

DEPARTMENT OF THE INTERIOR  
UNITED STATES GEOLOGICAL SURVEY














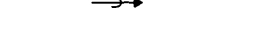


**SURFICIAL GEOLOGIC MAP OF THE PALMER QUADRANGLE,  
SOUTH-CENTRAL MASSACHUSETTS**

**By John D. Peper**





Prepared in cooperation with  
THE COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF PUBLIC WORKS

GEOLOGIC QUADRANGLE MAP  
Published by the U.S. Geological Survey, 1978  
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


**GEOLOGIC MAP SYMBOLS**  
**COMMONLY USED ON MAPS OF THE UNITED STATES GEOLOGICAL SURVEY**  
(Special symbols are shown in explanation)

	Contact—Dashed where approximately located; short dashed where inferred; dotted where concealed
	Contact—Showing dip; well exposed at triangle
	Fault—Dashed where approximately located; short dashed where inferred; dotted where concealed
	Fault, showing dip—Ball and bar on downthrown side
	Normal fault—Hachured on downthrown side
	Fault—Showing relative horizontal movement
	Thrust fault—Sawteeth on upper plate
	Anticline—Showing direction of plunge; dashed where approximately located; dotted where concealed
	Asymmetric anticline—Short arrow indicates steeper limb
	Overtured anticline—Showing direction of dip of limbs
	Syncline—Showing direction of plunge; dashed where approximately located; dotted where concealed
	Asymmetric syncline—Short arrow indicates steeper limb
	Overtured syncline—Showing direction of dip of limbs
	Monocline—Showing direction of plunge of axis
	Minor anticline—Showing plunge of axis
	Minor syncline—Showing plunge of axis




Strike and dip of beds—Ball indicates top of beds known from sedimentary structures

 70° Inclined     Horizontal  
 Vertical     40° Overturned




Strike and dip of foliation

 20° Inclined     Vertical     Horizontal




Strike and dip of cleavage

 15° Inclined     Vertical     Horizontal

Bearing and plunge of lineation



 15° Inclined     Vertical     Horizontal

Strike and dip of joints



 40° Inclined     Vertical     Horizontal

Note: Planar symbols (strike and dip of beds, foliation or schistosity, and cleavage) may be combined with linear symbols to record data observed at same locality by superimposed symbols at point of observation. Coexisting planar symbols are shown intersecting at point of observation.

Shafts



 Vertical     Inclined

Adit, tunnel, or slope

 Accessible     Inaccessible

X Prospect








Quarry

 Active     Abandoned

Gravel pit

 Active     Abandoned

Oil wells

 Drilling     Shut-in     Dry hole, abandoned  
 Gas     Show of gas  
 Oil     Show of oil