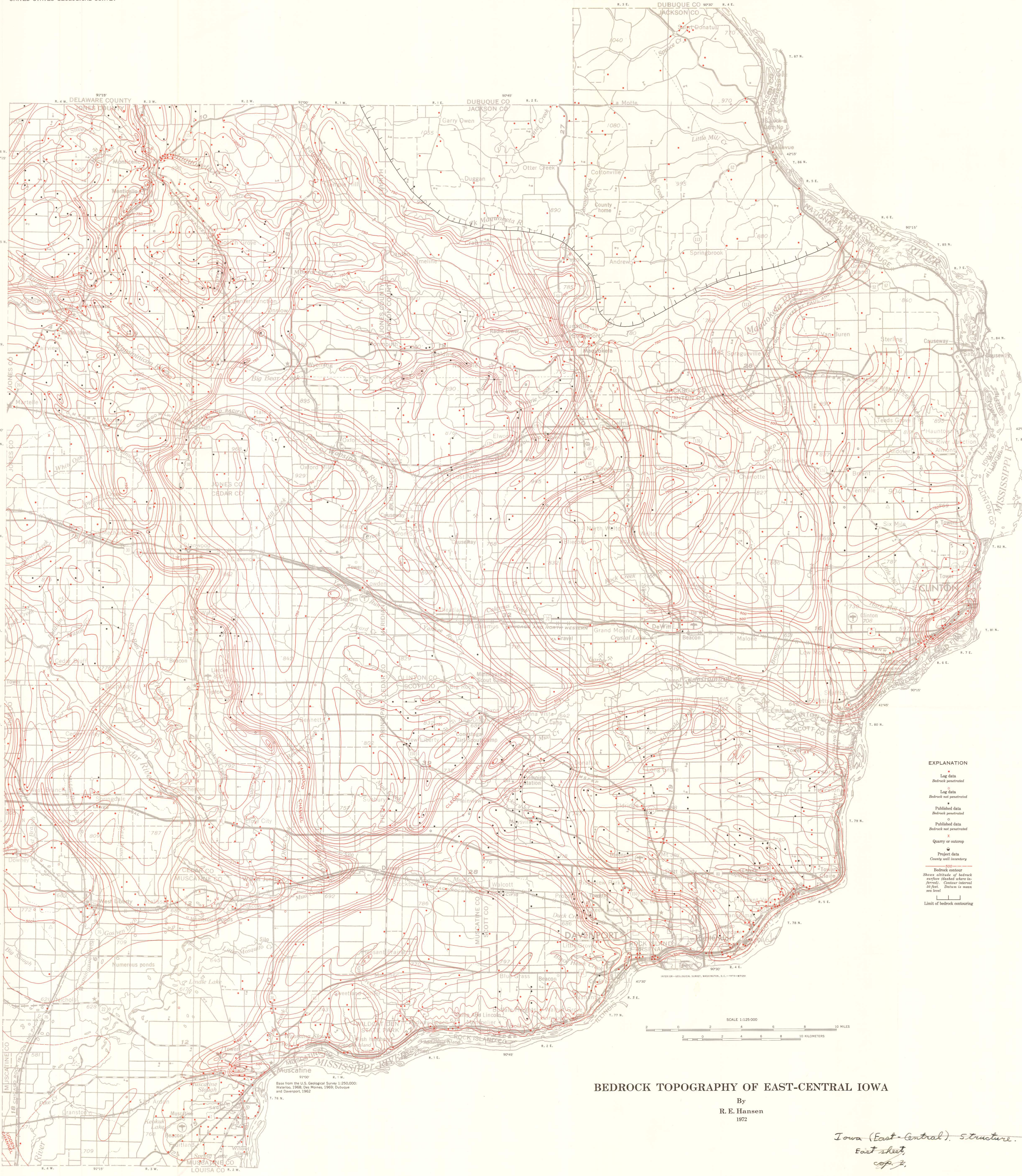
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE
IOWA GEOLOGICAL SURVEY

MISCELLANEOUS GEOLOGIC INVESTIGATIONS
I–717 (EAST HALF)



Base from the U.S. Geological Survey 1:250,000: Waterloo, 1968; Des Moines, 1969; Dubuque and Davenport, 1962

INTRODUCTION

The bedrock surface in Iowa is covered nearly everywhere by unconsolidated glacial deposits that range in thickness from less than 1 foot to more than 400 feet. This surface is the result of a complex system of ancient drainage courses, which were developed during the long period of preglacial erosion and during the shorter, but more intense, periods of interglacial erosion. This map, covering a 12-county area in eastern Iowa, is the first of a series of reports which will provide complete coverage of the bedrock surface of the State.

USES OF MAP

The bedrock map, when used in conjunction with land-surface altitudes, is a vital tool for studying hydrologic, environmental, and geologic problems.

Hydrology.—The map is an aid in locating supplies of ground water. In the southwestern corner of the map area that is underlain by shale bedrock (Hershey, 1969), the bedrock channels often are the only source of potable water within 1,000 feet or more of the land surface. Not all channels contain sand and gravel aquifers; however, the larger, more extensive channels, such as the Poweshiek, Cleona, and Belle Plaine channels, are known to contain aquifers that supply many farm and rural-domestic needs and the needs of several small towns. Yields of 10 to 500 gallons per minute have been obtained; however, a careful program of test drilling must precede the development of a large yielding well.

The map will help the drilling contractor when planning the construction of a well. By determining the depth to bedrock, the contractor can estimate casing needs and prepare more accurate cost estimates. And, where the overburden is particularly thick, the contractor can be better prepared for any problems attendant to drilling this material.

Other uses for the map are in basin hydrology studies and in determining surface-water and ground-water relationships at selected locations.

Environment.—The bedrock information is particularly valuable to state, regional, and local planners concerned with environmental problems; for example, the location of landfill sites. The thickness of overburden, which can be determined from this map, is one requisite needed to minimize or eliminate potential contamination of ground-water supplies.

Geology.—The bedrock map gives the location of bedrock highs, which are of interest to quarry operators and to construction engineers concerned with foundation problems. The map also aids in the interpretation of drainage changes caused by glacial advances and in mapping the areal distribution of consolidated rocks.

BEDROCK TOPOGRAPHY

Primary control for the map is log data and information from quarries and outcrops. Published data (Norton, 1912) provide additional control, but they are not as precise as the log data. Project data are information obtained during a well inventory in Linn County in 1958–59. More detailed information about the control data is available in the cooperative files of the Iowa Geological Survey and the U.S. Geological Survey, Iowa City, Iowa.

The accuracy of the map is related to the density of control points; the greater number of points there are in a given area, the more exact is the placement of the contours. In several instances dashed contours were used where it seemed reasonable to continue a ridge or valley, but where no control point was available to confirm the contours. The dashed contours near the southeast edge of Clinton County and the mouth of the Wapsipincon River are extensions from the Illinois bedrock map (Horberg, 1950) and are dashed because there is no evidence, in Iowa, to confirm or refute the indicated depth of such a deep channel. A further note on accuracy relates to the buried channels mapped. Approximately 70 percent of the area mapped is underlain by limestone and dolomite (Hershey, 1969) and deep channels cut into these materials usually have very steep to vertical valley walls. In order to show all the contours in those areas, the contours are placed side by side rather than stacked; hence, the map may portray channels somewhat wider than they actually are.

The northeastern corner of the map area, in Jackson County, was not contoured because the unconsolidated material generally is thin and discontinuous, and many of the larger stream valleys are bedrock controlled. Extensive surface mapping would be required in order to accurately depict the bedrock surface in that area. However, several buried channels trend toward the area and may extend some distance into the uncontoured area.

PREVIOUS INVESTIGATIONS

Many previous studies covering parts of the map area describe the existence of several buried-bedrock valleys, the diversion of the Mississippi River drainage by glacial encroachment, and present ideas concerning the historical development of the ancient drainage. The several references mentioned will guide the reader wishing additional knowledge of the area.

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EXPLANATION

Log data
Bedrock penetrated

Log data
Bedrock not penetrated

Published data
Bedrock penetrated

Published data
Bedrock not penetrated

Quarry or outcrop

Project data
County well inventory

500
Bedrock contour
Shows altitude of bedrock surface (dashed where inferred). Contour interval 50 feet. Datum is mean sea level

Limit of bedrock contouring

BEDROCK TOPOGRAPHY OF EAST-CENTRAL IOWA

By
R. E. Hansen
1972

For sale by U.S. Geological Survey, price $1.00 per set

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Base from the U.S. Geological Survey 1:250,000:
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and Davenport, 1962

SCALE 1:125 000

2 0 2 4 6 8 10 MILES

2 0 2 4 6 8 10 KILOMETERS

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