One of these laws which relates to land use in the area is a five dollar fine for any person found guilty of setting the woods on fire before the first of March in each year (Starr 1910).

One of the leaders of the Arkansas Cherokee who signed the treaty exchanging the lands in Arkansas for those in Indian Territory was George Guess, better known as Sequoyah. Sequoyah was the inventor of the Cherokee syllabary, which was completed around 1822. His invention quickly allowed the Cherokee to become literate in their own language and by 1844 printing presses were set up to print in the Cherokee language. He visited the Western Cherokee in Arkansas in order to teach them the syllabary and decided to move there in 1824.

When he moved from Arkansas to Indian Territory he was given the right to use a salt spring on Little Lee's Creek in exchange for the one he used in Arkansas. He built his home (which is now a state monument) about nine miles to the southwest of the spring. The salt spring where he used to distill salt is located in Salt Hollow about one and a half miles west of Nicut. This salt spring was a focal point of early activity in the Lee's Creek area. Salt was an important item, as it was needed for the preservation of meats.

Soon after Fort Gibson was established in 1824, the need for troops at Fort Smith diminished, so the fort was temporarily abandoned. Troops were once again stationed at Fort Smith in 1831, in order to control the transportation of liquor upstream in boats. This task proved difficult to implement at the Fort Smith location, so the company moved upstream about ten miles to where a rock overhung the river. In June 1834, the new post, named Fort Coffee, was established. This fort was

in operation about four years during which time they greatly reduced the smuggling of liquor upstream. Persons wishing to transport liquor found it difficult to pass up the river without confiscation of their goods, so two alternate overland routes were utilized.

These two overland freight routes are described by Ragland (3-22-57:8):

> . . . One was from Fort Smith to Fort Gibson over a northwesterly road which ran about thirty or forty miles north of Fort Coffee and south (sic. north) of the military road. This route probably went through present Nicut. The other route ran about ten miles north of Fort Coffee and south of the military road.

During the years 1828 to 1838, we find the Lee's Creek area settled by Cherokee Indians from Arkansas. We do not have any records indicating the specific settlement pattern or land uses of these people. We do know that Sequoyah was using the salt spring in Salt Hollow and that this was one of the main reasons for settlement in the vicinity. We also know that the area was settled, as Black Fox, one of the chiefs is buried to the north of Nicut on the east side of Little Lee's Creek. Given the kinds of settlements the Cherokee established in Arkansas, we would expect them to have employed hunting and fishing techniques and to have cultivated small gardens near their log cabins. Knowing the depth of several family genealogies these families most likely settled in the Belfont and Nicut area.

We have at least one historical reference to a road which connected Fort Smith and Fort Gibson by passing through the Lee's Creek area. This road known as the "whiskey road", may have passed through the community now known as Nicut. Another route of transportation passed south of the drainage and was known as the "military road". We would expect

that several places along the whiskey road were used as stop overs, here the travelers would camp and rest their animals for the journey ahead.

This period ended when the Cherokee of the southern Appalachians were forced to move to this land in 1839.

CHAPTER V

ESTABLISHMENT OF THE CHEROKEE NATION TO THE END OF THE CIVIL WAR - 1839 TO 1864

The Trail of Tears removing the major group of Cherokee began in Georgia, Alabama and Tennessee in 1838. The forced migration of these people ended at several localities in Indian Territory, among which are Webbers Falls, the mouth of Salisaw Creek, Lee's Creek, Fort Gibson, Tahlequah, Westville and Stilwell.

After arriving they set up a government similar to that established in their native lands. The newcomers were divided into two groups, those who had agreed with the treaty and removal to Indian Territory, and those who disagreed. These two groups, after arriving in their new homeland, remained distinct parties within the Cherokee Nation. A third Cherokee political group was the old Cherokee settlers who have lived in the area since 1828 after their removal from Arkansas.

By July 12, 1839, John Ross the leader of the non-treaty party and Sequoyah representing the old settlers; agreed upon an "Act of Union". This act declared the eastern groups and the old settlers one body politic, referred to as the Cherokee Nation. This agreement was only after much discord between the three groups, resulting in the assassination of John Ridge and Elias Boudinot, the men who signed the treaty giving away Cherokee lands to the United States Government, resulting in the removal

of the Cherokee. After much debate, the Cherokee Nation capital was established at Tahlequah and a constitution was agreed upon providing for a representative government with an executive, legislative and judicial branch. By 1840 the Cherokee Nation was divided into eight districts, one of which, Skin Bayou district, incorporated the Lee's Creek area. The portion of Little Lee's Creek which is now in Adair County was in Flint District. In 1851 Skin Bayou district was changed to Sequoyah District.

The Cherokee legislature was divided into the National Committee and the Council. Together these two bodies were referred to as the National Council. The National Committee, later called the Senate, was composed of two members from each of the eight districts. The Council also had two members from each of the districts with any increase in members based on the increase in population of the district. The members of the National Council were elected by the members of the respective districts. The members of the Cherokee Nation also elected the Principal Chief who was the Chief executive of the Cherokee people and a Assistant Principal Chief, both of whom served for a period of four years. The judicial powers of the Nation were vested in a supreme court which established circuit and inferior courts below it.

Actually, it was not until 1846 that the Cherokee finally came to terms with one another and began to develop a peaceful relationship among the three different parties. This was only after many families threatened to leave the Nation for land in Texas, and an appeal was made to the United States Congress for help. In August 1846, a treaty was signed among the three groups in a Washington ceremony. The resultant

treaty:

> . . . decreed that the lands in the Cherokee Nation were for the use and occupancy of all the Cherokees; provided for the adjudication of all Cherokee claims as well as the adjustment of other unsettled matters; extended amnesty to fugitives accused of minor and major crimes, provided they return to the Nation by December 1, 1846; provided for the protection by law of all the inhabitants in the Nation; guaranteed every Cherokee a trail by jury . . . (Woodward 1963:236).

Lee's Creek Area as Part of the Cherokee Nation

Lee's Creek was within the Sequoyah District which was the sector east of Sallisaw Creek in the area of today's Sequoyah County. The first district courthouse was at the home of Sequoyah and here is where the area of Lee's Creek was governed from until the courthouse was rebuilt a few years later on a site where Black Fox Fork and Skin Bayou run together. (This site is approximately 12 kilometers southwest of the Lee's Creek area.) In 1883 a new courthouse was built which was a two-story building south of the present day Maple Cemetery. This building was the political center of Sequoyah District until 1898 when the Cherokee courts were abolished and the United States courts came into jurisdiction.

After Tahlequah was established as the capital of the Cherokee Nation a road was established connecting it to the nearest major city, Van Buren, Arkansas Territory. H. D. Ragland outlines the route of this road:

> From Van Buren, the road ran in a westerly direction through, or near, present Uniontown, Arkansas. It crossed Big Lee's Creek northwest of present Short; Little Lee's Creek southeast of present Nicut; and took a northwesterly direction through what is now the village of Nicut. Near here, the road forked-- one prong or branch going on to Tahlequah and the other taking a northerly course to Fayetteville, Arkansas (Ragland 6-7-57:9).

After 1846 there was a very rapid development in the educational

and political aspects of the Cherokee people. Schools were established throughout the Nation with major institutes of learning established in Tahlequah, the capital of the Cherokee Nation. One of the schools established during this time was the Lee's Creek Mission. This school was under the supervision of the American Board of Froeign Missions and was provided for by an Act of the Cherokee National Council on November 9, 1848. The Mission was opened in the early 1850s and by 1853 a church was also in operation. In 1854 the school enrollment for the winter term was 40 and the church membership eleven. The Mission did not succeed as recalled by Ragland (7-12-57:7):

> . . . by 1854 the teachers had left and the school was being taught by Mrs. Ranney, wife of the missionary. Rev. Ranney, however was pastor of the church. The mission closed just before the Civil War, and so far as we know, was never reopened.

The Lee's Creek Mission was located on the east side of Mission Branch about two miles southeast of present day Nicut adjacent to the road from Van Buren to Tahlequah.

Lee's Creek Mission was associated with a religious denomination, but another school in Lee's Creek area provided secular education to the residents of the area. This school was approved by the National Council in 1841. Belfonte school was probably not established this early, but in 1841 the Act established a system of national schools with a superintendent and a board of education. The citizens of an locale were to construct a building and apply to the Cherokee Nation for a teacher. The teacher would be appointed by the school board and the superintendent, and supported out of the annuity funds of the Nation. The original Belfonte school location appears to have been near the present day Belfonte Baptist Church and cemetery. The school itself has been moved at least

six times to different places within the Lee's Creek area and is today known as Belfont School which is between Nicut and Short.

In regard to the salt spring in Salt Hollow, we find this reference:

> After Sequoyah's death, this saline became the property of Joseph Coodey and his son, William Shorey Coodey, and was operated under the name of Coodey and Son. In 1846 they advertised that they had 3,000 bushels of salt which they would sell cheap. They had to do this because, since there were no navigable streams to market, the salt had to be sold at the source of supply. About January 1, 1848 Mr. Coodey sold his saline to J. and W. T. Mackey, sons of Samual Mackey. After the Mackeys abandoned the works, local citizens often took their kettles to the place and manufactured their own supply of salt (Ragland 3-13-57:7).

Several people in the area recall their families going to the salt spring for a period of time during each summer. They would carry the complete family in the wagon and set up camp near the spring. Here they would heat the spring water in kettles; evaporating the water; leaving the salt. They would work at this for several days until they had collected enough salt to last them the year.

The salt spring in the summer of 1978 was very difficult to get to. The original road up Salt Hollow from Nicut is no longer open and an alternate route is used by way of the low gap road which connects Nicut and route 59 to the northwest. The low gap road is a county-maintained dirt road and the road leading to the salt spring from this road is an overgrown rocky and twisting automobile trail. The spring itself is unrecognizable as a place of major historical importance. No cultural items remain on the surface surrounding the spring. The location is now used for grazing cattle which frequent the spring for its salty taste, leaving the ground churned up from their hooves. In the late

summer a stagnant puddle is all that remains.

Cherokee and the War Between the States

The United States Civil War wrecked havoc with the Indians of Indian Territory. The Cherokee split on the Civil War issue along the two lines which had developed from the removal period in the late 1830s. The anti-treaty party lead by John Ross favored neutrality. The treaty party sided with the southern cause and was lead throughout the war by Stand Watie.

At the start of the war, northern troops were stationed at the forts in Indian Territory until they were abandoned when the troops were ordered to move to northern territory. The southern troops then easily took command of the region and those individuals who sided with the northern cause fled to the north, mainly to Kansas. This left the remaining individuals at the hands of the Confederate forces whom they sided with. Since many of the well-to-do Cherokee owned slaves, they had an interest in the outcome. No major battles were fought in the Lee's Creek vicinity but there was major military action to the northeast at Pea Ridge, to the west at Honey Springs and to the southwest at Mackey's Salt Works on the Arkansas River. In 1863, northern troops recaptured Tahlequah and Fort Gibson. In the same year, at the battle of Honey Springs, the Confederate troops were forced to retreat.

At the close of the war most of the men of military age were scattered across Indian Territory. Cherokee civilian refugees who sided with the north were camped at Fort Gibson and at camps in Kansas and Missouri. Confederate refugees were to the south along the Red River and on into Texas. Cholera and malnutrition, in addition to combat

wounds, resulted in population decrease of twenty-five percent for the Five Civilized Tribes (Fisher 1974:24). The region was depleted of usable property due to the guerrilla-type fighting, which resulted in plundering and foraging by free companies of men.

In the 1930s a Sallisaw resident made these comments:

> The civil war had left the Indians in the Indian country in a deplorable condition.
>
> Immediately after the war the Cherokee began to clear ground once again for cultivation, all the fields having grown up with brush, briars and sprouts. Log cabins were built and rails split for fences to enclose their little clearings (Foreman Indian and Pioneer Papers 99:376).

It is estimated by McReynolds (1954:224-225) that 2,220 Cherokee served with the Union armies and about 1,400 with the Confederate forces. He also states that about one-third of the Union Cherokee women were left widowed and one-fourth of the Cherokee children were orphaned.

But the worst result of the Civil War was to Cherokee sovereignty. Those who had sided with the Confederates met with defeat along with the Southern states. The Cherokee along with the other Five Civilized Tribes negotiated reconstruction treaties with Washington. They agreed to establish peace with the United States government and other tribes, abolish slavery, grant tribal citizenship to freedmen with all the rights of Indians, provide for railroad right-of-ways, and submit to the development of a unified intertribal council consisting of the other tribes in Indian Territory. They also agreed to allow federal courts to handle non-Indian criminal offences in Indian Territory and they had to make provisions to compensate the losses to the Indians who sided with the Northern cause. Most important was the additional provision, whereby the United States government could settle other Indian tribes on tribal lands

held by the Five Civilized Tribes (Fisher 1974:26-27).

Cherokee Land Use Before the Civil War

During this period the Cherokee continued the old Indian custom of holding the land in common. All of the citizens of the Cherokee Nation had equal rights to share in their domain. Each member fenced and used the land he needed for his livelihood. Every citizen could fish, hunt, and cut timber in all places not occupied by farms or towns. The open range practice was followed where an individual's livestock, marked with the owner's brand, roamed at will on the public domain, which was that zone not enclosed by a fence. An act of the old Cherokee settlers defined a lawful fence:

> . . . all persons having farms or other enclosures within the limits of the Cherokee Nation, are hereby required to have a fence of nine good rails high, and the cracks in the fence within the space of two feet from the ground up, not to exceed four inches in width. And all fences filling this description, shall be considered lawful fences, and all as falls short of it, shall be without the laws protection (Starr 1910:111).

The settlement pattern of the Cherokee in their original homeland of the southern Appalachians consisted of nucleated towns with many people residing in a relatively small unit. By the time of their removal to Oklahoma, dispersed settlements were the practice. An early law of the Cherokee Nation was that no citizen could enclose a tract for his use closer than one-fourth of a mile to that of another citizen, unless there was a spring, running water or needed timber in the locality, in which case one hundred yards was the minimum (Ragland 4-26-57:12).

Ragland (4-26-57:12) was of the opinion that the full-bloods settled:

> . . . in the hills where there was plenty of wood for fuel and

> good spring water. They farmed small patches and tended a few hogs, cattle and other livestock. Some of the more well to do --usually mixed bloods-- were able to live on the more level areas and in the river and creek bottoms.

It is difficult to ascertain the environmental condition of the Lee's Creek area during this period. Since we have no evidence that the Osage cultivated the land we are assuming that, except for the fired zones, the region was in a climax stage of growth. This would mean that most of the habitat would be covered by an oak hickory forest previous to Euroamerican and Cherokee settlement. A United States geological survey of the region was not made until 1897, because the land was owned by the Cherokee Nation. To give us a better idea of what the habitat might have been like, inferences from an Arkansas survey in 1859 may be in order. Leo Lesquereux completed a botanical and paleontological survey of Arkansas including the upper portions of Lee's Creek in 1860. In this report he describes the region as wooded, except for two kinds of prairies. The first kind of prairie which he outlines is located in the northern counties of Arkansas in the Ozark mountains:

> . . . They are singular in this fact, that their surface is not always flat, and that they are mostly placed on soft declivities or coves along or between the ridges. They are mostly of small extent and surrounded by thickets of low trees. The compact or somewhat porous Subcarboniferous Limestone which they cover does not absorb water with rapidity. Hence, in the spring, water percolates slowly along the slopes, taking with it the detritus of the stone, and depositing it where its course is either stopped or slackened. A scant swamp vegetation springs up there, its decomposed remains are mixed with the original deposit, which, by and by, augments in thickness under the action of water and of vegetation. This soil is naturally spongy, preserves water for a part of the year, like peat, which it resembles, and thus cannot sustain trees. They establish themselves on a firmer ground all around. When by successive contribution of limestone deposited by water and of particles of humus received from the plants this soil has become thick enough, it is, when drained by a few ditches (serving as channels for the water of the rainy season), a fertile and easily cultivated ground (Lesquereux 1860:324).

The second kind of prairie:

> . . . on the Carboniferous shales are generally flat, surrounded by hills, or at least by a higher border, which gives them the appearance of the bottom of drained lakes. These prairies are of various extent, and although they may overlie different kinds of ground or geological formation, in Arkansas they are generally underlaid by Carboniferous fire-clay or shales. In the spring they are covered with water which cannot percolate, and become true marshes for a time, and have the vegetation of marshes: the rushes and the sedges. This semi-aquatic vegetation gives, according to the nature of the underlying strata, either a hard, compact, cold soil, by decomposition of shales or clay; or, when mixed with sand, the peaty black soil of the prairies of Illinois and of the Northern States. In the summer months, these marshy prairies become dry by evaporation, and as it happens with the prairies of the first section, the alternative of too much water and of dryness in the soil prevents the growth of trees.
>
> These prairies are more sterile or rather more difficult to cultivate than those of the former section . . . (Lesquereux 1860:325).

If the region was wooded except for these two kinds of prairies, then these two environments would most likely be the first to be settled and cultivated by the incoming population of people. If this is the case, then the first kind of prairie which is on the uplands would be the preferred site of settlement as it is fertile and easily cultivated ground. The second kind of prairie found between the hills would be the next site to be settled as it is more difficult to cultivate.

Adding to this line of thinking, Lesquereux, in speaking of the northern counties of Arkansas; including Crawford County, states that:

> . . . In all these counties, the hills or ridges are formed by the Millstone Grit, and consequently their summits are sandy, dry, and sterile, except on somewhat extensive plateaux where water does not find an easy course down the declivities and is restrained, moistening the ground by percolating through it. On these flat surfaces only, the soil of the Millstone Grit becomes of sufficient thickness to be arable, and by cultivation is fertile enough . . .
>
> Near the base of the Millstone Grit, we find thick beds of

> red shales, covered by flaggy sandstone, and underlaid by beds of clay and black shales, containing sometimes one or two beds of coal. The land extending over these shales is, when flat, transformed into prairies. But, on all the declivites, or where it is cut in hills or undulations by the water-courses, it is covered with a fine growth of trees, . . . The red shales form, by their decomposition, what is called the Red-upland, and is considered the most fertile soil of this division (Lesquereux 1860:33).
>
> Around Fayetteville and south of Washington County, through Crawford County to the Arkansas River, the hills, are high, steep, and all of Millstone Grit formation. Where the top is flat, or at least unbroken, it is generally cultivated. The soil of the Millstone Grit, though it has no limestone, is richer than could be supposed from the porosity of the sandstone. It is light, sandy, permeable, and produces from twenty-five to thirty bushels of wheat per acre. It is still better for tobacco, giving, on an average one thousand pounds per acre. This soil is soon exhausted, and should be carefully manuered. In dry seasons the crop is very short. Good springs are found at the top of the Millstone Grit, even on hills of small extent; but generally, water is scarce in summer (Lesquereux 1860:336).
>
> The banks of bottoms of the water-courses, running between these high hills of Millstone Grit, are generally narrower than those which cross the subcarboniferous cherty formations. They are consequently rocky and do not afford as large fertile plains for agriculture. Nevertheless, clearings and plantations are seen along Lee Creek and other creeks of the northern part of Crawford County (Lesquereux 1860:337).

A major part of the Cherokee subsistance was hunting and, from prehistoric archeology, a cycle of deer ranging and hunting has been outlined. Bruce Smith (1974) by using archeological material from the southeastern Ozarks has noted a prehistoric cycle which might be similar to the present situation. In computing the deer bone found in sites, he has found that the deer move to the higher elevations when the oak trees are producing large quantities of nuts. This period is between the beginning of October and the beginning of January. Also, beginning in October is the deer rutting season, which lasts for two months. From archeological material, Smith found that the number of deer killed each season is by

far the greatest between the end of October and the end of January, when the deer are concentrated in the uplands. This is also the rutting season when the deer have a decreased awareness of humans. In 1978 the deer hunting season was October 14 to November 26 (Sequoyah County Times 10-19-78:B-2). During the 1977 deer season it was noted by the researcher that the hunters in the Lee's Creek area were concentrated in the uplands where they set up temporary camps for the duration of the hunting season. This contemporary pattern is very similar to the prehistoric behavior provided by Smith for the southeastern Ozarks. From this analysis it is easy to conclude that the full-blood Cherokee, by settling in the uplands, were settling where the hunting would be good.

The settlement of these uplands by full-bloods may not have been because they desired to get away from the Euroamericans, leaving the rich bottom lands for the mixed-bloods. This upland settlement may not have even been because they came from the Appalachians and these sites reminded them of home. During the middle years of the 1800s the technology of farming in Arkansas and Oklahoma may have made it more profitable and efficient to farm the small areas of prairies in the uplands. In these prairies the land would not have needed to be cleared previous to planting; plus, the elevation allowed for the planting of orchards, and good hunting of deer. It may not have been until advanced agricultural techniques allowed for efficient use of bottom lands that the mixed-bloods benefited by their selection of settlements. In Arkansas in 1860 there was a similar preference by Euroamerican farmers for these higher uplands. Lesqueaux (1860:337) expresses his attitude towards this preference:

> A great part of Sebastian and of the south of Franklin County is occupied by prairies underlaid by clay and shales, and still mostly uncultivated. It is impossible to look at the immense and beautiful plains, which are now used only as pastures for cattle, without regretting that agriculture has not until now been able to produce more out of them. They are too wet, too hard, too clayey, say the farmers, who clear land in the forests surrounding the prairies, where they find a dry, light soil, mostly red upland, or who even prefer settling on the top of the hills of the Millstone Grit. It does not appear that any fair trial of culture has been made on the prairies of this section. By a fair trial, I mean not only the deep ploughing of the subsoil, but the drainage also. The tenacity of the soil may be easily remedied by the addition of manure, and if it is not at hand, of sand, most abundant on all the declivities of the hills surrounding the prairies. Generally, the proprietors know that the soil can be rendered productive; but they find that the result would not repay the cost and trouble. Moreover, the prairies are well enough as excellent pastures for their cattle. These reasons may suffice at present; but when the population of Western Arkansas increases industry will yet derive a great deal more advantage from these plains.

An additional advantage to the settlement of the uplands as compared to the river terraces is the problem with disease. In the collection of oral history we asked specific questions about the settlement of homes in certain zones. A reason, stated several times from different parts of the drainage, was that malaria was bad in the old days. One informant even recalled one house site as having been occupied by several families, and each family lost a person to this disease. This particular site is located in a marshy site in the old Rocky Point locality. This factor in land use and settlement may have influenced people's decisions in settling on the higher grounds. It was not until after World War Two that the United States government implemented a DDT program which successfully eliminated the Anopheles mosquito and thus allowed for reduction in malaria as a factor in adaptation to this environment.

An old settler up Lee's Creek to the east of Creektown Bluff also had this reason for settling on higher grounds. In a long recorded

interview dealing with where he had lived at certain times and health care, an incident came to his mind of a time when his daughter was very ill and needed doctors attention.

DW: What kind of ailment did she have at that time?

LB: Well I tell you back then we use to have a lot of, they called it stomach trouble, but I think we used to have a lot of malaria. I think that was what was bothering her. I know that was what was bothering her. I know people years ago use to think it was the water, but it wasn't water it was mosquitos. And the people use to work up and down this creek and they would drink out of them bank springs, and them mosquitos would bite you. And they didn't know that was what was causing it. Well they sprayed and they killed that mosquito, and nobody has typhoid fever any more. It use to be people would die here every summer here with it.

DW: How long ago did they spray?

LB: They done that in, I guess in the 40's I believe. You don't hear of typhoid fever anymore. They killed that mosquito. There's mosquitos here, but there's just one type that carries malaria.

DW: Did you ever get malaria?

LB: Yeah I did I use to live way down the bluff down here. There ain't no house down there anymore. And I kinda lived, if you live up on that and stayed away from that creek. That's where them mosquitos, that's where they breed, where they have water. It's drier up on that mountain than it is on that creek. People use to have chills, well it was malaria is what caused them chills. Some people would have them every other day, and some people would have em every 30 days, and some will have em every day. And boy when that started I had em every day. And I had it as long as I stayed on that place down there. When I left there I quit. But we wasn't very far from the creek, it could be in the water, it was a well, but it was the best tasting water you ever drank in your life (Tape 1B, Page 12).

The sites which were surveyed that are on top of the hills or mountains in the Lee's Creek area fit the description of natural prairies in the uplands of Crawford County, Arkansas in 1860. Many of the sites which we identified in the upland area had characteristics which differ-

entiated them from the sites at lower elevations (See Map #9). Houses themselves were similar in floor plan but the sites had more buildings associated in a cluster. In many cases there was a subterranean root cellar. Oral history material collected on these homesites revealed that these cellars were used for the storing of foodstuffs, especially bottled fruits and vegetables. Also, the upland sites usually had a house referred to in the oral history as "smoke houses". This log cabin building was used for the preservation of meats. The root cellar was a stone-lined structure sometimes as much as seven feet in the ground, with a stone stairway. This structure was covered with large timbers, then smaller pieces of wood to form a roof which was about 1 to 1½ feet above ground level. Another characteristic repeatedly attached to these sites in the oral history is the diverse activities associated with them. Dairying — providing milk to surrounding households — is associated with one of the sites, but most of them had a reference to fruit trees or orchards.

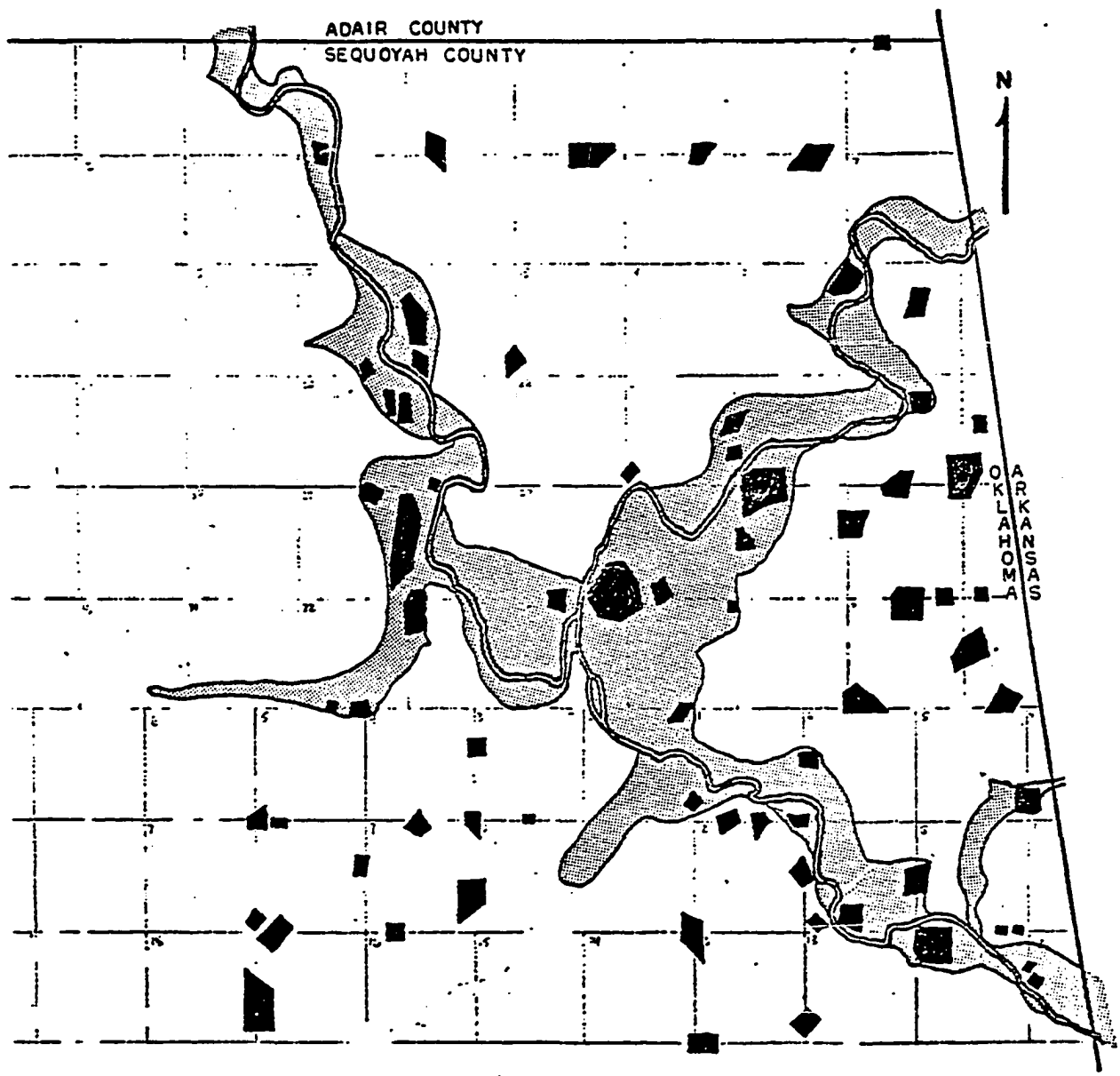
This common reference to orchards and fruit trees at the upland sites indicated a diversity in land use not attempted by the settlers at lower elevations. In Arkansas, Lesqueaux (1860:21) refers to this upland area:

> . . . it makes an excellent ground for the growth of the trees, and consequently for the culture of fruit trees. While the north counties of Arkansas scarcely cultivate any fruit, in these western counties nearly every plantation on the red-upland is surrounded by a fine orchard of peach and apple trees.

There are three orchards within the study area today; only one of these is maintained and it is an apple orchard at the 820 to 840 foot elevation. The remaining two orchards are at 920 to 940 and 720 to 740

MAP 9

AREAS OF CULTIVATION FROM 1897-1900



SCALE: 1 Inch = 1-3/4 Miles
Grey Zone = Bottom Lands
Dark Zone = Cultivated Fields

foot elevations.

The Cherokee who were removed from southern Appalachia in the 1830s settled in the Ozark mountains west of Arkansas Territory. The Ozarks in Oklahoma are confined to the tract north and east of the Arkansas River and to the east of the Grand River. The present boundaries of Adair, Cherokee, Delaware, Mayes and Sequoyah are within this area. These five counties are the region settled by the Cherokee. Most of the old settlers selected farms in the southern part of the region not far from their homes in Arkansas (Hewes 1940:63). The preferred lands were the limestone uplands throughout the region where Cherokee settlers dispersed in individual farmsteads. The notes of a church man who crossed Cherokee country in 1844 are quoted by Hewes (1940:67). The traveler found that the farms were usually within five miles of each other.

The use of the Lee's Creek area from 1839 to 1864 was predominantly by Cherokee Indians who had moved into the region from the Appalachians. These people settled among the Cherokee who had moved in a decade before from Arkansas. After setting up a government, these immigrants prospered, increased in population, and established schools, courthouses and roads. The land during this time was for the use of all Cherokee; only the fenced-in tracts were considered the restricted domain of individuals. We have indications that the population was spread out over the hills and hollows from accounts of travelers in the vicinity and also by a law of the Nation prohibiting settlement within one quarter mile. It was during this time that the full-bloods settled the uplands and the mixed-bloods the river bottoms. Both of these two kinds of settlement utilized the clearing of small patches of land, the tending of a few hogs, cattle and live-

stock. Although students of Cherokee history have stated that the full-bloods settled on the hills because it reminded them of their previous homes in Appalachia, thus leaving the better bottom land to the mixed-bloods, evidence was provided indicating that these upland sites had natural prairie clearings, were more fertile than the lower prairies and were areas of good hunting. Given this quality of the upland sites, the full-bloods chose to live in the best ecological zone, given the technology of the time.

This period came to an end when the United States entered a Civil War which split the Cherokee. Because of the war, the region is believed to have suffered a significant population decrease and a spoilation of many buildings and capital improvements.

CHAPTER VI

FROM THE END OF THE CIVIL WAR TO ALLOTMENT OF LANDS IN SEVERALTY - 1864 TO 1907

The years 1864 to 1907 were a period of major change in the land-use patterns in the Lee's Creek area. During that time small Cherokee homesteads dominated by hunting and the cultivation of corn and vegetables change to larger farms, with the addition of cotton as a major cultigen. It was during that time that the region was rapidly populated by Euroamerican settlers, and also the time when it was opened up by railroads which facilitated the export of cotton. The Cherokee Nation, after the Civil War, lost control in governing the populace of the land and by the end of the period was abolished. Land which was held in common by Cherokee Nation citizens in the 1860s was allotted to individuals by 1907, thus eliminating the Cherokee Nation's control of the terrain.

Important Roads and Trails

After the establishment of the Five Civilized Tribes in the eastern part of Oklahoma, travel by United States citizens became much more secure. In 1858 the Butterfield Stage Line began its run between Fort Smith and San Francisco. To the west of Fort Smith and south of the Arkansas River the stage line ran in a southwesterly direction toward McAlester, then to Fort Washita, and then to Preston on the Red River.

From here the line passed through Texas to El Paso, San Diego, Los Angeles and finally ended in San Francisco.

In the early 1870s there was a stage route established between Fort Smith and Muskogee, in the Three Forks locale. This stage line departed from Fort Smith, crossed the Arkansas River and passed south of Muldrow where the Cottonwood Station was located. From here it went to Childers Station, south of Sallisaw, then west, passing near Vian up to Muskogee. This stage line passed too far to the south to be of major influence on the Lee's Creek area.

There seems to have been a stage route, which H. D. Ragland describes as passing through the Lee's Creek drainage in the early 1870s. It follows the route described earlier as the road from Tahlequah to Fort Smith but when the road reaches present day Nicut from the east, it turns to the north and follows Little Lee's Creek north to Fayetteville, Arkansas. He goes on to state that:

> In the 1870's, a stage line was in operation over that branch from Van Buren to Fayetteville. John Vail probably was operating the line at that time. Joe and Nancy Seabolt's place, located at a site (NW28-13n-26e) on the east bank of Little Lee's Creek and about a mile southeast of present Nicut, was used as a stand on this line (Ragland 6-7-57:9).

This stage stop was the home of Joseph and Nancy Seabolt and this building was the most substantial building in the vicinity for fifty years. Nothing remains of the building today except for some of the sandstone foundation blocks and a pile of chimney stones. The stone-lined dug-well still marks the site which is a few meters north of present day highway 101 and 1.3 kilometers southeast of Nicut (See Map #5, Place 11).

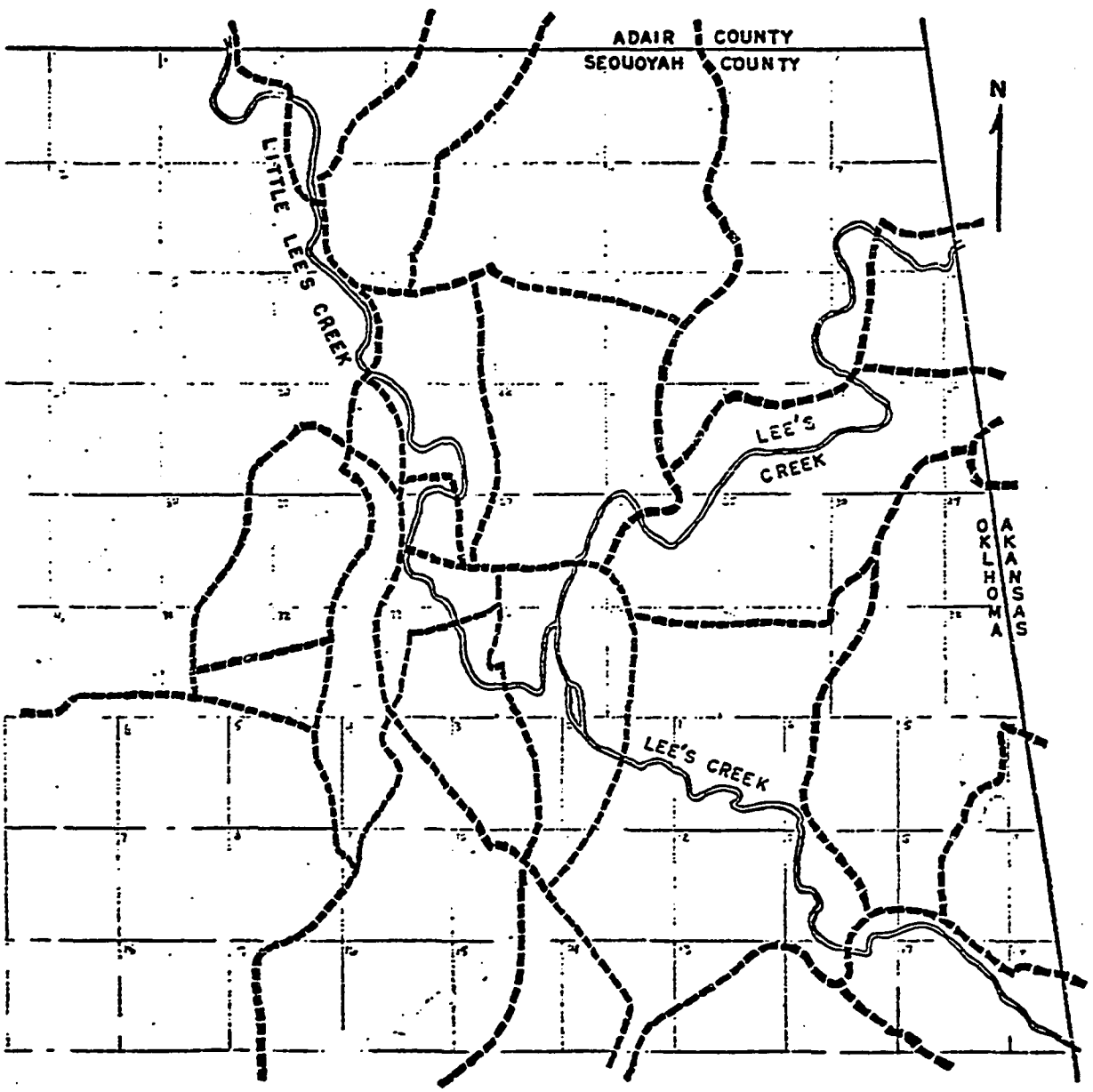
The Seabolt stage stop served as a place where the horses could be changed and also travelers could be boarded. Before it was torn down,

it was a large two-story double log cabin. The bottom floor was composed of two large rooms separated by a hallway. In the hallway was the staircase leading to the second floor. The upstairs of the northern portion of the double log cabin was not finished. The southern portion of the upstairs served as living quarters for slaves whom the Seabolts owned and, after the Civil War, as rooms for travelers and visitors. Two long porches ran the length of each side of the building and these were covered by the single roof, which covered the whole building. On each end of the building was a chimney which provided a fireplace for each of the three rooms. This stage stop was on the route from Van Buren to Fayetteville, and on the road to Tahlequah, indicating that it was the hub of the transportation system in the Lee's Creek area during this period.

From the original United States geological survey maps in 1897, we can note the trails used at this time. The maps actually indicate a spider web of trails which, without field knowledge and oral history, would be unintelligible. On Map #10, we can see the major roads which were utilized at the turn of the century. The major east-west road, and probably the route of the stage before it went out of business, is the road leading out of Uniontown, Arkansas Territory and taking a gradual turn to the southwest along the top of the ridge. It travels until it meets the north side of the Short Branch; then it follows the Short Branch to the west until it reaches the first terrace of Lee's Creek. Here the main road goes to the north passing by Duncan's cabin and taking a left to cross Duncan's Ford. Traveling directly west the route crosses Mission Branch and proceeds west until it passes the Seabolt stage stop and fords the Little Lee's Creek directly to the west. On the other side of

MAP 10

FREQUENTLY TRAVELED ROADS OR TRAILS 1897-1900



SCALE: 1 Inch = 1-3/4 Miles
Dashed Line = Road or Trail

Little Lee's Creek it turns north crossing over Salt Branch in several places and arrives in the Nicut area. Not indicated on the map, but mentioned in the present oral history, is a possible alternate route which leaves the Seabolt stage stop in a northerly direction; crossing Little Lee's Creek at the bottom of its loop to the east. After crossing, it went north for a short jog and then turned directly west, entering the Nicut area from the east. According to the conditions of the river, these may have been utilized at different times. Leaving the site of Nicut for Fayetteville, the stage route probably went directly north crossing to the east side of Little Lee's Creek near present Copic Slab and followed the route of the present dirt road on up around the west side of Little Round Mountain. An alternate route would have been to turn north after crossing Little Lee's Creek near Copic Slab, and proceed north to Hunt Mill Hollow; crossing the stream in Hunt Mill Hollow, and follow the west side of the stream north.

The route to Tahlequah would follow this last route but, instead of following Hunt Mill Hollow north, the route crosses back over Little Lee's Creek and travels up the west side of the creek until what is today called Bradley Ford. It crosses at Bradley Ford, then follows the northern side of Little Lee's Creek until the creek turns north again; at this point the route would cross the stream and head in a westerly direction. There is an alternate route out of the Nicut vicinity, going to Tahlequah and places west. This route goes south out of Nicut and crosses the Salt Branch, staying on the northern side of Polecat Creek. The route follows Polecat Creek until the stream turns to the north where a hard, natural rock slab serves as a ford to the west side. After a short distance this

road meets with a road going north over Brushy Mountain and meets with the northern route. The Brushy Mountains were a formidable barrier to transportation and communication to the west of the Lee's Creek area; thus these two routes were necessary (See Maps 11 thru 15).

Railroads

Two railroads presently cross Sequoyah County. Crossing east-west is the Missouri Pacific Railroad completed in 1888 and crossing from north to south is the Kansas City Southern, completed in 1896. The Missouri Pacific at one time connected Van Buren with Roland, Muldrow, Salisaw and towns further to the northwest passing through the Three Forks region. The towns of Roland and Muldrow, south of the Lee's Creek milieu, started at the time the railroad was begun.

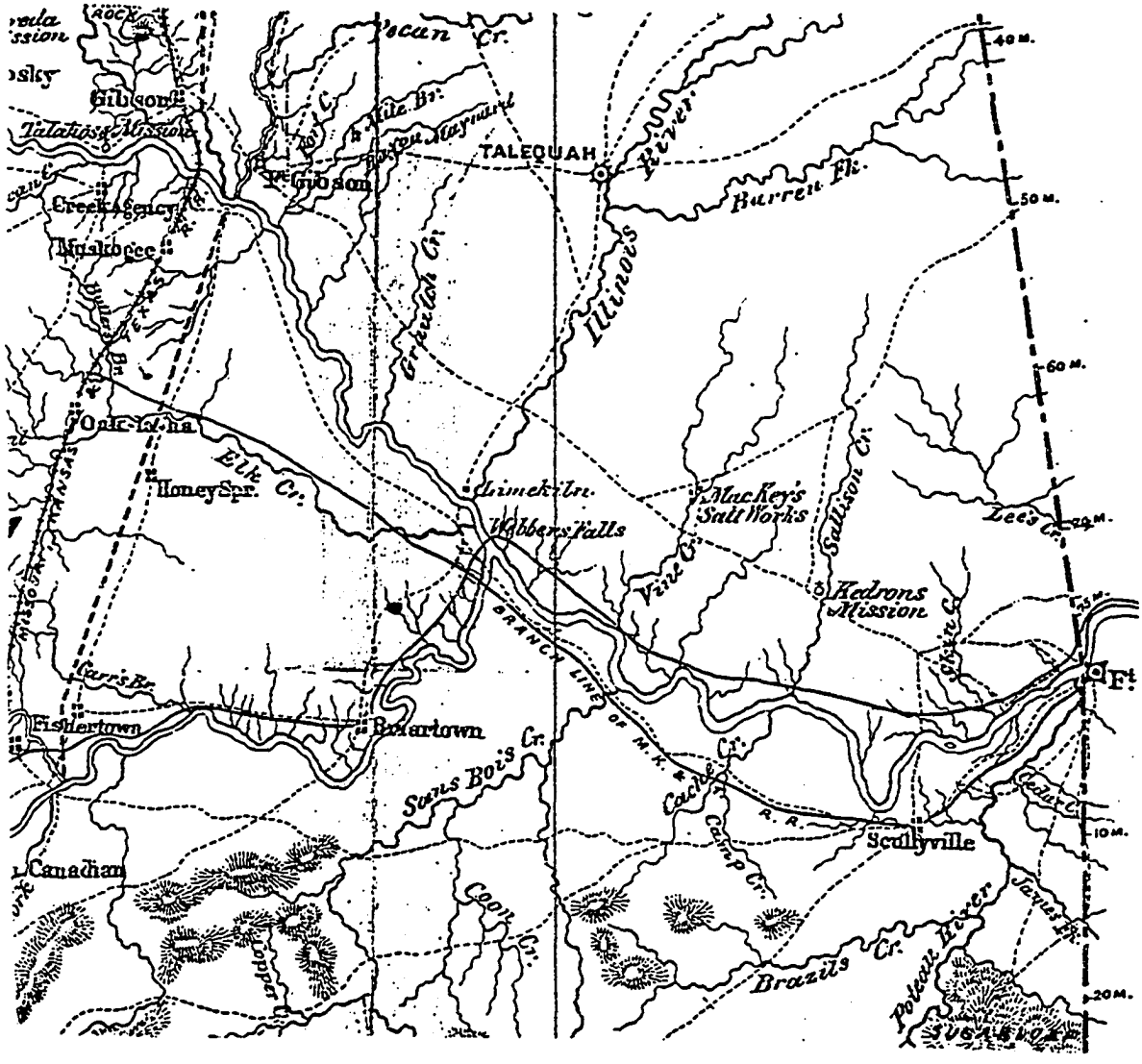
The north-south route of the Kansas City Southern is 27 kilometers to the west of the Lee's Creek area. This railroad passes through Stilwell in Adair, County, then Marble City to the west of Lee's Creek, and then Salisaw where it crosses the Missouri Pacific Line. This railroad extends from Kansas City, Missouri to Port Arthur, Texas on the Gulf of Mexico.

Many maps dealing with this part of Oklahoma in the later part of the 19th century indicate a railroad, the "Kansas City, and Fort Scott and Gulf Railroad". This railroad is supposed to have passed through the Lee's Creek drainage, following Little Lee's Creek, then south through Remy, then to Muldrow. No evidence of this railroad is in the locale today and no individuals ever knew of it (See Map #13). Other maps, including a map in the 1898 report to the Commission of Indian Affairs, refer to this railroad as the Kansas City, Pittsburg and Gulf and indicates it

MAP 11

1879

LEE'S CREEK AREA OF INDIAN TERRITORY



SCALE: 1 Inch = 12 Miles

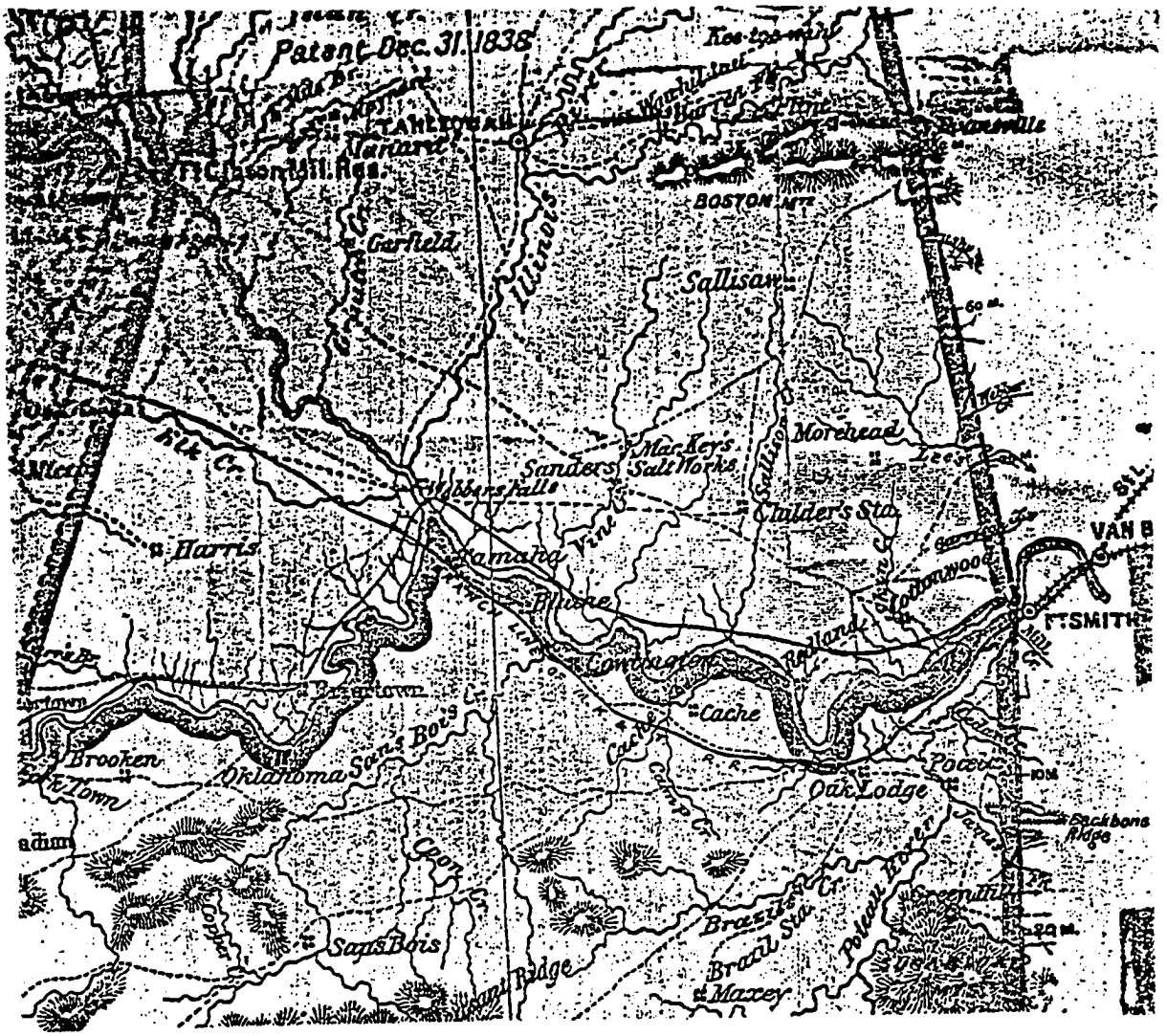
SOURCE: Department of the Interior General Land Office.

Courtesy of the Western History Collection, Oklahoma University.

MAP 12

1885

LEE'S CREEK AREA OF INDIAN TERRITORY



SCALE: 1 Inch = 12 Miles

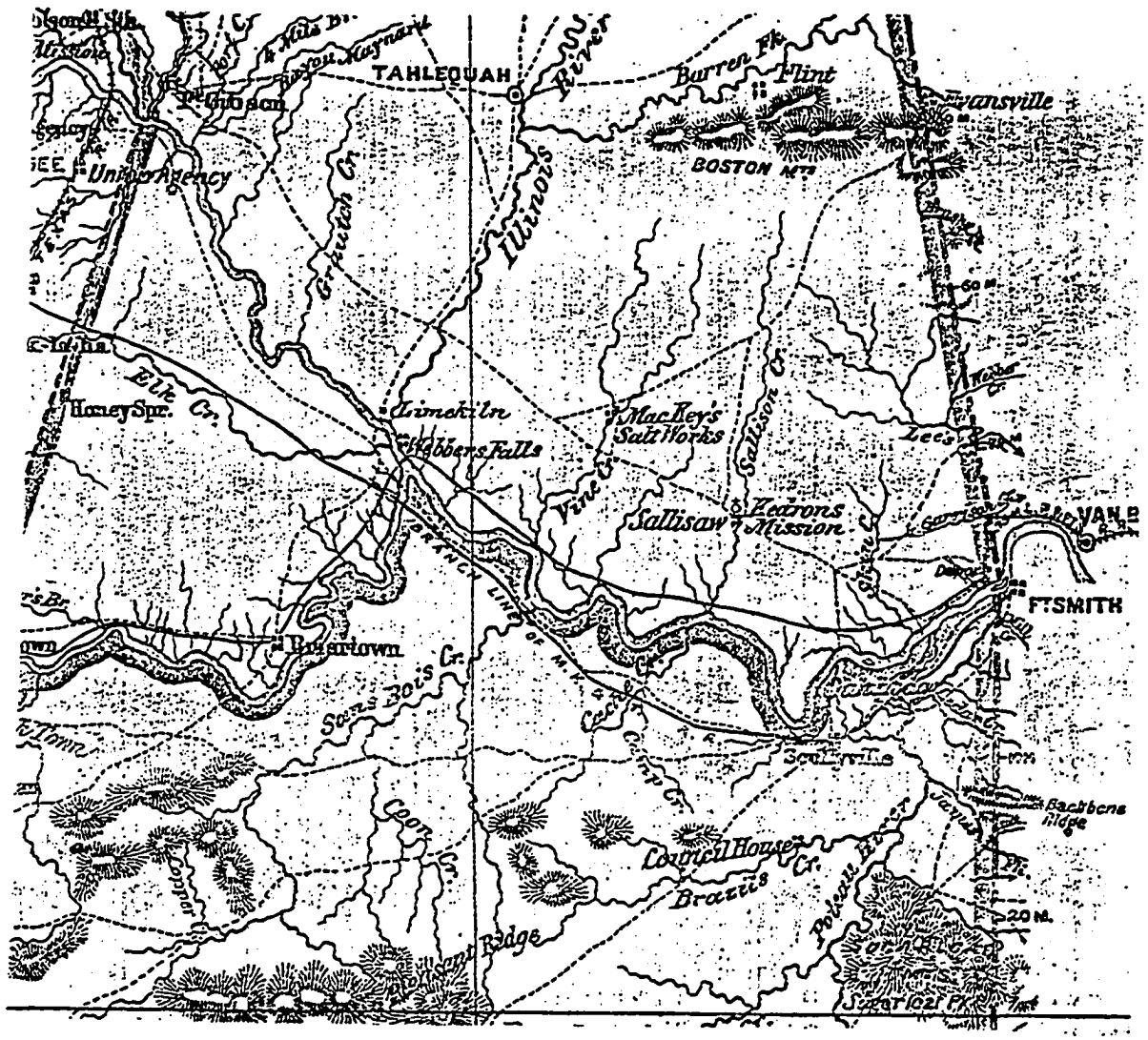
SOURCE: Department of the Interior General Land Office.

Courtesy of the Western History Collection, University of Oklahoma.

MAP 13

1890

LEE'S CREEK AREA OF INDIAN TERRITORY



SCALE: 1 Inch = 12 Miles

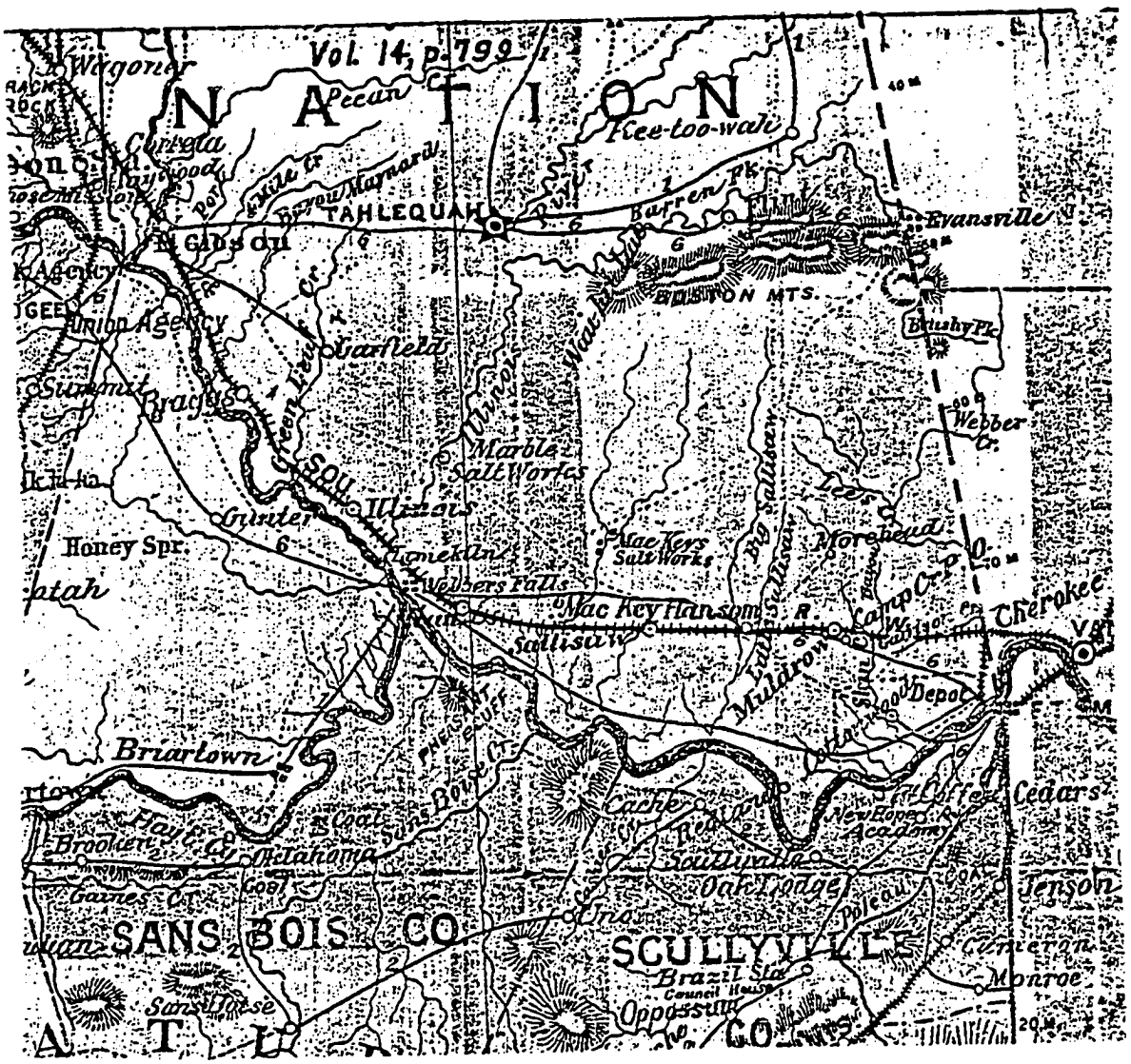
SOURCE: Eleventh Census of the United States.

Courtesy of the Western History Collection, University of Oklahoma.

MAP 14

1890-91

LEE'S CREEK AREA OF INDIAN TERRITORY



SCALE: 1 Inch = 12 Miles

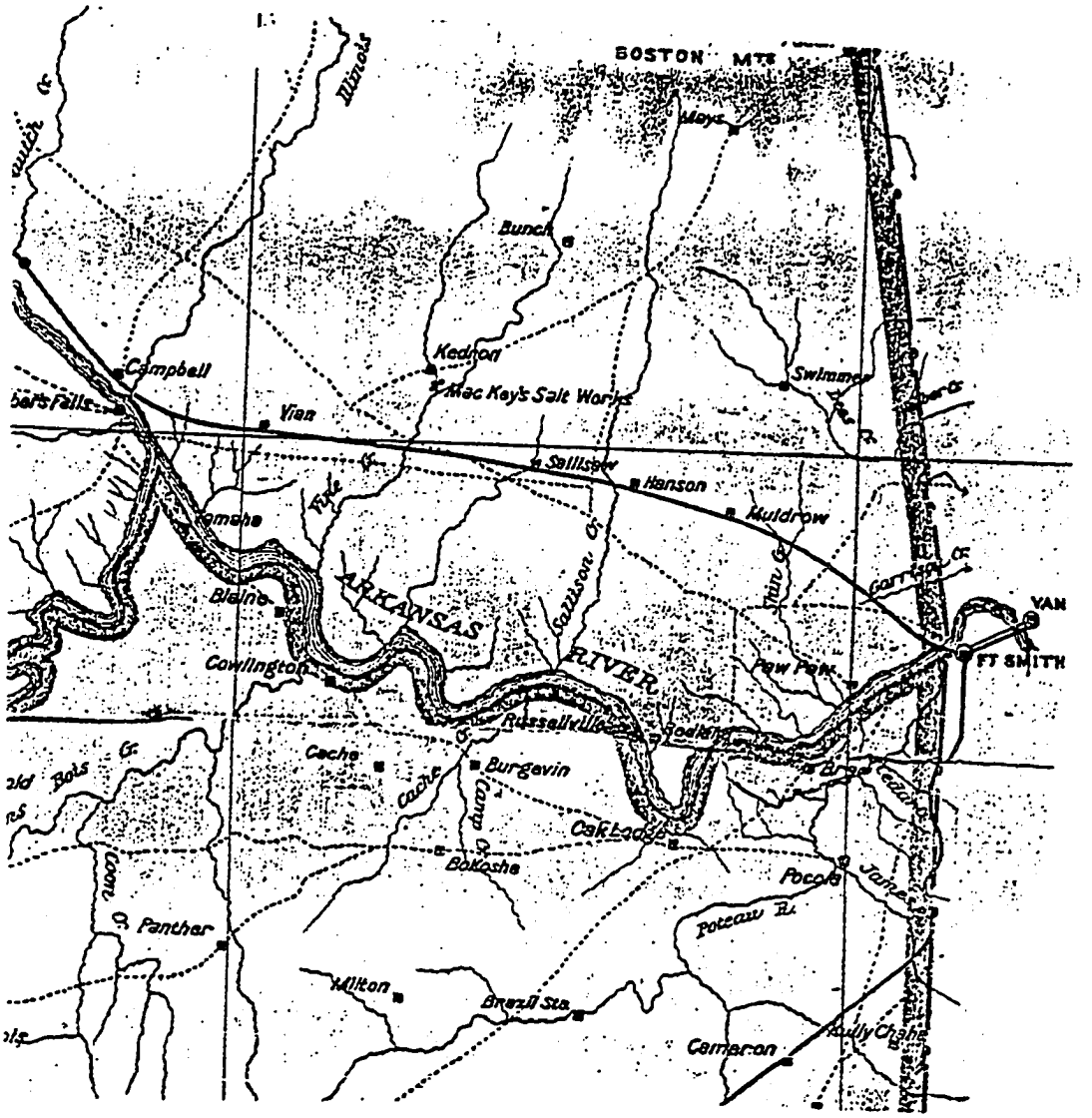
SOURCE: Compiled from the Official Records of the General Land Office and other sources by Rand, McNally & Co. Map Publishers.

Courtesy of the Western History Collection, University of Oklahoma.

MAP 15

1891

LEE'S CREEK AREA OF INDIAN TERRITORY



SCALE: 1 Inch = 8 Miles

SOURCE: Department of the Interior General Land Office.

Courtesy of the Western History Collection, University of Oklahoma.

passing through the Lee's Creek drainage. These must be mistaken, as the present Kansas City Southern was originally called the Kansas City, Pittsburg and Gulf and it is west of the study area (See Maps 16 thru 22).

After the railroads had crossed the region, there was a decrease in pioneer home industries. It led to the greater exploitation of the timber, as railroads required the production of ties (an export product even today). It virtually eliminated the need to distill salt at the salt spring, as imported salt was much more economical. It also increased the production and export of cotton which could then be easily transported. Also, it eliminated the need for a stagecoach to transport people. Railroads led to the growth of towns along its route, as we see by the founding of Roland and the increase in the population of Muldrow and Sallisaw.

The Euroamerican Frontier

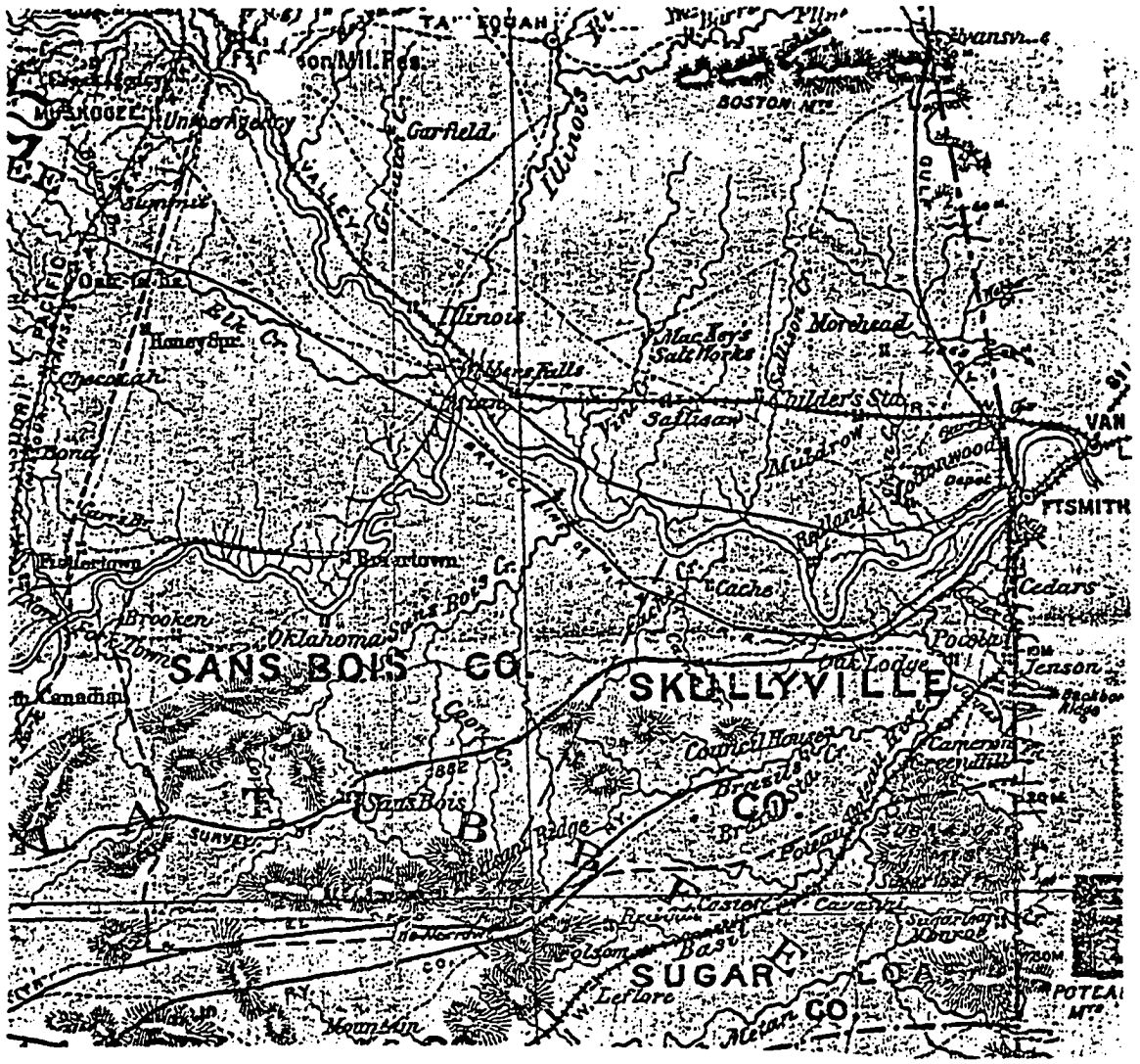
After the Civil War, with the dispersion of the Cherokee and decrease in population due to fatalities, we find that Euroamerican settlers began to move into the area. These settlers, although they were considered illegal squatters and had no legal right to the land, began to enclose homesteads and clear ground for cultivation. Some oral historical reports indicate that these people homesteaded a piece of land, enclosing it with a fence; then were generally unmolested by the resident population of Cherokee. These people were in the position of tenant farmers, or they leased the lands they cultivated from Cherokee.

After the Civil War, the black slaves of the Cherokee were freed and granted citizenship with an equal right to use the lands of the Cherokee Nation. We knew that slaves were utilized in the Lee's Creek locality,

MAP 16

1890

LEE'S CREEK AREA OF INDIAN TERRITORY



SCALE: 1 Inch = 12 Miles

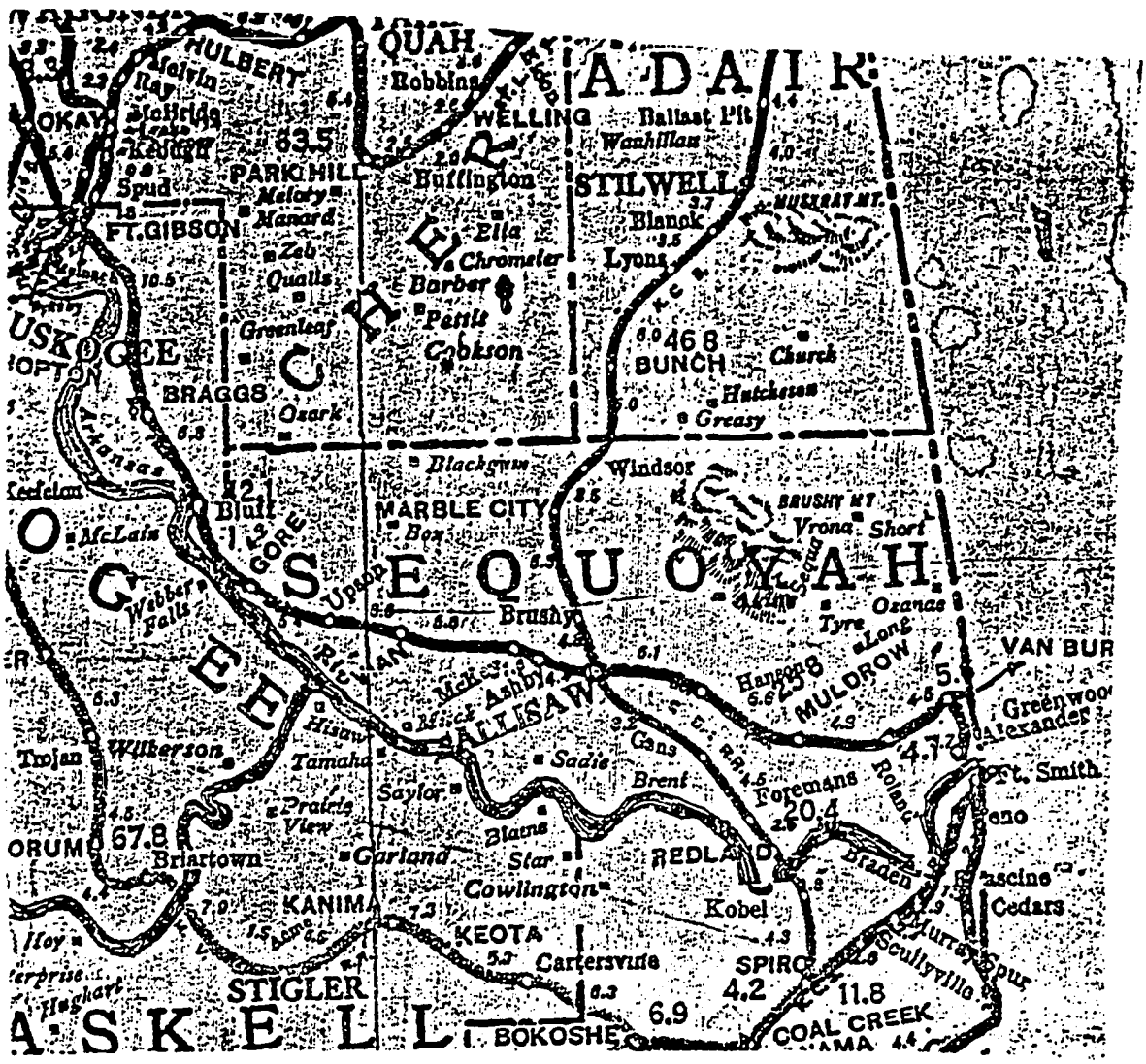
SOURCE: Eleventh Census of the United States.

Courtesy of the Western History Collection, University of Oklahoma.

MAP 17

1932

RAILROAD MAP OF LEE'S CREEK AREA OF OKLAHOMA



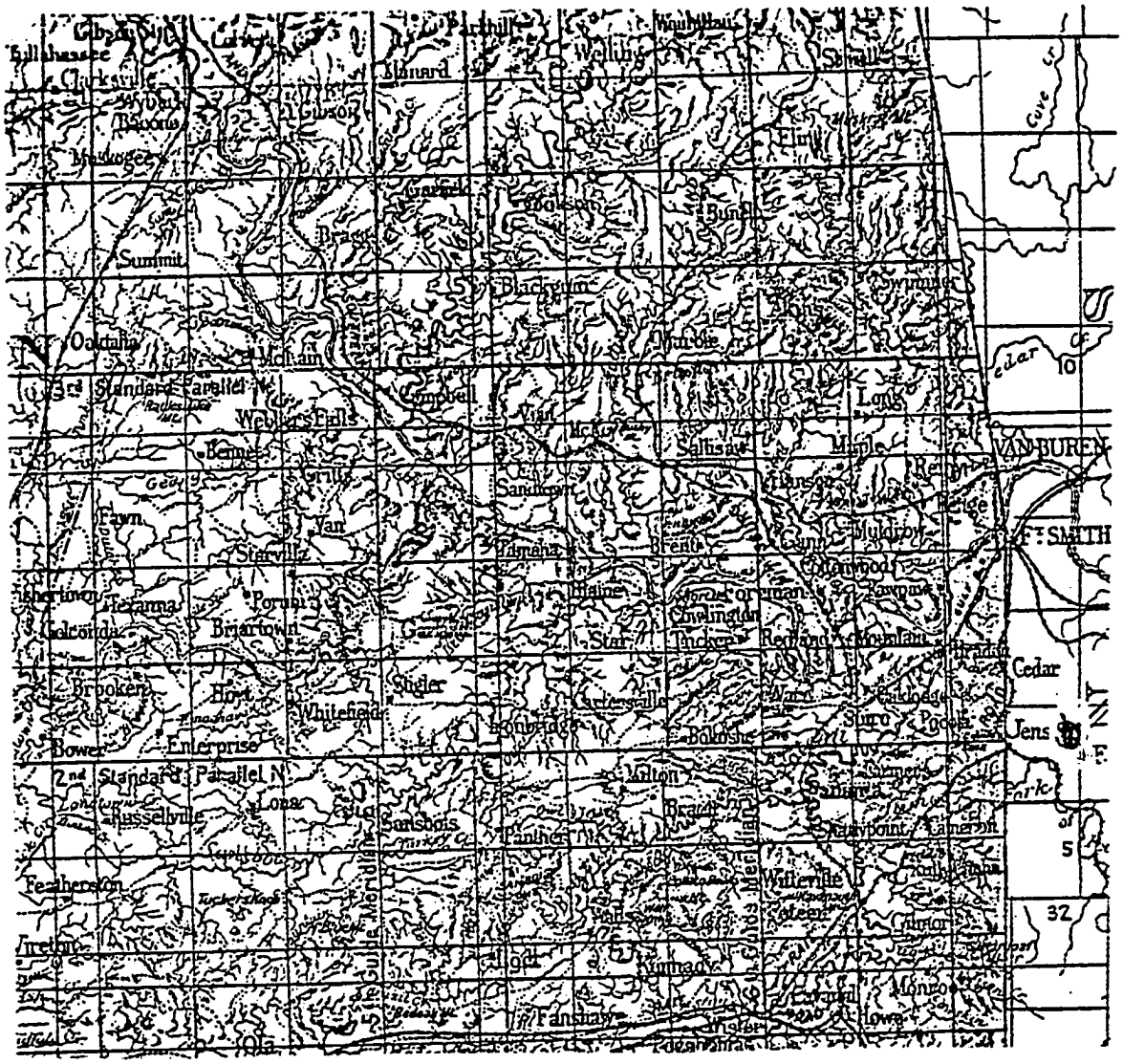
SCALE: 1 Inch = 10 Miles

SOURCE: Railroad Map of Oklahoma Published by the State of Oklahoma. Prepared under the direction of the Corporation Commission of Oklahoma.

MAP 18

1899

LEE'S CREEK AREA OF INDIAN TERRITORY



SCALE: 1 Inch = 12 Miles

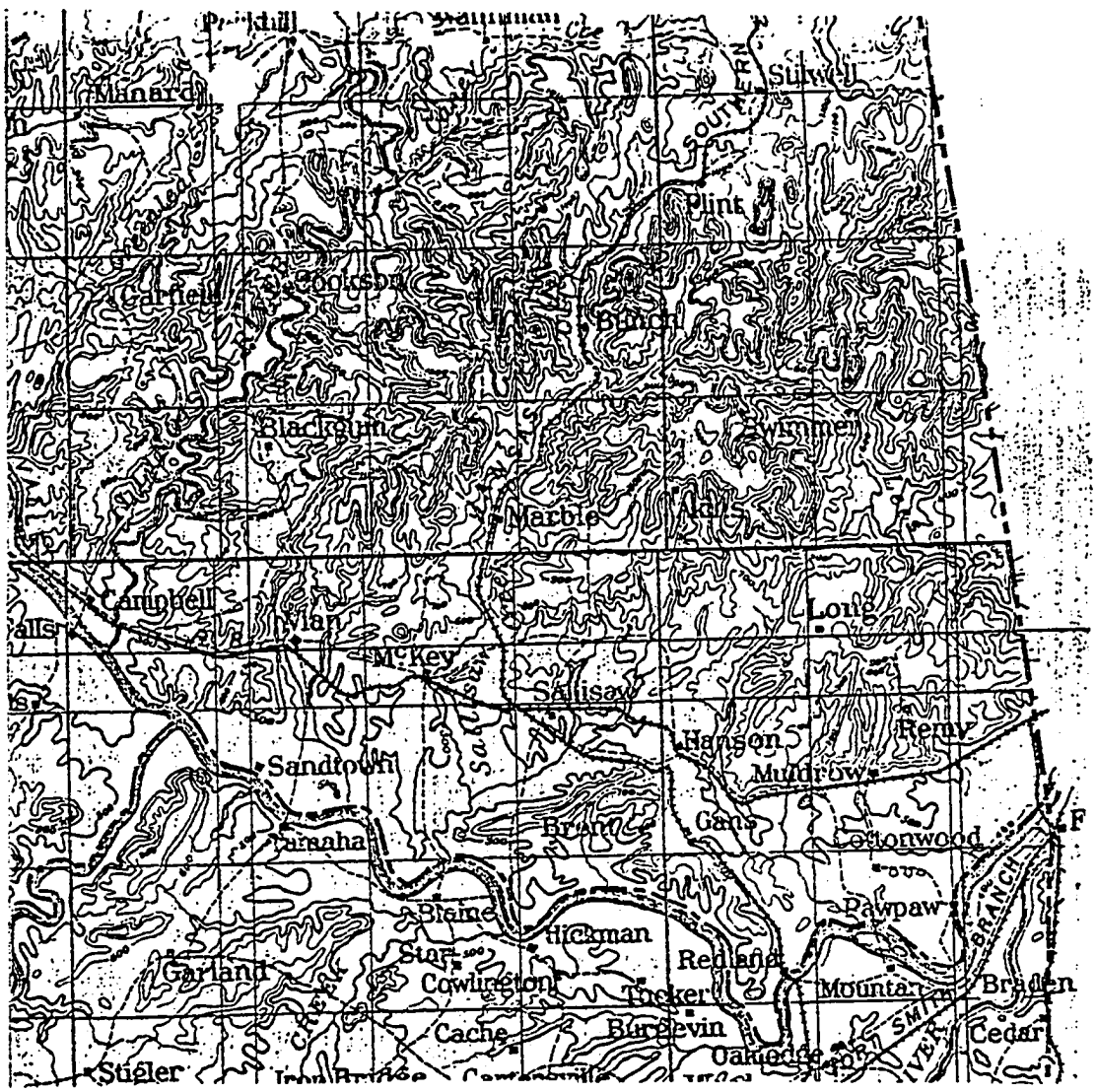
SOURCE: Department of Interior General Land Office

Courtesy of the Western History Collection, University of Oklahoma.

MAP 19

1895-1899

LEE'S CREEK AREA OF INDIAN TERRITORY



SCALE: $\frac{1}{500,000}$ = Approximately 8 Miles to the Inch

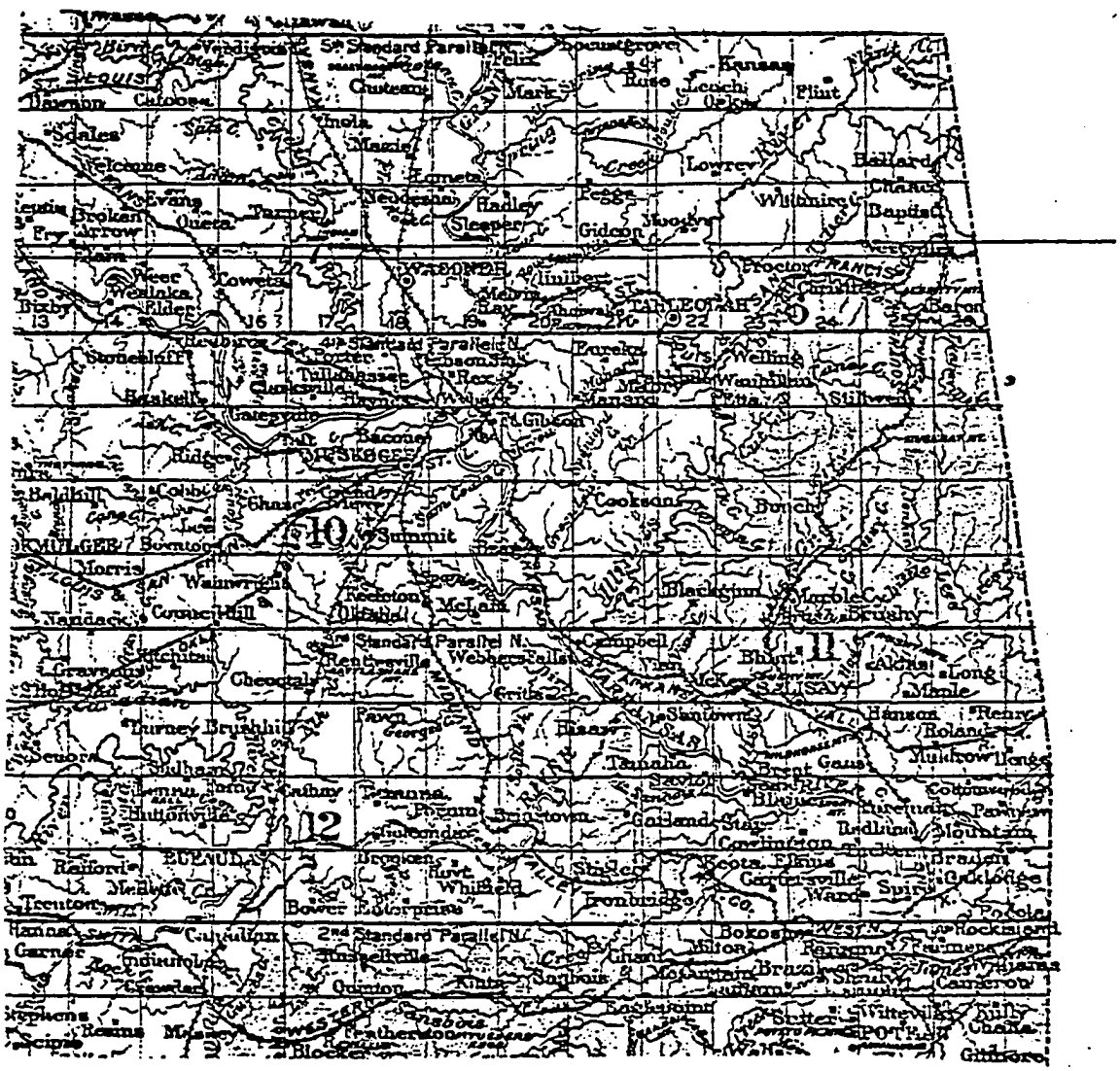
SOURCE: Department of the Interior U.S. Geological Survey, Edition of July 1902.

Courtesy of the Western History Collection, University of Oklahoma

MAP 20

1906

LEE'S CREEK AREA OF THE PROPOSED STATE OF OKLAHOMA



SCALE: 1 Inch = 15 Miles.

SOURCE: Department of the Interior General Land Office.

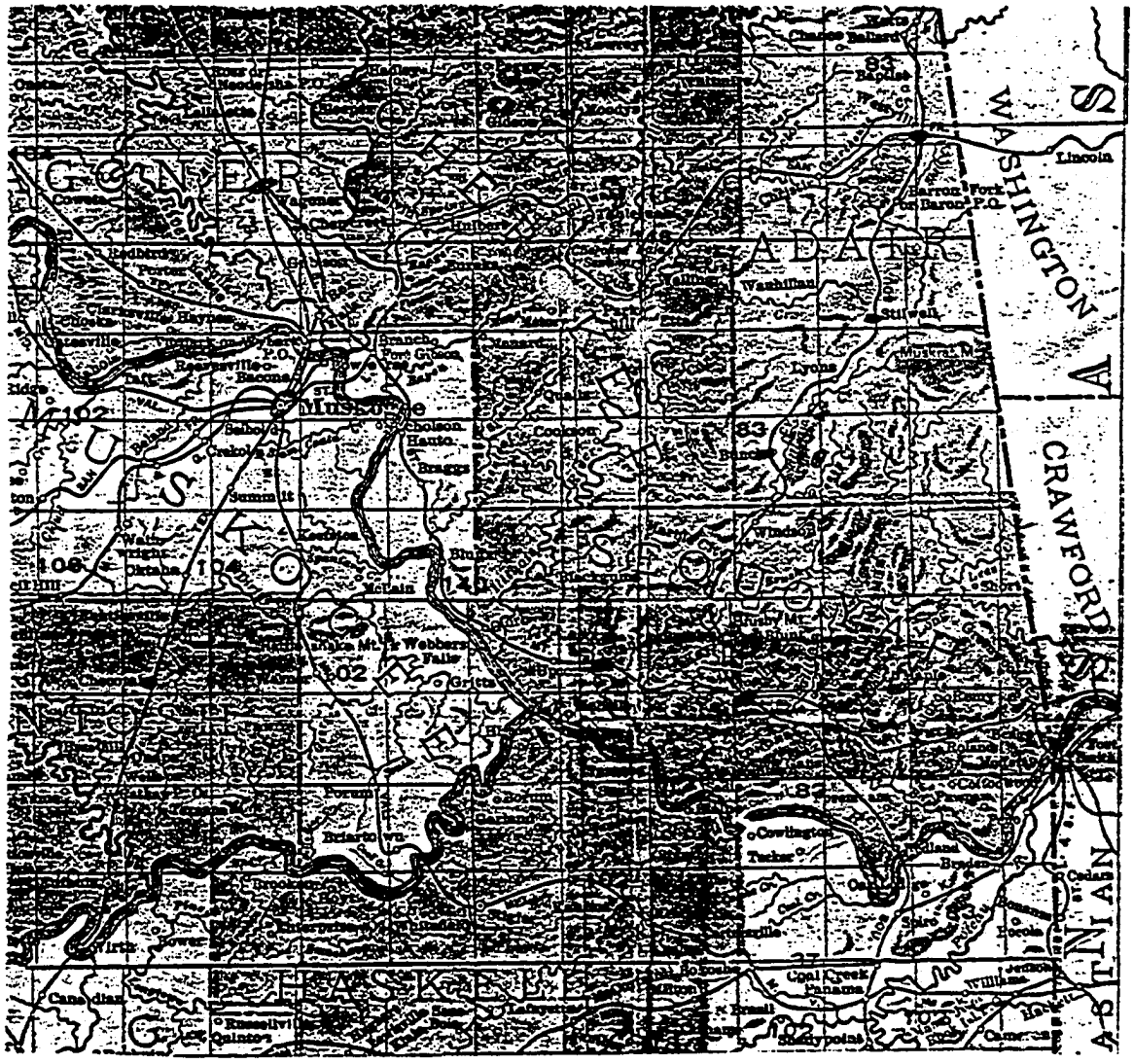
Proposed State of Oklahoma Act of June 16, 1906.

Courtesy of the Western History Collection, University of Oklahoma.

MAP 21

1911

LEE'S CREEK AREA OF OKLAHOMA



SCALE: 1 Inch = 13 Statute Miles

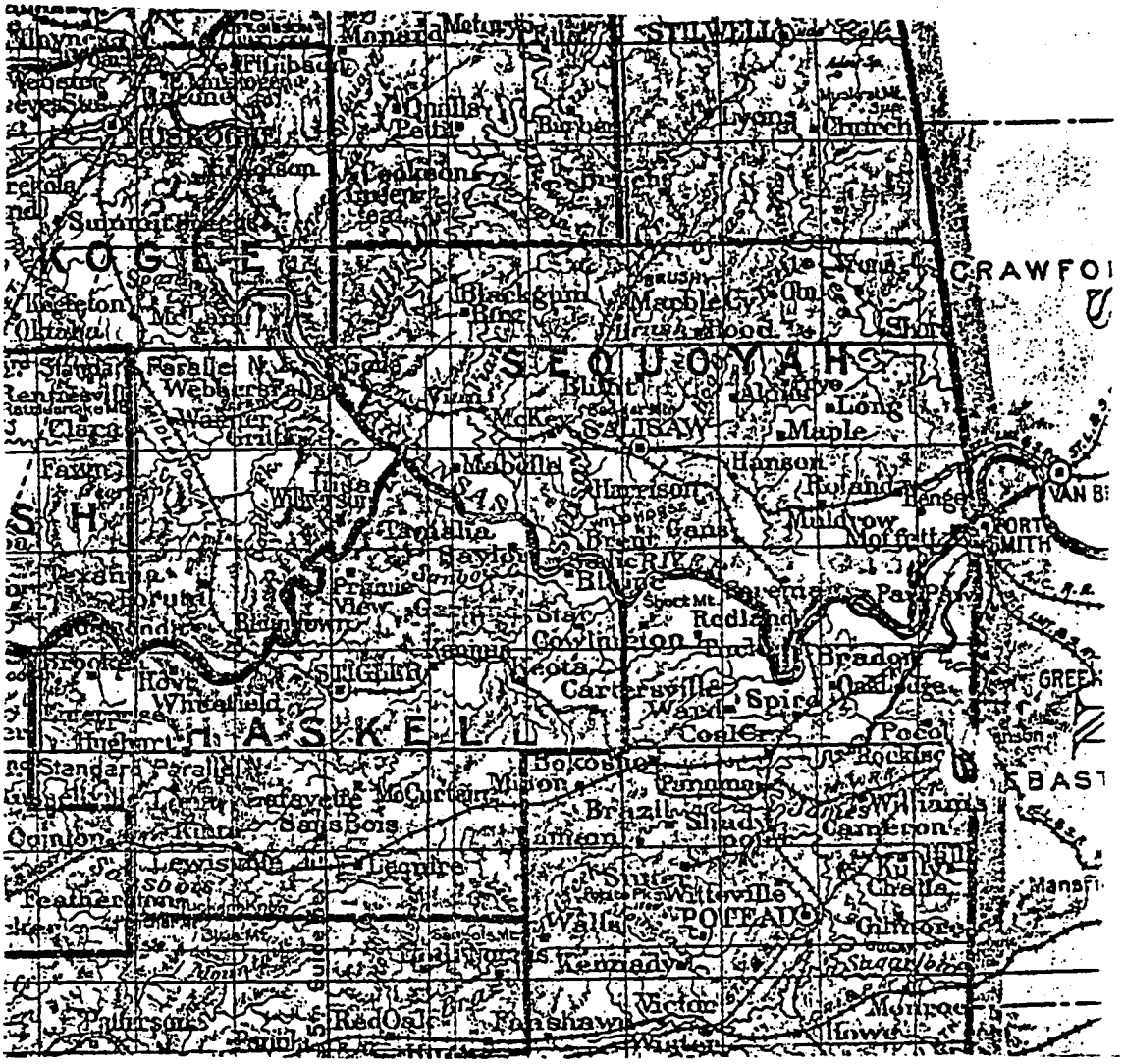
SOURCE: Rand McNally & Co., Chicago, 1911.

Courtesy of Western History Collection, University of Oklahoma.

MAP 22

1914

LEE'S CREEK AREA OF OKLAHOMA



SCALE: 1 Inch = 12 Statute Miles

SOURCE: Department of the Interior General Land Office.

Courtesy of the Western History Collection, University of Oklahoma.

as the first two burials in the Seabolt Cemetery are reported to be two slaves owned by the Seabolt family. (Also by the time of allotment, in 1906, a number of freedmen were given ownership of land in the area.)

With the freeing of slaves, the incoming Euroamericans took their place on the larger farms as tenant farmers. Hewes (1940, 1942, 1944) contends that many of these Euroamericans farmed land located in the uplands and the marginal rocky lands which the Cherokee had not settled. He also states that this increase in Euroamericans was mostly during the years 1880 to 1910 (See Population Diagram #3). In 1859, Hewes (1940:82) contends that there were only 1,000 Euroamericans in the Cherokee Nation, by 1880, 3,400 and by 1907 the Cherokee were outnumbered by the Euroamericans.

Land Use Before 1900

Hewes also gives us vital information about the land use during this time:

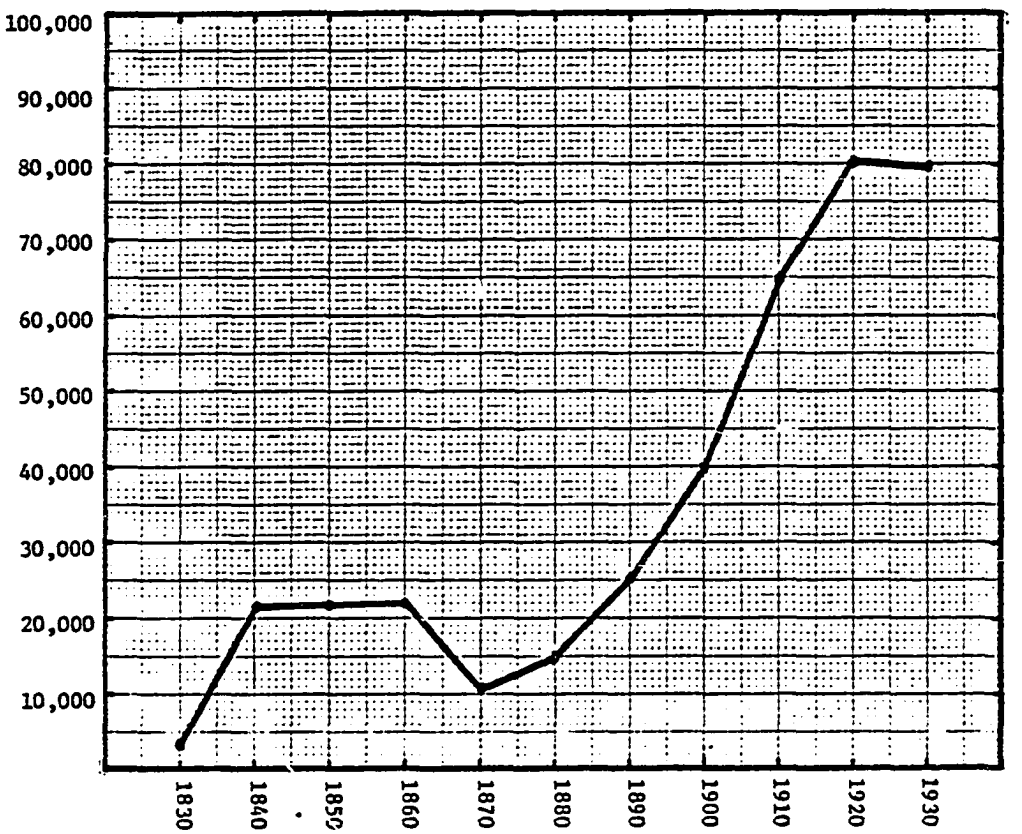
> The Cherokee Census of 1880 showed the average farm belonging to the Cherokee citizens in the six districts east of the Grand and Arkansas to contain 18½ acres of enclosed land, with a little over 16 acres in cultivation (Hewes 1940:72).

Of these 16.4 acres in cultivation, 10.7 were devoted to corn, with wheat and oats sometimes planted. Over five percent was planted with fruit trees.

We know that the cultivation of cotton was carried on at a very early date by Euroamericans south of Fort Smith. This information is reported by Nuttall in 1819 (1821:118). We also know that climatic conditions were proper for the production of cotton in the region. At Fort Smith the growing season is 228 days of the year, long enough for cotton

DIAGRAM 3

POPULATION OF CHEROKEE COUNTRY 1830-1936



SOURCE: Hewes 1940:61 The Geography of the Cherokee Country of Oklahoma. Ph.D. Dissertation, University of California: Berkeley.

growing. Cotton can grow as far north as above Tahlequah, where there are 209 frost-free days in the average year (Hewes 1940:51). It was not until the late 1800s that it became a vital crop in the Lee's Creek area. By 1878 there were only two cotton gins in all of the Cherokee Nation (Hewes 1940:74). Cotton acreage was still concentrated heavily in the southeastern portion of the United States at the first reliable census after the Civil War. But, among other factors, western railroad construction during the 1880s encouraged the western spread of cotton (Hart 1977:312).

John Duncan is known as the first person in the study area to own a cotton gin. Little information is available to indicate where this gin may have been, but we do know that, at a slightly later date, a cotton gin was being operated in Shakespear on the north side of the Short Branch, .9 kilometers south of Duncan's cabin (See Map #5, Place 17). John Duncan died in 1881 and was buried on top of Parris Mound, south of his house. If he died in 1881, and was closely associated in the oral history with owning a cotton gin, then we get the impression that cotton may have become a cash crop sometime before this date.

Technological Innovations

A major technological innovation occurred around 1880, which allowed for enlarging the small 10 to 50 acre fields to much more extensive farms, based on cotton production. Up until that time, we find that small farms were located on the uplands where the full-bloods found the fertile prairies and on the bottoms where the mixed-bloods settled. Each planting season the farmer cleared a larger portion of the land, enabling more ground to be cultivated; resulting in a larger crop pro-

duction. The people of the uplands were restricted in the extension of their cultivated fields because of the limited level ground and the proper soil composition. The settlers on the bottoms were restricted in their expansion, not because of the limited level ground, as this was much more extensive, but by the amount of time one person could expend in working the ground and maintaining the enclosed tract with rail or rock fences to prevent destruction by ranging cattle and hogs. This was not only the case with the Cherokee at this time, but also with the Euroamerican frontier in general.

As explained in 1931 by Walter Webb, the American agricultural frontier had, by the 1860s, come to a standstill on the eastern edge of the Great Plains. At that point the agricultural homesteaders could not economically fence their crops from the free ranging cattle herds. They were utilizing available materials such as wood, from the trees, rocks and hedges (Webb 1931:283).

The expansion of the Euroamerican frontier was restricted to the eastern edge of the plains until the invention of several new technological items. One of these, barbed wire, enabled economical fencing of large tracts of cultivated land.

The invention of barbed wire occurred over a period of years, when many types were experimented with, but it was not until 1874 that a type was designed which was not only functional but easily mass produced. This wire was invented by J. F. Glidden who, by the end of 1876, made and sold 2,840,000 pounds of the barbed wire (Webb 1931:309).

This expansion of the fields in the Lee's Creek area was also delayed by a law of the Cherokee Nation prohibiting the use of wire fenc-

ing of any kind. By an Act of the National Council, wire was prohibited during the years 1882 to 1892 (Cherokee Nation Constitution and By-Laws 1892).

Population Movement and the Frontier Process

Through crosscultural comparisons of the frontier process, certain recurrent behavior is noticeable. One aspect of this process, which is outlined elsewhere (Wiedman 1976A), is relevant to this time period in Lee's Creek history.

Briefly stated: people on the frontier are highly transient, moving from place to place, attempting to adapt to the new environment. With this in mind, we would expect that the Euroamerican settlers moving with the expansion of the Euroamerican population would pass through this region, settling in many different places. Some would remain, moving several times within the vicinity, but others would be temporary residents. These people would follow the expanding population west, as the Great Plains opened to settlement by the innovation of barbed wire, steel plows and the windmill to pump water.

During this period, we not only find the area settled by Euroamerican settlers, but also by Cherokee moving from other parts of the Cherokee Nation to take advantage of the cotton production and other resources. Through oral history we know that several prominant Cherokee individuals immigrated before the turn of the century. We also have evidence that some of these individuals were recent emigrants from the Appalachian Mountains, where a portion of Cherokee stayed defying the enforced Trail of Tears in the 1830s. Amanda Johnson Downing, interviewed for Grant Foreman's Indian and Pioneer papers in 1937, tells of her

movement into the Lee's Creek neighborhood:

> I left North Carolina in 1874, thirty-two years after the drive which was known as the Trail of Tears.
>
> There was a man sent from Oklahoma to North Carolina where a few of us still remained. The man's name was Mr. Punch, I don't remember his given name. He came to North Carolina for the purpose of telling us about the new country, Oklahoma. He made speeches and told us all about Oklahoma. Of course, we had to come and see! Oh, it was awful to give our place up and take a chance on getting another one like it. We had to give up our friends and relatives. Some women left husbands and husbands left wives.
>
> It was best that we came where we could own our land again. The day before we left, we had a farewell stomp dance. The next day we started walking. We walked for many miles before we came to a railroad station.
>
> We landed in Oklahoma, near Stilwell, the same year. We never did work, we got a small payment from the Government after we got here. We would have to go to Tahlequah to get the money. The way we would bring the money back was six or seven families would go in a bunch, only one wagon. Just the driver would ride in the wagon, the rest would ride horses and carry guns to protect the wagon. We had a big trunk in the wagon with all our money in it.
>
> Not many years after we came to the Territory we headed south to pick cotton. We landed here at Short and have been here ever since.
>
> We accepted our allotment and set to work to build homes and improve our land.

Amanda Downing was a prominent settler in the Shakespear-Short locale. The cemetery, .8 kilometers southeast of old Shakespear, is now referred to as the Mandy Downing Cemetery (gravestones date from 1867 to 1921, see Map #5, Place 20). Within meters of this old cemetery, Mandy Downing lived in a double log cabin. This log cabin was one of the focal points of the Short community up until the 1930s. No surface evidence of it remains today.

Land Use Around 1900

By 1900, we find that the farms situated on the bottoms, in many cases, were organized around the cultivation of corn and cotton. A common pattern was to build the house on the rocky ground, at the foot of the hills or mountain, leaving as much land to cultivate as possible. The land cleared for cultivation usually was around 10 acres, with 50 acres being considered a large farm which needed hired hands to work. The common farm consisted of the house on the edge of the cleared field, where corn was the dominant food item and cotton the cash crop. The fields were usually divided into three sections; corn, cotton and pasture. Corn was not only the staple food crop, but also the energy source provided the cows and pigs through the winter months. The cows were limited to one to a half dozen per family, and these were mostly for milk. The cows and pigs were let loose to free range on the uplands, where the acorns and other nuts provided subsistence for the pigs, and the grasses under the trees provided for the cows. During the summer months, when the fields were cultivated and the cows and pigs were ranging, little care needed to be provided the livestock, and maximum time spent with the cultivation. During the winter, the livestock were allowed to graze the remains of the cultivated fields and their manure provided the only fertilizer to the farmed land.

Population Demography and the Lee's Creek Area

It was not until the 1890s that the population of the Lee's Creek area reached the point where it could support a post office. The first post office was in the home of George W. Swimmer, which was approximately five kilometers north of present Nicut, but south of Bradley Ford. (See

Map #5, Place 2). This post office was established July 24, 1890 and was in existence until September 9, 1896 (Shirk 1974:230). In 1902, Swimmer was the location used by the disbursing agents to make payments to the Cherokee of the sector (Shoenfelt 1902:205).

Several other sites within the Lee's Creek drainage served as the center of the population during the last part of the 19th century.

In the Belfonte locale, several places have a significant population. One of these is near the Josiah Seabolt cabin (See Map #5, Place 13). There were houses on the bottoms of Polecat Creek to the west of Josiah Seabolt's and also to the east, north of the present Belfont Cemetery. Also in the Belfonte area there was a small settlement at the southern edge of Starr Bluff, west of the Starr Cemetery (See Map #5, Place 21).

North of present Nicut, on the east side of Little Lee's Creek, a population of people were spread out over the tops of the ridges and hills, with several along the bottoms east of the creek. By the early 1900s a school was established by the name of "Coppic" (Map #5, Place 3), but no store is known to have been started in that locale. For provisions, these people would have had to travel to Will Payne's store in the Nicut vicinity, to the store in Shakespear, or to Uniontown, Arkansas.

In the Nicut locale, near the present Anglin General Store, the Will Payne Store was the central focal point in the 1890s. Nicut, at this time, was called "Verone or Vrona". Houses were located along the base of Brushy Mountain—very similar to the present distribution, although not as populous. Also, at this time, on the east side of Little Lee's Creek was the Seabolt double log cabin discussed earlier.

During this period, before allotment, other dispersed settlements were located on the bottoms of Lee's Creek, near the John Duncan log cabin and the Josiah Vann log cabin (See Map #5, Places 17 & 24). The John Duncan cabin is said to have been built around 1842 and is believed, by many people in the area, to be the oldest log cabin in the vicinity.

> John Duncan, whose mother had come from Tennessee on the infamous Trail of Tears, settled here in 1842 and built a double log house. This is the oldest house in the community (Weavel 1976:153).

This cabin is located 3.7 kilometers east of Nicut, south of Reeder Bluff and north of present day highway 101. It was on the stage road and main route of traffic before crossing Duncan Ford, which is to the west on Big Lee's Creek.

.9 kilometers south of Duncan cabin Shakespear, Indian Territory was established. The store building, which formed the hub of Shakespear, was originally built further up Lee's Creek near Barcelona, Arkansas Territory. Around 1900 the store was dismantled and transported to the new location, on the north side of the Short Branch.

Shakespear was located on both the east and west side of the present section line road. The general store, on the east side, housed the post office which was established September 4, 1903 and lasted until March 31, 1905 (Shirk 1974:218). The name was derived from the English writer William Shakespeare. In addition to this store, there was a blacksmith shop, cotton gin and a grist mill; both of which ran off the same steam engine.

The John Vann School served this vicinity, and was located 1.6 kilometers west southwest of Shakespear, on the north side of Blackbird

Mountain. One kilometer further east on the north side of the Short Branch Creek was the Roastingear cabin and cemetery.

The people who resided here were spread out over the terrain on the ridge running north-south between the river terraces, on top of Blackbird Mountain, and along the rise in elevation extending from Blackbird Mountain to the western edge of Creek Town Bluff.

Another concentration of people was near the mouth of Webber Creek, southeast of Shakespear near the Arkansas Territory line. These people were close enough to Uniontown, Arkansas to utilize the resources offered there. Allison Cemetery, which is located nearby, is one of the oldest. From an analysis of the gravestones, nine persons died between the years 1866 and 1885. This shows that a significant number of people must have lived in this locale, in order to provide this mortality rate.

The scattered settlement for the Lee's Creek area was found to fit the description of the settlement pattern of the Cherokee country in general as described by Hewes (1940:68):

> The reports of the Indian agents fail to mention "towns" among the Cherokees, or anything suggesting the aboriginal settlement forms, but local tradition suggests their presence. It is claimed that early settlements of full bloods consisting of half a dozen houses grouped about a spring were known as towns.

Schools and Government

As Euroamerican settlers moved into the Lee's Creek area, their children were not allowed to attend the Cherokee National schools, as they were not citizens of the Cherokee Nation. Subscription schools were thus established, which were provided for by a tuition, paid by the pupils' parents. By 1898, control of the schools by the Cherokee government had gradually been taken over by the United States government. A

superintendent was put in charge of all the schools of Indian Territory, and this arrangement lasted until statehood (Nov. 16, 1907). Not until 1904 did the federal government appropriate funds for white students to attend the Cherokee Nation schools. Prior to statehood in 1907, there were two subscription schools in the Lee's Creek area, "Coppic", north of Nicut and "Lee's Creek", which may refer to the John Vann School north of Blackbird Mountain. These two schools served the Euroamerican children and Belefont continued to provide an education to the Cherokee students.

After the Civil War, the Cherokee allowed the United States government to try Euroamerican citizens in Indian Territory. The Cherokee Nation governed the Indians in the district through the courthouse on Skin Bayou, 12 kilometers to the southwest. The courthouse, which was discussed in the previous section, was the political center of Sequoyah district; until 1898 when the Cherokee courts were abolished and the United States courts came into jurisdiction. The Euroamericans in the Lee's Creek area were governed by Judge Parker, the "hanging Judge" of Fort Smith, who served from the 1860s to 1880. Judge Parker served to enforce laws from his courtroom in Fort Smith. With the movement of the Euroamerican frontier west, Judge Parker was kept busy managing the bandit type individuals, who, legend has it, sought refuge in the Lee's Creek environs.

Population Statistics

The twelfth census of the United States, undertaken in 1900, sheds some light on the population of the Lee's Creek area during this time. The census is organized on microfilm in the order of townships, the way it was collected. In township 13 north, we find that the original enumerator did not note the designation "range", so we do not know

where ranges 25, 26 or 27 begin or end. By knowing the names of the families in the area, from other historical sources, and living in the area, the first familiar name was chosen as a starting point. The following information was compiled, continuing from this individual until the end of township 13. This means that the eastern division between range 25 and 26 is unknown, but the information includes those individuals residing in range 27. Also excluded from this analysis would be the southern portions of the Lee's Creek study area falling within township 12, range 26 and 27.

From this census material, we get an idea of the demographic composition in the area during the year 1900 (Table #2). The total population was 690.

TABLE 2

POPULATION STATISTICS FROM THE TWELFTH UNITED STATES CENSUS 1900

	White	Indian	Total
Households	87	71	158
Farms	56	37	93
Total Population	442	248	690

If we view percentages, we can get a general idea of the ethnic composition even though it may not coincide exactly with our study area. This is given the assumption that the surrounding settlements would be of a similar composition.

There were a total of 158 households, 93 of which were considered to be on farms by the enumerator. Eighty-seven of the households were white families, and seventy-one were Indian. The total population of

white residents was 442, whereas there were only 248 Indians. Of the white families, 64% lived on farms whereas 52% of the Indians lived on farms. What may be a factor is the fact that several households may be on a farm, but only one is enumerated, that being the family who works the land. Almost all of the land was indicated to be owned by the Indians, since this was previous to allotment.

An interesting statistic is that of the number of people per household. The white households contained an average of 5.08 persons, whereas the Indian homes had 3.49. This indicates that the white families were not only forming 64% of the population, but that on the average they had 1.59 more people in the household, demonstrating larger family units.

Cherokee law designated that Euroamericans could not live in the Cherokee Nation unless they had a permit. A permit was obtained, for a fee, by a Cherokee citizen who desired the Euroamerican to provide needed services. These permits are in the archives at the Oklahoma State Historical Society and several deal with people in the Lee's Creek valley. From the population figures of the 1900 census, it appears that this permit system did little to discourage the Euroamerican settlers from making the region their home. By the time of allotment, these people were legally referred to as "intruders".

Allotment in Severalty

On March 1, 1901, the Cherokee entered into an agreement with the United States Government to divide the lands, held in common by the Cherokee citizens.

> All lands of said tribe, except as herein provided, shall be allotted by said commission, among the citizens of the tribe entitled to share therein, so as to give to each an equal share of

> the whole, in value, as nearly as may be, in manner following: There shall be allotted to each citizen eighty acres of land (boundaries to conform to the Government survey as nearly as may be) which may be selected by him. Eighty acres of land, valued at six dollars and fifty cents per acre, shall constitute a standard allotment, and shall be the measure for the equalization of values; and any allottee selecting lands of less value than such standard may select other lands, not lawfully held or occupied by any other citizen, which at their appraised value, will make his allotment equal in value to the standard so fixed (Cato Sells 1915:318-319).

All the land was allotted in severalty except for cemeteries, schools, public places and towns of more than 200, which were layed out in lots. The lands, once allotted, were deeded to the individuals, who then possessed the land which was considered to be inalienable. These lands, so long as they remained in the hands of the allottee or his heirs, was not taxable or capable of being taken or sold to satisfy debts or obligations incurred by the owner. Furthermore, they could not be sold or leased without the approval of the Secretary of the Interior. In order to accomplish the task of allotment, all the members of the Cherokee Nation had to be entered upon the rolls which were assembled by the Dawes Commission in 1902-1903.

With the allotment of lands in severalty, many Euroamerican settlers entered the region from Arkansas, thinking that some of the land would now be available for purchase. About the time of allotment, we not only find a population movement of Euroamericans, but also Cherokee who wanted land allotted of their own choosing. One such incident involves one of the oldest log cabins in the drainage, discussed earlier. The cabin was built around 1860 by a Euroamerican settler, who is believed to have married a Cherokee. Because the house, over the 40 year period after it was built changed residents through the generations, it was occupied by Euro-

americans at the time of allotment. Shortly before allotment, we find a Cherokee family moving into a box house near this cabin. When asked what lands they desired to be allotted, they chose land including the old cabin. After legal title was obtained to the land and cabin, they forced the Euroamericans out of the cabin. Other incidents of this same process are known, but most resulted in the leasing of the property to the Euroamerican residents by the new Cherokee owners.

House Types

During this time, there were two kinds of houses, the double log cabin occupied by prosperous individuals and the more common single log cabin occupied by the average family. The double log cabin is believed, by most scholars of this house type, to be peculiar to Euroamericans. Newton and Pulliam-DiNapoli (1977) discuss the diffusion of double log cabins as a direct result of the migration out of the southern Appalachians by German, Scotch Irish, Welsh and other western British settlers. There are three double log cabins still standing in good condition in the Lee's Creek area. Four other homes have been indicated to be double log construction, but covered by renovations. Oral history indicates that the three double log cabins were built around 1860. The earliest is the Duncan cabin, discussed earlier. A second of the buildings has sufficient oral history data to indicate that it was built by a Euroamerican settler. This log cabin has a half dove tail log construction, mortised loft joists wedged between the logs and a chimney separated from the roof.

An early traveler in the Cherokee Country described the buildings of a Cherokee homestead.

The dwelling house was a substantial log-building of one sin-

> gle apartment . . . Five other distinct erections of different shapes and dimensions surrounded the principle hut, and served as kitchen, smoke-house, store house, etc. beside a shed covering the room in which the ordinary garments of the family were woven (Hewes 1940:69).

Statehood

After the allotments were made to all the Indian tribes of both Oklahoma and Indian Territory, the legal foundation of private ownership of land enabled the territories to apply for statehood under the constitution of the United States. Originally, the two territories attempted to become two separate states. The state of "Sequoyah", almost made history in 1905. The statehood attempt was made by the Principle Chiefs of the Cherokee, Choctaw, Creek, and Seminole and with the agreement of the Chickasaw. The 182 delegates met in Muskogee for a constitutional convention, and by the end of that same year, the constitution was voted on by the people of Indian Territory. On November 7, it was accepted by the majority vote of 56,279 to 9,073. When sent to the United States Congress, the House of Representatives tabled the bill and it met the same fate in the Senate.

After this bid for separate states failed, the two territories were allowed, after the United States Congress passed the "Enabling Act" of 1906, to join together in a single state. This then led to an Oklahoma State constitutional convention, where a constitution was written which was accepted by the people in September, 1907. After a vote of the United States Congress, Oklahoma was proclaimed a state on November 16, 1907, by President Theodore Roosevelt.

Culture Change from 1864 to 1907

From 1864 to 1907 we see that the land use patterns changed in the Lee's Creek area. The Cherokee, who had settled throughout the region cultivating small tracts near their houses, were gradually overtaken by the expanding population of the Euroamericans, whom they had fled two generations earlier. The Cherokee had come to the very end of the mountainous region, to which their culture was best adapted. The southwestern portion of the Ozarks is the last mountainous region similar to the Lower Appalachians before the Great Plains. Several groups fled from the influx of Euroamericans by traveling to California and Mexico, but the ma-majority of Cherokee citizens remained.

The Euroamerican frontier was propelled by the railroad, which opened up new zones of the continent to settlers and the export of products. The railroad, barbed wire and the steel plow allowed the Great Plains of the United States to be opened up for settlement after the 1870s. It is through these same inventions that changes occurred in the Lee's Creek milieu.

With barbed wire, larger amounts of land could be cared for by a single individual. The land, which was previously restricted in cultivation by the ranging of livestock, was now available for the production of a cash crop. Cotton then became this cash crop, which combined with the original corn cultigen.

We find that the incoming Euroamericans became tenants on Cherokee farms, or leased lands in marginal localities and the uplands. Up to 1890, the full-bloods on the tops and the mixed-bloods on the bottoms had an equal amount of economic potential. The full-bloods who settled the

uplands originally were better off because of the fertile prairies, fruit cultivation and good hunting. But, after 1890, when barbed wire became legal they were at a disadvantage. The people who settled bottom lands could then expand the amount of land under cultivation, while the full-bloods were restricted. It is from these times that historians and observers note that the mixed-bloods got the better deal, while the full-bloods remained on the relatively uselss uplands. Even James Mooney, the first ethnographer to enter the region in the late 1890s, makes this value judgment:

> . . . the conservative element has taken refuge in the mountain districts, while the mixed-bloods and the adopted whites are chiefly on the richer low grounds and in the railroad towns (Mooney 1975:145).

The Cherokee Nation, which originally owned the land, gradually lost governing power and was replaced by the United States government. This period comes to an end when the land is allotted individually to Cherokee citizens, thus making it legally possible for Euroamericans to buy land. The Cherokee population, which at the start of this period had been reduced due to the Civil War, was confronted with incoming Euroamericans. By the year 1900, 64% of the population in the Lee's Creek locality were Euroamericans.

CHAPTER VII

FROM COTTON BOOM TIMES TO AGRICULTURAL USELESSNESS 1907 TO 1946

The allotment of the lands in severalty had the effect of anchoring the restricted Indians even more firmly to the land, since most of the land selected was their old farms and neighboring land. In 1907, Euroamericans formed a larger proportion of the population than Cherokee throughout the Oklahoma Ozarks. Hewes reports that in this year for the Cherokee Ozarks, Euroamericans outnumbered the Indian population 43,791 to 16,598 (Hewes 1940:129).

Population Centers of the Lee's Creek Area

The population increase started in the 1880s was continued into this period. The population centers of the Lee's Creek area of Verone or Nicut and Belfonte gained in families and remained focal points of the valley. Shakespear lost its economic vitality and the focal point moved 2.3 kilometers to the east northeast. At this new location, adjacent to the large cultivated tract on the bottom of Lee's Creek, we find that by December 5, 1908 there was, again, a need for a post office (Shirk 1977: 220). Andrew Rogers, a Cherokee educated at the Cherokee Seminary for Men, owned the double log cabin, which was previously owned and reportedly built by his father-in-law, Josiah Vann. In this log cabin, in a room on

the south porch, was the "Short" Post Office and a general store.

Andrew Rogers later moved the Short Post Office and store to a separate building, to the south of the still existing log cabin, on the east side of the present dirt road. Gradually Andrew Rogers discontinued the store and became a full time postmaster. (See Map 5, Places 24 and 25).

Even though the Short Post Office was now located to the northeast of old Shakespear, the cotton gin and grist mill still served the farmers in the vicinity.

> The cotton industry around Short in the year 1918 was very prosperous. Three cotton gins were in operation at Short, Uniontown and Natural Dam, Arkansas. They ginned about 700 to 800 bales a year. One year Short gin produced 1,000 bales. Cotton came from as far away as Stilwell. When the cotton was ready for the compress at Van Buren, the wagons left early in the morning (Weavel 1976:153).

By 1912, the village of Verona was busy enough to have a post office established. At this time Verona consisted of a grist mill, cotton gin, blacksmith shop and a general store. The Verona post office was located in the general store. On December 16, 1925 the name Verona was changed to Nicut, due to a ruling of the United States Post Office (Shirk 1977:171).

The Timber Industry

The region was not only productive of cotton during these years, but also a major supplier of forest products which had been utilized by the resident population for their own uses since their settlement in the locale. By 1900 most of the walnut and pine had been considerably reduced but, beginning about 1910, a ten to fifteen year active lumbering period took place in southern Adair County, just north of the study area. In 1910 a mill was operating by taking timber off of leased land. By 1916,

the Oklahoma Land and Lumber Company began in Stilwell. This company also opened two mills at a site fifteen miles southeast of Stilwell in the upper drainage of Little Lee's Creek. This operation worked a tract of over 17,000 acres, much of which had been purchased from the county for failure of the owners to pay taxes. The Oklahoma Land and Lumber Company and other smaller enterprises used oak and pine to make barrel staves, wagon bows, furniture wood and tool handles (Hewes 1940:225).

These companies also purchased railroad ties from individuals. Among the tie buyers it was generally agreed that the restricted Indians made the best ties and they produced half of the ties even though they were a smaller percentage of the total population. The Indians tended to view the open range for cattle, open range for timber and cut the timber even though they did not possess a lease (Hewes 1940:227-228).

The Demise of Cotton

With cotton a major economic product, the Lee's Creek area experienced substantial prosperity up until 1929. Around 1929 the stock market crashed, resulting in the Great Depression; but it wasn't this factor which significantly changed the life of the people of the region. By 1929 the land, gradually opened up since 1880, was depleted of its soil nutrients because fertilizer was not utilized. There was also the factor that, as more land opened up on the bottoms, more topsoil was washed away by the rains and the creeks when they overflowed. The boll weevil, which had entered the area around 1910, reduced the harvested cotton crop each year; until by the late 1920s cotton production per acre was not worth the effort expended. Thus we see the demise of cotton by 1929, after an

expansion of this cash crop for fifty years.

The rapid decline in cotton production for Sequoyah County is represented by a drastic decline from 1924 to 1929. In 1919, 61,795 acres were planted, in 1924, 61,728; 1929, 30,626 and in 1934, 27,816 (Hewes 1940:205). Hart (1977:310) sums up the factors most likely related to this decrease in cotton production for the Lee's Creek locality:

> The clean cultivation of the same crop year after year over a long growing season could lead to such severe soil erosion that cotton was not a good crop for the hill areas of Appalachia and the Ozarks (Hart 1977:308).

Population Statistics 1910 to 1970

From the population statistics of Sequoyah County from 1910 to 1970, (Table #3 and Diagram 4) we see that the population continued increasing until 1920 when cotton production began to drop. The population dropped acccrdingly until another increase began after 1930. This population profile for the county does not properly represent the Lee's Creek area. As most of the population was along the Arkansas River to the south, the statistics are more representative of that part of Sequoyah County. The mountainous habitat of northern Sequoyah County are better represented by the population statistics of Mayes, Delaware and Adair Counties. These three counties are mountainous and they continued the population increase up to 1940. As noticed from Diagram #4, Cherokee County is similar to Sequoyah County with a decrease in population from 1920 to 1930. Cherokee County borders on the Arkansas River upstream from Sequoyah County and, like Sequoyah County, suffered from the decline in population due to reduced cotton production.

TABLE 3

POPULATION OF FIVE CHEROKEE OZARK COUNTIES
BY CENSUS YEAR 1907-1970

	Adair	Cherokee	Delaware	Mayes	Sequoyah
1907	9,115	14,274	9,876	11,064	22,499
1910	10,535	16,778	11,469	13,596	25,005
1920	13,703	19,872	13,868	16,829	26,786
1930	14,756	17,470	15,370	17,883	19,505
1940	15,755	21,030	18,592	21,668	23,138
1950	14,918	18,989	14,734	19,743	19,773
1960	13,112	17,762	13,198	20,073	18,001
1970	15,141	23,174	17,767	23,302	23,370

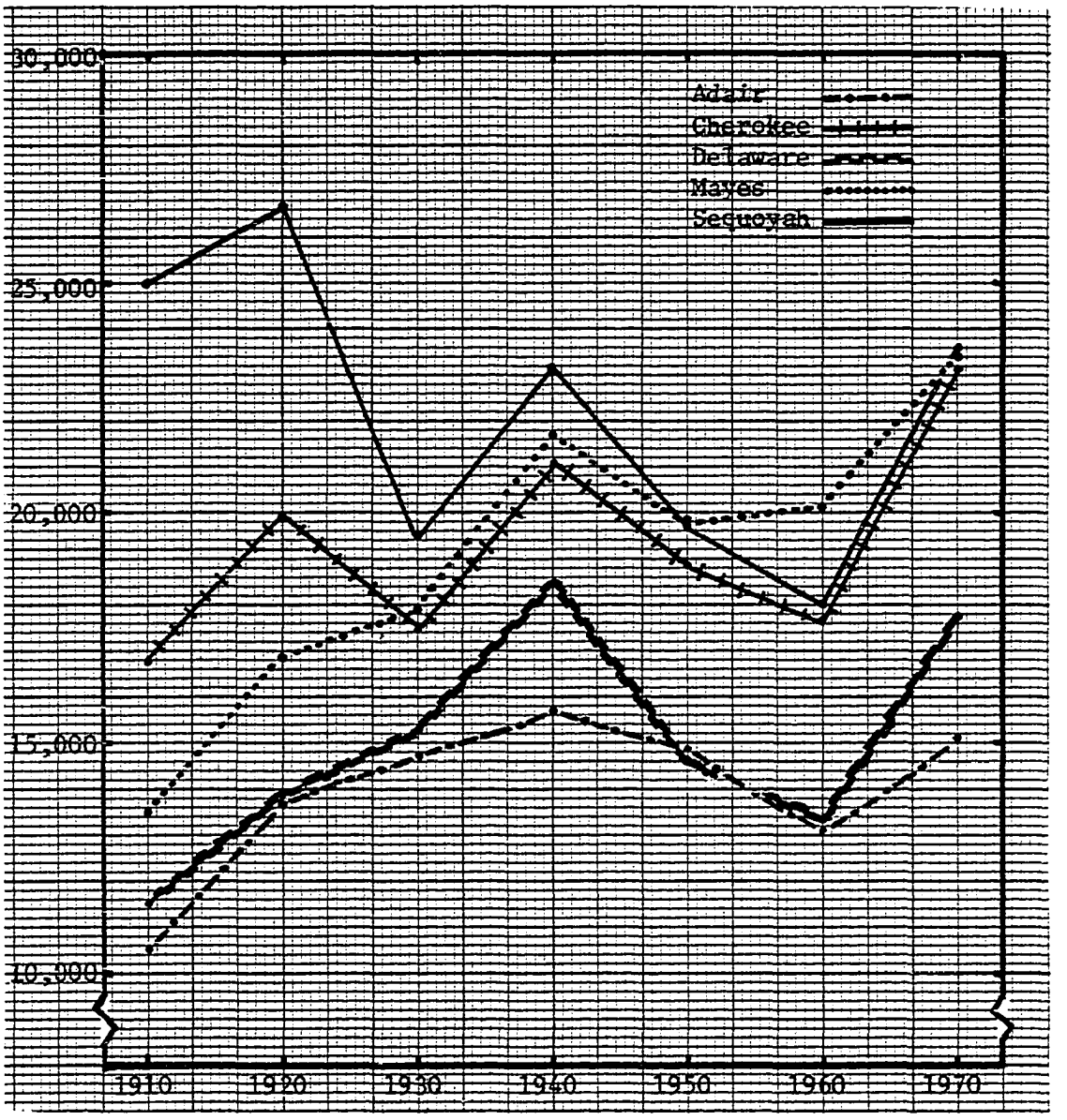
SOURCE: 1907-1960 Peach, W. N., R. W. Poole and J. D. Tarver. County Building Block Data, For Regional Analysis: Oklahoma. Research Foundations, Oklahoma State University, Stillwater. 1964:16, 86, 156, 352, 485.
1970 Oklahoma State Health Department, Department of Data Management.

Even though there was an agricultural failure, we find an increase in the population after 1929. New families enter the region from the larger towns, which were greatly effected by the economic depression that began with the stock market crash of 1929. These people, many of whom moved from the farm lands, to the south along the Arkansas River, saw Lee's Creek as a place of opportunity. Long, the largest town south of Lee's Creek, became a ghost town. Long was once a booming cotton town with several stores on its main street; after this time it was an empty stretch of road between Lee's Creek and Muldrow.

The people who moved into the area took up lands among the previous residents. With the demise of cotton, smaller farms resulted which were based on corn agriculture. From 1930 to 1936 the number of farms

DIAGRAM 4

POPULATION OF FIVE CHEROKEE OZARK COUNTIES, BY CENSUS YEAR
1910-1970



SOURCE: 1907-1960 Peach, W. N., R. W. Poole and J. D. Tarver. County Building Block Data, For Regional Analysis: Oklahoma. Research Foundation, Oklahoma State University, Stillwater. 1965:16, 86, 156, 352, 485.
1970 Oklahoma State Health Department, Department of Data Management.

and acres in cultivation increased (See Table #4, Diagram #5), as more people farmed the same amount, or a little more, of the land which had been opened for cotton production.

TABLE 4

NUMBER OF FARMS AND FARM SIZE, SEQUOYAH COUNTY 1925 TO 1975

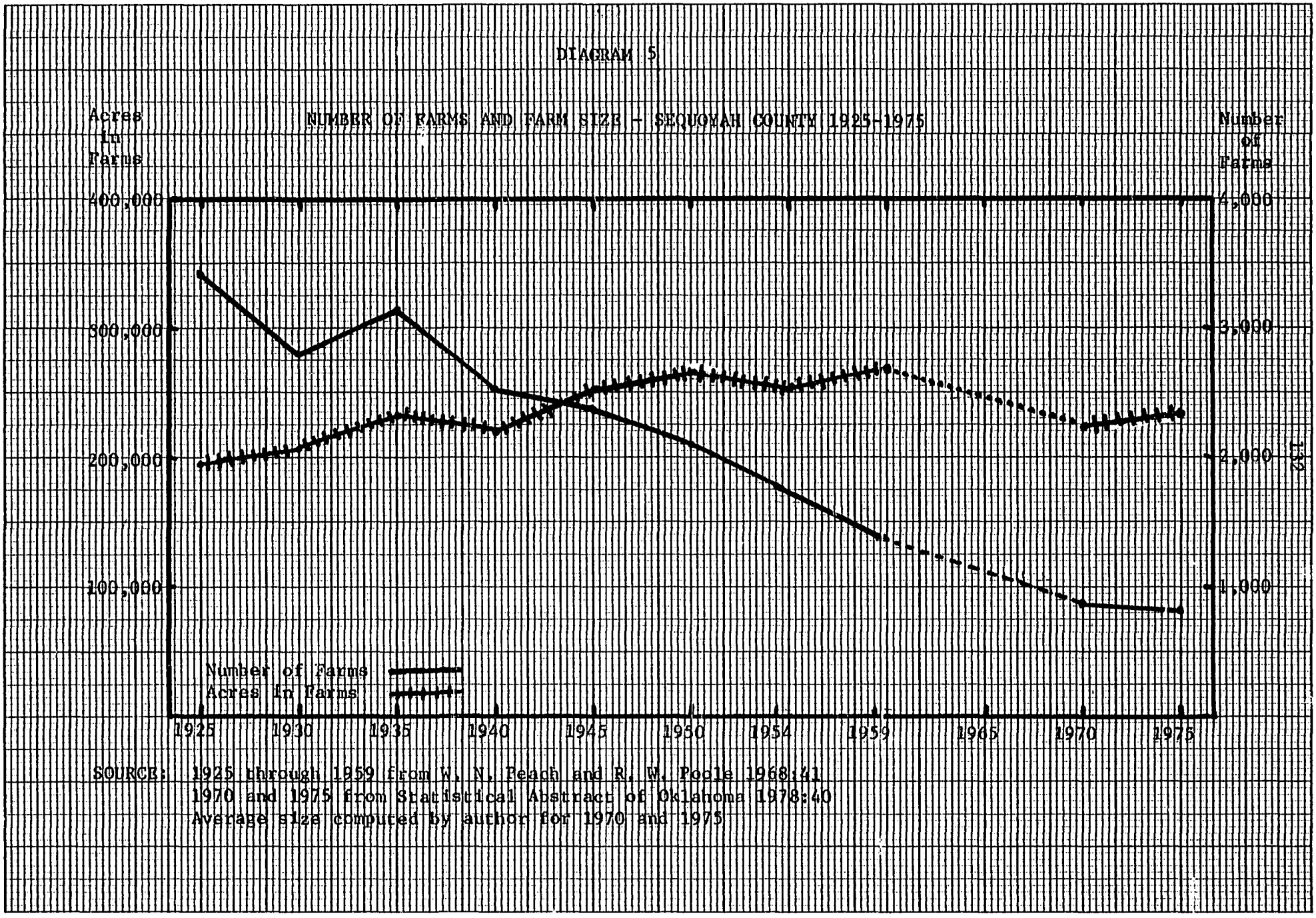
	Number	Acres in Farms	Average Acres
1925	3,429	197,000	57.5
1930	2,769	208,000	75.0
1935	3,151	232,000	73.7
1940	2,504	220,000	87.9
1945	2,308	251,000	108.9
1950	2,093	262,000	125.4
1954	1,774	252,000	141.9
1959	1,362	268,000	197.0
1965	—	—	—
1970	907	222,198	244.9
1975	883	231,921	261.5

SOURCE: 1925 through 1959 from W. N. Peach and R. W. Poole 1968:41
1970 and 1975 from Statistical Abstract of Oklahoma 1978:40
Average size computed by author for 1970 and 1975.

The land thus became even more intensely utilized and marginal lands further opened. Many of these people sharecropped with the owners. In the Lee's Creek area, oral history tell us of a case of two white men sharecropping land belonging to a full-blood Indian. This was upland farm land to the north of Reeder Bluff.

> My dad furnished the team and all the equipment to farm it with and they farmed it on sharecrop. Which they got one third of

DIAGRAM 5



SOURCE: 1925 through 1959 from W. N. Beach and R. W. Poole 1968:41
1970 and 1975 from Statistical Abstract of Oklahoma 1978:40
Average size computed by author for 1970 and 1975

> everything that was raised on it, and my dad got the balance (Tape 12D:12).

We have an indication that marginal bottom lands were opened up only after allotment time. The bottom lands north of Creek Town Bluff were utilized before allotment by several Cherokee families who lived in the vicinity. Oral historical accounts imply that they were farming only small tracts of opened land. This farmed site was directly north of the western edge of Creek Town Bluff. After allotment, the bottom lands to the east of these fields were sold by the allottee to Euroamericans from Uniontown. The son of this allottee related to us that his father was allotted the land, which was at that time completely wooded. He sold the land thinking it was not useful. Only after the new owners cleared the trees, built houses and planted the fields did the original allottee regret the sale. This same process of Euroamericans opening up land not utilized by the Cherokee is also illustrated by a man from West Virginia who moved into a community up Little Lee's Creek, which Hewes studied in 1935. This farmer's open land was a total of 120 acres in 1935:

> . . . When the present owner, a West Virginian by birth, came to the farm in 1924 he found a field of less than ten acres on the place. Its former Indian owner had cultivated no more extensively than the other Indians of the area. Most of the crop land, and the enclosed pastures, which are cleared, are the work of the newcomer. In 1935 there were four acres of "new ground", not yet planted, which had been cleared by "deadening", or girdling the trees (Hewes 1940:144).

The increased population from the cities, the depletion of the soil nutrients and the boll weevil added to the complications of gaining a livelihood from the Lee's Creek land. But, with the variety of alternate resources, different crops, forest products, etc., the people adapted to the prevailing conditions. This decrease in cotton caused a change in crops to sweet and grain sorghum and small grains which were grown as hay

and forage crops for the support of livestock. Between 1929 and 1934, Hewes (1940:212) tells us that acreage in these hay crops in the four main counties of Cherokee country was increased by 36% and the acreage in pasture by 20%.

Cherokee Ozark Communities and Adaptations before 1936

It is fortunate that a good cultural geography of the Cherokee Ozarks was accomplished in the years before 1940. Leslie Hewes was able to survey four communities in the Ozark region and gives detailed land use and cultural descriptions which would have been lost without his study.

In the four communities that he surveyed in the late 1930s, he noted a difference in land use between the restricted Indians and their Euroamerican neighbors. He noted that there are few animals owned by the restricted Indians to compete for the woodland range with the stock owned by white and unrestricted Indians. Compared to white settlers, only a small percentage of the Indian households had either a fenced pasture or hay field. This is a similar finding of Hall (1934) who conducted a survey of Cherokee households for his master's thesis. He does not survey the Euroamerican families in the locality, so we do not have comparative figures. Of the one hundred households, only 26% of the Indians had cows. Hogs at this time were more common, he found that of the 100 families 58% had a hog; ten had as many as 10 to 25 hogs; forty families had five or less (Hall 1934:82).

Of the four communities studied by Hewes, one was in the upper portion of Little Lee's Creek about six miles north of the study area. He chose this particular community because it had just opened up to the outside world by the new road between Sallisaw and Stilwell, highway 59.

and because this community was predominantly Indian. The terrain ranges in elevation from the valley floor of 964 to the mountain tops of over 1,500 feet. It is marked by steep slopes immediately above the valley floor, but also by some level areas in the uplands. Nowhere is the valley floor wide. Except for limited clearings, woods cover the terrain. The land in the area was notably poorer than generally allotted to restricted Indians in the Cherokee Country as calculated from the values of the allotment appraisals. Over 62% of the land had changed into the hands of Euroamericans (Hewes 1940:138-139).

Within the township which incorporates the sector, there was an estimated population of 200, most of whom were full-bloods, in the geological survey of the area in 1900. In 1935, 4.7 square miles were intensively surveyed by Hewes. The locale contained 19 occupied houses, 68% of which were occupied by Indians. Of the 106 people in the vicinity, 74% were restricted Indians and only one unrestricted Indian. The remaining 36 people were of Euroamerican background. Most of the Indians had been born within five miles of the area. Most of the Euroamericans were born in Cherokee Country except one family who moved in from a county to the west, a family from Arkansas, and a third family in which the father was from West Virginia (Hewes 1940:140-141).

The major cropland is on the low slopes above flood level, but some are along the streams. A number of fields are in the Boone limestone uplands, which had been filled with chert and had been laboriously cleared of the stone. Other fields which were in the uplands, but with a sandstone base, had been abandoned by 1935 (Hewes 1940:141-142).

The fields of the Indians in this community were small. In 1935

the largest enclosed field utilized by an Indian was 36 acres, and the largest tract of cropland was 29. Only three of the farms operated by Indians had cropland of as much as ten acres. Four other farms contained five acres of cropland each. Five households had only small gardens.

One Euroamerican had 120 acres with 95 acres in cultivation. Five Euroamerican families in the locale had from 6 to 23 acres of cropland each and from 3 to 13 acres in crops. Two of these families were sharecroppers without teams, one on white-owned land, the other on Indian owned land. Two Indian land owners rented their cropland to Euroamericans and moved to poorer houses, and in one case to poorer land (Hewes 1940: 144-145).

The livestock, other than draft animals, at the time of Hewes' study included 9 head of cattle owned by five Indian families, 42 head by 6 white families; 37 hogs by 7 Indian families, 52 by 6 white families; 21 goats were owned by two white families. In addition to these locally owned animals, there were several herds of several hundred head owned by cattlemen from outside the area. Occasionally, herds of cattle in the vicinity were owned by people who lived outside the county and even the state (Hewes 1940:146).

The acres of land and the crops produced are compared by Hewes (1940:145) for the Indians and the Euroamericans. From the following table we can see that the Euroamericans had much more diversity in what they were producing. The Indian people were reliant upon corn production, as 84% of their land in crops was in this cultigen; whereas the Euroamericans had 48% of their land in corn.

TABLE 5

NATIVE AMERICAN AND EUROAMERICAN LAND USE IN AN UPPER LITTLE LEE'S CREEK COMMUNITY IN 1935

	Indians	Euroamericans
Resident Families	13	6
Full Owners	7	1
Part Owners	2	0
Tenants	4	5
Land Owned	1,078 Acres	1,920 Acres
Land Under Fence	125 Acres	186 Acres
Crop Land	96	153
Actually In Crops	45	135
Corn	38	66
Oats	0	24
Wheat	0	4
Buckwheat	0	1
Grain Sorghum	2	2
Meadow	0	22
Cane	0	3
Orchard	0	7
Garden and Truck	5	7
Fallow	50	14
New Ground	½	4
Abandoned Cropland	12	40
Fenced Pasture	0	28

The diversity in the crops planted by the Euroamericans is deceiving as most of these crops were introduced recently by the man from West Virginia discussed earlier. Hewes (1940:144) discusses these crops and their introduction.

> The West Virginian has introduced some new crops and farm practices to the area. Corn, the principle crop, is rotated with oats and wheat, and meadow of timothy and clover. The corn is used mainly to feed stock, including dairy animals. Oats, wheat, timothy, and clover provide hay for the stock and for sale. Another feed stuff, grain sorghum, is grown as a late crops. A truck patch is another source of cash income. Small fields of cane and buckwheat provide sorghum and pancake flour, respectively. In addition, the place contains an orchard, and the largest garden in the area. The three enclosed pastures, although small, contain more than half the land enclosed for that purpose in the area. The West Virginian is the only progressive farmer in the community, and his farm is the only one above the self-sufficing class (Hewes 1940:144).

The 1930s a Time of Change

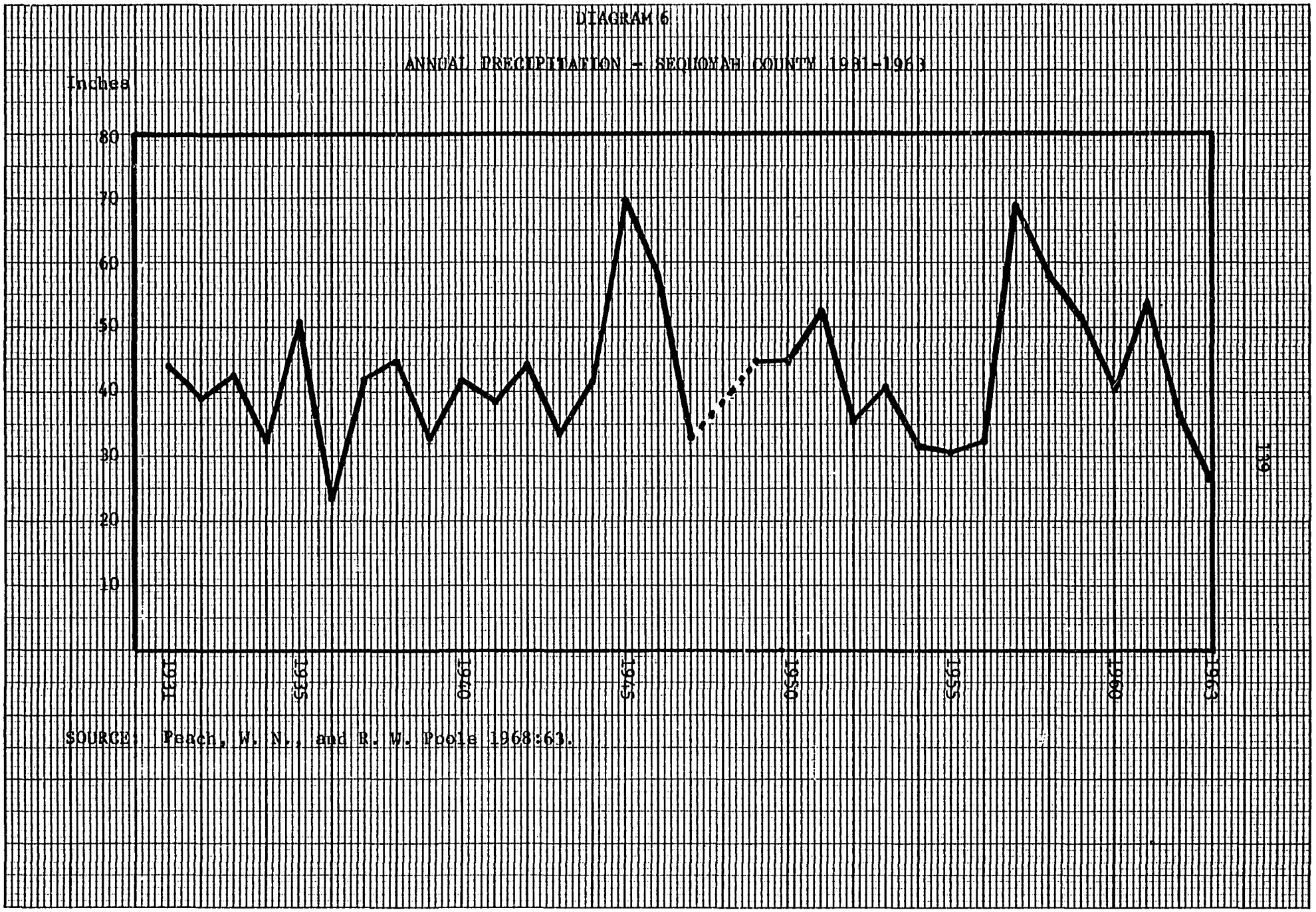
It is not until 1936, when the drought caused severe crop failures, that we find many of the long term residents beginning to give up and move from the area. (This drought condition can be seen in Diagram #6.) For 1936 there was a total of 23.3 inches of rain compared to an average of 42.8 inches (See Diagram #6). This drought must have been significant, as the previous year there was 50.8 inches of rain; well above the average.

From 1936 to 1946 there was a substantial decrease in the population, mainly by the offspring of the original Euroamerican settlers. As was described in the methodology section of this paper, the families moved to California, with a small percentage moving to the Gulf Coast. The movement to the coasts became quite substantial after the beginning of World War II, as war industries in those vicinities needed additional manpower.

A major source of income during the late thirties was the stave mill operating out of Nicut. From this mill, the oak trees in the surrounding zones were cut and made into barrels. From this same building there was operated a furniture factory, where hand carved chairs were made by the local residents. This stave mill and furniture company is said to have been supported by the Cherokee Nation. By the late 1930s most of the lumber companies in the Cherokee Ozarks had gone out of business as the timber had been depleted. In the last years of the 1930s the only tract which had not been depleted of its stand of timber was in parts of the Little Lee's Creek drainage, and this was because it had just been opened to truck transportation by the establishment of a road through the

DIAGRAM 6

ANNUAL PRECIPITATION - SEQUOYAH COUNTY 1931-1963



SOURCE: Peach, W. N., and R. W. Poole 1968:63.

locality.

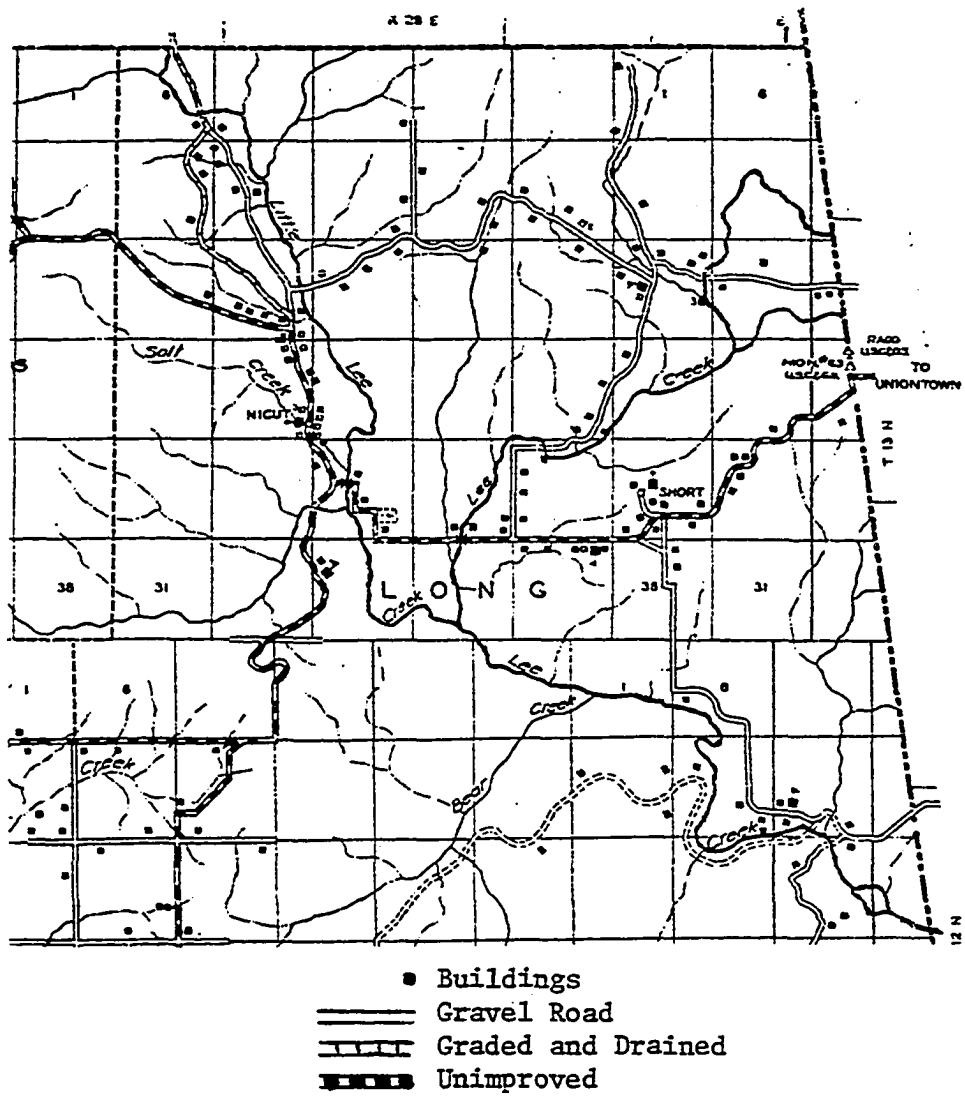
It was during the later years of the 1930s that the federal government implemented its Work Progress Act, which employed many people throughout the region building roads. Many of the people have stories which tell us that these public work projects kept food on the table during these years of declining farm production. A major project of the WPA crews was to stabilize the main east-west road which crossed the Lee's Creek valley; this road is now known as highway 101. It enters the valley from Eagle Mountain and the Belfont locale, then travels north to just south of Nicut, where it winds its way east over Little Lee's Creek and Big Lee's Creek, then on up the river terraces and across the state line into Arkansas. This road, which was once a winding wagon trail with "stair steps" of rocks, became the main thoroughfare maintained by the county. Even though it was a dusty, and sometimes muddy, gravel road, it was far better than the winding trails which it replaced (See Map #23).

Also during this time the construction took place of two roads leading out of Nicut. Both of these roads were constructed by the Cherokee Nation. In order for a person to find employment on the construction crews of these two roads, they had to prove one-quarter Cherokee Indian blood or more. The crews were filled by Cherokee Indians, as were the crew chiefs.

The road which today leads out of Nicut to the north, crossing Little Lee's Creek at Bradley Ford, is one of the roads built at this time. Several people indicated that "Bradley Ford Road" was completely new through this locale, as no road or trail had previously taken that particular route. It was this road which opened Little Lee's Creek for

MAP 23

1936 GENERAL HIGHWAY TRANSPORTATION MAP OF NORTHEAST SEQUOYAH COUNTY, OKLAHOMA



- Buildings
- Gravel Road
- Graded and Drained
- Unimproved

Prepared by the Oklahoma State Highway Department in cooperation with the U.S. Department of Agriculture Bureau of Public Roads.

Data obtained from Statewide Highway Planning Survey
Date of inventory June 11, 1936
Revisions 12-31-37
SCALE: 1 Inch = 2 Miles
Provided courtesy of the Oklahoma State Historical Society

lumber. The previous route, to the north from Nicut, crossed the Little Lee's Creek near Copic Slab and traveled on the east side of the creek for a distance until Hunt Mill Hollow, and then crossed the creek to the west side; then it traveled north crossing the creek again at Bradley Ford. On the west side of the creek the terrain prevented the building of a road as the increase is from 600 feet to 800 feet in less than a quarter of a mile.

The second road constructed by the Cherokee Nation at this time was the road leading out of Nicut to the northwest connecting with highway 59, which connects Stilwell and Sallisaw. Oral history, collected from a Cherokee who was a foreman on this project, tells us that the road followed the "old Indian trail". He indicated that the road, at this time, was widened and in places filled in so that it did not slope as much. It was also stabilized with new gravel and fill. This road known as "Low Gap Road", passes through the twin peaks of Low Gap Mountain, which is at an elevation of 1,338 feet and 1,257 feet above sea level. This road passes along the north ridge of Salt Hollow.

Both of these roads, constructed around 1938, opened up the locality to the towns to the north. Both remained gravel roads maintained by the county. Presently the road to the north, across Bradley Ford, is being black topped by the Cherokee Nation, which has crews of Cherokee Indians widening, straightening and stabilizing it. They are also constructing a bridge across Little Lee's Creek to the east of Bradley Ford. This road is expected to be finished in 2 to 3 years and will connect Nicut with the town of Bell, southeast of Stilwell in Adair County.

The oral history consistently placed the construction of these

two roads in 1938, whereas a 1936 Sequoyah County road map indicates the roads to be in use by that time (See Map #23). This particular map also indicates that another road, not mentioned in the oral history or in use today, was in existence at that time. This third road travels in a northwesterly direction between the previously described roads, goes over the ridges on the east side of Low Gap Mountain and then turns to the north; meeting the first described road before it gets to Bradley Ford.

Where the three of these roads leave the bottom, 1.65 kilometers north of Nicut, was a small settlement referred to in the oral history as Reinesville. Here a general store was established and a grist mill. The settlement was named after the store owner. This place name has never been recorded in the written documents of the area, or even the maps of that time period. It is believed that this settlement probably lasted from the early 1920s to the late 1940s, at the most.

An indication of the continued economic vitality of the district after 1929 is the number of retail stores which opened after this time. In 1936 a new store moved into the Short area. The store building and the accompanying house was moved from Long. As stated earlier, Long met with severe population decrease during the late 1920s and early 1930s as the cotton production decreased. A church building on the main street of Long was sold to a young couple who were residents of Long. They had the building torn down and moved, piece by piece, to the east side of Lee's Creek, on the north side of what is today highway 101.

In speaking with the store owners during the fieldwork period, they indicated that they moved into the area because there was so much economic potential as compared to Long. The store mistress's father was

a store operator in Long and she was carrying on the family tradition. She stated that the store, which was the center of Shakespear, hardly carried the essential items needed by the neighboring community and the local people were very pleased at their moving into the vicinity. This store was a focal point and it contained the Short Post Office after Andrew Rogers' Post Office was closed due to the ill health of Mr. Rogers in 1938. The Short store remained on the edge of Lee's Creek for ten years, until the flood of 1946 encouraged the owners to move to higher ground; it is found today on the river terrace next to Parris Mound.

After the highway was completed through the valley, the store which had been in Shakespear was moved to the highway and was situated .75 kilometers to the east of Parris Mound. Another store was begun in the Short locale during the late 1930s. This store was situated south of where the old Short Post Office operated. It was on the northeast corner of the intersection of highway 101 and the road which ran north to the Short Post Office. This store remained in business for a few brief years from 1938 to 1942.

For a short period of time, in the mid-thirties, a tourist resort developed in the Nicut area. To the west of Nicut, 3.2 kilometers up Salt Hollow, is a sulfur spring. This spring is on the south side of the creek in the stream bed. It is .75 kilometers further up the hollow from the salt spring which was the focal point of the vicinity before the 1880s. This sulfur spring, called by the local people the "stink spring" because of its odor, became a place where people would come from many miles around, for its supposedly medicinal effects (See Map #5).

Around 1935 a developer built two buildings at the site, .15 ki-

ometers to the southeast of the sulfur spring. The only remains of these two buildings today are the poured concrete foundations and debris from the house structure and contents. These buildings were log cabins, as piles of the concrete chinks from between the logs are stacked in several spots. As told to us by several people, one of the structures may have been a living quarters, the other was a place where people would shower and bathe in the sulfur water. Remains of a shower stall still remain. The spring itself had a concrete cistern built around it, and the water supposedly was pumped up to the building. Many contemporary people refer to this as a health spa and tell of several people who bought small lots of land in the vicinity in order to be near the spring.

Before this health spa was established and developed, the same site was the residence of a Cherokee family who moved to that location because the man of the family had "dropsy", and he would soak his legs in the sulfur water. This family seems to have raised hogs in order to provide for themselves, and also had several acres of corn planted on the bottoms of Little Lee's Creek. The tradition in the locale that this spring had medicinal value, most likely resulted from this Cherokee family's residence in the hollow.

By the late 1930s this health spa fell into disuse because it did not live up to its reputation as a cure-all. Another probable reason for the decrease in activity at this site, is that Salt Hollow is a very narrow valley with an elevation of 680 feet at the sulfur spring and an increase of 841 feet to the top of Brushy Mountain to the south, .75 kilometers to the southwest there is an increase of 660 feet, while .9 kilometers to the north the increase is 577 feet. With this slope and

narrowness of the hollow, whenever it rained a flash flood was likely; thus a road was impossible to keep open up to the sulfur spring. During the time that Sequoyah worked the salt spring, which is further down the hollow, a trail led over the eastern side of Brushy Mountain to Polecat Creek, then in the direction of Sequoyah's home on Skin Bayou. This trail is noticeable on the 1897 Geologic Survey Map (Map #10), and also partially visible on aerial photographs.

Population Demography During the 1930s and 1940s

From the years before the allotment until the late 1940s, several settlements, other than Nicut and Short, grew in population as a result of the Euroamerican settlers moving into the locality; opening up land which previously had remained forested.

One of these communities was referred to as Oakdale (See Map #23). It was not a town, but a dispersed community over the land north of Lee's Creek and east of Little Lee's Creek. A school house was built here by at least the early 1910s. The school house was the main focal point of the neighborhood; it also served as a church house and a community building. It was originally constructed of wood, but during the late 1930s the WPA program built another building of natural sandstone to serve as the school. This stone building is still standing today, and is serving as a residence for people working in the vicinity at the large ranch which is now in existance. This stone building was built to the southwest of the old wooden school building. For many years the old school building served as a church, while school was held in the new building.

The residents of Oakdale district lived along the four main roads which crossed at the school. Often the houses were along the edge of the bottoms, but many were on the level tops of ridges and mountains.

In talking with the previous residents of this locality, a recurrent topic was their almost weekly travels to Uniontown, Arkansas. Uniontown was the economic focal point at that time, it was larger than Nicut or Short and it had up to three general stores at one time. Many people said that Uniontown provided everything that one would want.

By 1946 the population of Oakdale was about virtually depleted and the last farmer on the bottoms of Lee's Creek south of Oakdale moved out when the river flooded, washing away crops and the vital top soil. The people who settled in the Oakdale area were mainly Euroamerican settlers who had immigrated from Arkansas during the late 1890s to the early 1920s. Several of the families were composed of a Cherokee women and a Euroamerican male. There were several Cherokee families, mainly scattered over the area on the uplands. The main population of Cherokee in the Oakdale area were settled on the hills on both sides of Mission Hollow.

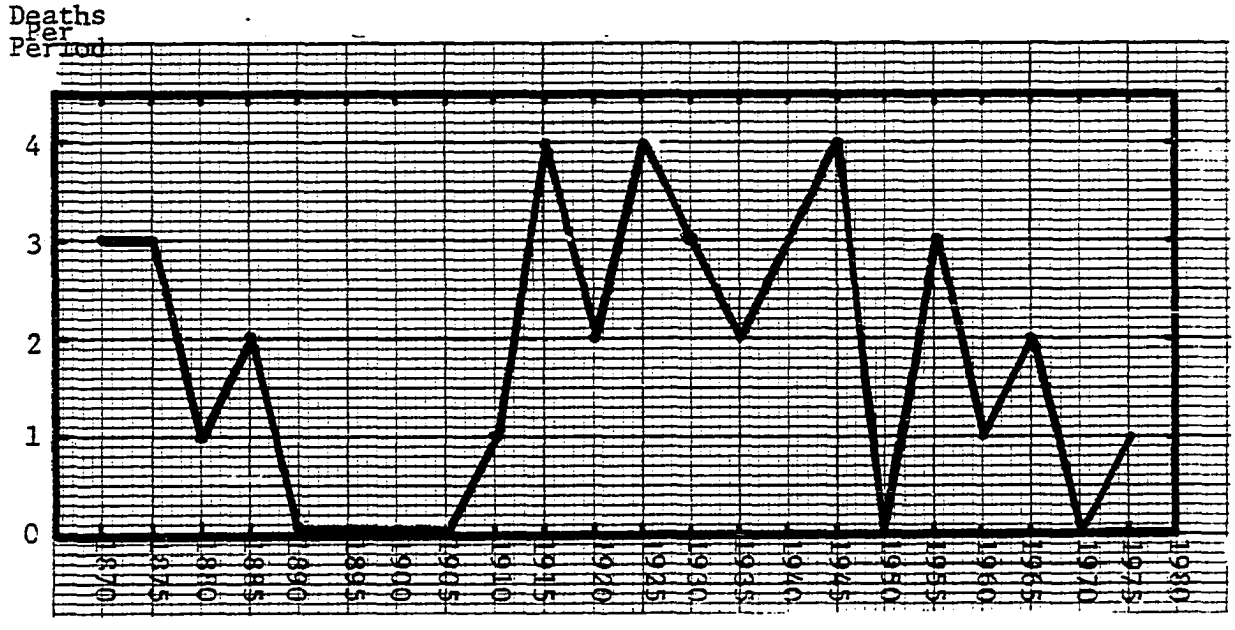
We also see an increase of population after allotment times southeast of Short, in the vicinity around Johnson school house, which is sometimes referred to as Rocky Point. This locality today, is mostly widely dispersed and is referred to as the people "near the mouth of Webber Creek". A road connects to this locality from Short, going on the east side of Blackbird Mountain. The population is also connected to Arkansas by a series of dirt roads, thus making easy contact with the resources of Van Buren and Uniontown, when Webber Creek is not flooded. The habitat is mainly rolling hills, which are not as abrupt as the mountains in other parts of the study area. The bottoms south of the school house are flat and extensive, with the added advantage of being at a

higher elevation than the river; thus they do not flood as often. Lee's Creek at this point is cut down into the strata, leaving little room for meandering.

This locality at the mouth of Webber Creek, was one of the earliest settled by the Cherokee, as we have evidence of major families in the locality. Allison Cemetery, which serves this vicinity is one of the oldest in the study area. By calculating the frequency of burials in this cemetery (Diagram #7), we find that it is trimodal with nine burials between 1866 to 1885, and no burials until 1910. From 1910 until 1945 we have 23 and five from 1955 to 1965. After this date, we have one burial in 1975.

DIAGRAM 7

BURIALS PER FIVE-YEAR PERIOD - ALLISON CEMETERY



Generalizations made from this data may not be accurate, as graves which are not marked by readable gravestones are not in our calculations, which means those individuals too poor for an engraved stone are left out. But,

with this in mind, we can at least say that a large enough population existed in the vicinity to have a significant mortality rate, resulting in members being buried in this cemetery during certain time periods. From 1866 to 1885 we find the original population of Indian settlers dying in the vicinity, and not until 1910 to 1945 is there a sufficient population of Euroamerican and Cherokee settlers to provide burials for their members. This last period would coincide with the historical development of the area, thus adding further evidence to the historical construction from alternate methods. Thus, after the allotment, the increasing population of the area opened up the Rocky Point district to settlement. By the mid 1940s, this population decreased as people moved out of the region to find employment with the war industries in California and the Gulf Coast. By 1955 the population begins to increase once again as people return to the region from California and other places.

While in the field, we collected an oral historical statement which indicated that a post office named Ozonee was once in the Webber Creek area during the late 1920s. We asked this several times of other old timers and they did not seem to recall such a post office. Thinking this was a piece of information created to please the interviewer, it was filed away without much confidence. After returning from the field and continuing the analysis of historical documents, no evidence came forth. Shirk (1977), who organized his information on place names from the registries of United States Post Offices did not list such a post office. In collecting maps of the area, a single railroad map (Map #17) indicated the town of Ozonae. This map is dated 1932. Thus once again a historical document verifies an oral historical statement, as a place of that

name must have been significant enough to have been placed on the map. We still are not sure whether this was a post office or not.

The Lifestyle of the 1930s and 1940s

Although the double and single log cabin were still in use, most of the people, during this period, were living in a "box house". The box houses were square and constructed of rough saw-cut lumber placed in a vertical position with the slots between the boards covered by a thin piece of wood. This type of house is also known as "board and batten" construction, although this term was never used by the local people.

These residents usually had several acres of level land, on which they farmed corn and cotton and a family vegetable garden. Each family usually had several milk cows and a few pigs, which were left to range over the uncultivated lands. A few of the house sites were mentioned as having a pig lot where many pigs were kept impounded, only to be left out after the growing season when they rooted in what was left of the cultivated crop. This strategy of pig production may have developed after the cotton crop failure as an alternate method of livelihood. During the late 1930s and early 40s, when this strategy is mentioned to have occurred, corn is said to have been the major crop. The land which was previously devoted to cotton then was planted in corn or maintained as pasture land. With each year of declining crop production, more land was turned into pasture and alternate means of livelihood were sought. I asked several people if corn then became a major export and cash crop, and the reply was often in the negative. Corn was used as the staple for human consumption. Each year they would produce enough corn to last the year for the family members and the excess was fed to the cattle, horses and pigs

to allow them to last the winter. With this change in land use, the sale of pigs became the main source of cash. We also have several house sites at which, instead of pigs, the alternate animal was goats, but this strategy was much less frequent. During the years from 1936 to 1946 we also hear of sorghum being cultivated and several families became middlemen in sorghum production, as they operated mills to process the cane into syrup. These same individuals were usually the largest cultivators of the plant.

In the later 1930s, many new subsistance strategies were attempted. Of these the most legendary was bootlegging. With the increased reliance upon sorghum and corn, a few industrious individuals distilled these agricultural products into alcohol. This was the time of prohibition across the country and this home industry became a profitable business for many of the people who lived up away from the main thoroughfares. Intricate methods of production and distribution developed, which often resulted in the transportation of the barreled product in a motorized vehicle to towns in Arkansas, especially Cederville. In more than one portion of the Lee's Creek area, this home industry became a substantial way of life which continued up to recent times.

Land Ownership and Change

In order to gain a more precise account of the land use of the area, we studied the land documents in the Sequoyah County Clerk's office. We narrowed this analysis to the recording of the legal transactions within five sections in the study area. Each of these sections is one mile square and contains 640 acres. They were selected to represent upland and bottom lands, heavily populated and sparcely populated localities.

From this information, a generalized idea of land transactions

can be constructed. In 1906 the land was owned completely by enrolled members of the Cherokee Nation, who were allotted lands prior to statehood. As long as the lands of the individual allottee remained unsold or in the possession of the heirs, they could not be taxed. Once they were sold, they then were taxed by the county. Today there are many acres of land which is still "Indian land", but most of it has come into the hands of people other than the original allottees.

Beginning in the teens, we see much of the land leased to oil and gas companies, who begin to explore for mineral resources. In the late teens, the uplands in many cases were leased to companies who used the land for its timber. Many of these companies were from Missouri and Arkansas. In 1934, a number of people mortgaged their property to the Federal Land Bank and a number of other mortgage companies. At least one of these mortgage companies declared bankruptcy in the early 1930s, and the mortgages were sold to an individual who then owned the mortgages on hundreds of acres. The owners of the properties did not begin to default on county tax payments until 1939; then there are numerous tax sales up until 1943. Previous to this time around 1926, and after this time up to 1953, there is an occasional sale of land by the county for taxes.

Three of the sections under study give us an idea of how these transactions occurred. To the west of Nicut, on the eastern edge of Brushy Mountain is a hollow which is now the center of a large ranch. During the 1930s, this land was sold for taxes and purchased by the highest and only bidder who was, at that time, a resident of Sallisaw. The bottom lands south of Oakdale School and north of Lee's Creek were bought and sold many times by residents of Uniontown, Arkansas. The area near the mouth of

Webber was bought and sold several times, but mainly remained in the hands of a resident of the area.

From the historic site analysis and oral history, we find that the upland farm sites which had been originally settled by the full-bloods in the 1830s, were in operation all the way into the 1940s. Indications are that these places of residence were not as economically productive as the bottom lands. Many of these full-blood families were able to adapt because, at allotment time, they received both upland and bottom land. They chose to live in the uplands, while they leased the bottom lands to Euroamerican settlers. This is the case with the Blackbirds, who lived on top of Blackbird Mountain. They lived at this upland location, farming corn along with an array of garden vegetables. They had many fruit trees, which provided an alternate food source. The bottom lands to the south of Blackbird Mountain are called Blackbird Bottoms and these fields are not supposed to have been cleared until Euroamericans opened the land after allotment. These settlers leased the land from the Blackbirds.

We do not have population statistics specifically for the Lee's Creek area, but from the oral history and historical site analysis, a slightly different picture emerges than that reflected by Sequoyah County population statistics. We do find the area to be gaining in population starting in 1880, but we do not have an indication of a population decrease until 1936, approximately 16 years after the decrease for the county. There is an indication that the bottoms of Lee's Creek did not come into extensive cotton cultivation until after the bottoms of the Arkansas; as Lee's Creek is further from the transportation routes of the highways. In others words, Lee's Creek was on the margin of cotton

production and did not come under intensive cotton production until after the Arkansas bottoms. As the new Euroamerican settlers moved into the area, they gradually opened up more of the land to cultivation. They worked for existing Indian farms where, as tenant farmers, they extended the acres farmed. Some of these families also leased marginal lands which had never been under cultivation in historic times. This increase in Euroamerican population leveled off around 1910, when the existing cotton lands were fully utilized. For the next ten years, maximum cotton yields were attained until the boll weevil and soil depletion virtually ended cotton production in 1929. After 1929, the same farmers diversified in the kinds of farm products they produced, but still relied upon corn as the basic staple; with other cereals being planted along with the wide variety of vegetables in the family garden.

When the depression hit the country in the early 1930s, the Lee's Creek area witnessed an additional increase in population of people from the cities and also from the Arkansas bottoms area. A portion of these new people attempted the small farm, corn, vegetable, hog and cattle strategy. The cultivated lands were broken up into smaller plots of ground and the land use intensified. Other people from this influx worked in the stave mill, which utilized the forest products. By 1936 the federal government and Cherokee Nation established work projects in the vicinity, keeping the people economically viable. Starting around 1936 we see an out migration of people who settled the land since before statehood, and newcomers fill their places.

From 1936 to 1940, the cultivation of the land decreased rapidly, but the population found alternate forms of employment. The movement

within the area was from the uplands, and marginal bottom lands to the county maintained road which was stabilized by the federal works project. People moved out of the area after 1936, but especially so after 1940, when war related industries in California and on the Gulf Coast were in need of manpower. By 1946 we found the last of the bottoms were cultivated, and most of the population either moved out or are now residing along the highway.

CHAPTER VIII

FROM CATTLE RANCHING TO COMMUTING

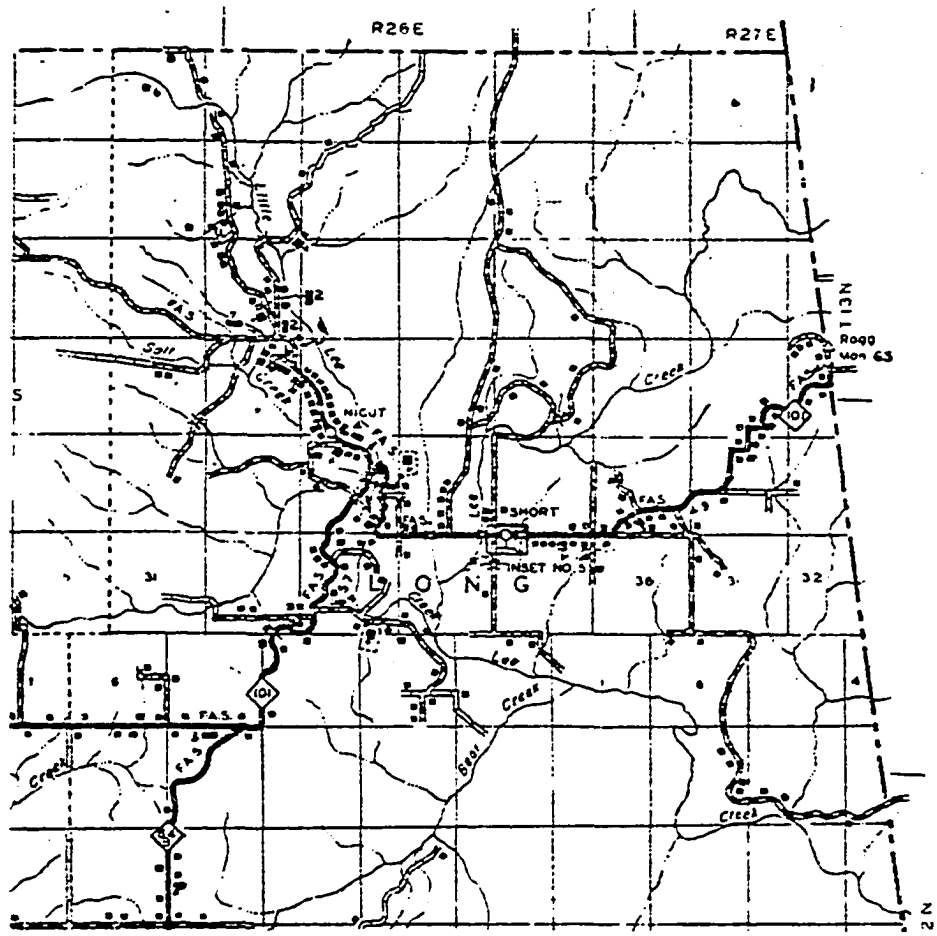
1946-1978

From the mid 1940s the area adjacent to the main road became the most desirable place to settle for people who wanted to adapt to the new conditions. As the people moved from the localities away from the road, the land was bought by larger land holders, who accumulated a significantly large percentage of the land (See Map #24). By 1975, most of the land not accessable to the main roads was controlled by these large land holders. This process can also be seen in Diagram #4 where the number of farms decreases significantly within the county. In 1940 there were 2,504 farms, 1950-2,093, 1960-1,362 and 1970-907. This decrease in farms results in fewer people operating farms, but these fewer people control larger land tracts. Also from Diagram #4 it can be noticed that the land in farms remains relatively stable over this same time period.

From Map #25 we can see the distribution of large land holdings within and around the study area as it was in 1975. Land tract A contains 5,130 acres, only one-half of a section of the eastern margin is within the study area. This same person owns other land to the southwest. Land tract B contains 6,625 acres and is about two-thirds within the study area. This land owner controls Brushy Mountain and most of the western border of the study area. Tract C is the most extensive tract within the study

MAP 24

1963 GENERAL HIGHWAY MAP NORTHEAST SEQUOYAH COUNTY, OKLAHOMA



Prepared by the Oklahoma Department of Highways Planning Division in cooperation with the U.S. Department of Commerce, Bureau of Public Roads

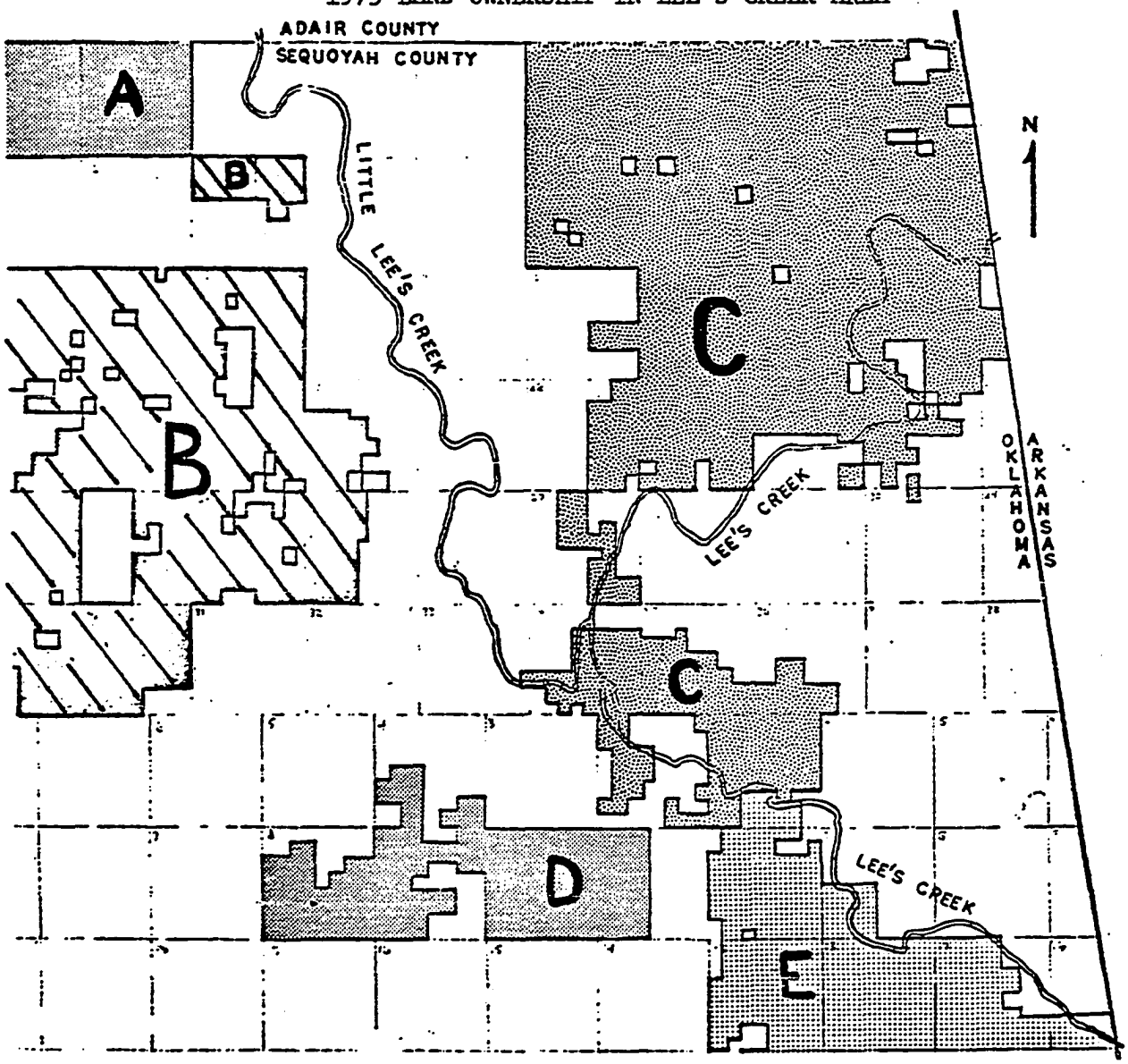
Date of inventory 1963
Revision 1-1-64
1-1-65
1-1-66 all except culture

SCALE: 1 Inch = 2 Miles

Courtesy of the Oklahoma State Historical Society.

MAP 25

1975 LAND OWNERSHIP IN LEE'S CREEK AREA



SCALE: 1 Inch = 1-3/4 Miles

SOURCE: Sequoyah County Plat Book
Sequoyah County Abstract Co.
1975

A 5,130 Acres
B 6,625 Acres
C 9,553.5 Acres
D 2,020 Acres
E Out of Study Area

area. Contained in this tract is 9,553 acres, all of which are within the defined study area. This land tract extends well into Adair County to the north. Tract C not only contains the old Oakdale vicinity, but also the bottom lands all along Lee's Creek from the western edge of Creek Town Bluff to the state line. This same land owner, in 1975, owned a large tract to the south of Short, controlling most of the bottom lands. Tract D, on the southern margin of the territory under study, contains 2,020 acres, about half of which is in the study area. Tract E is completely outside the study area, but by showing this land holding the extensiveness of large land holdings is better visualized.

On the edges of these large land holdings, but still away from the roads, are a number of medium sized land holdings. In 1975 there were two land tracts owned by individuals who controlled 827 and 1,141 acres. At this time, seven people owned lands containing between 534 and 320 acres. From this inventory of land ownership, thirteen individuals own the majority of land in 1975.

Land Ownership and Consolidation after 1940

From the county land records, we can construct the process of land ownership and consolidation for tract C (Map #25). By the 1920s, the land around the Oakdale School and the bottoms north of Creek Town Bluff were sold by the original allottees. From this time until the late 1930s, a number of owners either farmed the land or leased it to small farmers. Starting around 1939 to 1943 the land was sold by people leaving or by the county for taxes. The land around the school was purchased by one individual, the bottoms by another. In 1950, a single owner purchased both land tracts and we infer that this also happened to the land tracts

around these two sections. This individual owned the land for three years when it was sold to a man who was from outside the locale. This individual owned the land until his death and his heir sold the land in 1970, seventeen years after the original purchase. In 1970, the land was sold to the present owner.

After agricultural production ceased, the land was depleted of nutrients; so the large land holders begin, in the 1950s, to build herds of cattle. The lands which had been in cultivation are maintained as pasture for cattle and horses. These herds were usually maintained by a manager who hired several people as hired hands. During the times of the year when the herds needed to be worked, local men would be hired for the day, or as long as it took to give the necessary care to each animal. These ranches, in the 1950s, nearly coincide with the land ownership in 1975 (Map #25).

The houses, which had been built by the people residing in the Oakdale locale, were systematically removed by the land owner in the 1950s and 60s. A person was hired by him to tear down the structures and use the wood for other buildings. In this way the large land owner prevented squatters from taking up residence within the tract that he controlled.

Other land modification projects were conducted by the large land owners. Around 1960 the technique of opening up new land for pasture was begun. Areas on the hills, which had at least some level spots, were opened up by bulldozer. These were lands which had never been opened previously, and in most cases have never been planted in anything but pasture grasses. These lands do not have any historic structures or debris, which supports this interpretation. Several large land tracts

opened by this method including a tract directly south of Short on the west side of Blackbird Mountain. From aerial photos, these fields can be recognized by the long rows of parallel trees which grew where the piled up growth remained.

By the late 1960s we notice a reduction of large herds. There may be many factors related to the reduction of cattle on these large ranches, but a noticeable one is the closing of the open range. When the owners of cattle became responsible for the ranging cattle, the added control decreased their profit. These large land owners did not own all of the land contained within their fences. Scattered throughout these large land holdings were parcels of land which never were released by the original allottee or heirs. With the closing of the range, the large land owners would have to pay a lease fee to each of the smaller land holders. The closing of the range also effected other aspects of Lee's Creek environment. Several of the local people that we interviewed were under the impression that in the days when the land was in cultivation, before the late 1940s, that the river did not flood nearly as much as it has since. They expressed the reason for this as the cattle, which were free to range at will, kept the growth of bushes and trees down along the edges of the creek. By having the edges cleared of underbrush and the sand bars free of willow, the water was allowed to pass when it rained heavily. In a recorded interview, the concern about flooding was discussed by a couple who farmed a little over ten acres south of Reeder Bluff in the 1930s. WG is the husband and I asked what he was farming at that time.

WG Oh, we farmed cotton, corn, cotton, corn.

DW Did you have problems with the river?

WG Huh

DW Did you have problems with the creek?

WG _____

DW Wash your crops out much?

WG Not at that time, no. No, along about them days, why, there was a creek, the creek bed was pretty well open. You'd get a lot of rain, and the creek get up, why they's have a open channel, it could get on out. Now a days you walk up and down the creek, the water can't go nowhere, because the creekbed itself it all growed up. It doesn't take much water, it got no where to go, it can't go down the stream, it's got to spread, it's got to go somewhere because the creekbeds growed up and it's got to, that's why it overflows now so bad. But them days the creekbed was, the channel was pretty well open, it wasn't growed up in them days.

DW What was keeping it open?

WG Well, I just, them days it wasn't any more than what it is right now. The channel just wasn't growed up, I don't know why it's growed up now.

EG Well, I do, because it's a closed range, the stock don't go up and down.

WG No, the, the only difference between then, when I was a kid the only difference then and now, was cleared on up 'til, oh how long have we had the stock law here?

EG About eight years, eight or nine years.

WG Eight to ten years was open range. If I had a cow, you had a cow, or your neighbor had a cow, there wasn't anything as keeping it in a pasture, it run outside, everybody kept em run together.

EG They just branded 'em, marked their ears and they just

WG They'd go wherever they wanted to.

EG Wherever they wanted to go.

WG Maybe that's one reason that the channel stayed open I don't know.

EG Well, I think it is.

WG Then when they made that stock law, and everybody if they had

> a cow had to keep it up. Supposed to, they get out sometimes _____. And then the country begin to grow up, that's all I can tell you.
>
> EG Well, that's what I think it is. 'Cause they ain't no animals allowed to roam up and down through the creek bottoms and what have you to keep the brush and stuff wore down (Tape 11A, Pages 15-17).

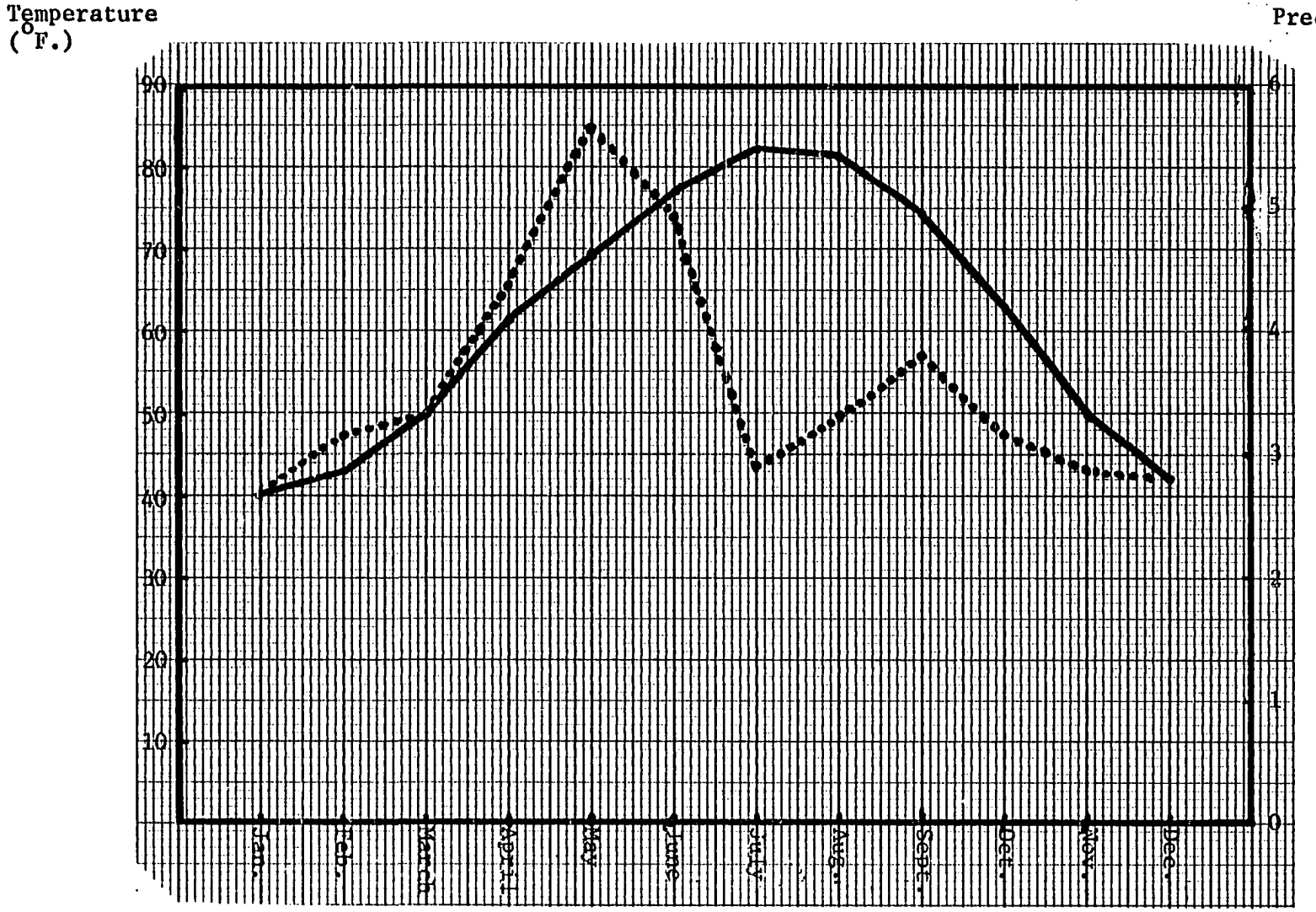
In recent years when it rains in any portion of the Lee's Creek drainage, it raises the water significantly. This is especially so in the spring, when the rainy season is in progress. During the rainy season, the creek fills to its limit with the surrounding ground thoroughly soaked. If another good rain comes along, the water does not run fast enough through the creek channel; because during the dryer season bushes and trees have grown in its channel. With this increase in water, floating debris is caught in these thickets and backed up over the channel's edge into the surrounding river terraces. From March to mid June is the rainy season, and it is during these months that floods are most prevelant. If the oral history is correct then, even though large tracts of bottom land were open in the 1930s, these would not have been washed out as would be thought by the current history of floods. Oral history data indicates that in just about every recent year the creek has overflowed its banks within a day, and was back within its banks in two days.

Temperature and Precipitation

The season variability in temperature and precipitation for Sequoyah County from 1931 to 1960 is graphically represented in Diagram #8. December through the first of March is the winter season when the temperature averages between 40 and 43 while the precipitation is from 2.6 to 3.2 inches per month. Around March 1st the rainy spring season begins

DIAGRAM 8

AVERAGE MONTHLY TEMPERATURE AND PRECIPITATION 1931-1950 SEQUOYAH COUNTY



SOURCE: Peach, W. N., and R. W. Poole 1968:61.

and reaches its peak around May. In May the greatest amount of rain is received. For the 29 years represented by these figures, May had an average of 5.7 inches of rain. Temperatures continue to increase until July, which has an average of 82 degrees fahrenheit. By July when the temperature has reached its peak, the precipitation has dropped to a low of 2.9 inches for the month. A second rainy season is experienced in September, but only for the amount of 3.8 inches. From August until January the temperatures continue to drop as fall leads into winter.

With the majority of the rain falling in the spring from March until June there is a complication with the planting season. Although the farmers desire rain for the crops, the intensity of the rain in thunder storms, with occasional accompanying tornados, causes a severe run off of vital topsoil. These storms arrive just when the ground is opened up for cultivation. The soil erosion is of particular concern in the upland areas where the slope of the ground facilitates the washing away of the top soil. With the months of July and August the main period for the maturation of crops, the low level of precipitation necessitates a rainy spring to maintain the crops until harvest time. This was the case in 1978. Twenty-six days were over 100 degrees Fahrenheit and little rain came after the spring rains. The results were that the crops once planted did not receive enough water to last for the growing season. In 1978, the second rainy season in September did not materialize so the agriculture of the region was devastated. The region was declared a drought area by the United States government and federal funds were allotted to farmers.

Mechanization

Mechanization of farm production can be gauged by the number of tractors in Sequoyah County. In 1925 there were 8, 1930-23, 1940-66, 1945-259, 1950-313, 1954-507, 1959-751 (Peach and Poole 1967:46). From this we can estimate that mechanization occurred between 1940 and 1945, when an increase of 400% was realized in the number of tractors. This time period is also the era when land per farm increased, and number of farms decreased (See Diagram #5). With increased mechanization, fewer people were needed to farm the larger acreages.

This mechanization did not effect the agricultural production of the Lee's Creek area, because the soil could not support the growing of a crop. Mechanization and the use of trucks and automobiles did facilitate the transportation of people out of the locale for jobs in surrounding cities and it enabled the consolidation of local schools. Mechanization also effected land use by the use of bulldozers to clear land of trees and level lands previously unusuable for pasture. The tractor may have enabled the small land owner to quickly cultivate the family garden, but it had a great effect on livestock production because it increased the use of hay cut from pastures for storage until winter months.

Recent Land Use

The increase in land consolidation continued until the mid 1970s, when small acreages began to be sold to individuals. Some of these acreages are being sold to people from out of state who desire wooded property; but other acreages are being sold to local people who are using the land for cattle production. These small cattle ranches usually range in the neighborhood of 50 to 100 acres, which provides enough pasture for 20 to

70 head of cattle. Since the beginning of the 1970s, there has been an increase in the small family production of beef. The tracts that were controlled by the large land holders for cattle production, are now being plowed for soybeans or, if too rocky and ill suited for soybeans, sold to these family operations.

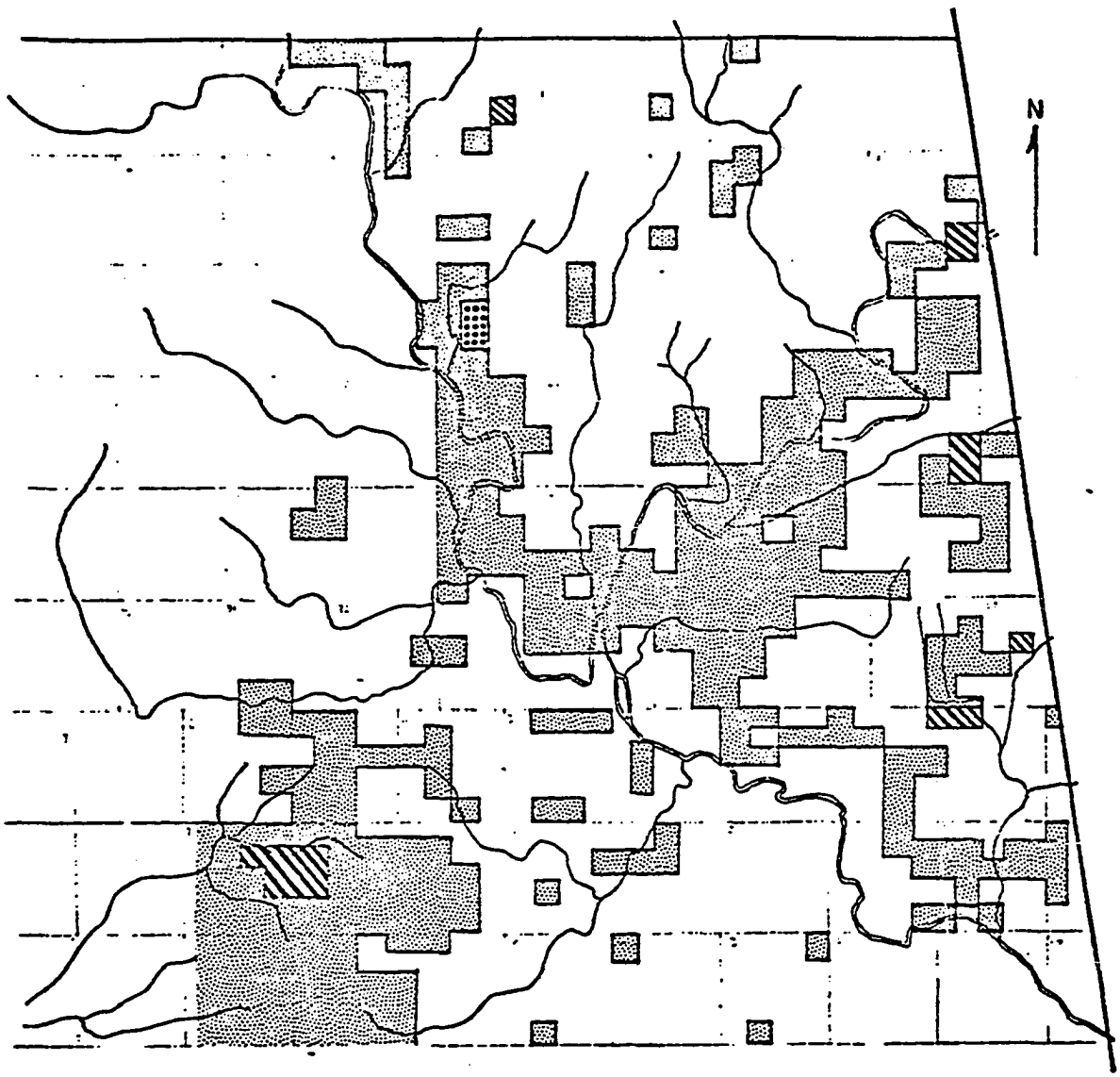
In 1974 the Sequoyah County Soil and Water Conservation District considered only 80 acres within the Lee's Creek area under cultivation (See Map #26). This cropland was on the bottoms east of Little Lee's Creek and south of the old Copic School. Since 1974 the region has seen a dramatic increase in agricultural production. In 1978, soybeans were planted on at least 700 acres within the Lee's Creek area. Most of these lands were on the bottoms north of Creek Town Bluff, Blackbird Bottoms, and the bottoms east of old Shakespear. The bottoms planted on the northern fields were planted by the workers of the largest land owner in the area today. The bottoms to the west of old Shakespear and Blackbird Bottom are owned by the same individual, who leases the fields to a farming family from the Arkansas River bottoms near Muldrow.

Every open grassland, during the summer of 1978, seemed to have a number of head of cattle on it, or at least signs of recent usage. The use of the land for these small cattle ranches is outlined on Map #26. Pastures not used for grazing cattle were most often cut for hay. The hay was then used to feed the cattle during the winter months. Any excess hay was sold to cattle owners who did not have available pasture.

With the main road through the valley maintained by the county since 1940, and paved in the early 1970s, residents could commute to Fort Smith and Van Buren in 45 minutes in order to obtain needed supplies.

MAP 26

1974 LAND USE IN LEE'S CREEK AREA



Background = Forest Land

Shaded = Pasture Land

Dot = Cultivated Land

Striped = Rangeland

SCALE: 1 Inch = 1-3/4 Miles
SOURCE: Sequoyah County Soil and Water Conservation District
Computed on 40 acre average.

Most important was the fact that people were able to commute to jobs outside the vicinity, but still maintain their homes in the district. Since 1940, most of the families moved their residences up to the maintained highway, or within easy access of it; and this is where we find them today (See Map #27).

The increase in transportation reliability also resulted in Sequoyah County consolidating its rural schools. Since students could now be bussed, within a few minutes, from anywhere in the valley, a single gradeschool could serve the students better as resources could be combined into one school. In this respect, a community wide election was held in each of the school districts to validate this consolidation. Oakdale, Copic, Johnson and Belfonte consolidated together, but Short decided on consolidating with Muldrow. Even though Short consolidated with Muldrow, the students are allowed to attend Belfonte School. All of the students above the eighth grade have to go outside the valley for an education. This consolidation process took place in 1954.

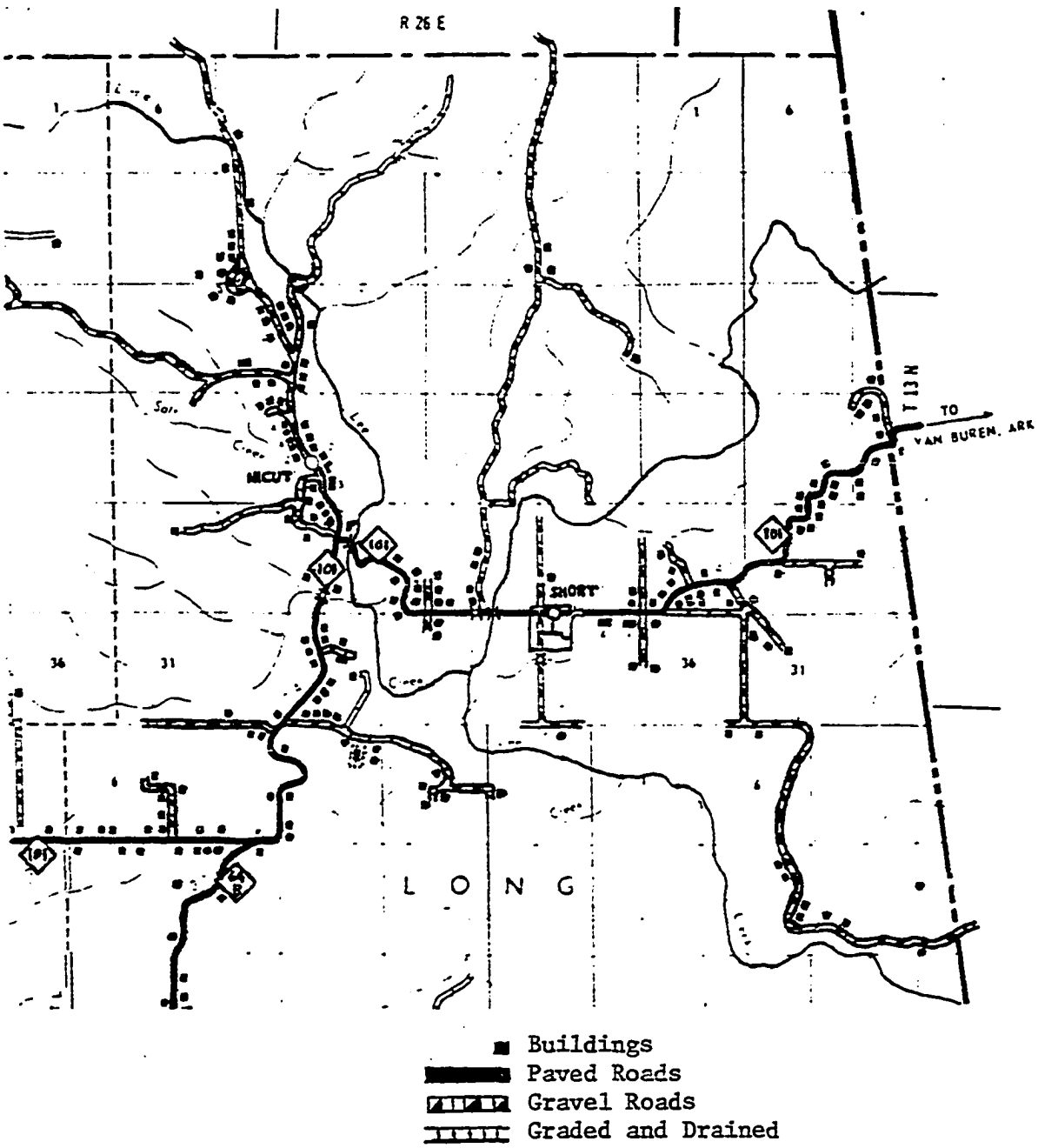
Contemporary People

In his mid 1960s survey of Cherokee communities, the anthropologist Wahrhaftig (1965) identified Nicut and Bellefonte as tribal Cherokee. He defined tribal Cherokee as the Cherokee who live in distinct settlements of small groups of people, related by kinship and participation in a common ceremonial institution. According to this survey, Nicut had 30 households and Bellefonte 21. He characterized these two communities as:

> Less strongly closed, but very cohesvie settlements, in which inhabitants are tribal in self conception but interact somewhat more freely with whites and do not have a reputation for extreme conservatism (Wahrhaftig 1965:5).

MAP 27

1972 GENERAL HIGHWAY AND TRANSPORTATION MAP OF
NORTHEAST SEQUOYAH COUNTY, OKLAHOMA



SCALE: 1 Inch = 1-3/4 Miles
SOURCE: Oklahoma Department of Transportation, in cooperation with the United States Department of Transportation, Federal Highway Administration.
DATE OF INVENTORY: 1-1-72

His survey showed that those Cherokee settlements throughout the Cherokee Nation, which were not on the flat lands but were in the hollows, remained cohesive communities; whereas those on flat land disintegrated. His analysis correctly portrays the flat land around the Short environs.

> In the flat lands, white farmers bought tracts of land in the midst of the Cherokee settlements. As a result of this interspersion of whites, Cherokee households were dispersed relative to one another. Such Cherokee settlements disintegrated through intermarriage and migration within a generation or two rather than through "acculturation" over a long period of time (Wahrhaftig 1965:22).

By participating in social events through the fieldwork period, we observed that the extended family was not limited to people of Cherokee heritage; the Euroamerican families were also organized in this manner. These extended families were related people living in a single house or a cluster of houses. A great amount of interaction between different houses, but within the extended family was observed. Several family names are quite numerous throughout the valley, indicating that these families have been successful in adapting to the region through changing times. The descendants of the original Cherokee and Euroamerican settlers have intermarried with other Cherokee and Euroamerican families to a great extent. There are still several families who are considered full-bloods and they maintain their Cherokee identity. These families have a limited number of Euroamerican intermarriages and still speak the Cherokee language in the home. They restrict their interactions with outsiders by avoiding direct eye contact and conversation.

The brick homes in the valley have been built since the mid 1960s. A number of houses were built by residents, but many were built with the

aid of the Bureau of Indian Affairs. The Bureau implemented the building project in the mid 1960s, in order to upgrade the living conditions of the Cherokee and other Indian groups throughout Oklahoma. Many times these homes are built next door to the older building which is still in use by some family member. Thus, we find clusters of extended family groups.

By the middle 1950s we find a number of people returning from California and other places to take up residence in the drainage. Most of these people had left the area for about twenty years and then decided to return. One person commented that one of the greatest mistakes in his life was to leave for California. He said he is making more money now, raising cattle, than he ever did in California. Many of these people who are returning were youngsters when their parents left in the 1940s, and we see complete extended families returning with the additional married spouses. A good number of people who have moved into the study area in the past ten years are new to the region. Most of these families are city people who desire to live in the country, but maintain their jobs in Fort Smith.

The Population of Five Cherokee Ozark Counties

A comparison of the population statistics for the five Cherokee Ozark counties (Diagram #9) reveals a similar population movement occurred for the five counties as described here for Sequoyah County and the Lee's Creek area. From 1930 to 1940 there was an increase in population in all of the five counties during the depression years. This increase was due to the people moving from the cities to the rural countryside. These people put such a stress on the resources that by 1940 a popu-

lation maximum was reached. Starting in the years around 1940, the population began to leave the region and this decrease continued until 1960. From 1960 all of these counties began to experience a repopulation of people, as people were beginning to return from California and other regions. Mayes County began its population increase in the 1950s, before the other four counties.

A compilation of the number of farms in these five counties indicate that a general decrease occurred from 1945 to 1959. In all of the counties this decrease began after 1935 with the exception of Adair County, which experienced a severe decrease from 1935 to 1940 with a brief increase from 1940 to 1945.

TABLE 6

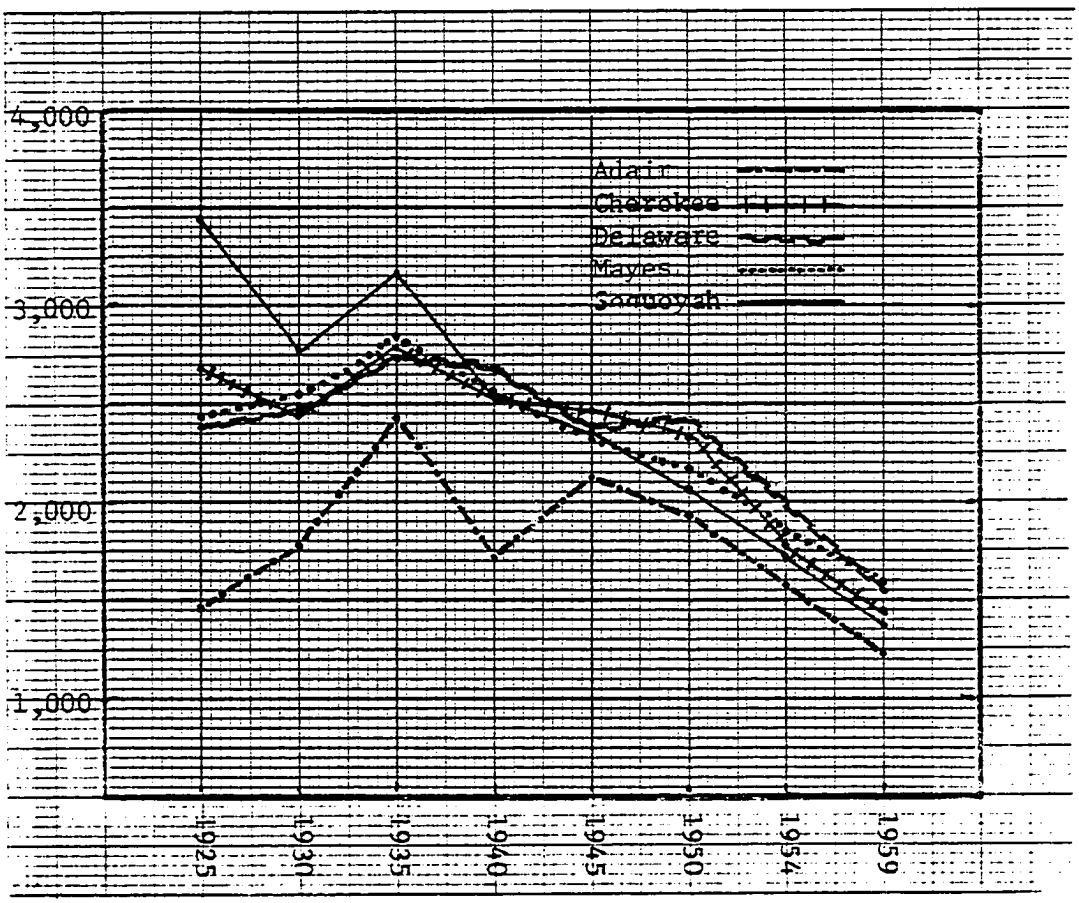
NUMBER OF FARMS IN THE FIVE COUNTIES OF THE CHEROKEE OZARKS 1925-1959

	Adair	Cherokee	Delaware	Mayes	Sequoyah
1925	1,464	2,670	2,399	2,420	3,429
1930	1,779	2,429	2,460	2,541	2,769
1935	2,409	2,793	2,711	2,810	3,151
1940	1,704	2,507	2,683	2,534	2,504
1945	2,130	2,470	2,352	2,345	2,308
1950	1,919	2,322	2,410	2,163	2,093
1954	1,590	1,798	1,974	1,836	1,774
1959	1,231	1,422	1,546	1,580	1,362

SOURCE: W. N. Peach and R. W. Poole 1967:20, 90, 160, 356, 489.

DIAGRAM 9

NUMBER OF FARMS IN THE FIVE COUNTIES OF THE CHEROKEE OZARKS 1925-1959



SOURCE: W. N. Peach and R. W. Poole 1967:20, 90, 160, 356, 489.

These population and farm numbers indicate that a similar process of population movement occurred in all of the five counties as that described for the Lee's Creek area for the period since 1940.

The years since 1940 have been a time when the people moved to the highways and began commuting to surrounding cities for employment. The land tracts away from the roads were purchased by individuals who, over several years, consolidated large ranches. These large ranches were

based mainly on the production of cattle. With the decreased feasibility of the large ranches by the late 1960s, a return to the cultivation of the bottom lands has taken place. During the most recent years, we are witnessing a return of family operated farms, but these are now based upon cattle production. Most of the people in the area are members of extended families who pool their resources; thus, a combination of economic resources are supporting the people of Lee's Creek valley.

CHAPTER IX

DIABETES MELLITUS AND THE OKLAHOMA CHEROKEE

From this presentation of Cherokee culture history, we can outline the changing interrelationship between exploitative or productive technology and environment; the first of Steward's (1955:40) procedures for the culture ecology approach. By focusing our analysis upon a limited geographic area, we also utilize Steward's second procedure; whereby the behavior patterns involved in exploitation of a particular area by means of a particular technology are analyzed. With these two aspects of the Oklahoma Cherokee placed into a culture historical and ecological perspective, we can better analyze the factors related to the increase of diabetes since 1940.

The Changing Culture of the Cherokee

The Cherokee were a portion of the Southeastern Native American population who, around 500 A.D., began to utilize domesticated plants. This horticultural technology was based upon the cultigen corn, which had diffused from Meso-America. The Cherokee were situated at time of historic contact in the 16th century, in the Southern Appalachian mountains, where their villages were along the river and creek bottoms. They hunted the surrounding elevations for mammals, especially deer, which provided a major portion of the required fat and protein needed for existance.

The cultivation of corn, beans and squash, plus the collecting of wild species of plants provided the carbohydrates needed for proper nutrition. Their tools, previous to contact, were made from the natural stone, clay and fibers found in their environment, or traded from other Native American groups. Stones provided the sharp edges needed to cut meat and plants and also the points for arrows and spears. The clay of the earth enabled the construction of pottery for cooking vessels and storage containers. The fibers of plants were used to weave cloth for bags and clothing.

European technological items gradually were introduced into Cherokee culture, the first of which were metal objects such as knives and guns. Not until 1740 was the horse frequent and the cow not until 30 years later (Mooney 1975:221). Cotton, coffee and potatoes were also added during this time.

Through warfare with surrounding Native American groups and the European colonists, Cherokee society increased in political unity. From a group dispersed among the valleys of the Appalachians without formal political unity, they gradually formed aggregates of politically united villages. By 1760 a priest-state had formed, which dealt with the Europeans as a single political unit (Gearing 1962:6).

As the Cherokee were confronted by the increasing population of European settlers to their east, many Cherokee moved further west, where a Cherokee settlement was established in the Ozark Mountains of north-central Arkansas. In this location, they continued their lifestyle based upon hunting of animals and the cultivation of corn, beans and squash; supplemented by the gathering of wild vegetable products. By 1838, the entire Cherokee population of Georgia, Tennessee, Alabama and South

Carolina were forced to move from their traditional homelands. They resettled in the western portion of the Ozark Mountains in what was known as Indian Territory.

After removal, they changed their settlement patterns from villages along the river bottoms to dispersed settlements of clusters of extended family units. Many of the Cherokee, on moving into the Ozarks, settled the open prairies on the tops of the mountains. Others settled adjacent to flat areas on the river bottoms where they had to clear the trees from the land. In Indian Territory, they were able to continue the hunting of animals and the cultivation of corn, beans and squash. The area was rich in resources because it had not been intensively utilized by man since the prehistoric peoples left the region three hundred years earlier.

The Cherokee population increased slightly in their new homelands for twenty years, until the Civil War between the Northern and Southern United States. During these twenty years, the Cherokee governed themselves with a National Council elected in a democratic fashion. This government was separate from any direct control by the United States government. When the Civil War broke out, the Cherokee Nation tried to remain out of the internal civil disputes of the government of the United States. As the war continued, the Northern troops abandoned the forts which were maintained to prevent intertribal warfare. This left Indian Territory unprotected from the Southern troops who soon moved into the locality. A major faction of the Cherokee then joined the Southern side and a portion sided with the Northern government. This split the Cherokee Nation and, in some battles, they fought against one another.

The Civil War left Indian Territory in shambles. Most of the improvements made to the land had been destroyed and the population was spread out over Kansas and Texas. The Cherokee population suffered a great decrease. Since a portion of the Cherokee sided with the losing cause of the Confederacy, the Cherokee Nation entered into a treaty agreement with the Federal Government. This treaty greatly restricted self-government and they then became governed in many aspects by the United States government.

With a decrease in the population from the Civil War, many of the lands were not utilized. Gradually the Euroamerican frontier reached the Ozarks and new settlers began to move in. It was illegal for people of European background to enter and settle in Indian Territory, but many did so anyway. This influx of people led to a population increase, which lasted for another 50 years. From the end of the Civil War, until 1880, the Cherokee and the Euroamericans remained in dispersed households based on hunting and corn cultivation. Around 1880, new technological items, including the iron plow and barbed wire, were invented and allowed the Euroamerican population to move into a new ecological environment, the Great Plains. The Lee's Creek area and the Cherokee Ozarks were affected by this new technology by the settlement and exploitation of the large prairies and bottom lands within their territory. By the 1890s the railroads crossed Indian Territory. Cotton, which had been produced on the family level for the weaving of cloth, then became a commercial export. The bottoms could be fenced from the ranging cattle and hogs and the cotton could be sent to eastern markets by way of the railroad. The small farmsteads in the uplands remained productive and planted a portion of

land in cotton. These upland farms were not able to expand their cultivated lands by the use of barbed wire, because of the restricted amount of level land. As the new Euroamericans moved into the area, they were not legally able to own property, so they leased or sharecropped land from the Cherokee. These people opened up lands which had never, in historic time, been open to cultivation. The Euroamericans planted similar crops as the Cherokee, but they utilized more of the rangeland for cattle and hogs. The Cherokee, in general, have never had a taste for milk and dairy products.

A pattern of housesite selection was noticed after many sites were identified. The house itself would be built adjacent to a cultivated field, but not on land usable for cultivation. From soil analyses presented in the Soil Survey, Sequoyah County, it was found that soil which was usable for farming was seldom used for a house site. On the bottoms, the houses consistantly were built along the edge of the bottoms or slightly up the slope into the talus zone. The talus zone was rocky and had not been opened for farming. Some of the houses built on the bottoms were constructed on the edge of a river terrace between two cultivated fields. In these areas, if the ground was plowed close to the terrace edge, erosion would begin. The houses in the uplands followed the same pattern. They would be built on level land which was adjacent to the cultivated area, but of a different soil type.

Until the completion of the railroads in the 1890s, few items were produced for export so little cash was utilized to purchase manufactured items or food products from outside the region. Through railroad transportation, industrially produced items were made available at reason-

able costs. With the completion of railroads, cotton could be exported and there was a demand for railroad ties and other forest products. With the export of cotton and forest products, families obtained the necessary cash to purchase manufactured products.

The continued immigration of Euroamericans into Indian Territory made law enforcement impossible. The Cherokee Nation could not impose its laws on United States citizens, and the United States courts in the surrounding territories could not maintain control over the Euroamericans within Indian Territory. With this as one of the reasons, the United States government convinced the Native Americans in Indian and Oklahoma Territory to allot their lands to individual citizens. After the land was owned by individuals, the land could then be sold to whomever might want to purchase such property.

In 1906 the state of Oklahoma came into existance under the constitution of the United States. The power of the Cherokee Nation in governing its people was thus greatly restricted.

The intensive use of the land for the cultivation of cotton lasted for 40 to 50 years. The continuous planting of cotton without fertilization depleted the soil nutrients. After 50 years of cultivation, the bottom lands north of the Arkansas River and south of the Lee's Creek area became non-productive. From 1920 to 1929, we find the bottom lands north of the Arkansas quickly decrease in population, as people began to move further west. It was not until 1929 that Lee's Creek area suffered cotton crop failure, after the introduction of the boll weevil.

In this same year, 1929, the general failure of the United States economic system resulted in the stock market crash. The families who had

lived in urban areas were greatly effected by the depression and many chose to move to the rural countryside. In the rural areas they thought they could farm a plot of ground and produce food for the family. These people, who were mostly Euroamericans, moved into the Cherokee Ozarks opening up marginal grounds, farming small acres of ground with several animals ranging in the wooded zones. Several of these families moved in from the states of Arkansas and Missouri, but some from as far away as Virginia, the Carolinas, Georgia and Alabama. Several of these families introduced a wide array of cultivated plants such as sorghum, oats, wheat and pasture grasses.

The influx of people into the Ozark region after 1929 added to the intensity of land use. Even though a diversity of crops was gradually planted and crop rotation implemented, the overpopulation of the land quickly reduced the natural resources. In 1936 a major drought was experienced in the mid-central United States and the Cherokee Ozarks were also affected. Many of the families in the Ozark region were living at the poverty level and, with the widespread crop failures in 1936, many families decided to give up and move out.

For ten years, starting in 1936, people moved from the vicinity to California and other places supposedly offering a better way of life. This was generally a difficult time for people in the Oklahoma Ozark mountain region and even though many people moved out, a number of families moved in from localities to the east. Starting in 1936, the outmigration was greater than the immigration, thus the region began to decrease in population.

During the late 1930s, the Federal Government and the Cherokee Nation implemented work projects which enabled the people to support their

families. These public works projects involved the building of schools, bridges and roads. From these work projects, the main dirt roads were leveled, straightened and stabilized; resulting in improved transportation. The families who had lived in the hollows and hilltops, both white and Cherokee, began to move their households to these roads where they would have easy access to outside resources. The lands which had been bought by Euroamericans from the Cherokee allottees then fell into disuse because they were not able to produce a crop. These lands then became county property as the taxes were not paid. The people who now lived along the roads then worked for the stave mills and cut timber for railroad ties. Other family members began to commute to Fort Smith and other towns in order to obtain employment.

A few individuals from outside the area placed bids on the land as the county auctioned off the land for taxes. These purchases became quite extensive up to 1950, when one land tract included over 9,000 acres. The lands were used by these big land owners as ranches, which were an extension of the ranging cattle strategy used by the previous settlers. The ranches were run by a manager who then hired several local men to work the cattle. Three large ranches were formed in the Lee's Creek drainage during this time. After 1946, there was no cultivation of the ground except for family gardens which were usually less than a quarter of an acre. The remaining lands which had been opened for cultivation became pasture land for cattle.

The large ranches lasted until the late 1960s, when the State of Oklahoma passed a law closing the open range. The ranch owners then became responsible for ranging cattle and needed to pay owners lease fees

for using their lands. With the cattle ranching strategy less profitable, these owners in the early 1970s began to open the bottom lands again for the agriculture of soybeans. With large mechanized tractors and trucks, plus the use of fertilizers, they are able to produce a good crop where 40 years previously the soil was depleted of nutrients.

For all the five counties of the Cherokee Ozarks, the population began to decrease in 1940 and continued until 1960. In 1960 in the Lee's Creek study area, we find people moving into the region. Many of these people were city residents who desired to live in the rural environment, but many people were also those individuals who left during the period from 1936 to 1956. These people moved into houses along the improved roads and commuted to jobs in Fort Smith and larger towns. Some of these families purchased 50 to 500 acres and began to raise cattle on a small scale. With their small ranches, they could control their animals and produce a profit. The lands they purchased, in many cases, are the lands of the large land owners who have limited the size of their herds and are now beginning to cultivate the bottom lands.

Lee's Creek Study Area and other Mountainous Regions

This presentation of land use in the Lee's Creek area, when compared to other mountainous regions, reveals a surprising amount of similarity. Two major adaptive strategies have been formulated from cross-cultural comparisons of mountainous regions by Rhodes and Thompson (1975:547). The first of these involves a:

> . . . single population which through agro-pastoral transhumance, directly exploits a series of microniches or ecozones at several altitudinal levels; in the second, a population locks into a single zone and specializes in the agricultural or pastoral activities suitable to that altitude, developing elaborate trade rela-

> tionships with populations in other zones which are also involved in specialized production. In some cases, this specialized strategy involves the exploitation of several niches in the same mountain area by two or more distinct groups (e.g. agriculturalists, pastoralists, traders) which are in symbiosis.

The first of these strategies is common in the Alps and the Himalayas of Nepal. In this habitat the population is dependent upon grains, vegetables and other village-grown products for their own consumption. The animal herds must be exiled during the harvest and growing season to prevent damage to crops and hay meadows. This set of agricultural necessities lead to the individual ownership of small cultivated plots and hay meadows in the valley bottoms and communal ownership of larger unfragmented forest and pasture lands lying at higher elevation (Rhoades and Thompson 1975:539).

In these mountainous regions, the rights to the use of the land correspond with the needs of agricultural input; the small garden plots and hay meadows are more efficiently exploited by individual households, while the requirements of successful pasturing of the animals necessitates a coordinated effort (Rhoades and Thompson 1975:540).

The first adaptive strategy, outlined in the above statements, is very similar to man's use of Lee's Creek from 1828 to 1940. In the Lee's Creek area, the great altitudinal variation is not present, so the distinct zones that, in Alpine areas necessitate individuals herding the animals at the higher elevations, is not needed for successful animal production. In the Lee's Creek locality we found individually controlled cultivated plots and meadows in the bottom lands and on the level land in the uplands. The cultivated fields were fenced in to protect from ranging animals. The cattle and hogs would be let loose on the forest zones to

range. These animals would be kept from the cultivated zones during the growing season and let to graze on the cultivated fields during the winter. While the cattle and hogs were ranging over the forested lands, little care would be needed for their production. Many people mention that they only had a few cows and these returned each morning on their own to be milked. The cattle on the range were marked and each year they would be rounded up and given the proper attention. Roundup times then, as it is today, is a communal effort which brings together many individuals who don't normally gather together for other purposes. Thus we see that the individual control of fenced-in tracts and communal ownership of the rangeland was not a form of adaptation particular to the Cherokee Nation. This same adaptation is common throughout the world where man is found in a mountainous region.

Private ownership of land was not legal until after allotment in severalty in 1906 for the Lee's Creek area. After this time, individual ownership of land followed the above adaptive strategy until the late 1930s and early 1940s. A factor in the demise of this adaptive strategy is detailed in a prophetic statement about mountainous regions in general:

> . . . individuals can sell and exchange valley bottom land, and the village as a unit will not be threatened, but if the highland pasture or any part of it were privately controlled and owned, then its alienation to outside agents would leave the village in the fatal position of having no summer pasture at all or of being blocked from reaching the higher levels (Rhoades and Thompson 1975:540).

The control of the higher elevations and the rangeland a distance from the maintained roads by individual owners, occurred after the general maladaptation due to the over exploitation of resources. The soil nutrients were especially over exploited by the increased population from the urban

environments during the years of the depression. The demise of cotton production was an initial indicator that the land had been over utilized, but the opening of marginal lands for cultivation and the washing away of these soils led to the maladaptation. By the late 1930s, the adaptive strategy of agro-pastoralism as a cultural system was not capable of maintaining the population, as was common for over one hundred years. This maladaptation was widespread enough to cause a major cultural change from an agricultural society to a population based upon cash income obtained from a wide array of nonagricultural economic pursuits.

Diabetes Mellitus in the Cherokee Ozark Counties

Throughout the data presentation, the conclusions provided from the Lee's Creek area were discussed in relation to the five counties of the Cherokee Ozarks. Similar processes of adaptation and population change were noted for the five counties. These five counties were chosen because they were settled by the same cultural group and they were part of a similar environmental region, the Ozark Mountains. The study of diabetes in the Lee's Creek drainage does not produce enough cases to allow for comparison with other localities. It was found that the number of deaths due to diabetes for Sequoyah County as a whole, were too few in number to provide enough cases for a proper analysis. The five counties of the Cherokee Ozarks provide sufficient numbers of deaths due to diabetes to make judgments on the frequency of this disease.

Data was obtained from the Oklahoma State Health Department for the number of deaths due to Diabetes for these five counties for as far back as proper records were obtained. From this data, Table 7 was compiled

TABLE 7

DEATHS DUE TO DIABETES MELLITUS - BY RACE - FIVE COUNTIES OF THE CHEROKEE OZARKS
ADAIR, CHEROKEE, DELAWARE, MAYES, SEQUOYAH - 1940 THROUGH 1977

	Total			White			Black			Indian		
Year	Population	#	Rate	Population	#	Rate	Population	#	Rate	Population	#	Rate
1940	100,183	13	13.0	84,038	13	15.5	2,583	0	0.0	13,562	0	0.0
1941	98,979	8	8.1	83,256	7	8.4	2,467	1	40.5	13,251	0	0.0
1942	97,777	14	14.3	82,472	11	13.3	2,365	2	84.6	12,940	1	7.7
1943	96,578	16	16.6	81,692	12	14.7	2,257	0	0.0	12,629	4	31.7
1944	95,372	14	14.7	80,908	13	16.1	2,147	0	0.0	12,317	1	8.1
1945	94,175	13	13.8	80,127	10	12.5	2,040	0	0.0	12,008	3	25.0
1946	92,967	13	14.0	79,343	11	13.9	1,930	0	0.0	11,694	2	17.1
1947	91,764	14	15.3	78,560	13	16.5	1,821	0	0.0	11,383	1	8.8
1948	90,562	7	7.7	77,778	6	7.7	1,712	0	0.0	11,072	1	9.0
1949	89,360	18	20.1	76,996	15	19.5	1,603	0	0.0	10,761	3	27.9
1950	88,157	18	20.4	76,213	14	18.4	1,494	0	0.0	10,450	4	38.3
1951	87,556	16	18.3	75,564	14	18.5	1,468	0	0.0	10,524	2	19.0
1952	86,955	19	21.9	74,917	16	21.4	1,441	1	69.4	10,597	2	18.9
1953	86,356	18	20.8	74,269	13	17.5	1,416	0	0.0	10,671	5	46.9
1954	85,754	18	21.0	73,622	14	19.0	1,388	0	0.0	10,744	4	37.2
1955	85,154	7	8.2	72,973	5	6.9	1,363	0	0.0	10,818	2	18.5
1956	84,549	20	23.7	72,323	13	18.0	1,336	0	0.0	10,890	7	64.3
1957	83,949	8	9.5	71,676	7	9.8	1,309	1	76.4	10,964	0	0.0
1958	83,348	15	18.0	71,028	12	16.9	1,283	1	77.9	11,037	2	18.1
1959	83,289	15	18.0	70,921	11	15.5	1,257	0	0.0	11,111	4	36.0
1960	82,146	16	19.5	69,732	13	18.6	1,230	0	0.0	11,184	3	26.8
1961	84,208	17	20.2	71,223	15	21.1	1,258	0	0.0	11,727	2	17.1
1962	86,280	21	24.3	72,724	18	24.8	1,286	0	0.0	12,270	3	24.4
1963	88,329	11	12.5	74,203	9	12.1	1,313	0	0.0	12,813	2	15.6
1964	90,390	19	21.0	75,693	14	18.5	1,341	1	74.6	13,356	4	29.9
1965	92,454	23	24.9	77,185	12	15.5	1,370	1	73.0	13,899	10	71.9
1966	94,511	21	22.2	78,674	17	21.6	1,397	0	0.0	14,440	4	27.7
1967	96,574	24	24.9	80,165	20	24.9	1,425	1	70.2	14,984	3	20.0
1968	98,635	22	22.3	81,656	14	17.1	1,452	0	0.0	15,526	8	51.5
1969	100,696	18	17.9	83,146	13	15.6	1,480	0	0.0	16,070	5	31.1
1970	102,754	24	23.4	84,634	19	22.4	1,508	0	0.0	15,336	5	32.6
1971	104,999	17	16.2	86,470	12	13.9	1,546	0	0.0	16,983	5	29.4
1972	108,200	23	21.3	88,255	18	20.4	1,554	0	0.0	17,391	5	28.8
1973	108,700	28	25.8	89,550	23	25.7	1,566	1	63.9	17,579	4	22.8
1974	111,400	16	14.4	92,221	13	14.1	1,638	0	0.0	18,042	3	16.6
1975	115,400	16	13.9	95,241	10	10.5	1,688	0	0.0	18,471	6	32.5
1976	117,501	20	17.0	96,929	12	12.4	1,716	1	58.3	18,856	7	37.1
1977	120,902	15	12.4	99,714	9	9.0	1,761	1	56.8	19,427	5	25.7

SOURCE: Provided by the Oklahoma State Department of Health, Department of Data Management.

and represented in Diagram 10. This compilation of information begins in 1940 and continues until 1977 for the white and Indian groups. From Diagram 10 we can see that no deaths occurred in 1940 and 1941 for the Native American population. Starting in 1942, up to 1956, there is an increase to 64 deaths per 100,000 population. Another peak in deaths is reached ten years later, in 1965, when 71.9 persons died from this disease per 100,000 population. Like the State figures presented in the beginning of this paper, the white death rate remains relatively constant throughout this time period. For the thirty-seven years the average death rate per year, per 100,000 population, is 16.27 for the whites, 19.62 for the blacks and 26.23 for the Indians. These figures are very similar to the State as a whole, where the whites had an average of 15.0, blacks 22 and Indians 27.2 deaths due to diabetes per 100,000 people for each year.

The Use of Death Certificates

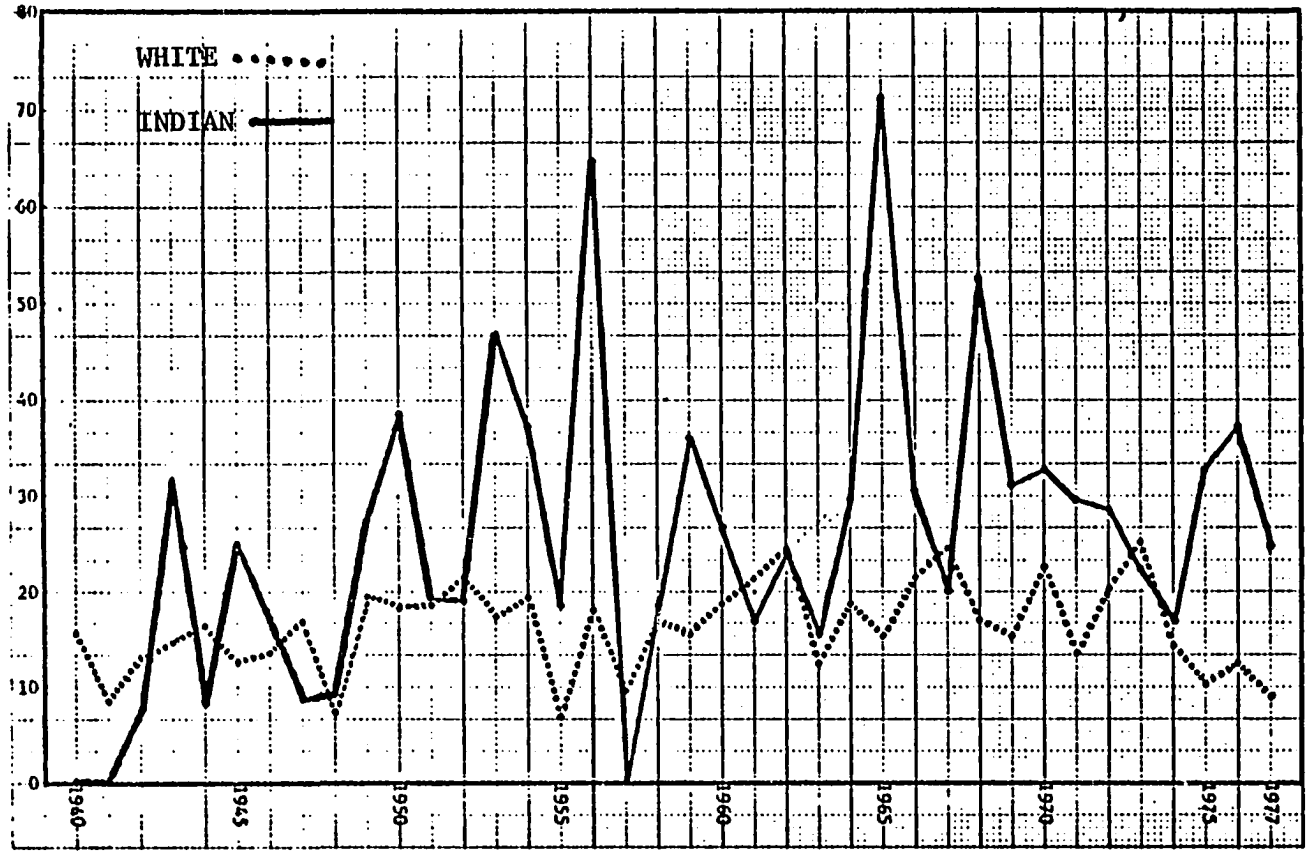
In order to make the data comparable between whites and Indians, an adjustment was made in order that the deaths were relative to the total population of each of the groups. This is a common procedure for epidemiologists, who claim this is necessary for proper analysis. These rates compiled for the State and the Cherokee Ozark Counties were calculated for the deaths per 100,000 population. The following formula was utilized by the State Health Department for the Cherokee Ozark rates, and by this researcher for the State rates (Mausner and Bahn 1974:135).

$$\text{Deaths Due to Diabetes} = \frac{\text{Number of deaths due to diabetes among residents of the area in a calendar year}}{\text{Average population in the area in that year}} \times 100{,}000$$

Another calculation thought necessary by epidemiologists is the

DIAGRAM 10

DEATHS DUE TO DIABETES MELLITUS FIVE COUNTIES OF THE CHEROKEE OZARKS BY RACE 1940-1977



SOURCE: Data provided by the Oklahoma State Health Department, Department of Data Management.

age adjusted rate. It is thought that the age adjusted rate is much more precise when comparing populations which differ in age compositions. It was not possible to obtain age adjusted mortality statistics from the State Health Department for the five counties of the Cherokee Ozarks. This being the case, the State totals were figured by the researcher in the same way so they would be comparable. It is believed that by adjusting for age, the statistics would change by increasing the rate of the Indian deaths. This is because the Indian birth rate has been higher in the past fifteen years and diabetes is prevalent among the people over 35. With this consideration, the data presented is a conservative statement of the extent of this disease.

Like other historical sources used in this paper, death certificates need to be evaluated in regard to their reliability. Since they are used here as a major indicator of diabetes prevalence, extra special consideration is necessary. Himsworth (1935), Yudkin (1957), Cleave and Campbell (1969) use death certificates as a major data source to construct national figures for the increases in diabetes in many different countries. This approach and their findings have been challenged by Keen (1964:117), who considers the tests used to diagnose diabetes to vary from nation to nation. Thus, nonstandardized measurements produce an amount of error, which makes these kinds of studies unreliable. He also finds fault with the use of death certificates because many diabetics die of some other condition, such as heart attack or severe infection. This being the case, some national mortality reports do not indicate diabetes in the mortality statistics.

Cameron (1966:146) conducted a study of death certificates to

evaluate the reliability of death certificates for diabetic studies. This study incorporated a group of 779 persons who were diagnosed as diabetic at the Royal Infirmary of Edinburgh, Scotland during the years 1939 to 1940 and 1949 to 1950. All of these known diabetics were followed through to death, and their death certificates were reviewed in order to calculate the causes listed on the certificates. In only 29% of the cases was diabetes entered as the primary cause and in another 32.2% diabetes was mentioned, but not as the primary cause. Cameron's study concluded:

> Many epidemiological and statistical reports, concerning diabetic mortality, derived from death certificates data have therefore referred to less than one-third of the known diabetics who have died.

Malins (1966:138) studied the death certificates of several thousand diabetics, producing several conclusions relevant to this discussion. He found severe diabetics, who need to take insulin daily, develop serious complications and die within fifteen years from coronary artery or renal disease. For others with less severe manifestations of diabetes, serious disability lasting for years may arise from:

1. Blindness, as a result of retinopathy, may persist for several years, but this is not very common because advanced retinopathy is usually accompanied by serious renal or coronary disease which leads to early death. Blindness from cataract in elderly patients occurs slightly more often than in non-diabetics.

2. Renal failure is a common cause of death in younger patients in the experience of some centres although not in ours.

3. Neuropathy may cause considerable disability from perforating ulcers and chronic infection of feet. The autonomic manifestations orthostatic hypotension and gastro-intestinal disturbances lead to long continued ill-health in a few patients.

4. Gangrene of the feet or legs, due to ischaemia or neuropathy is a major cause of prolonged incapacity. Although many die at an early stage, more survive for three or four uncomfortable years after the first amputation.

5. Chronic dementia following prolonged hypoglycaemia is very rare.

6. Psychopathic illness is probably more common than realized. While most diabetics adjust to their situation there are some who fail to come to terms with the situation and either cannot face the continued self-discipline that it requires or accept the fact that they are abnormal. A few adopt the attitudes of invalidism, using diabetes as an excuse for abandoning responsibility. Others present as 'brittle' or difficult diabetes, a few even deliberately inducing hypoglycaemia (Malins 1966:138).

The statistics compiled in this report for Oklahoma and the five counties of the Cherokee Ozarks were collected by a single medical system, so we do not have the variations which are the source of error in multinational studies. In Oklahoma the underlying cause of death filled in on the death certificate at the time of death by the mortician or attending physician is the cause of death calculated by the State Health Department. The underlying cause of death as defined by the State Health Department is as follows:

> That disease or condition which gave rise to the chain of events leading to death or the circumstances of the accident or violence that produced the fatal injury (Oklahoma Health Statistics 1975:146).

A problem we may have in understanding these statistics is that the State may have changed their methods at some time since 1940, thus they would not be comparable. It is known that in 1949 the State changed its death certificate in order to adjust to national standards and in 1968 adopted international definitions for specific diseases. State Health Department officials thought that these changes in the death certificates changed some disease statistics, but had little or no effect in regards to deaths due to diabetes.

Another problem in the interpretation of these death statistics

is in regard to the category of race. The State Health Department does not have any guidelines in regards to how to fill out the form dealing with race. This results in value judgments as to who is Indian, white or black. When dealing with the category Indian it is felt by the researcher that the people who are assigned to this category are usually Indian because of physical characteristics. But a good many half-blood Indians are assigned to the "white" category because they lack overt characteristics, thus underreporting the Indians.

It is felt by this researcher that the use of death certificates is warranted in this kind of study, because we do not have any other source of data covering such a long period of time. Even though these problems, in the use of death certificates exist, it is thought that these statistics are still reliable for the problem under study. The data was collected by a single medical system so the variations of reporting found in multinational studies is non-existant. The underreporting of deaths by causes other than diabetes, and the underreporting due to the race category, would mean that the data presented in these tables and diagrams would be a minimum number and our observations would thus be conservative.

Oklahoma Native Americans and Health Care

One would think that a possible reason for the high rate of mortality due to diabetes is that traditional Native Americans would not utilize the white man's health care system. This may be the case when it comes to initial treatment of a disease known to them where they may seek traditional medicine for their ailment. But when this route does not work, they probably seek the hospital and doctors available to them.

A measure of the care provided to Native Americans in Oklahoma by

the hospital system is the number of people born in a hospital. The Oklahoma State Health Department has assembled the birth certificates for the different races. The Oklahoma Health Statistics (1975:13) illustrates the fact that, beginning in 1940, the number of births in hospitals by Indians is exactly opposite what would be expected. In 1940, 40% of the white population were born in a hospital. This rate increased until 1967, when 99% were born in a hospital. Black births in hospitals began at under 10% in 1940 and did not reach 99% until 1970. On the other hand, Indians started at 70% in 1940 and reached the 99% level in 1965, two years before the whites and five years before the blacks. In 1940 Indians were utilizing the hospital facilities almost twice as much as their Euroamerican neighbors and 700% more than the blacks.

The explanation for this behavior is that the white and black population had to pay for hospital services and, more often than not, chose to have their children born outside the hospital facility. The Indian people at that same time were served by the Indian Health Service, which, according to treaty rights, provided free health care.

CHAPTER X

THE ETIOLOGY OF DIABETES MELLITUS

Before coming to a simplistic conclusion about the realtionship between the dramatic increase of Cherokee deaths due to diabetes since 1942, and the rapid cultural change from a population based upon agriculture to a cash economy from 1936 to 1946, we need to place these findings within the context of developments in the study of diabetes.

A Short History of Diabetes Mellitus

The characteristics of diabetes were mentioned as early as 1500 B.C. in the medical writings of Egypt, Japanese and Chinese of the 3rd century A.D., and Indian Sanscrit texts in the 6th century A.D. Hippocrates in all of his writings did not describe a disease with the characteristics of diabetes. Arab doctors from clinical observations described the disease with accuracy in the 9th, 10th and 11th centuries (Papaspyros 1964:4-6).

A Greek physician, in the second century A.D., provided the first complete clinical description of diabetes and the first description of it in Europe. Aretaeus wrote:

> Diabetes is a wonderful affection, not very frequent among men, being a melting down of the flesh and limbs into urine. The patients never stop making water, but the flow is incessant, as if the opening of aqueducts. Life is short, disgusting and painful; thirst unquenchable; excessive drinking, which, however, is disproportionate to the large quantity of urine, for more urine

> is passed; and one cannot stop them either from drinking nor making water. Or if for a time they abstain from drinking, their mouth becomes parched and their body dry; the fiscera seems as if scorched; they are affected with nausea, restlessness and a burning thirst; and at no distant term they expire (Papaspyros 1964:7-8).

Aretaeus is believed to be the first to use the term "diabetes" although this is not certain, because some modern writers state that two Greek physicians Apollonius and Demetrius of Apamia in the third century B.C. were the first to use this term (Papaspyros 1964:7).

By 1849 Claude Bernard identified glycogen in the human body as similar to the sugar found in grapes. This same sugar was identified as that found in the urine of diabetics. Bernard discovered that when the fourth ventricle of the dog's brain is pricked that a temporary diabetes appears and that the pancreatic juice has the ability of changing starch into sugar. His conclusion was that diabetes was a disturbance of normal nutrition and was a problem of the liver (Papaspyros 1964:20).

In 1869 Paul Langerhans described the structure of the islets of the pancreas which have been named after him. He suggested the possibility of an internal secretion from the pancreas concerned with the metabolism of carbohydrates. It was not until 1889 that the pancreas was positively associated with the cause of diabetes. In that year, Minkowski and Von Mering accidentally discovered that by removing the pancreas of a dog, the characteristics of diabetes resulted in the death of the dog (Geevarghese 1968:2).

On July 30, 1921, Fredrick Banting and Charles Best succeeded in lowering the blood sugar level by giving diabetic organisms the hormone which controls carbohydrate metabolism. They were able to extract this hormone from the islets of Langerhans of the pancreas. "Insulin", which

was hypothetically described as early as 1909 by De Mayer, thus became a life giving substance for thousands of people. By 1923 insulin was being produced for diabetics in Canada, and in the same year production was begun in Denmark. Shortly, this substance was available from laboratories in Hungary, Australia and Argentina. In 1923 Sir Fredrick Banting was honored with the Nobel Prize for his discovery of insulin. Insulin enabled diabetics to live a longer and almost normal life (Papaspyros 1964:48-55).

Also in the year 1923, H. Hagedorn and B. Jensen found the method of determining the amount of sugar in the blood which is necessary to diagnose some forms of diabetes. After blood tests and insulin treatment were widespread, it came to the attention of researchers that some forms of diabetes may not be due to a diseased pancreas. The pancreas of diabetics, who were supported on insulin for over 15 years, were analyzed after their deaths. Some of the diabetics died with a completely healthy pancreas. From these observations, many researchers have considered diabetes a polyglandular disturbance. The control of insulin in the blood has been hypothesized to be controlled by an anti-insulin which reduces the level of insulin in the blood. This view has been supported by the hundreds of compounds which have been synthesized for oral therapy of high blood sugar. Since early 1950s, these oral hypoglycemic agents have been widely used by physicians for the control of blood sugar in their patients (Papaspyros 1964:62-67).

Genetics and Diabetes Mellitus

Diabetes has the appearance of a chronic disease which occurs in some family groups more than others. This pattern suggested a genetic basis to Pincus and White (1933) who collected 675 family histories in

the New England area detailing the age of parents and siblings. Families with diabetic relatives were studied for age at death, while a control group of non-diabetics were also studied in the same way. Of the 523 diabetic families, there were 187 diabetic relatives, other than parents and siblings in 110 families. In the 153 non-diabetic families, 16 families reported 21 blood relatives with diabetes. These findings indicated that 22.94 percent of the diabetic families and 10.64 percent of the non-diabetic families had a family history of diabetes. The odds were 19,300 to 1 against this 12.48 percent difference occurring from chance alone (Pincus and White 1933:2).

The family histories indicated that the disease may skip one or more generations, so they tested the hypothesis that diabetes is inherited as a simple Mendelian recessive trait. They grouped the families into types according to the number of parents having diabetes, and correlated the resulting diabetes in the following generation. After a lengthy discussion of the exceptions, they concluded "that the potentiality for developing diabetes behaves in these families as if it were a Mendelian recessive" (Pincus and White 1933:13).

One of the most comprehensive Native American studies of family histories and genetics was conducted with the Texas Alabama-Coushatta. Johnson and McNutt (1964:123) agreed with Pincus and White that an autosomal recessive gene can best account for the tendency to develop diabetes. The simplist genetic mechanism to account for the observations:

> . . . is an autosomal recessive gene which in homozygous conditions predisposes a person to develop diabetes, being modified by factors of diet, activity and possibly others of endogenous and exogenous origin (Johnson and McNutt 1964:123).

This same conclusion was reached by Elston et al. (1964:31) with

data from the Florida and Oklahoma Seminole, as discussed in the first section of this manuscript. Many different genetic interpretations for the occurance of diabetes have been formulated and these are discussed in detail by Elston et al. (1974:14-15). One of the more important studies at variance to this interpretation is by Neel et al. (1965). This researcher (1965:128) considers from his data that there is an excess of diabetically predisposed individuals among the offspring of normal and diabetic parents. The hypothesis that the disease is due to homozygosity for recessive genes occurring at a single gene locus, is not supported by this excess above the statistically expected diabetic offspring. Neel's (1965: 128) counter hypothesis is that what we know as diabetes is actually several different diseases, each exhibiting different inheritance patterns. He also proposes the possibility of a multigenic hypothesis, which involves a principle gene with modifiers, or genes at several different loci with approximately additive effects. In the opinion of Neel (1965:105) "Diabetes Mellitus is in many respects a geneticist's nightmare. As a disease, it presents almost every impediment to a proper genetic study which can be recognized."

In a recent study of family history and diabetes, Berry, Stober and Sanders (ND) found, in a defined population of Oklahoma Native Americans, a 70% positive correlation. The family history of diabetes mellitus concerning the first degree relatives was ascertained in 891 adult-onset diabetics age 35 to 54. Seventy percent of the diabetics had a first degree relative with diabetes. In 27% of these cases one relative had diabetes and in the remaining 43%, two or more relatives were identified.

Family histories were collected in the study by Drevets (1965)

of Oklahoma Choctaw. He noted a significant difference between full-bloods and mixed-bloods in the percentage of diabetics:

> The differences in the observed incidence and prevalence rates between fullblood Choctaws and those having only part Choctaw blood are interesting and significant. Both ethnic groups were observed under the same conditions. Diabetes is considered by some as being transmitted along Mendelian recessive lines. Inbreeding in a minority group would thus increase mating of persons carrying the diabetes trait and intensify the increased prevalence of diabetes. The intermarriage of Choctaws with non-Indians decreased their chances of becoming diabetic (Drevets 1965:324).

This study also found that 18 percent of the men and 32.5 percent of the women had a family history of diabetes.

In the opinion of this researcher, it is difficult to distinguish between genetic traits of a family and the cultural traits in regards to their effect on the incidence of diabetes. It is conceded that diabetes does occur in family groups and that genetics has a basis in this occurance but how the lifestyle and eating habits of a family can be distinguished from genetic predisposition remains to be clarified in future studies. The difference in prevalence of diabetes between males and females in the Choctaw study may indicate the role of nutrition in the onset of diabetes. In the Choctaw society, the women manage the selection and preparation of foods and these cultural behaviors are passed from mother to daughter. It would be expected that, at marriage, the foods prepared in the new household would be similar to the women's previous diet, whereas the male's nutrition would be changed much more than the female's since he is moving into a different kitchen. In future studies, the male's family history should be collected with emphasis upon his wife's family history. The male may be marrying into a diabetic family and this would not be known by collecting his family history.

Psychobiology and Diabetes Mellitus

The correlation of life stresses and the onset of diabetes has been noted in the literature. Hinkle (1951:180-181) in a limited study of patients found that onset began after the separation from the mother, after her death, or after the loss of friends, money, social position or parental approval. In all the patients, there seemed to be an intense underlying need for love and attention. This need was present from early childhood and never fulfilled to the patient's satisfaction.

> In the women it appears that this failure of fulfillment arose from the cold, undemonstrative, or rejecting attitude of the mother toward the child. In the men it appears that the failure arose from the presence of a hostile, punitive, dominating male parent, fear of whom thwarted or interfered with the close relationship with the mother which the child desired (Hinkle 1951:181).

Hinkle found that the response of the diabetic in periods of stress is to consume large amounts of carbohydrates as if in a starvation state. His interpretation was that diabetes was a disease of adaptation. Persons showing this disorder react to various life stresses with a physiologic response which is inappropriate to the deprevations they have suffered. Trueting (1962:96) summarizes this psychobiological approach in that the stress is reacted to as if it is a threat of starvation. This inappropriate response is continued even when large amounts of food are supplied to them. Long continued use of this behavior is associated with the changes of structure and function which are associated with diabetes. This approach is further reviewed by Trueting (1962) who considers the role of emotional factors in the etiology of diabetes mellitus to be significant.

Nutrition and Diabetes Mellitus

Yudkin (1957) found a high correlation between the increase of carbohydrates and the increase of diabetes among manufacturing nations. He explained that man eats foods which were palatable to him. With rapidly increasing knowledge of food technology, it is now possible for the food manufacturer to separate palatability from nutritional value. This leads to the consumption of increasing amounts of food rich in carbohydrates, especially sugar. Yudkin (1963:1335) places this approach into the context of cultural change:

> With the discovery of cereals some ten thousand years ago, man for the first time became a food producer and ceased to rely only on gathering and hunting his foods. The deliberate production of cereals, and later of other seeds and of roots and tubers, all rich in starch, led to his diet containing less protein and fat, and much more carbohydrate. The relative ease of producing carbohydrate-rich foods as compared with the difficulty of hunting and foraging for protein-rich foods meant that food-supplies increased. This in turn resulted in an increase in population, partly because there was more food to go round, partly because food could be produced in areas where little wild food was available. Once man's numbers had increased to the new limits of food availability, there was rarely the opportunity to revert to the largely meat-eating habits of his predecessors. The introduction of domestic animals did not help very much; for the conversion of vegetable food into meat, or eggs, is an inefficient process, and man could fill his ever-demanding stomach more easily from the protein-poor carbohydrate-rich vegetable foods which he was producing. Thus, in most of the places where he lived, and for most of the last ten thousand years, economic pressure has perpetrated man's dependence on carbohydrate-rich foods.

Yudkin claims that as modern countries became richer, the food habits changed back to man's hunting and gathering diets; as the populations were able to purchase more protein and fats in the form of meats. They also purchased a greater amount of refined carbohydrates in the form of sugar.

Yudkin (1964:4) substantiates this viewpoint by collecting data on the diets of thirty-four countries. He found that from the lowest to

the highest average income countries, carbohydrates remain fairly constant; whereas fat and sugar increases fourfold.

The viewpoint that refined sugar is the primary cause of diabetes is forcefully presented in a book by Cleave and Campbell (1969). The overconsumption of refined carbohydrates are thought by these researchers to impose unnatural strains upon the pancreas, either through overconsumption or through rapidity of consumption and absorption, or both. Refined carbohydrates produce saccharine, thus they refer to diabetes as a saccharine disease. The refining of carbohydrates produces its effects on the body in three ways; through the concentration of carbohydrates which leads to overconsumption, through the removal of fibre, and through the removal of protein. They view unrefined carbohydrates which include cereals, tubers, and the sugar in fruit, sugar beets and sugar cane as absolutely safe. Only the refined carbohydrates are harmful. From an evolutionary viewpoint, they consider the dietary changes from the natural state to refined carbohydrates, on account of the increased magnitude and the recentness of alterations, as the cause of diabetes (Cleave and Campbell 1969:1-20).

Cleave and Campbell's (1969:48) multi-national studies revealed a pattern which they term as the "rule of twenty years". It seemed to them that there was a uniform twenty year incubation period of exposure to a diabetogenic factor (sugar), before the onset of the disease. In their opinion, it took twenty years for the pancreas to wear out after the introduction of sugars. The pancreas had evolved for the consumption of dilute, unrefined carbohydrates, not concentrated refined ones.

The introduction of refined sugar products to Native American populations would have quite an impact. Other than the sugar in vegeta-

bles, fruits and honey, no form of condensed carbohydrates were a common portion of the diet of the Cherokee or any of the southeastern tribes. In all of North America, no sugar was produced except for a region of the northeastern United States. In this area, maple syrup was produced from the Silver Maple tree. Clark Wissler (1938:13-14) considered the manufacturing process developed by Native Americans in this region to be one of the most important technological processes adopted by Euroamericans:

> Of manufactured foods, other than those made of maize, maple sugar takes first place. Practically every essential detail of the process now in use was developed by the Indians of this area before 1492. The sugar maple being a northern tree, the tree (sic.) is almost peculiar to the northern half of the area, though the box elder and a few other trees have, in later times at least, permitted a makeshift extension of the art. That any kind of sugar was made in the south is doubtful (Wissler 1938:13-14).

Cleave and Campbell (1969) use data from the African country of Natal to prove their hypothesis that diabetes is a saccharine disease. They studied the change from India to Natal of a population of people who dramatically increased in diabetes after arrival in Natal. This increase was also noticed in Zulus who moved to an urban environment. Other data was presented by them, which showed an increase in diabetes in the western nations since 1900. All of these cases pointed to the increase of dietary sugar as the cause for the increase of diabetes. This is the same conclusion reached by an earlier study of Yeminite Jews who moved to Israel (Cohen 1972).

The theory that sugar causes diabetes has been challenged by a number of researchers. Keen (1974) reported a study of two groups of a thousand persons. Sucrose intake was correlated with onset of diabetes and high blood sugar. He found that there was a negative correlation!

> Our own studies indicate that, within populations, if anything, there is an inverse relationship between the stated sugar intake and various measures of "diabeticity" or impaired glucose tolerance. This fact fits with the unexpected inverse correlation between estimates of sucrose intake, carbohydrate and calorie intake, and obesity (Keen 1974:25).

Data refuting the sugar hypothesis was also produced in Anderson's (1974:51) studies of short-term high-consumption of carbohydrates. In a small sample of people, the consumption of an 80% sucrose diet for up to nine weeks improved the glucose tolerance tests. Their bodies utilized more of the sugar rather than discharging it. This test was also conducted in a group of mild diabetics; results on the glucose tolerance test were similar.

The Tokelauans in the South Pacific, a Maori group studied by Prior (1974:10), have a relatively high rate of diabetes and obesity, but are in fact on a low sucrose and relatively low carbohydrate diet. For eight years a group of physicians, nutritionists, a sociologist and an anthropologist from New Zealand observed the gradual emergence of the Euro-american pattern of organic disease among the Maori people. In addition to the population in New Zealand, they selected three islands which were varied in the utilization of European material culture and foodstuff. These island population studies were conducted with people of the same blood and ethnic group. They concluded that the disease patterns did increase towards European averages as they adopted European culture. The patterns, they claimed were basically due to environmental rather than genetic factors. "As the groups became more oriented to a cash economy, and increasing salt and sucrose intake, the larger the increase of hypertension, diabetes, ischaemic heart disease, and gout" (Prior 1971:11). In regards to the "rule of twenty years" for the onset of diabetes,

Prior's study of migrants from Polynesian atolls to urban New Zealand indicate that the onset of diabetes can happen much faster (Prior 1974:13).

In the study of eleven nationalities, West (1974:35) used standardized tests and procedures. These studies, sponsored by the World Health Organization, produced data which can be controlled for cross-cultural comparisons. In calculating the carbohydrate intake, they did not discern the difference between refined sugar intake from other carbohydrates. These findings indicate that diabetes is least common where carbohydrate consumption is highest. Further analysis revealed that this negative correlation was associated where the carbohydrates were starches rather than sugar. High carbohydrate diets where starch is the main carbohydrate tend to reduce the risk of diabetes. These same analyses produced a positive correlation of a moderate degree, between the level of fat consumption and the prevalence of diabetes.

The correlation of fat intake and diabetes was originally hypothesized in the 1930s. Himsworth (1935), the main proponant of this hypothesis, utilized death certificates to understand the rise in mortality from diabetes since the late 1890s for industrialized nations. Himsworth (1935) gathered data from the United States, Netherlands, Prussia, England and Wales, Australia, Italy, and Japan. From this data he noted that from the year 1900 to the year 1931 a rise in the diabetic mortality rate occurred in the principle countries of the world. In the majority of these countries, this rise is interrupted at two points in time; during the years of the first World War, and in the years shortly following the introduction of insulin into general medical practice in 1922-23. His national comparison indicated that

latitude was not a factor and also that race did not significantly effect the different rates. His conclusions on race were previous to the increase in diabetes among Native Americans. His analysis indicated that the countries in which the rate of diabetes mellitus was high, the diets were relatively low in proportion of carbohydrates and high in proportion of fat. He noted that the rise in the previous thirty years was due to a change in dietary preference by which progressively greater proportions of fat and smaller proportions of carbohydrates had been chosen. At the same time, the proportion of calories and protein remained the same. After the First World War, the restriction of the food supply involved the reduction in fat and an increase in the proportion of carbohydrates. He was able to note that there was a greater rate of diabetes in the urban areas, as compared to the rural population. The increase in diabetes, he thought, was related to the increased economic position of the people. As people gained in prosperity, they chose fatty foods as compared to carbohydrates. Thus he thought that people in these countries, when they had the money, choose to eat meat containing fat as compared to vegetable items (Himsworth 1935:146-147).

His conclusions about race are partially based upon data indicating that migration brings about an increase in diabetes. Diabetic rates of transplanted groups in time, manifest the same rate as the surrounding populations in the new country. He explains this by the immigrants gradually acquiring the dietary preferences prevalant in the new country. This rise in diabetes was always associated with the decrease in carbohydrate intake and a corresponding increase in fat. How this change in diet causes diabetes is explained by:

> . . . the long continued ingestion of a diet containing a relatively low amount of carbohydrate might eventually result in the permanent impairment of sugar tolerance and insulin sensitivity and finally produce diabetes mellitus. It has been shown that the increase in diabetic mortality in the last thirty years has probably been associated with a steady diminution in the amount of dietary carbohydrate. It is, therefore, possible that the causative factor in the disease, diabetes mellitus, is not the low proportion but the insufficient amount of carbohydrate in the diet of the potential diabetics in the population (Himsworth 1935:143-144).

The increased consumption of fats or sugars may not be independent of each other, as these studies try to indicate. West's (1972) studies of twelve populations provides further epidemiological evidence linking nutritional factors to the prevalence and manifestations of diabetes. His conclusion is that the combination of dietary fat and sugar leads to the high risk of diabetes. His most impressive and consistant association was between prevalence of diabetes and adiposity or body fat, irrespective of the source of calories. When the individuals in the national studies were matched for fatness, the different diabetic rates between countries were always very modest. This is also the case when dealing with different sexes:

> In several of the populations we studied, diabetes was much more common in women than in men (as much as three-fold in some populations). In each instance sex differences were corrected by matching for adiposity (West 1972:426).

His explanation for this increase in diabetes is that:

> Increasing economic affluence often leads to a reduction in exercise. This combination of factors leads to increasing adiposity which probably accounts for the high rates of diabetes (West 1972:421).

Elsewhere, West states:

> Generally speaking, the invention of agriculture made it possible for some royal personages to become fat, while the industrial revolution brought this prospect within reach of the common man. The industrial revolution greatly increased food

> supply by making food production more efficient. But quite possibly its effect on human energy expenditure was even more important in increasing the risk of obesity. Even in very privileged circumstances obesity seemed rather uncommon before physical exercise was made virtually unnecessary in much of the western world by the technologic acumen of recent generations (West 1974A:50).

West tested this idea specifically with a population of Kiowa Comanche in southwestern Oklahoma. Intake levels of refined sugar were very similar to the general population of the United States. This nutritional data was collected by a detailed interview. From his sample of 290 adults, none of whom were known to be diabetics, 76 individuals had high blood sugar levels two hours after administration of a glucose load. From this test, they were classified as having diabetic characteristics although not yet exhibiting manifestations of the disease. The subjects with abnormal tolerance were somewhat older and fatter than those classified as normal. After matching for sex, age and adiposity, there was no significant difference in sugar consumption between those with and without occult diabetes (West, Oakley, Sanders, et al. 1976:28).

A similar conclusion was reached by West (1978:43) after he studied 338 Plains Indian adults from southwestern Oklahoma with no apparent diabetes. After blood sugar tests, diabetes was rare in lean Indians, but twelve times as frequent in grossly obese subjects.

CHAPTER XI

CONCLUSIONS AND IMPLICATIONS

The study of disease and health care has been part of anthropology, with its interest in primitive medicine, since the development of anthropology in the late 1800s. The historic roots of this subdiscipline within anthropology were reviewed by Foster (1974). Through the years a limited number of commonalities have formed as points of concensus for medical anthropology. These points of reference stated as empirical generalizations have been formulated as follows:

1. Disease in some form is a universal fact of human life; it occurs in all known times, places and societies.
2. All known human groups develop methods and allocate roles, congruent with their resources and structures, for coping with or responding to disease.
3. All known human groups develop some set of beliefs, cognitions, and perceptions consistent with their cultural matrices, for defining or cognizing disease (Wellin 1977:48).

Since diabetes has only been a common illness among Native American groups for the past 40 years, they lack traditional cultural beliefs which would indentify diabetes within their perceptual martix. This is also the case with many other diseases introduced from European populations. Crosby (1972), in a classic study of smallpox and its introduction to the New World, notes the devastating effect of this disease due to the lack of genetic immunity and cultural perceptions. Since 1492, many other diseases which the Native Americans had had no previous knowledge of or resistance

to--including measles and influenza--have reached epidemic proportions among them and reduced their numbers, effecting a natural selection process, in which the surviving persons carry on the selected genetic traits of the population. In this light, diabetes is one of the latest disease epidemics resulting from the cultural and physical interaction of Native Americans with European culture.

An Obese Body Image as a Cultural Theme

Starting in the 1940s, after diabetes was recognized among Native Americans, the development of methods to cope with this disease began. A major problem with the Native American recognition of this disease is that the onset of outward symptoms do not manifest themselves until the disease process is well underway. It is hard for Native Americans to change their diets and lifestyles only because a doctor tells them they have a disease of which they themselves have never experienced symptoms before. The conception that refined food products are related to these symptoms is even less understood. During a full year of fieldwork in 1972 among a group of Cherokee-Delaware Peyotists, it was brought to the attention of this researcher that obesity is an accepted cultural norm. There were recurrent statements from the people that I was underweight and unhealthy. With this theme recurrently stated, a person w tries to maintain a lean body weight would be constantly reminded of his unhealthy appearance. If diabetes is related to obesity, then a major cultural change will have to occur among the perceptions of these people about their ideal body types. This idea was tested recently by West (ND) among the Kiowa and Comanche who are now quite fat. In 557 diabetics the mean weight was 140% of ideal body weight as determined from height. These same diabetics had been 105% at age

18, and 159% at diagnosis of diabetes. Only 18% of these diabetics were below 115%, and only 1% had never been obese. Non-diabetics from the same population were asked how much they would like to weigh. The mean preferred weight was 127% of ideal weight! Thus we find that the ideal body weight of these Native Americans implicates cultural perceptions as a cause of the diabetes epidemic.

For the thousands of years of Cherokee adaptation to their mountainous environment, the natural foods consumed and the energy expended in obtaining these foods resulted in a lean body. In the 1930s, when this adaptive strategy was changed, they began to gain weight by consuming more food energy than expended in exercise.

For 1,400 years after the introduction of corn around 500 A.D., the Cherokee culture was based upon hunting and the cultivation of corn, beans and squash. This was a successful adaptive strategy until 1936, when in a ten-year period the agricultural economy changed to one based on cash labor. This rapid period of change resulted in a nutritional change from corn as the basic food item to refined foods. Whole ground cornmeal, which served as the basic food item for these 1,400 years, contains 87 grams of carbohydrates per cup. Refined cornmeal purchased with cash was degermed, enriched, and increased in carbohydrates by 25% to 114 grams per cup (United States Department of Agriculture 1975).

This change to a cash-based economy also resulted in a reduction of energy previously expended in agricultural labor. Until the 1930s the natural resources and the technology employed restricted the Cherokee's choice of foods and maintained a high level of physical activity. With the introduction of cash incomes, they were freed from the restraints of

the immediate natural resources and could purchase foods obtained from a wide array of environments. At this same time they reduced the amount of energy they had expended in agricultural pursuits by allowing machines to do part of the work for them. In commuting to jobs in the cities, they further reduced energy expenditure. Most of the employment in the cities is now in industries which require the use of only a portion of a person's body. With household machines, the women could eliminate many of the chores which formerly kept them in physical shape. With this decrease in energy expenditure, body fats were stored by the body and obesity ensued.

As average body weight increased, the perception of the ideal body image changed, adapting to the new reality. Once a majority of people had gained this obese-body image, their cultural perceptions maintained it by verbal approval or disapproval stated in everyday interactions. The environmental factors which had set parameters on Native American behavior are now of less importance. This reduction of physical environmental factors on behavior results in an increase of the importance of cultural themes in relation to diabetes:

> The term "theme" is used here in a technical sense to denote a postulate or position, declared or implied, and usually controlling behavior or stimulating activity, which is tacitly approved or openly promoted in a society (Opler 1945:198).
>
> . . . to be considered a valid theme in the sense in which the term has been defined here, an interest must be expressed quite a few times in the cultural round (Opler 1945:200).

The obese body image as a cultural theme must be understood by health care officials who attempt to control diabetes among Native Americans. While involved in research at the Native American Center Clinic in Oklahoma City, this statement was reinforced. The Euroamerican doctors who serve Native Americans do not recognize the cultural basis for obesity.

They attempt to treat patients on a single individual level when they ought to be trying to change cultural perceptions towards obesity. It will do little good to inform a patient that he has to change his diet and lifestyle, when the individual is part of a culture which approves of behavior and diets which lead to obesity. There needs to be a conscious, organized attempt by Native Americans and health care officials to change the culture traits related to this disease.

The Theory of the "Thrifty Genotype" and Suggested Modifications

If there is a genetic basis for diabetes, then what selective value would this trait have in a preindustrialized population? Neel (1962) proposed that diabetics have a "thrifty" genotype which has become detrimental with progress. This theory is based on the consistent reports of oversized infants among the offspring of women with overt or subclinical diabetes, and of children who develop diabetes tending to be somatically advanced for their age. These observations indicated to Neel (1962:353) that the individual predisposed to diabetes differs metabolically from the non-predisposed from birth onward. From this viewpoint, the overweight individual of 40 to 50 with mild diabetes is not so much diabetic because he is obese, as he is obese because he is of a particular diabetic genotype.

The diabetic genotype displays a phenotype which, at the outset, is distinguished by a greater than normal availability of effective circulating insulin, especially after food intake. If the islets of Langerhans continue to produce insulin longer in the predisposed than in the normal, this can depress the blood sugar level, resulting in hunger and an increased food intake. It was further theorized by Neel that the individual predisposed to diabetes had an increased ability in the early years of life

to release insulin. The increased insulin levels in time provoke a relative overproduction of anti-insulin. Initially in the life of an individual predisposed to diabetes, there is a balance in the production of insulin and the anti-insulin. As the person gets older, this balance is overcome by the excessive production of anti-insulin and clinical diabetes develops (Neel 1962:356).

How this thrifty genotype is advantageous in man's evolution is that:

> . . . (the) mechanism to be considered involves a pancreas more rapidly responsive to increases in the level of blood glucose. In this connection it must be remembered that during the first 99 percent or more of man's life on earth, while he existed as a hunter and gatherer, it was often feast or famine. Periods of gorging alternated with periods of greatly reduced food intake. The individual whose pancreatic responses minimized post-prandial glycosuria might have, during a period of starvation, an extra pound of adipose reserve (Neel 1962:355).

This theory indicated that a person in a hunting and gathering society, who has a genotype which enables him to metabolize carbohydrates quickly into fat, may be better able to survive a shortage of food. The person without this innate capacity would die in a shorter period of time; thus, the diabetic genotype would be an adaptive advantage. On the other hand, this same adaptive advantage is to the person's detriment once refined foods and reduced exercise increase his fat level to the obese range, and he develops diabetes. In preindustrial societies, few persons would develop obesity, thus deaths due to diabetes would seldom be exhibited.

In the February 1979 issue of Science, the results of a test of the thrifty genotype hypothesis was released. The author of these tests summarizes the theory for us:

> In undeveloped countries humans foraged for a limited food supply and were subjected to periods of abundance alternating with periods of food deprivation and famine. Those individuals (thrifty) with a predisposition to diabetes were able to utilize a limited food supply more efficiently and thereby maintained a selective advantage when food was scarce. However, as such countries developed and the food supply increased, or as representatives of such selected cultures moved to more affluent societies and became urbanized, the thrifty genotype became a liability rather than an asset. In situations of affluence, hyperinsulinemia occurred, obesity developed, the insulin synthesizing and secreting capacity of the pancreas was stressed, and diabetes often ensued (Coleman 1979:663).

A controlled experiment of a thrifty genotype hypothesis would be difficult to conduct if human subjects were utilized. Coleman utilized two strains of mice, which consistently gain weight and accumulate excess fat, even when pair-fed with a control group of normal mice. One strain consistently became obese, and the other strain obese with the onset of diabetes and death. Normal mice live for a period of three years. The diabetic strain of mice has high blood and urine sugar levels, plus high insulin levels in the blood; they die at the average age of eight months (Coleman 1979:664).

These mice were compared to normal mice in their ability to withstand starvation. The normal mice survived on the average of 7 to 10 days—the obese and diabetic strains up to 40 days. The mice which were homozygous for obesity and diabetes may have been better able to utilize their fat stores to live for the longer period of time. To control for this imbalance in fat stores, the homozygous obese and diabetic strains were bred with normal mice which produced mice heterozygous for obesity and diabetes. These mice and normal mice were housed and given free access to food and water for one week before initiation of a total fast. At starting time, there was no difference between normal and heterozygous

mice of either strain with respect to body weights, blood insulin, blood sugar or liver glycogen concentrations; however, the diabetic and obese heterozygous mice survived the fast 2 to 3 days longer than the normal mice (Coleman 1969:664).

These tests demonstrated a possible beneficial effect in the heterozygous state of two different deleterious genes—obesity and diabetes. These benefits were in respect to the rapid depletion of food stores and the ability to survive prolonged fasting. The only phenotypical traits observed by Coleman was that the heterozygous mice had a different blood-insulin concentration, and that the fat pads oxidized glucose slower in these mice than in the normal mice. In other words, once the food is stored into fat, it is released much more slowly in the obese and diabetic mice. This trait leads to greatly increased food efficiency and the markable ability to withstand a fast (Coleman 1979:665).

> This thriftiness trait, if manifested in wild populations, could provide the heterozygote with a selective advantage when food was scarce and yet not be deleterious when food was abundant (Coleman 1979:665).

The thrifty genotype explanation of how diabetes became part of the human genetic pool is based on the concept that "during the first 99 percent or more of man's life on earth, while he existed as a hunter and gatherer, it was often feast or famine" (Neel 1962:355). Recent anthropological studies of hunters and gatherers have shown that this is not the case; periods of starvation are not common among the marginal hunters and gatherers who exist in the world today.

Neel is not at fault for generalizing a feast-or-famine stereotype for 99% of man's existence here on earth. Anthropologists also had a similar stereotype previous to the specialized hunting-and-gathering

research synthesized in the late 1960s by Lee and Devore (1968), Damas (1969A and 1969B), Bicchieri (1972). Previous to this time, there were two common stereotypes: Hunters and gatherers were primarily dependent upon hunting of game animals; and their life was generally a precarious and arduous struggle (Lee 1968:30).

From the cross-cultural analysis of hunters and gatherers, it is now generally accepted that, with few exceptions, the subsistence base of hunters and gatherers is at least routine and reliable, and at best, surprisingly abundant. A cross-cultural analysis by Lee (1968:42) found that, of the 58 documented societies who were hunters and gatherers, half emphasized gathering of vegetable items more than hunting, one-third emphasized fishing, and only one sixth of the cases depended mostly upon hunting. An additional finding of the ecological study of hunters and gatherers is that the Bushman of the Kalahari Desert in Africa, who from a western viewpoint are in a harsh environment, have a great amount of leisure time. Lee states:

> . . . the adults of the Dobe camp worked about two and a half days a week. Since the average working day was about six hours long, the fact emerges that !Kung Bushman of Dobe, despite their harsh environment, devote from twelve to nineteen hours a week to getting food. Even the hardest working individual in the camp . . . spent a maximum of 32 hours a week in the food quest (Lee 1968:37).

The ecological basis for the reliable food sources of hunters and gatherers is that they are a mobile population using a wide variety of food sources. This generalized adaptation allows them to change locations and ecozones easily. This mobility enables them to exploit resources which are abundant in some areas while not abundant in others. The finding that hunters and gatherers do not live a feast-and-famine existence is

succinctly stated in the following quotes:

> Patent (and perhaps even borderline) malnutrition is rare. We should expect this in stable well-adapted hunter-gatherer populations, modern or prehistoric. Dietary resources, even in arid environments, are diverse: typical sampling of these resources by modern hunter-gatherers in ecosystems relatively undisturbed by outsiders seems to provide at least the minimal protein, carbohydrate, fat, mineral, and vitamin requirements. Many workers have commented on the relatively good nutritional status of hunter-gatherers in comparison with neighboring agriculturalists or urban dwellers (Dunn 1968:223).

> In general it seems that agriculturalists, more or less dependent on one or several staple crops, are more liable to food supply failure and famine than are hunters and gatherers. Famine risk may even be increased as the effects of dry seasons are exaggerated through agricultural modification of the natural vegetational cover (Dunn 1968:223).

The evidence that man's existence as a hunter and gatherer for 99% of his existence on earth may not have been a feast-and-famine situation does not cancel the thrifty genotype hypothesis, but suggests that modifications are in order. Several famines in a generation would be sufficient for a diabetic genotype to be naturally selected; subsequently, this trait would be maintained in the breeding population. Agriculturalists who are attached to a territory with a specialized adaptive strategy are more likely to suffer from a feast-and-famine cycle than are hunters and gatherers. Societies based on the domestication of plants would be affected by climatic changes more so than hunters and gatherers, who could more easily move to a habitat with sufficient resources. If this is the case, after the introduction of refined foods and reduced exercise, we should find the diabetic genotype more frequent in horticultural populations than among hunters and gatherers.

The many different Native American groups in the State of Oklahoma provide a full range of cultural groups to exemplify this relation-

ship. The Native American groups from the eastern portion of the United States who were mainly horticulturalists are settled in the eastern portion of the State. The Native Americans who were mainly hunters and gatherers on the plains and western portions of the United States are settled in western Oklahoma.

The eastern groups, like the Cherokee, were settled in Oklahoma starting in the 1820s. The western groups settled in western Oklahoma about 50 years later, during the 1380s and 1890s. From health reports we know that both groups did not begin to suffer deaths due to diabetes until approximately the same time—around 1940. In fact, the Cherokee did not begin to suffer diabetic deaths until 1942, later than other groups shown by the state totals. It is true that the eastern groups adopted Euroamerican cultural items long before the western groups, but why do we find a similar beginning date for diabetic deaths? From the data presented earlier in relation to the Cherokee, it seems that industrialized foods, non-agricultural pursuits and low-energy expenditures resulted in diabetes. The introduction of this lifestyle and refined food products may have occurred about the same time across the State. This may be the reason that Indian groups in the state, even though they were at different levels of acculturation, began the diabetic epidemic at approximately the same time. If the level of acculturation resulted in diabetes, then we should have found the more acculturated groups beginning to die from diabetes at an earlier date, but this is not the case. We do find that the Five Civilized Tribes have a higher rate of diabetes than the western groups. It is proposed here, as an hypothesis, that this difference is not due entirely to the level of acculturation, as Niswander

speculates (1969), but that the difference is due to the higher frequency of the diabetic genotype among agriculturalists, compared to hunters and gatherers.

Niswander provides us with data to better understand this difference in diabetic frequencies. He compiled data from the Indian Health Service hospitals showing the percentage of diabetic cases treated from 1963 to 1967. The Clinton and Lawton Hospitals in western Oklahoma reported diabetes as 2 to 3 percent of all admissions. Claremore and Talihina Indian Hospitals reported 4 to 10 percent. Clinton and Lawton Hospitals serve the Cheyenne, Arapaho, Kiowa, Comanche and Caddo. Claremore and Talihina Hospitals treat Cherokee, Creek, Ponca, Choctaw, Chickasaw and Seminole. These data are not precise, because in the western hospitals the horticultural Caddo are included and in the eastern hospitals the non-agricultural Ponca are included (Niswander 1969:135).

A more precise comparison of the diabetic rates between agricultural groups and hunters and gatherers would be blood-glucose tests conducted with the same procedures. Fortunately, we have these data, and moreover, the tests were administered by the same researcher in the same time period. West (1974B) reports administering the blood glucose tolerance test to 124 Cherokee of Tahlequah and 80 Kiowa and Comanche. Each group was measured two hours after administration of a glucose load. Fourteen percent of the Kiowa and Comanche had a two-hour plasma glucose reading of 169 mg. per 100 ml. or more, and 20.2 percent of the Cherokee had values exceeding 149 mg. per 100 ml. It is not known how much the difference of 20 mg., in classifying glucose tolerance, would change these percentages, but as reported, they do indicate a significant differ-

ence between the cultural groups.

This interpretation would explain why the Pima of Arizona have one of the highest rates of diabetes known. Their agricultural system experienced cyclical periods of famine which selected in favor of the diabetic genotype. It would also explain why the non-agricultural Apache and Navaho of Arizona and New Mexico have a lower rate of diabetes than the neighboring agriculturalists.

These cultural comparisons are suggestions for medical researchers to consider when designing further tests involving diabetes. They are in no way considered definite evidence for the difference of diabetic rates between agriculturalists and hunters and gatherers. Further precise tests need to be made.

Some Concluding Comments

This study of diabetes and Oklahoma Native Americans attempted to outline the cultural changes associated with the increased frequency of diabetes starting in 1940. Oklahoma State Health Department statistics were provided which validated previous research indicating that this increase did exist. Detailed cultural data was presented for the Cherokee of the Lee's Creek area of Oklahoma. This data supported the findings of previous researchers that diabetes is related to the increased consumption of industrially refined foods and the reduction of energy expenditure. The reason for the increased frequency of deaths due to diabetes starting in 1942 among the Cherokee was outlined. This increase of diabetic deaths began in the same time period that the Cherokee rapidly changed from an agricultural economy to one based primarily on cash incomes. Rapid cultural change, beginning in 1936, resulted in diabetic deaths beginning in

1942.

However, Eaton's (1977) conclusion that increased diabetes should be expected as cultures undergo lifestyle evolution from hunting and gathering, to agrarian, to urban, and to industrial societies is much too broad. The data in this manuscript indicates that it is the change to an industrial society from either a hunting-and-gathering or agrarian culture which results in an increase of diabetes. On the other hand, medical studies have discounted refined sugars and carbohydrates as the sole cause of diabetes mellitus. Eaton's stress on these food items as causal factors is seen to be too narrow.

Some problems in the treatment of diabetes were mentioned. The ideal obese body image of Oklahoma Native Americans was mentioned as a factor contributing to the prevalence of diabetes. It was suggested that a conscious organized attempt be made by Native Americans and health care officials to change the cultural traits related to diabetes.

Modifications of the thrifty genotype theory were recommended when anthropological data were presented which indicated that hunters and gatherers do not live an existence of feast and famine. It was suggested that agricultural societies are much more prone to a feast-and-famine cycle, due to their specialized adaptations and climatic fluctuations. Data supporting this modification were presented which indicates that agricultural societies may have a higher rate of diabetes than hunters and gatherers.

This cultural study should illustrate the need for future medical studies of diabetes to consider cultural factors related to this disease. These future studies should incorporate into their analyses the

cultural background of their populations. This is of special importance in regards to the system of food production they maintained previous to the introduction of industrialized products, and the length of time since such introduction.

NOTES

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2. The historic materials collected from surface samples are stored at the Oklahoma Archeological Survey with the prehistoric materials from the Parris Mound Archeology Project. Site forms are on file with the Oklahoma Archeology Survey.

3. Tape recorded interviews were made with selected individuals. These tapes are in the possession of the Oklahoma State Historical Society. Transcribed manuscripts of these tapes are located in the Indian Archives, Oklahoma State Historical Society. Special thanks is made to Earl Metcalf of the Oklahoma State Historical Society for providing tape recorders, tapes and funds for the transcriptions.

4. We are grateful to the many people of the Lee's Creek area who welcomed us into their homes and shared their knowledge of the area with us. Without the enthusiastic response of the community, this study would not have been possible.

BIBLIOGRAPHY

Abernathy, E.
1970 Soil Survey of Sequoyah County, Oklahoma. U.S. Government Printing Office, Washington D.C.

Alland, A. Jr.
1967 Evolution and Human Behavior. New York: Anchor Books.

1970 Adaptation in Cultural Evolution: An Approach to Medical Anthropology. New York: Columbia University Press.

Anderson, J.
1974 Influence of High Carbohydrate Diets on Glucose Tolerance of Normal and Diabetic Men. In Is the Risk of Becoming Diabetic Affected by Sugar Consumption? Eighth International Sugar Research Symposium, pp. 44-52.

Armelagos, G., A. Goodman and K. Jacobs
1978 The Ecological Perspective in Disease. 71-83. In M. Logan and E. Hunt (eds). Health and the Human Condition: Perspectives on Medical Anthropology. Massachusetts: Duxbury Press.

Barth, F.
1956 Ecologic Relationships of Ethnic Groups in Swat, North Pakistan. American Anthropologist 58:1079-1089.

Bartram, W.
1928 Travels of William Bartram. Edited by M. Doren. New York: Dover Publications.

Bennett, J. W.
1976 The Ecological Transition: Cultural Anthropology and Human Adaptation. New York: Pergamon Press Inc.

Bennett, P. H., T. A. Birch and M. Miller
1971 The High Prevalence of Diabetes in the Pima Indians of Arizona, U.S.A. In Diabetes Mellitus in Asia 1970, Tsugi, S. and Wade, M. eds. Amsterdam, Excerpta Medica, p. 33.

Berry, B., J. Staber and M. Sanders
N.D. Relationships of Concomitants of Adult-Onset Diabetes. In Press.

Bicchieri, M. G.
1972 Hunters and Gatherers Today. New York: Holt, Rinehart and Winston.

Cameron, D.
1966 Reliability of Death Certificates. In Diabetes Mellitus. L. Duncan (ed.). Edinburgh, England: Edinburgh University Press, pp. 146-147.

Center for Economic and Management Research
1978 Statistical Abstract of Oklahoma. College of Business Administration. Norman: University of Oklahoma.

Chapple, E. D. and E. H. Spicer
1979 Shaping the Anthropologist: The Crucible of the Field. Anthropology Newsletter 20:9-11.

Cheek, C.
1976 Honey Springs, Indian Territory Search for a Confederate Powderhouse. An Ethnohistoric and Archeological Report. Oklahoma Historical Society, Series in Anthropology #2.

Cherokee Nation
1892 Constitutional By-Laws. Published as an Act of the National Council. Parsons, Kansas: The Foley Printing Co., Ch. 12, Art. 22, Sec. 705.

Cleave, T. L. and G. D. Campbell
1969 Diabetes, Coronary Thrombosis and the Saccharine Disease. 2nd Ed. John Wright and Sons Ltd., Bristol.

Cohen, A. M., A. Teitelbaum and R. Saliternik
1972 Genetics and Diet as Factors in Development of Diabetes Mellitus. Metabolism 21:235-240.

Cohen, B. M.
1954 Diabetes Mellitus Among Indians of the American Southwest: Its Prevalence and Clinical Characteristics in a Hospitalized Population. Annual of Internal Medicine 40:588.

Cole, J. and E. Wolf
1974 The Hidden Frontier: Ecology and Ethnicity in an Alpine Valley. New York: Academic Press.

Coleman, D.
1979 Obesity Genes: Beneficial Effects in Heterozygous Mice. Science 203:663-665.

Comess, L. J., P. H. Bennett, T. A. Buch and J. Miller.
1969 Congenital Anomalies and Diabetes in the Pima Indians of Arizona. Diabetes 18:471-79.

Crosby, A. W.
1972 The Columbian Exchange; Biological and Cultural Consequences of 1492. Westport, Conn.: Greenwood Publishing Co.

Damas, D., ed.
1969A Contribution to Anthropology: Band Societies. Bulletin #228. Ottawa: National Museums of Canada.

1969B Contributions to Anthropology: Ecological Essays. Bulletin #230. Ottawa: National Museums of Canada.

Darwin, C.
1966 The Origin of Species. New York: Collier Books.

Doeblin, T. D., K. Evans, G. B. Ingall et al.
1967 Diabetes and Hyperglycemia in Seneca Indians. Human Heredity 19:612-27.

Drevets, C. C.
1965 Diabetes Mellitus in Choctaw Indians. Journal of the Oklahoma State Medical Association 58:322-29.

Dunn, L.
1968 Epidemiological Factors: Health and Disease in Hunter-Gatherers. In Man the Hunter. Lee, R., ed. Chicago: Aldine Publishing Co.

Eaton, C.
1977 Diabetes, Culture Change, and Acculturation: A Biocultural Analysis. Medical Anthropology 1:2:41-63.

Ede, M. C.
1966 Diabetes and the Way of Life on an Indian Reservation. Guy Hospital Report 115:455-461.

Elston, R. C. et al.
1974 Studies on Blood and Urine Glucose in Seminole Indians: Indication for Segregation of a Major Gene. American Journal of Human Genetics 26:13-34.

Fears, J.
1976 Belfonte. In The History of Sequoyah County, 1828-1975. Published by the Sequoyah County Historical Society, pp. 63-65.

Fischer, L. H., ed.
1974 The Civil War Era in Indian Territory. Los Angeles: L. L. Morrison, Publisher.

Foreman, G.
1975 Indians and Pioneers. 3rd Printing of Revised Edition. Norman: University of Oklahoma Press.

N.D. Indian and Pioneer Papers. Unpublished papers in the collection of the Oklahoma State Historical Society.

Foster, G.
1974 Medical Anthropology: Some Contrasts with Medical Sociology. Medical Anthropology Newsletter 6:1-6.

Freudenrich, K.
N.D. Botanical Survey of Lee's Creek Area of Oklahoma. In Muto Ed. Parris Mound Archeology Project, Phase One, Part Two.

Friedl, J.
1974 Kippel: A Changing Village in the Alps. N.Y.: Holt, Rinehart and Winston, Inc.

Frohman, L. A. et al.
1969 Diabetes in the Seneca Indians. Diabetes 18:38-43.

Gearing, F.
1962 Priests and Warriors: Social Structures for Cherokee Politics in the 18th Century. American Anthropological Association, Memoir 93.

Geevarghese, P. J.
1968 Pancreatic Diabetes. Bombay: Popular Prakashan.

Genuth, S. M. et al.
1967 Hyperinsulinism in Obese Pima Indians. Metabolism 16:1010-1015.

Hall, T. A.
1934 The Socio-economic Status of the Cherokee Indians. University of Oklahoma.

Hart, J. F.
1977 The Demise of King Cotton. Annals of the Association of American Geographers 67:307-322.

Henry, R. E., T. A. Burch, P. H. Bennett and M. Miller
1969 Diabetes in the Cocopah Indians. Diabetes 18:33-37.

Henshaw, N.
1976 Health Care. In The History of Sequoyah County, 1828-1975. Published by the Sequoyah County Historical Society, pp. 18-21.

Hewes, L.
1940 The Geography of Cherokee Country. Ph.D. Dissertation, University of California, Berkeley.

1942 The Oklahoma Ozarks as the Land of the Cherokee. Geographical Review 32:269-281.

1944 Cherokee Occupance in the Oklahoma Ozarks and Prairie Plains. Chronicles of Oklahoma 22:324-337.

1978 Occupying the Cherokee Country of Oklahoma. University of Nebraska Studies. New Series #57.

Hill, D. A. Jr. and M. I. Spector
1971 Natality and Mortality of American Indians Compared with U.S. Whites and Non-Whites. Health Services and Mental Health Administration. Health Reports 86:229-46.

Himsworth, H. P.
1935 Diet and the Incidence of Diabetes Mellitus. Clinical Science 1935-1936 2:117-148.

Hinkle, L. and S. Wolf
1950 Studies in Diabetes Mellitus: Changes in Glucose, Ketone, and Water Metabolism During Stress. Research Publications of the Association for Research of Nervous and Mental Disorders 29:338-389.

Hinkle, L. E. et al.
1951A Studies in Diabetes Mellitus III. Psychosomatic Medicine 13:160.

1951B Studies in Diabetes Mellitus III. Psychosomatic Medicine 14:184.

Hinkle, L. E. and H. G. Wolff
1956 The Nature of Man's Adaptation to His Total Environment and the Relation of This to Illness. Archives of Internal Medicine 99:442-460.

Hong, D. E. and T. H. Holmer
1973 Transient Diabetes Mellitus Associated with Culture Change. Archives of General Psychology 29:683.

Jennings, J.
1974 Prehistory of North America, 2nd Edition. New York: McGraw-Hill.

Johnson, J. E. and C. W. McNutt
1964 Diabetes Mellitus in an American Indian Population Isolate. Texas Reports of Biological Medicine 22:110-125.

Joslin, E. P.
1940 The University of Diabetes. Journal of the American Medical Association 115:2033.

Kappler, C. J.
1902 Indian Affairs: Laws and Treaties. 2 Vols. Washington, D.C. II:211-14.

Keen, H.
1974 Diabetes and Sugar Consumption. In Is the Risk of Becoming Diabetic Affected by Sugar Consumption? Eighth International Sugar Research Symposium.

Leacock, E.
1961 Symposium on the Concept of Ethnohistory: Comment. Ethnohistory 8:256-261.

Mouratoff, G. J. et al.
1969 Diabetes Mellitus in Athabaskan Indians in Alaska. Diabetics 18:29-32.

Muto, G.
N.D. Parris Mound Archeology Project. Phase One, Part One. Oklahoma Historical Society. In Press.

N.D. Parris Mound Archeology Project. Phase One, Part Two. Oklahoma Historical Society. In Preparation.

Neel, J. V.
1962 Diabetes Mellitus: A "Thrifty" Genotype Rendered Detrimental by "Progress"? American Journal of Human Genetics 14:353-362.

Neel, J. W., M. W. Shaw and W. J. Schall
1965 Diabetes Mellitus, In Genetics and the Epidemiology of Chronic Diseases. U.S. Public Health Service Publication #1163. Washington D.C. Government Printing Office.

Netting, R. McC.
1972 Of Men and Meadows: Strategies of Alpine Land Use. Anthropological Quarterly 45:132-144.

Newton, B., Jr. and L. Pulliam-Di Napoli
1977 Log Houses as Public Occasions: A Historical Theory. Annals of the Association of American Geographers 67:3:360-383.

Niswander J. D.
1969 Some Special Medical Problems of Indian Populations - Discussion on Diabetes. Biomedical Challenges Presented by the American Indian. World Health Organization, Pan American Health Organization Publication 165, 1969.

Nuttall, T.
1821 A Journal of Travels into Arkansas Territory, During the Year 1819. With Occasional Observations on the Manners of the Aborigines. Philadelphia: Printed and Published by Thomas E. Palmer.

Oklahoma State Department of Health
1943-
1970 Oklahoma Medical-Statistics. Public Health Statistics 1943-1970, Oklahoma City.

1971-
1976 Oklahoma Health Statistics 1971-1976. Oklahoma City.

Opler, M. E.
1945 Themes as Dynamic Forces in Culture. American Journal of Sociology 51:198-206.

Lee, R. and I. Devore
1968 Man the Hunter. Chicago: Aldine Publishing Co.

LeRiche, W. and J. Milner
1971 Epidemiology as Medical Ecology. London: Churchill Livingston.

Lesquereux, M. L.
1860 Botanical and Paleontological Report of the Geological State Survey of Arkansas. Second Report of a Geological Reconnaissance of the Middle and Southern Counties of Arkansas by David D. Owen and Others. Philadelphia: C. Sherman and Sons, pp. 295-400.

Levine, S. B., R. E. Sampliner, P. H. Bennett et al.
1970 Asymptomatic Parotid Enlargement in Pima Indians. Relationship to Age, Obesity, and Diabetes Mellitus. Annual of Internal Medicine 73:571-73.

Malins, J.
1966 Causes of Death in Diabetics. In Diabetes Mellitus, L. Duncan (ed). Edinburgh, England: Edinburgh University Press, pp. 138-143.

Marble, et al.
1971 Joslin's Diabetes Mellitus. Eleventh Edition. Philadelphia: Lea and Febiger.

Mausner, J. and A. Bahn
1974 Epidemiology: An Introductory Text. Philadelphia: W. B. Saunders Co.

Mayberry, R. H. and R. D. Lindeman
1963 A Survey of Chronic Disease and Diet in Seminole Indians in Oklahoma. American Journal of Clinical Nutrition 13:127-34.

McDonald, G. W.
1969 Diabetes in the Americas. In Diabetes. Proceedings of the 6th Congress of the International Diabetes Federation. J. Ostman ed., pp. 657-667. Amsterdam: Excerpta Medica Foundation.

McReynolds E. C.
1954 Oklahoma: A History of the Sooner State. Norman: University of Oklahoma Press.

Menninger, W. C.
1935 The Interrelationship of Mental Disorders and Diabetes Mellitus. Journal of Mental Science 81:332.

Miller, M., P. H. Bennett and T. A. Burch
1968 Hyperglycemia in Pima Indians: A Preliminary Appraisal of its Significance. In Biomedical Challenges Presented by the American Indian. Pan American Health Organization #165.

Mooney, J.
1975 Historical Sketch of the Cherokee. Chicago: Aldine Publishing Co.

Papaspyros, N. S.
1964 The History of Diabetes Mellitus. 2nd Edition. Stuttgart: Georg Thieme Verlag.

Parks, J. H. and E. Waskow
1961 Diabetes Among the Pima Indians of Arizona. Arizona Medicine 18:99-106.

Peach, W. N. and R. W. Poole
N.D. Human and Material Resources of Sequoyah County: A Profile for Growth and Development. Oklahoma: Southeastern State College, Durant. Technology Use Studies Center. (Circa 1967)

Peach, W. N., R. W. Poole and J. D. Tarver
1965 County Building Block Data for Regional Analysis: Oklahoma. Research Foundation, Oklahoma State University, Stillwater.

Pincus, G. and P. White
1933 On the Inheritance of Diabetes Mellitus: An Analysis of 675 Family Histories. American Journal of Medical Sciences 186:1-14.

Prior, I.
1971 The Price of Civilization. Nutrition Today 6:2-11.

1974 Diabetes in the South Pacific. In Is the Risk of Becoming Diabetic Affected by Sugar Consumption? Eighth International Sugar Research Symposium, pp. 4-13.

Prosvitz, L. R. and G. L. Mandell
1967 Diabetes Mellitus Among Navajo and Hopi Indians: The Lack of Vascular Complications. American Journal of Medical Science 253:700-05.

Rappaport, R.
1971 Ritual, Sanctity and Cybernetics. American Anthropologist 73:59-76.

Ragland, H. D.
1957 Sequoyah County Times, Sallisaw, Oklahoma. 8, 15, 22, February; 13, 22, March; 26, April; 7, June; 12, July.

Reid, J. M. et al.
1971 Nutrient Intake of Pima Indian Women: Relationships to Diabetes Mellitus and Gall Bladder Disease. American Journal of Clinical Nutrition 24:1281-89.

Rhoades, R. and S. Thompson
1975 Adaptive Strategies in Alpine Environments: Beyond Ecological Particularism. American Ethnologist 2:535-551.

Royce, C. C.
1975 The Cherokee Nation of Indians. Chicago: Aldine Publishing Co.

Rimoin, D. L.
1969 Ethnic Variability in Glucose Tolerance and Insulin Secretion. Archives of Internal Medicine 124:695-700.

Saiki, J. H. and D. C. Rimoin
1968 Diabetes Mellitus Among the Navajo. Archives of Internal Medicine 122:1-5.

Schaefer
1969 Glycosuria and Diabetes Mellitus in Canadian Eskimos. Canadian Medical Association Journal 99:201-206.

Seivers, M. L.
1966 Disease Patterns Among Southwestern Indians. Public Health Reports 81, No. 12:1075-83.

Sells, G.
1915 Laws Relating to the Five Civilized Tribes in Oklahoma 1890-1914. Committee on Indian Affairs. Washington Government Printing Office.

Sequoyah County Abstract Company
1975 Sequoyah County 1975 Plat Book.

Sequoyah County Times, Sallisaw, Oklahoma.

Shirk, G. H.
1974 Oklahoma Place Names, Second Edition. Norman: University of Oklahoma Press.

Shoenfelt
1902 Annual Report to the Commission of Indian Affairs. Indian Affairs Part 2, U.S. Department of Interior.

Smith, B. D.
1974 Predator-Prey Relationships in the Southeastern Ozarks-AD 1300. Human Ecology 2:31-44.

Smith, R. L.
1957 Cardiovascular, Renal and Diabetes Deaths Among Navajos. Public Health Reports 72:3333-38.

Sochet, B. R.
1958 Five Year Experience with Diabetes Mellitus at the U.S. Public Health Service Indian Hospital, Lawton, Oklahoma. Journal of the Oklahoma State Medical Association 51:459-62.

Spenser, R. and J. Jennings et al.
1965 The Native Americans. New York: Harper and Row.

Starr, E.
1910 Cherokee "West", 1794-1839. Claremore, Oklahoma.

Stein, et al.
1965 The High Prevalence of Abnormal Glucose Tolerance in the Cherokee Indians of North Carolina. Archives of Internal Medicine 116:842.

Steinberg, A. G., N. B. Rushforth, P. H. Bennett, T. A. Burch and M. Miller
1970 Preliminary Report on the Genetics of Diabetes Among the Pima Indians. In Early Diabetes, Camerine-Davalos, R. A. and Cole, H. S. eds. New York and London: Academic Press 11-21.

Steward, J.
1955 Theory of Culture Change: The Methodology of Multilinear Evolution. Chicago: University of Illinois Press.

Sturtevant, W.
1966 Anthropology, History and Ethnohistory. Ethnohistory 13:1-52.

Treuting, T. F.
1972 The Role of Emotional Factors in the Etiology and Course of Diabetes Mellitus: A Review of Recent Literature. Progress of Medical Science 133:93, 1962. American Journal of Medical Science 244:93-109.

U.S. Department of Agriculture
1975 Nutritive Value of Foods. Home and Garden Bulletin 72.

U.S. Government
1900 Twelfth Census of the United States. In Collection of Oklahoma Historical Society.

Wahrhaftig, A. L.
1965 The Tribal Cherokee Population of Eastern Oklahoma: Report of a Demographic Survey of Cherokee Settlements in the Cherokee Nation. Carnegie Cross-Cultural Education Project of the University of Chicago.

Washburn, W.
1961 Ethnohistory: History 'in the Round'. Ethnohistory 8:31-48.

Weavel, M.
1976 Short. In The History of Sequoyah County, 1828-1975, Published by the Sequoyah County Historical Society.

Webb, W. P.
1931 The Great Plains. Ginn Publishers.

Wellin, E.
1977 Theoretical Orientations in Medical Anthropology: Continuity and Change Over the Past Half-Century. In D. Landy (ed.) Culture, Disease and Healing. New York: MacMillan 47-57.

West, K. M.
1972 Epidemiologic Evidence Linking Nutritional Factors to the Prevalence and Manifestations of Diabetes. Acta Diabetalogica Latina (Supplement 1) 9:405-29.

1974A Culture, History and Adiposity, Or Should Santa Claus Reduce? Obesity and Bareatric Medicine 3:48-52.

1974B Diabetes in American Indians and Other Native Populations of the New World. Diabetes 23:841-855.

1974C Epidemiologic Observations on Thirteen Populations of Asia and the Western Hemisphere. In Is the Risk of Becoming Diabetic Affected by Sugar Consumption? Eighth International Sugar Research Symposium.

1978 Diabetes in American Indians. Advances in Metabolic Disorders 9:29-48.

N.D. Detailed Study of an Epidemic of Obesity and Diabetes. In Press.

West, K. M. and J. Kalbfleish
1970 Diabetes in Central America. Diabetes 19:656-63.

1971 Influence of Nutritional Factors on Prevalence of Diabetes. Diabetes 20:99-108.

West, K., E. Oakley, M. Sanders et al.
1976 Epidemiology of Diabetes and its Vascular Complications. Proceedings of Satellite Meeting of IXth International Diabetes Federation Meeting, Bombay, 1976. Published by: International Diabetes Federation.

Westfall, D. N. and A. L. Rosenbloom
1971 Diabetes Mellitus Among the Florida Seminoles. Health Services and Mental Health Administration Health Reports 86:1037-41.

White, W. D.
1966 Diabetes in the Oklahoma Indian. Abstracted Proceedings, 1st Joint Meeting of the Clinical Society and Commissioned Officers Association. U.S. Public Health Service, Baltimore 1966, p. 21.

Wiedman, D.
1976A The Individual and Innovation in the Process of Sociocultural Adaptation to Frontier Situations. Papers in Anthropology 17:106-116. University of Oklahoma Anthropology Department Publication.

1976B Technique for Measuring Rim Wall Angle of Historic Ceramics. In Cheek, Honey Springs, Indian Territory, Search for a Confederate Powder House: An Ethnohistorical and Archeological Report. Oklahoma Historical Society, Series in Anthropology, Number 2.

Wise, P. H., F. M. Edwards, D. W. Thomas et al.
1970 Hyperglycaemia in the Urbanized Aboriginal. The Davenport Survey. Medical Journal of Australia 2:1001-1006.

Wissler, C.
1938 The American Indian: An Introduction to the Anthropology of the New World. Third Edition, New York: Oxford University Press.

Woodward, G. S.
1963 The Cherokees. Norman: University of Oklahoma Press.

Wright
1951 A Guide to the Indian Tribes of Oklahoma. Norman, Oklahoma: University of Oklahoma Press.

Yudkin, J.
1957 Diet and Coronary Thrombosis: Hypothesis and Fact. Lancet 2:155.

1963 Nutrition and Palatability with Special Reference to Obesity, Myocardial Infarction and Other Diseases of Civilization. Lancet 1:1335-1338.

1964 Dietary Fat and Dietary Sugar: In Relation to Ischaemic Heart-Disease and Diabetes. Lancet 2:4.