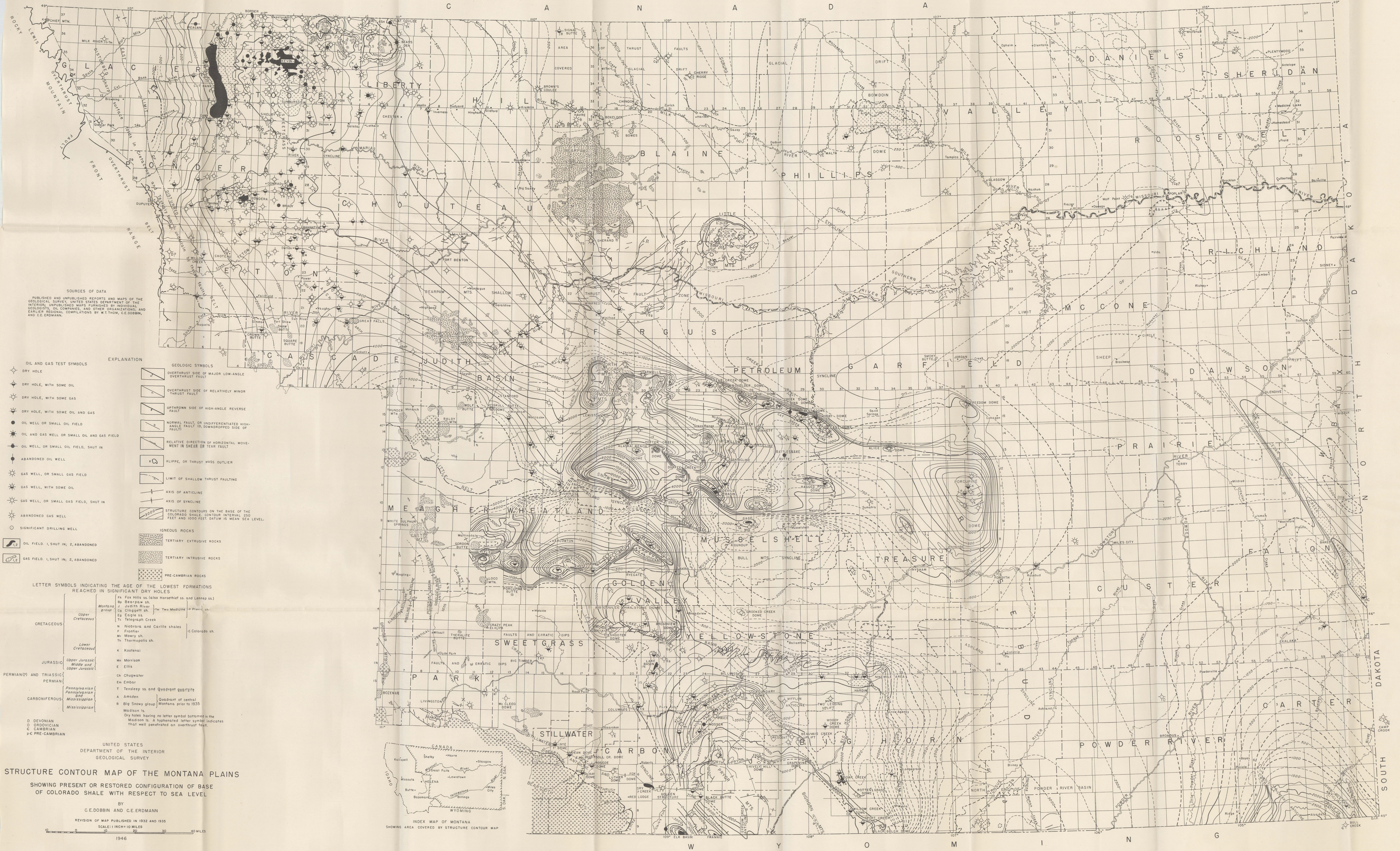




SOURCES OF DATA  
PUBLISHED AND UNPUBLISHED REPORTS AND MAPS OF THE GEOLOGICAL SURVEY, UNITED STATES DEPARTMENT OF THE INTERIOR, UNPUBLISHED MAPS FURNISHED BY INDIVIDUAL GEOLOGISTS, OIL COMPANIES, AND OTHER ORGANIZATIONS, AND EARLIER REGIONAL COMPILATIONS BY W.T. THOM, C.E. DOBBIN, AND C.E. ERMANN.

- OIL AND GAS TEST SYMBOLS**
- DRY HOLE
  - DRY HOLE, WITH SOME OIL
  - DRY HOLE, WITH SOME GAS
  - DRY HOLE, WITH SOME OIL AND GAS
  - OIL WELL OR SMALL OIL FIELD
  - OIL AND GAS WELL OR SMALL OIL AND GAS FIELD
  - OIL WELL, OR SMALL OIL FIELD, SHUT IN
  - ABANDONED OIL WELL
  - GAS WELL, OR SMALL GAS FIELD
  - GAS WELL, WITH SOME OIL
  - GAS WELL, OR SMALL GAS FIELD, SHUT IN
  - ABANDONED GAS WELL
  - SIGNIFICANT DRILLING WELL
- EXPLANATION**
- OIL FIELD, 1, SHUT IN, 2, ABANDONED
  - GAS FIELD, 1, SHUT IN, 2, ABANDONED
- GEOLOGIC SYMBOLS**
- OVERTHRUST SIDE OF MAJOR LOW-ANGLE OVERTHRUST FAULT
  - OVERTHRUST SIDE OF RELATIVELY MINOR OVERTHRUST FAULT
  - UPTHROWN SIDE OF HIGH-ANGLE REVERSE FAULT
  - NORMAL FAULT, OR UNDIFFERENTIATED HIGH-ANGLE FAULT (DOWNDROPPED SIDE OF FAULT)
  - RELATIVE DIRECTION OF HORIZONTAL MOVEMENT IN SHEAR OR TEAR FAULT
  - KLIPPE, OR THRUST MASS OUTLIER
  - LIMIT OF SHALLOW THRUST FAULTING
  - AXIS OF ANTICLINE
  - AXIS OF SYNCLINE
  - STRUCTURE CONTOURS ON THE BASE OF THE COLORADO SHALE. CONTOUR INTERVAL 200 FEET AND 1000 FEET. DATUM IS MEAN SEA LEVEL.
- IGNEOUS ROCKS**
- TERTIARY EXTRUSIVE ROCKS
  - TERTIARY INTRUSIVE ROCKS
  - PRE-CAMBRIAN ROCKS

- LETTER SYMBOLS INDICATING THE AGE OF THE LOWEST FORMATIONS REACHED IN SIGNIFICANT DRY HOLES**
- | AGE                     | FORMATION        | Symbol                                                |
|-------------------------|------------------|-------------------------------------------------------|
| CRETACEOUS              | Upper Cretaceous | Fa. Fox Hills ss. (also Horseshoe ss. and Lennep ss.) |
|                         |                  | Bp. Bearpaw sh.                                       |
|                         |                  | J. Judith River                                       |
|                         |                  | Cg. Chugwater sh.                                     |
|                         |                  | Eg. Eagle ss.                                         |
| JURASSIC                | Lower Cretaceous | Tc. Telegraph Creek                                   |
|                         |                  | N. Niobrara and Carlisle shales                       |
|                         |                  | F. Frontier                                           |
|                         |                  | Mr. Mowry sh.                                         |
|                         |                  | Th. Thermopolis sh.                                   |
| PERMIAN(?) AND TRIASSIC |                  | K. Kootenai                                           |
|                         |                  | Mn. Morrison                                          |
|                         |                  | E. Ellis                                              |
|                         |                  | Ch. Chugwater                                         |
|                         |                  | Em. Embury                                            |
| CARBONIFEROUS           |                  | T. Tensleep ss. and Quadrant quartzite                |
|                         |                  | A. Amsden                                             |
|                         |                  | B. Big Snowy group                                    |
|                         |                  | Quadrant of central Montana prior to 1935             |
|                         |                  | Madison ls.                                           |
- Dry holes having no letter symbol bottomed in the Madison ls. A hyphenated letter symbol indicates that well penetrated an overthrust fault.

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

**STRUCTURE CONTOUR MAP OF THE MONTANA PLAINS**

SHOWING PRESENT OR RESTORED CONFIGURATION OF BASE OF COLORADO SHALE WITH RESPECT TO SEA LEVEL

BY  
C.E. DOBBIN AND C.E. ERMANN

REVISION OF MAP PUBLISHED IN 1932 AND 1935

SCALE: 1 INCH = 10 MILES

1946

INDEX MAP OF MONTANA  
SHOWING AREA COVERED BY STRUCTURE CONTOUR MAP