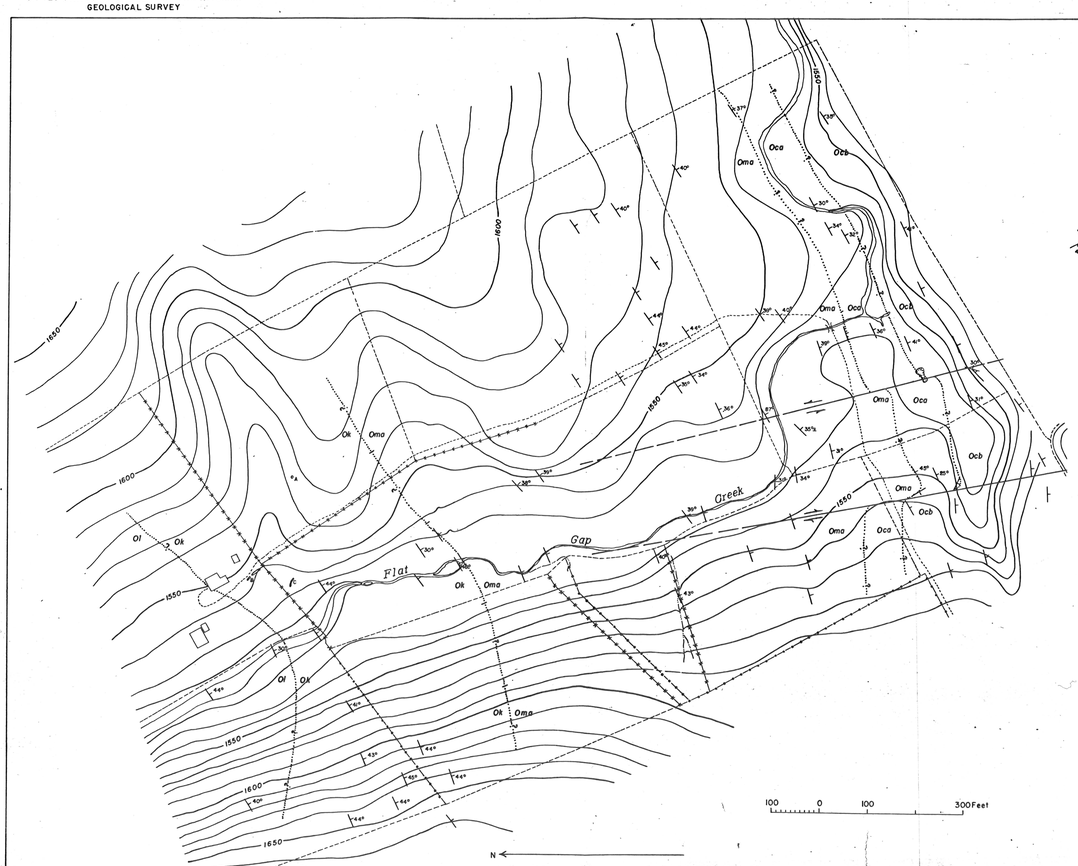
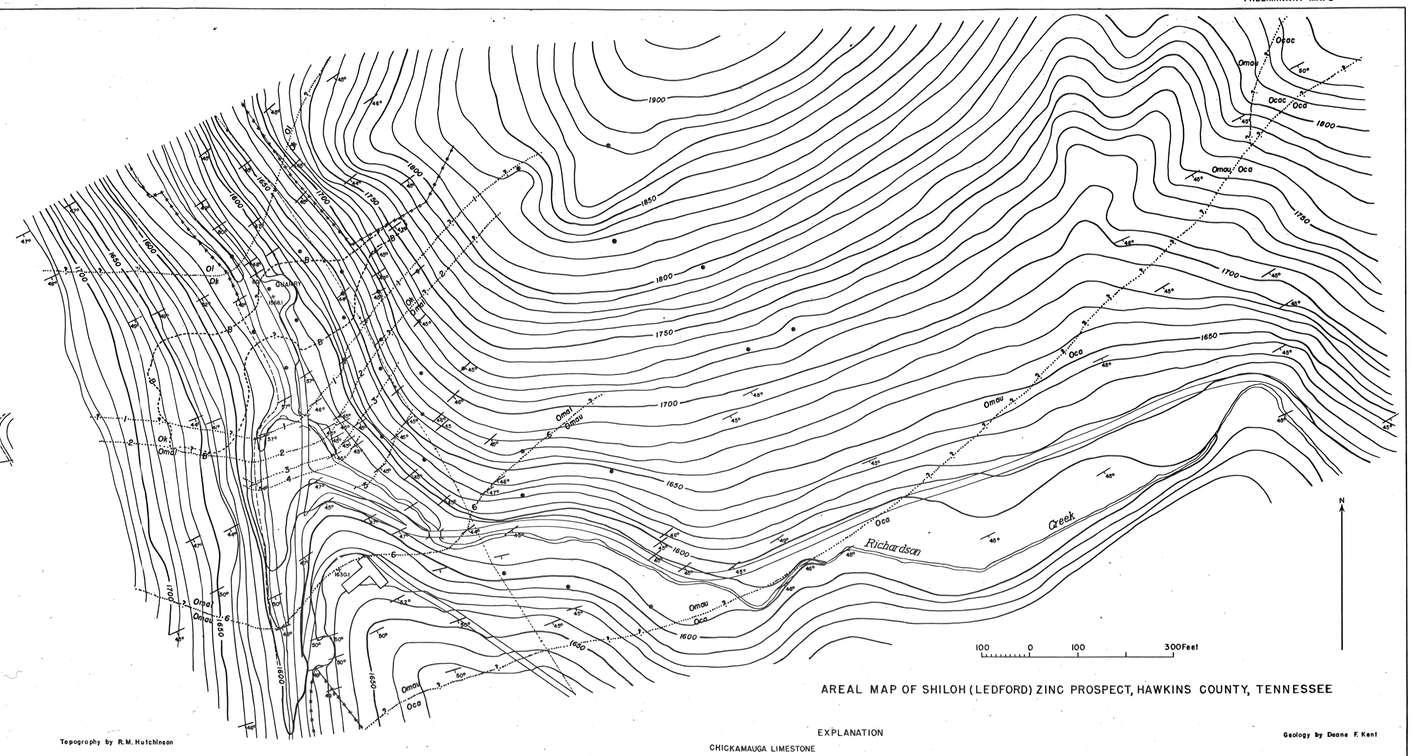


AREAL MAP OF HENRY N. JOHNS ZINC PROSPECT, HANCOCK COUNTY, TENNESSEE

Topography by R.M. Hutchinson

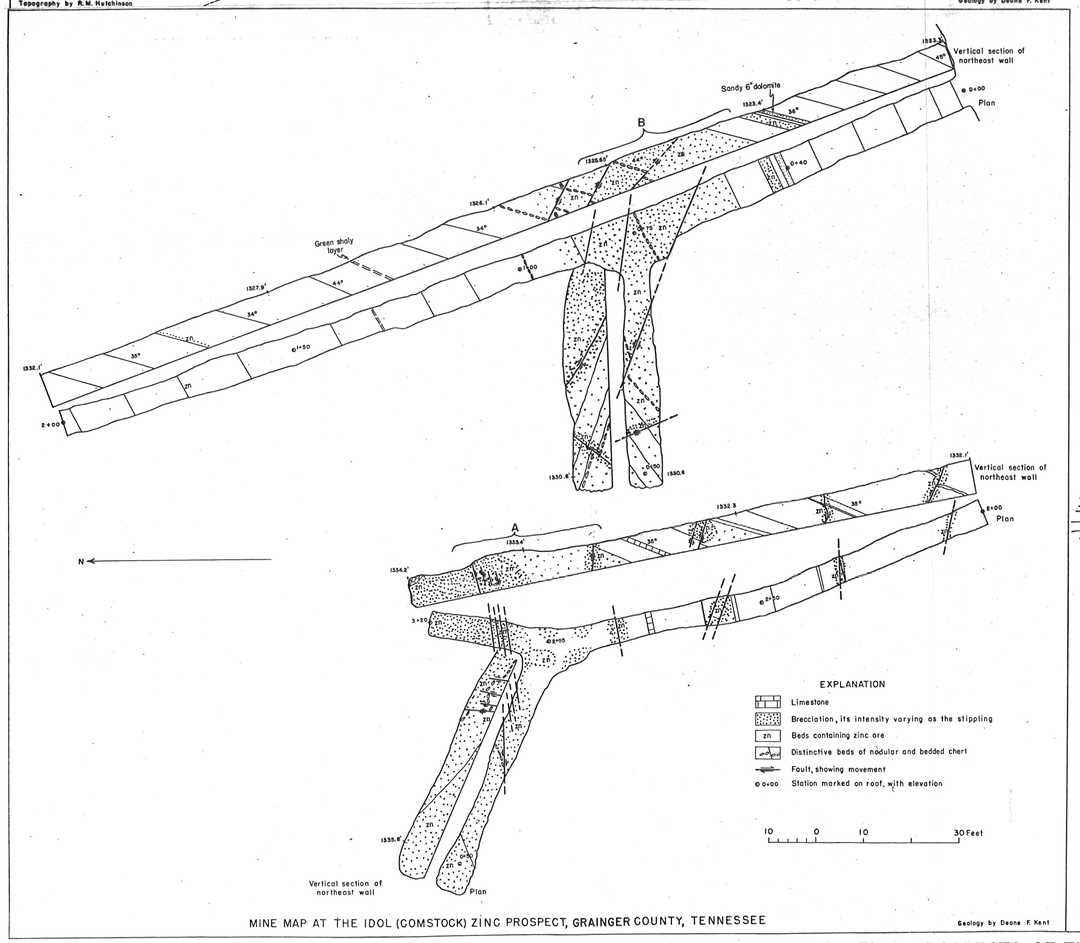
Geology by Deane F. Kent



AREAL MAP OF SHILOH (LEDFORD) ZINC PROSPECT, HAWKINS COUNTY, TENNESSEE

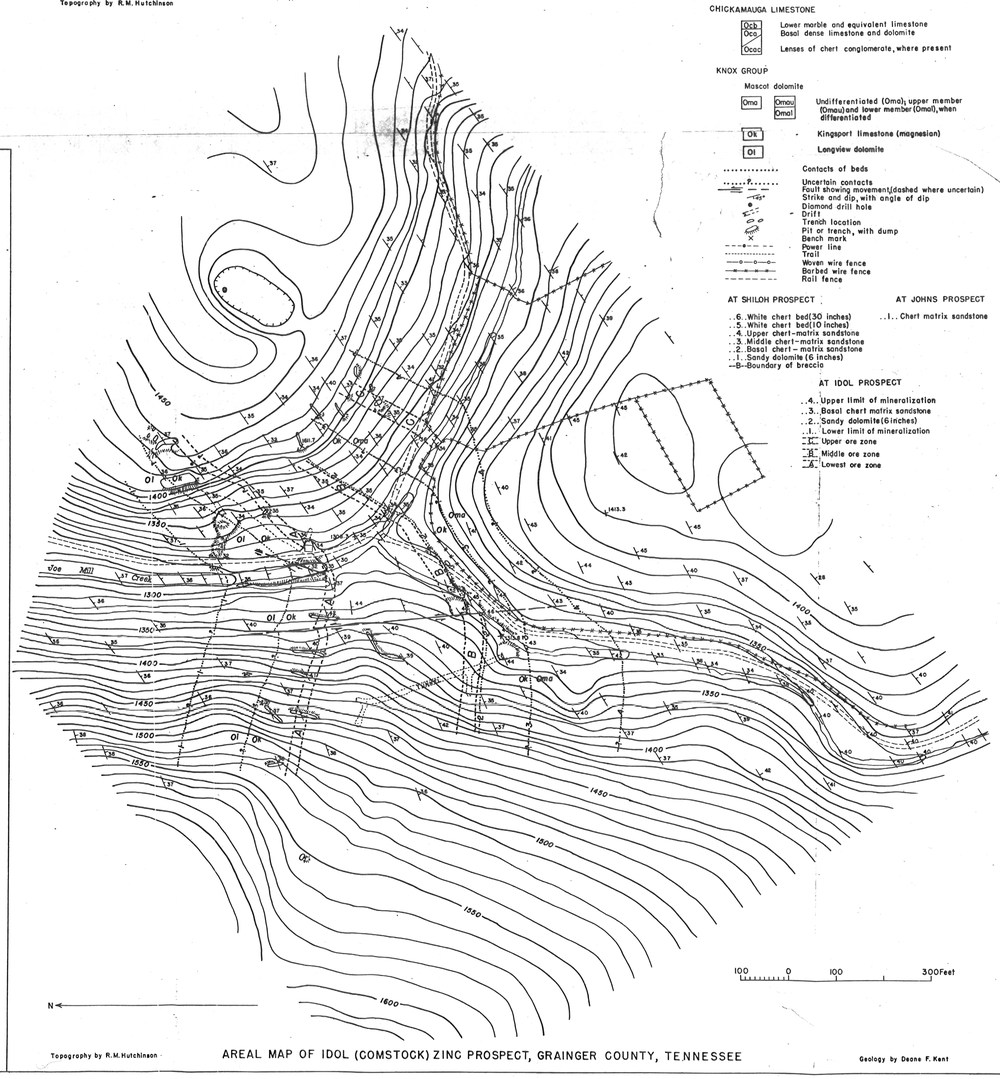
Topography by R.M. Hutchinson

Geology by Deane F. Kent



MINE MAP AT THE IDOL (COMSTOCK) ZINC PROSPECT, GRAINGER COUNTY, TENNESSEE

Geology by Deane F. Kent



AREAL MAP OF IDOL (COMSTOCK) ZINC PROSPECT, GRAINGER COUNTY, TENNESSEE

Topography by R.M. Hutchinson

Geology by Deane F. Kent

EXPLANATION

CHICKAMAUGA LIMESTONE

- Ocb, Oca — Lower marble and equivalent limestone; Basal dense limestone and dolomite
- Ocac — Lenses of chert conglomerate, where present

KNOX GROUP

Mascot dolomite

- Oma — Undifferentiated (Oma), upper member (Omau) and lower member (Omal), when differentiated
- Ok — Kingsport limestone (magnesian)
- Ol — Longview dolomite

Contacts of beds

Uncertain contacts

Fault showing movement (dashed where uncertain)

Strike and dip, with angle of dip

Diamond drill hole

Drift

Trench location

Pit or trench, with dump

Bench mark

Power line

Trail

Woven wire fence

Barbed wire fence

Rail fence

AT SHILOH PROSPECT

- 6. White chert bed (30 inches)
- 5. White chert bed (10 inches)
- 4. Upper chert-matrix sandstone
- 3. Middle chert-matrix sandstone
- 2. Basal chert-matrix sandstone
- 1. Sandy dolomite (6 inches)
- B-Boundary of breccia

AT JOHNS PROSPECT

- 1. Chert matrix sandstone

AT IDOL PROSPECT

- 4. Upper limit of mineralization
- 3. Basal chert matrix sandstone
- 2. Sandy dolomite (6 inches)
- 1. Lower limit of mineralization
- U Upper ore zone
- M Middle ore zone
- L Lowest ore zone

MAPS OF THE SHILOH, JOHNS, AND IDOL ZINC PROSPECTS HAWKINS, HANCOCK, AND GRAINGER COUNTIES, EAST TENNESSEE

By Deane F. Kent

The Shiloh, Johns, and Idol zinc prospects, detailed maps of which are presented herewith, are of special importance at this time because of the need for zinc in the war industries. They are all located in the Copper Ridge zinc district, a map of which has been prepared by John Rodgers and published by the Geological Survey, United States Department of the Interior, (Geologic map of the Copper Ridge district, Tenn.). This district is a belt about a mile wide, extending northeast along the strike of the beds and passing through points situated some 2 miles northwest of Rutledge and 6 miles northwest of Rogersville.

The rocks surrounding the zinc prospects are dolomite and dolomitic limestone of the Knox group, including chiefly parts of the Mascot dolomite, Kingsport limestone, and Longview dolomite (the oldest). Locally the lower part of the overlying Chickamauga limestone is also included in the mapped areas. Most of the exposed ore is confined to the Kingsport limestone, here largely dolomitic. In these formations are certain horizon markers, especially thin sandstones with chert as matrix, which serve as excellent guides to the detailed structure.

The prospects are on the southern limb of a large anticline broken by a great thrust fault to the north. The regional strike is approximately N. 60° E., and the dips are southward, generally about 40°. Cross flexures and transverse faults are lesser structures with which the ore bodies are typically associated.

The ore consists of light-colored sphalerite, pyrite, and dolomite, with small quantities of other minerals. Pyrite forms a cement in brecciated zones associated with the flexures and cross-faults. Tenors range up to 8 percent zinc, but most of the exposures regarded as promising average about 3 percent.

Shiloh prospect

The Shiloh (Ledford) zinc prospect is in Hawkins County, 6½ miles by direct line northwest of Rogersville, Tenn., but about 24 miles by the best road. A branch line of the Southern Railway has its terminus at Rogersville; the nearest ore milling facilities are on this railroad at Jefferson City, some 35 miles to the southwest. Richardson Creek nearby furnishes sufficient water for possible mill operation. As exposed the principal ore-bearing bed is 52 feet thick; it is in the basal part of the Kingsport limestone. Folding is present but is not conspicuous. No faults, other than very minor slippage along fractures and bedding planes, are known. Mineralization is localized in places where the limestone bed is partly or wholly altered to dolomite and is brecciated.

The main exposure of zinc ore is in a quarry on the northeastern side of the creek. Here a gentle anticlinal flexure causes a local change of strike from N. 40° E. to N. 80° E.; probably this flexure was the cause of the shattering. Examination of the ore-bearing zone shows that brecciation follows the axis of the anticline almost directly down the dip (45° SE.) but bearing slightly to the northeast.

The zinc ore occurs in the interstices of the breccia in the form of moderately dark brown sphalerite with some pyrite in a gangue of white, coarsely crystalline dolomite. The tenor is estimated to be about 3 percent zinc.

Another slight change in strike, not well shown on the map because of the scarcity of outcrops, was found to the northeast and the beds may be mineralized along this structure, as in the ore body exposed in the quarry.

Prospecting was carried on at this locality by the Universal Exploration Company from 1941 to 1943.

Henry N. Johns prospect

The Henry N. Johns property is in Hancock County, 9 miles southwest along the strike from the Shiloh prospect and about 27 miles by a moderately good road from Rogersville, Tenn. It is on Flat Gap Creek, which furnishes sufficient water for a small mill.

The zinc ore is in a dolomite bed 50 feet thick in the basal part of the Kingsport limestone. The strike varies from N. 55° E. to N. 63° E. and the dips average 40° SE. Brecciation is prominent locally and is attributed to two faults, both of which strike N. 10° W. to N. 15° W. The displacement on the western fault is approximately 70 feet, that on the eastern fault less than 25 feet. The upper Mascot dolomite and the basal Chickamauga limestone between the two faults are disturbed where exposed, and the brecciation and associated mineralization lie chiefly between the projections of the same faults.

The main exposure of zinc ore, at the point indicated by B on the map, is in an outcrop of heavily brecciated, coarsely crystalline dolomite. Another small outcrop of breccia is at the point indicated by C on the map, and a third occurrence, now covered, is reported to have been approximately at the point marked A on the map.

The ore has a tenor of more than 2 percent metallic zinc at point B on the map. Here it occurs in the interstices of the breccia as medium brown sphalerite in a gangue of white, coarsely crystalline dolomite.

Preliminary prospecting was carried on at this locality in 1943 by the Bureau of Mines.

Idol prospect

The Idol (Comstock) zinc prospect is in Grainger County, a mile and a half from the Thorn Hill Post Office and about 15 miles by good road from Lone Mountain, a station on the Cumberland Gap branch of the Southern Railway. It is near Joe Mill Creek, which furnishes sufficient water for possible mill operation.

The rocks exposed in the mapped area belong to the Mascot dolomite (above), the Kingsport limestone, and the Longview dolomite. The strike ranges from N. 20° E. to N. 70° E., outlining gentle flexures cut by many small normal and reverse faults.

The main exposures of zinc ore are confined to three beds (A, B, and C on the map) but sphalerite also occurs in small quantities in several other beds yielding tenors as high as 1 percent zinc. The ore is in breccia zones along normal and reverse faults and following certain beds. Some disseminated ore is found in beds of coarsely crystalline gray dolomite. Locally the sphalerite occurs as rosettes as much as an inch in diameter. The principal ore zone (B) is a brecciated dolomite lying 2 to 5 feet below a distinctive bed of sandy dolomite, 6 inches thick, near the top of the Kingsport limestone. The ore-bearing bed is 18 to 20 feet thick. In several places it has a zinc content of 3 percent or more. It passes under soil cover northeastward along the strike but shows heavy mineralization at its next outcrop, at the Dalton prospect, a mile and a half to the northeast.

Another mineralized bed (A), corresponding to that at the Johns and Shiloh prospects, is a dolomitized limestone in the basal part of the Kingsport limestone and this contains over 1 percent zinc. A third ore zone (C), which is in the basal part of the Mascot formation, contains over 2 percent zinc. Some zinc was also observed in fractures in the Longview dolomite.

The total thickness of formations in which mineralization has been found is over 475 feet and the distance along the strike is well over 1,000 feet. All told, 20 pits, trenches, and drifts have been dug here; the largest is a tunnel 320 feet long, mapped separately. Some carbonate ore was produced from the pits indicated on the northeastern part of the map.

The mine map shows the small, high-angle reverse faults and the brecciated zones containing zinc ore. Recognition of these faults on the surface is made difficult because they are nearly parallel to the strike and have only minor displacements and because outcrops are not extensive. The ore seems to be localized by some of these faults. Ore is cut by other faults, showing that some faulting followed mineralization. Except near faults, the beds dip 35° to 45° SE.

ZINC PROSPECTS OF THE COPPER RIDGE DISTRICT, EASTERN TENNESSEE