

## SECTION F, GEOGRAPHY

## De Martonne's Index of Aridity and Oklahoma's Climate

ARTHUR H. DOERR, University of Oklahoma, Norman<sup>1</sup>

Man has been wrestling with the problem of climatic classification for centuries, but no classification scheme meets the objections of even a large fraction of the workers in climatology. One of the simple empirical attempts to establish a quantitative measure of the relationship of temperature and precipitation was the Index of Aridity developed by De

Martonne. This index computed from  $Iar = \frac{P}{T + 10}$  where P is precipitation in millimeters and T is temperature in degrees Centigrade or

$Iar = \frac{45.72 P}{T - 14}$  where P is precipitation in inches and T is temperature

in degrees Fahrenheit (De Martonne, 1926) has served as a concept for more sophisticated attempts to show temperature and precipitation relationships.

The mean map of De Martonne (Fig. 1) shows the gradual diminution of index numbers as one moves westward across Oklahoma. Indeed, the pattern exhibited is not greatly dissimilar from a precipitation map of the state.

Rather than to establish a clear cut line marking arid and semiarid environments the index is designed to indicate increasing aridity as indices diminish. Working boundaries for semiarid and arid conditions would appear to be 22.5 and 7.5 respectively (Ives, 1949). Using these indices as working criteria it is clearly seen that no part of Oklahoma is arid under mean conditions, but the Panhandle and extreme Northwest are semiarid.

The map of the driest year in the 1923-58 period (1956) (Fig. 2) shows almost three-fourths of the state as semiarid (using 22.5 as the boundary of semiaridity), and a small area of desert is present in the region around Boise City. During humid years of the period no part of Oklahoma could be classed as semiarid.

De Martonne's Index of Aridity has the obvious advantage of showing the transition from one area to another, but it may logically be attacked because of its empirical nature. Nevertheless it serves as a useful discreet tool in illustrating the slow transition between arid, semiarid, and humid environments.

## LITERATURE CITED

- De Martonne, Emmanuel. 1926. Aréisme et indice aridité. *Comptes Rendus de L'Acad. Sci., Paris* 182: 1395-1398.
- Ives, R. L. 1949. Climate of the Sonoran desert region. *Annals Assoc. Am. Geog.* 39: 150-152.

<sup>1</sup>The author gratefully acknowledges the assistance of the Faculty Research Fund of the University of Oklahoma in providing aid for computer programming and drafting.

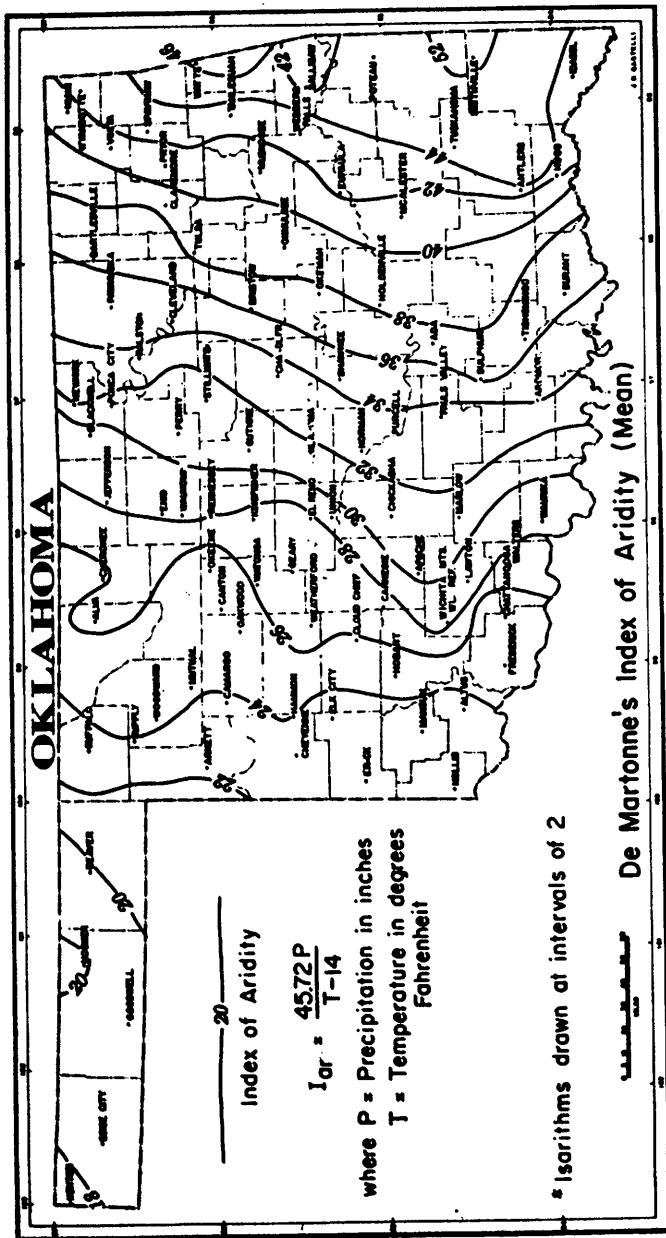


Fig. 1. De Martonne's Index of Aridity (Mean).

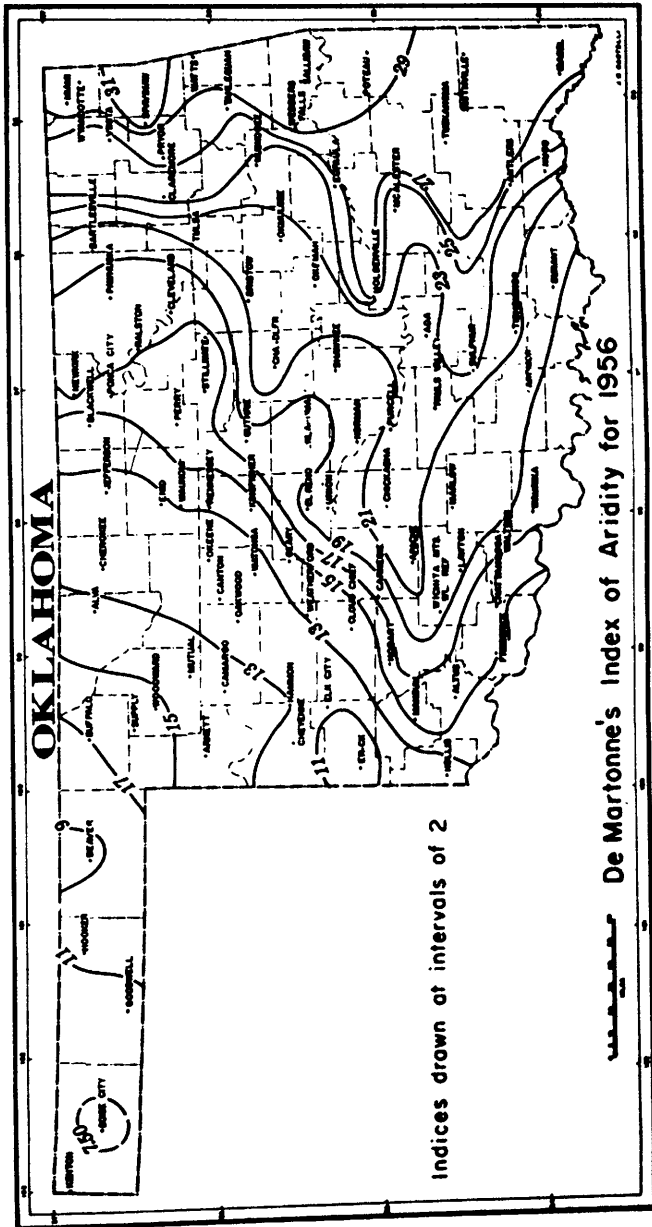


Fig. 2. De Martonne's Index of Aridity for 1956.