Desert Years in Oklahoma During the 1930's and 1950's

ARTHUR H. DOERR, University of Oklahoma, Norman[1]

More than 80 weather stations across Oklahoma were programmed on the IBM 650 computer for the purpose of classifying them, climatically, according to the original scheme developed by C. Warren Thornthwaite. Stations were selected to give a good geographic dispersal, and no station is more than 40 miles from a neighboring station. Because of incomplete information or improper punching not al stations could satisfactorily be utilized for a given year's record. For every year, however, 55 stations, or more, are utilized in the construction of isopleth maps subject to presentation and analysis in this study. For most years many more than 55 stations are utilized, and computational hiatuses do not exist for the same set of stations in any consecutive years.

Since the basic characteristics of Thornthwaite's classification are well known, it will not be reviewed here. It's principal value appears to lie in relating precipitation to evaporation in an empirical way. Application of the study on a long term basis indicates that it produces more discreet and finite boundaries, as well as yielding more climatic regions in Oklahoma than the more widely used Köppen system.

The decades of the 1930's and the 1950's were selected for analysis because they represent the most prolonged periods of climatic rigor in the recent past. The depth of the drought in both cases is heralded by preceding years with a very spotty climatic pattern. In short, great heterogeneity in rainfall and temperature patterns appear to anticipate impending drought.

Utilizing the Thornthwaite classification as a yardstick, desert conditions were present in some part of the state in each of 1933, 1934, 1935, 1936, 1937, 1954, and 1956 of the two decade period. During each of these years, as might be anticipated, the extent of semiarid conditions was greatly expanded.

The Panhandle was by far the most prone to experience desert conditions, although occasionally arid conditions obtained in northwestern Oklahoma outside the Panhandle and in the southwestern portion of the state. Desert conditions affected the largest area during 1956 (Fig. 1), when all the Panhandle and a small portion of northwestern Oklahoma were arid. By way of contrast 1935 (Fig. 2), 1936 (Fig. 3), and 1937 (Fig. 4), had only small relatively isolated areas with a desert climate. In 1937 the arid section was a small enclave around Goodwell. In the two preceding years only the extreme western portion of the Panhandle near Kenton suffered extreme dessication. The remaining desert years of the two decades were characterized by conditions between the minimal and the maximal extremes (see Figures 5, 6, 7, and 8).

[1]Funds provided by the Faculty Research Fund of the University of Okahoma made this study possible.

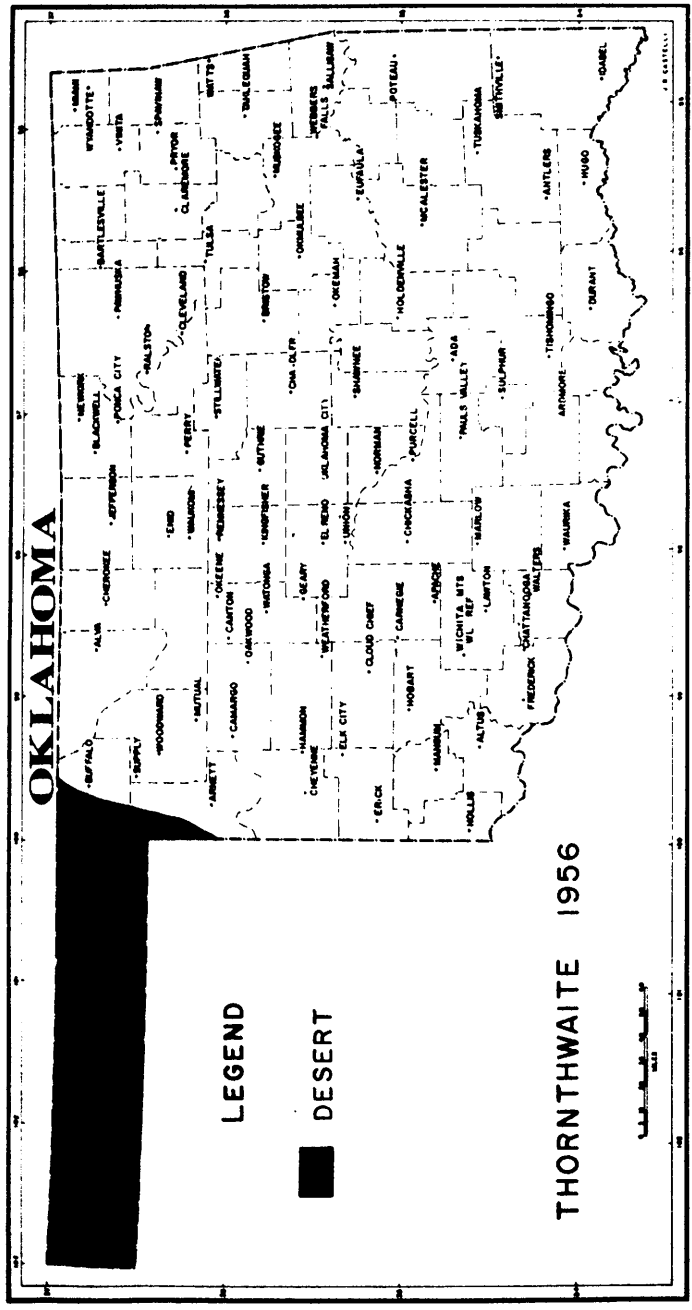

Figure 1

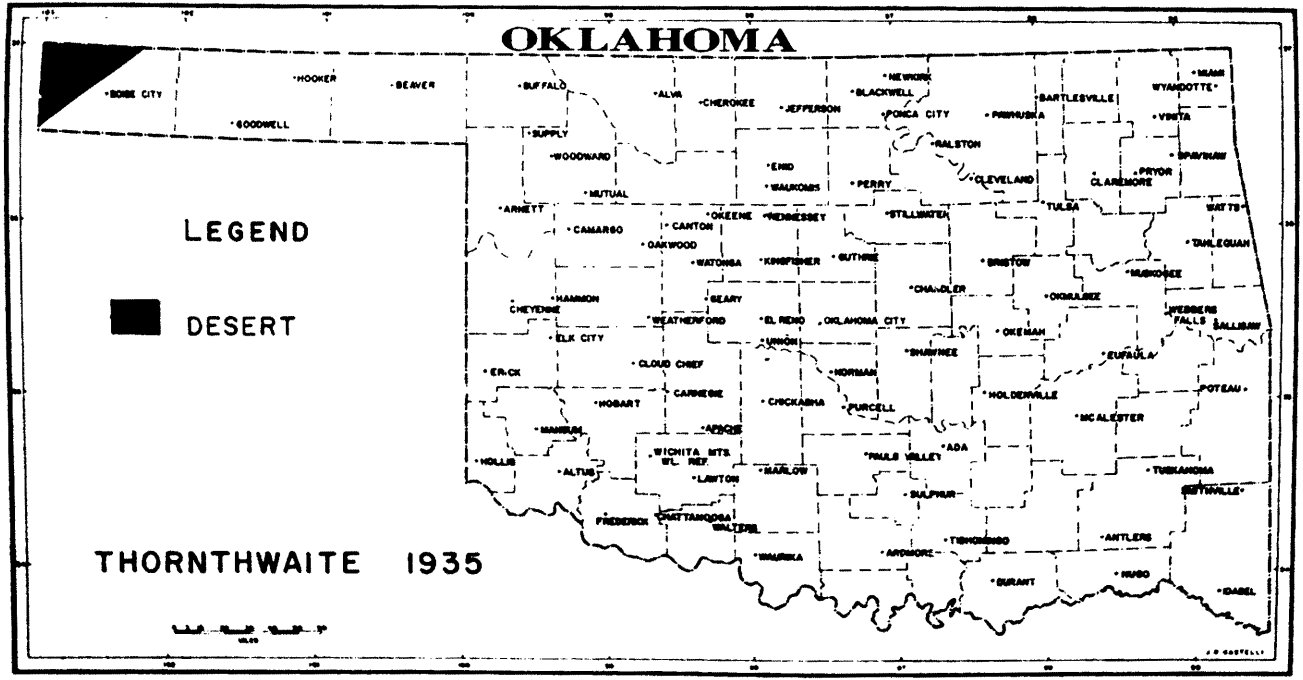
OKLAHOMA
LEGEND
DESERT
THORNTHWAITE 1935
BOISE CITY
HOOKER
BEAVER
GOODWELL
BUFFALO
ALVA
CHEROKEE
JEFFERSON
NEWKIRK
BLACKWELL
PONCA CITY
PERRY
RALSTON
PRAGUE
BARTLESVILLE
WYANDOTTE
MIAMI
VINITA
SPAVINAW
PRYOR
CLAREMORE
CLEVELAND
TULSA
WATTS
TAHLEQUAH
MUSKOGEE
SUPPLY
WOODWARD
MUTUAL
ARNETT
CAMARGO
CANTON
OKEENE
HEDGESBEY
STILLWATER
ENID
WAUKOMIS
OAKWOOD
WATONGA
KINGFISHER
GUTHRIE
BRISTOW
CHANDLER
OKMULGEE
CHEYENNE
HAMMON
BEAVER
WEATHERFORD
EL RENO
OKLAHOMA CITY
OKEMAH
WEBBERS FALLS
SALLISAW
ELK CITY
UNION
SHAWNEE
EUFAULA
ERICK
CLOUD CHIEF
NORMAN
HOBART
CARNEGIE
CHICKASHA
PURCELL
HOLDENVILLE
MCALESTER
POTEAU
MANGUM
ARNETT
WICHITA MTS WL. REF.
PAULS VALLEY
ADA
HOLLIS
ALTUS
LAWTON
MARLOW
SULPHUR
TUSKAHOMA
ATOKA
FREDERICK
CHATTANOOGA
WALTERS
TISHOMINGO
ANTLERS
WAURIKA
ARDMORE
DURANT
HUGO
IDABEL

Figure 2

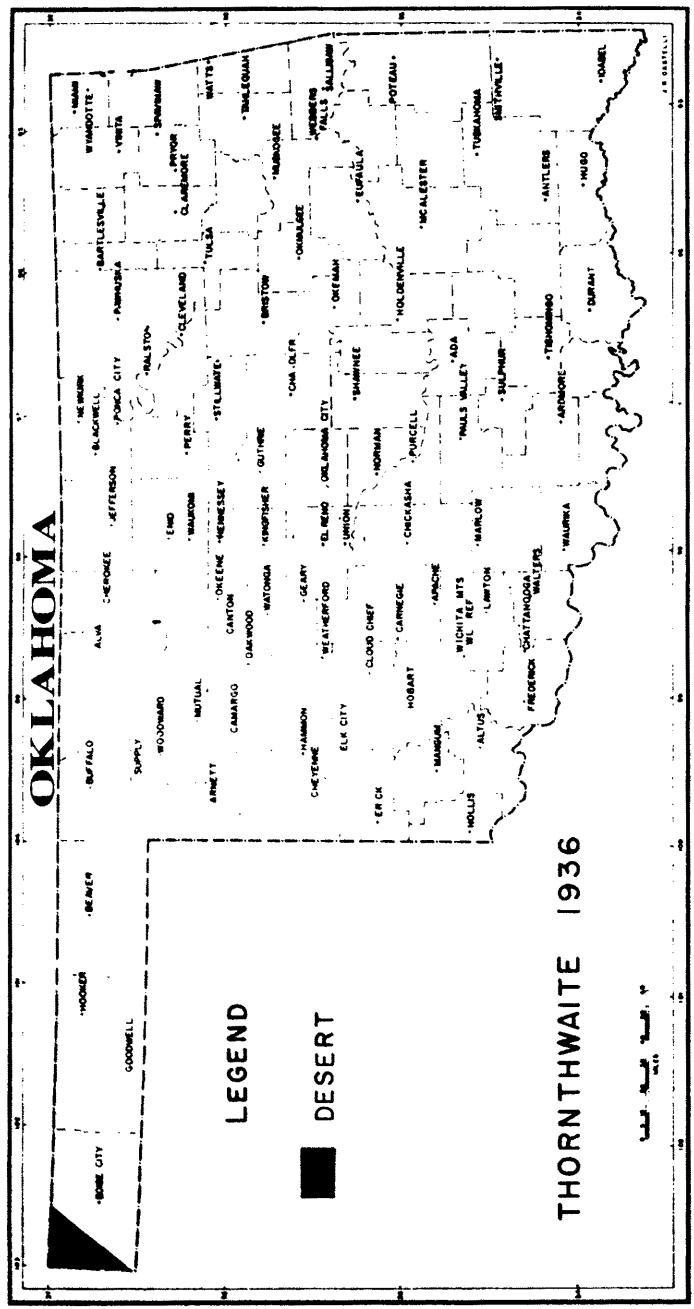

Figure 3

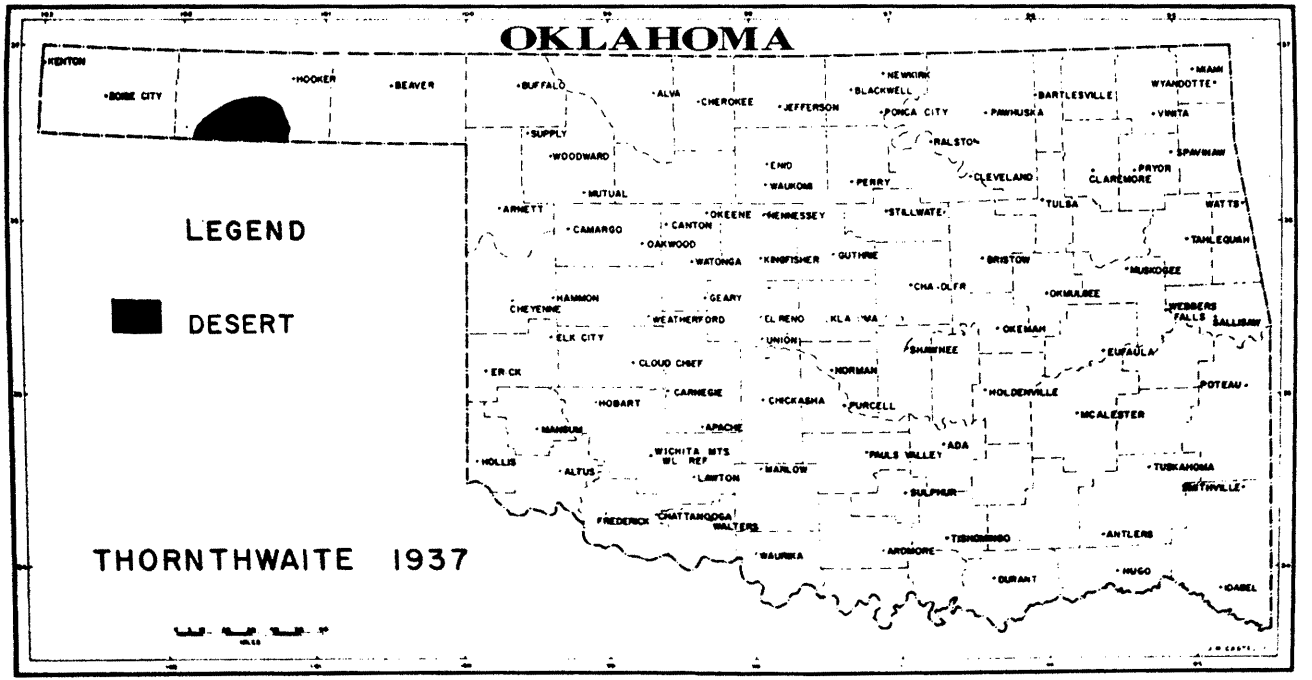
OKLAHOMA
LEGEND
DESERT
THORNTHWAITE 1937
KENTON
BOISE CITY
HOOKER
BEAVER
BUFFALO
ALVA
CHEROKEE
JEFFERSON
NEWKIRK
BLACKWELL
PONCA CITY
BARTLESVILLE
PAWHUSKA
MIAMI
WYANDOTTE
VINITA
SUPPLY
WOODWARD
RALSTON
SPAVINAW
ENID
WAUKOMIS
PERRY
CLEVELAND
CLAREMORE
PRYOR
MUTUAL
ARNETT
OKEENE
HENNESSEY
STILLWATER
TULSA
WATTS
CAMARGO
CANTON
OAKWOOD
TAHLEQUAH
WATONGA
KINGFISHER
GUTHRIE
BRISTOW
MUSKOGEE
HAMMON
GEARY
CHANDLER
OKMULGEE
CHEYENNE
WEATHERFORD
EL RENO
KLAHOMA
OKEMAH
WEBBERS FALLS
SALLISAW
ELK CITY
UNION
SHAWNEE
EUFAULA
CLOUD CHIEF
NORMAN
ER CK
CARNEGIE
HOBART
CHICKASHA
PURCELL
HOLDENVILLE
POTEAU
MCALESTER
MANGUM
APACHE
WICHITA MTS WL REF
ADA
PAULS VALLEY
HOLLIS
ALTUS
LAWTON
MARLOW
TUSKAHOMA
SULPHUR
STIGLER
FREDERICK
CHATTANOOGA
WALTERS
TISHOMINGO
ANTLERS
MAURICE
ARDMORE
DURANT
HUGO
IDABEL

Figure 4

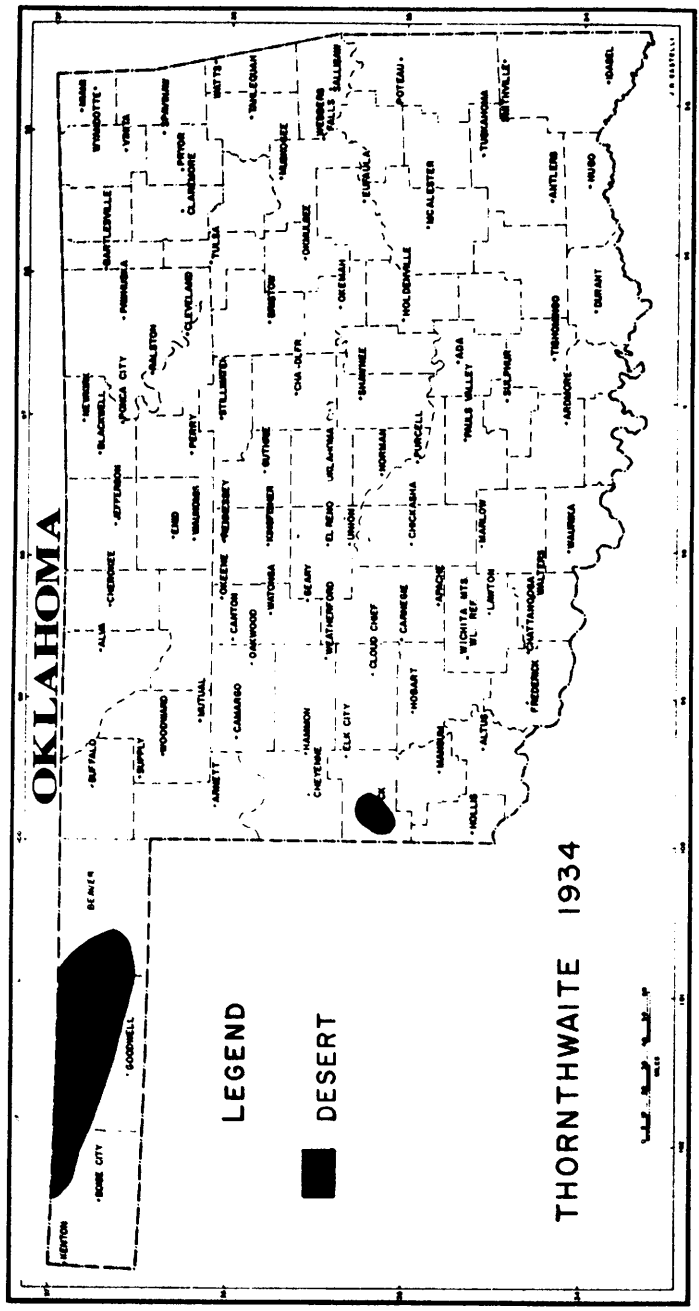

Figure 5

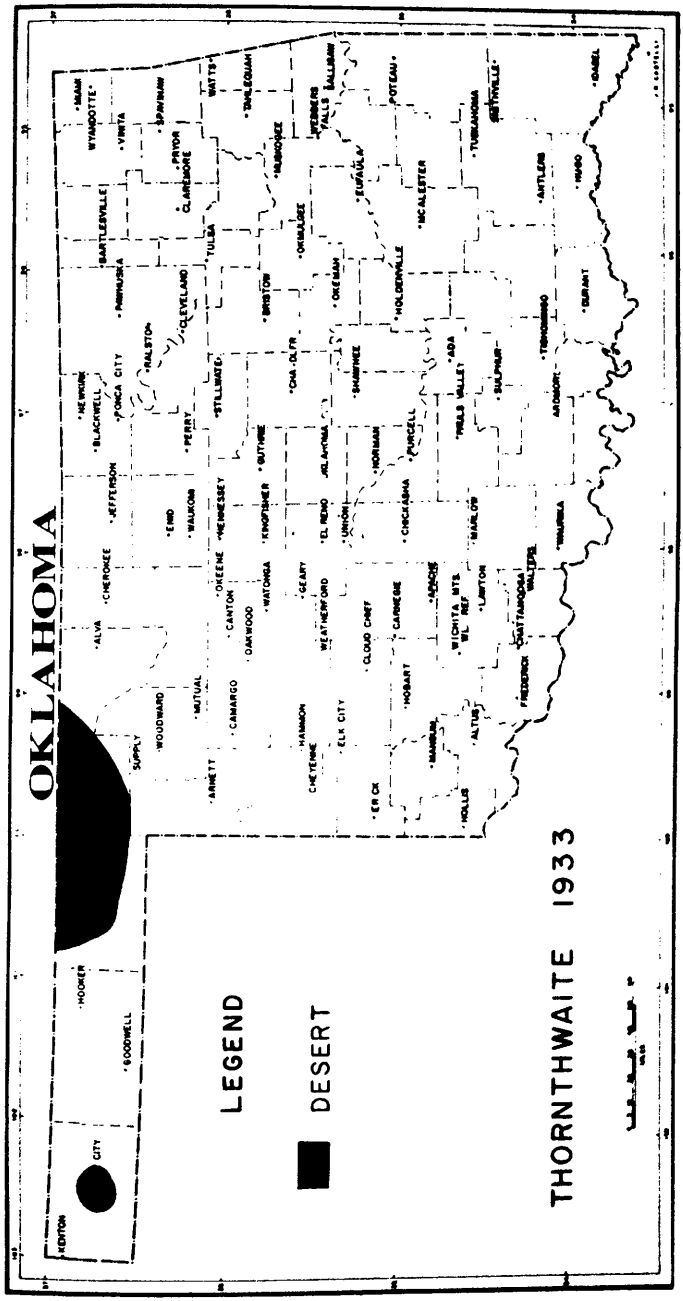

Figure 6

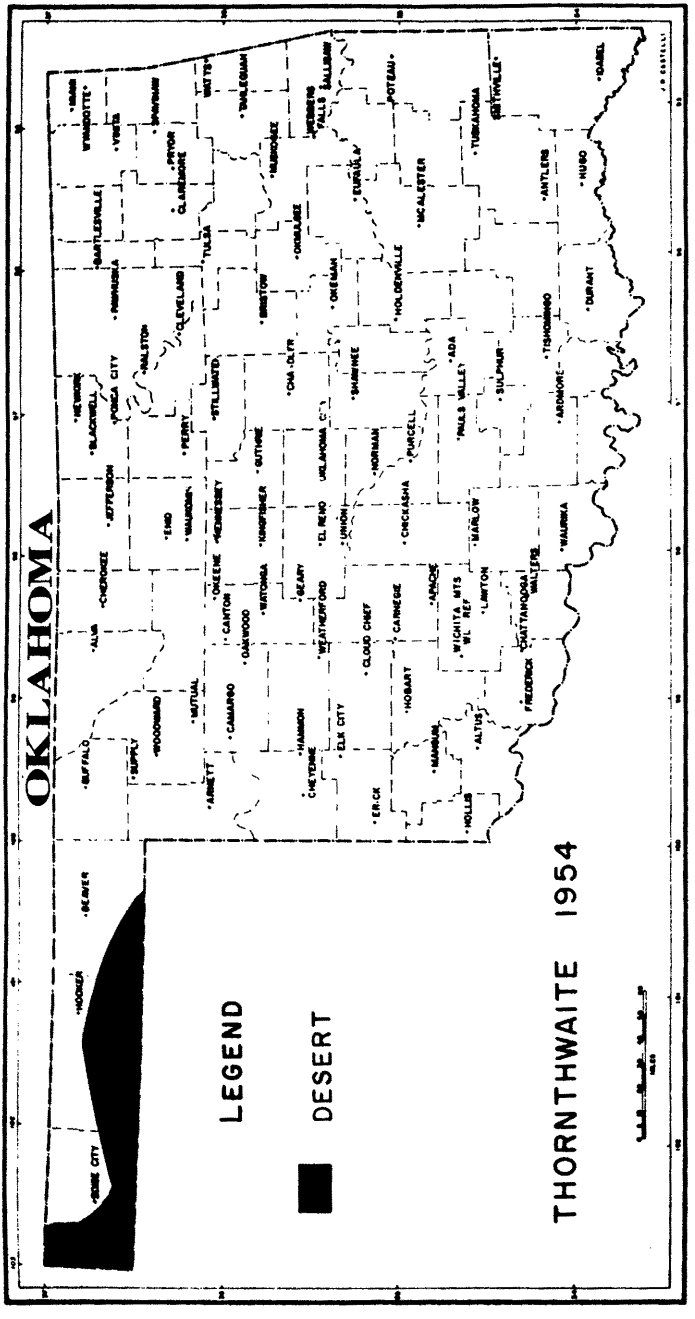

Figure 7


OKLAHOMA
LEGEND
DESERT
CUMULATIVE DESERT
ALVA
CHEROKEE
JEFFERSON
NEWKIRK
BLACKWELL
PONCA CITY
PAWHUSKA
BARTLESVILLE
MIAMI
WYANDOTTE
VINITA
SUPPLY
WOODWARD
RALSTON
SPAVINAW
ENID
CLEVELAND
PRYOR
CLAREMORE
MUTUAL
WAUKOMIS
PERRY
ARNETT
OKEENE
REDMESSEY
STILLWATER
TULSA
WATTS
CAMARGO
CANTON
OAKWOOD
TAHLEQUAH
WATONGA
KINGFISHER
GUTHRIE
BRISTOW
MUSKOGEE
CHEYENNE
HAMMON
SEARY
CHANDLER
OKMULGEE
WEATHERFORD
EL RENO
OKLAHOMA
PERKINS
FALLS
SALLISAW
ELK CITY
UNION
OKEMAH
SHAWNEE
EUFAULA
CLOUD CHIEF
NORMAN
HOBART
CARNEGIE
CHICKASHA
PURCELL
HOLDENVILLE
POTEAU
McALESTER
MANGUM
APACHE
WICHITA MTS WL. REF
ADA
PAULS VALLEY
HOLLIS
ALTUS
LAWTON
MARLOW
TUSKAHOMA
SULPHUR
FREDERICK
CHATTANOOGA
WALTERS
TISHOMINGO
ANTLERS
WAURIKA
ARDMORE
DURANT
HUGO
IDABEL

Figure 8

A reveiew of maps in the cartographic sequence suggests that great variability of precipitation across the state serves as a harbinger of arid conditions, and recovery is marked by a more normal and regular diminution of precipitation from east to west. A fruitful avenue of future research in this general area of cyclical drought would undoubtedly be in a search and analysis of storm tracks during a period preceding and succeeding a drought.