manella coquina). No inclusions were seen in this material. Except for water in its crystal lattice, it is probably pure silica.

Fibrous Calcite (averages 2.7 percent in Laminated argillaceous limestone and 6.2 percent in *Dalmanella* coquina). This is believed to be nearly pure calcite formed by brachiopod shells, mainly *Dalmanella fertilis.*

Dolomite (averages 0.28 percent of Laminated argillaceous limestone and 1.5 percent of *Dalmanella* coquina). This material is probably pure, having been exsolved from calcite oversaturated with magnesium.

Feldspar (0.1 percent of Laminated argillaceous limestone and 0.04 percent of *Dalmanella* coquina). As in quartz, the minor inclusions are of no significance. The minerals are essentially pure.

Muscovite (averages 0.09 percent in Laminated argillaceous limestone and is rarely seen in *Dalmanella* coquina). The muscovite seen was individual crystals without inclusions.

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A NEW FIND AT THE SMITHVILLE METEORITE LOCALITY

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EARLIER FINDS

Farrington (1909) has summarized the known history of Smithville meteorite finds prior to 1909. No further finds have been reported since. Briefly, then, the record is as follows:

Date Found		Weight (Lbs.)	Location
1.	c.1839	over 36	"a few miles west of Cany Fork, near the road from Liberty"
2.	c.1863	8	Berry Cantrell farm
3.	c.1863	over 1	Berry Cantrell farm
4.	1892	15	J. D. Whaley farm
5.	1892	65	James Beckwith farm
6.	1892	7	J. D. Whaley farm

Number 1 was described by Troost (1840, 1845) who purchased it between 1840 and 1845. Some "chips" had been removed for assaying; hence the original weight is uncertain. If "a few miles" in the location as given by Troost was actually 7 miles, this find came from the same area as the others.

Numbers 2 and 3 were described by Glenn (1904), who acquired them in 1903 but says they were found "about 40 years" earlier. The smaller mass (No. 3) had "had a portion removed."

Numbers 4, 5, and 6 were described by Huntington (1894). They had been purchased in 1893 by H. A. Ward of Rochester, N.Y., from Herman Meyer, a bank cashier in Carthage, Tennessee. Huntington quotes a letter from Meyer to Wa[rd] stating that "the spot where (they were) found [is] three-eighths of a mile south from the Smithv[ille] and Lebanon Pike, two miles from Smithville, a[nd] on (the) extreme southwest field of J. D. Wha[ley] and adjoining field of James Beckwith." T[he] boundary between the Beckwith and Whaley fa[rms] has shifted back and forth over the years, but [the] west line in 1892 probably followed Falls Cre[ek] as shown in Figure 1.

What may have been a seventh specimen [was] mentioned by Glenn (1904) as having been s[ent] to the U.S. National Museum. However, this sp[eci]men is not listed in Merrill's catalog of the muse[um] collection as of 1916.

1962 FIND

In January, 1962, the writer visited the Sm[ith]ville locality and spent several days searching fa[vor]able stretches of ground with an electromagn[etic] metal detector. The device used was copied f[rom] one owned by Mr. H. O. Stockwell of Hutchin[son,] Kansas, custom-built for him quite a few years [ago] by Hedden Metal Locators, Inc., formerly of Mi[ami,] Fla. It features overlapping D-shaped transmit[ting] and receiving coils about 4 feet in diameter an[d] mounted on a wooden wheelbarrow-like frame.

In the absence of information concerning [the] location of the Cantrell property, plots close to [the] Beckwith-Whaley line were sampled more or [less] at random. It now appears that better results m[ight] have been obtained by concentrating on an [area] farther southwest. (See Figure 1.) A further se[arch] is planned for January, 1963.

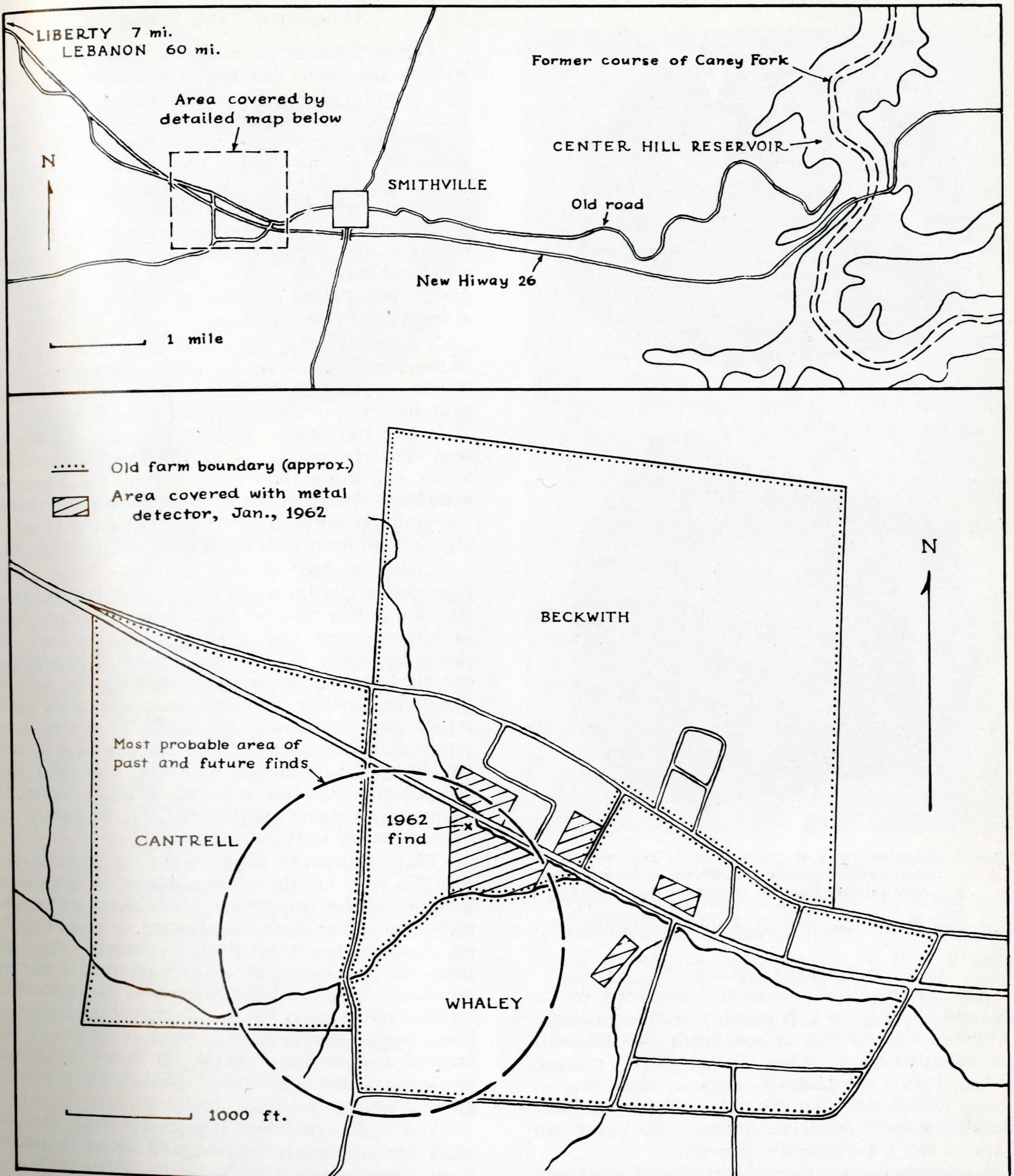

Fig. 1. Location Map

However, one specimen weighing approximately 7 pounds (2.924 kg.) was found at the point indicated on Figure 1. The top of this specimen was about level with the ground surface; it could be seen without digging after the detector revealed its presence. Undoubtedly, the meteorite had been turned over many times by the plow, so that surface scale due to oxidation was missing.

The latitude and longitude of this new find are: N 35° 57.8', W 85° 50.3'. Prior (1953) gives the coordinates of the Smithville fall as N 35° 59', W 85° 51'. This is gently rolling farm country, now

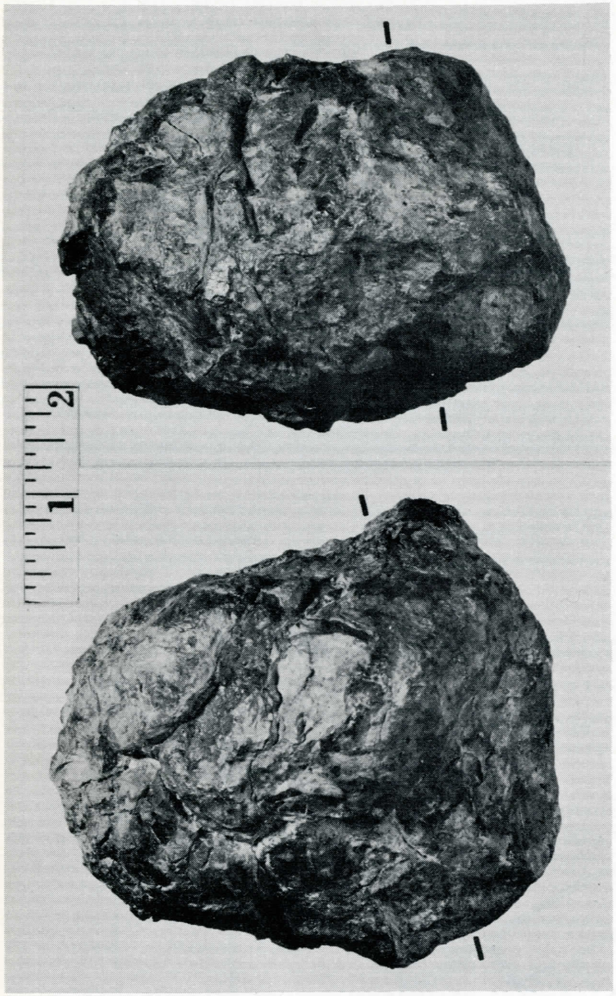

Figure 2. Exterior views of the 1962 find. Top view is the lower side of specimen as shown at bottom. Short lines indicate position of section shown in Fig. 3.

being rapidly encroached upon by suburbs of Smithville.

External Form

The newly found specimen, as shown in the photographs, Figure 2, is roughly ovoidal in shape. Published descriptions of specimens 1-6 also indicate rounded forms. Thus Troost (1845) remarks of No. 1 that "it had an irregular oval shape;" Glenn (1904) says that No. 2 was "of a compact, rounded shape;" and Huntington (1894) gives the shape of No. 5 as "roughly spherical."

Undoubtedly, weathering has played some part in shaping these specimens. However, in view of the fact that other irons exposed to long weathering are not particularly rounded, it is reasonable to conclude those found at Smithville were more or less rounded when they arrived at the earth's surface. If they are fragments from a single body broken up in the atmosphere, there must have been plenty of time for ablational rounding after the break-up.

Composition and Structure

Figure 3 shows an etched section through th writer's specimen. Octahedral structure is distin but irregular. Kamacite bands belonging to a pa ticular set show marked variation in width. Ind vidual bands pinch and swell. The average widt is perhaps 1½ to 2 mm. Thus, this is a "coarse octahedrite, as pointed out by Brezina (1885, 1895 Locally (as toward the lower left margin, Figure 3 octahedral structure blurs out in a jumble of irreg lar kamacite grains. These grains have a widt comparable to that of the bands. The plates an grains are broken up into secondary granules b a network of fine fractures.

Taenite lamellae are conspicuous between som of the bands but are entirely lacking between other Their absence may be due in some places to oxid tion; however, in the two distinctly unoxidized are (left and top center, Figure 3), it can readily b seen that the taenite is discontinuous, appearin along not more than one-third of the kamaci interfaces. There is little or no visible taenite i the granular areas. In some places taenite lamell broaden out to include small areas of grilled plessit

Earlier studies of this meteorite have calle attention to the abundant screibersite. For instanc Brezina (1895) remarks that "kamacite plates ha in almost every case a rib of schreibersite." A shown by Figure 4, the "ribs" consist of discontin ous elongate patches strung out along the axes o the plates. Locally, they may touch the plate bor ers, or even cross over into adjoining plates. Ina much as arrangement of the schreibersite is co trolled by the octahedral structure, it is clear th the schreibersite has replaced original kamacit Many schreibersite patches enclose, or partly e close, rounded kamacite inclusions.

Three unusually large patches of schreibersi may be seen on the sectioned surface shown i Figures 3 and 4 (top center, lower right, and upp right). In these, there is a distinct core of schrei ersite which has a rougher appearance, resultin from the breaking out of tiny fragments durin polishing. The breakage appears to be controlle by cleavage (perfect basal and imperfect prismatic The rough "core" schreibersite is probably in th form of single crystals, whereas the smooth-polishin borders, and the schreibersite of the ribs, is a fin grained aggregate.

The 1962 specimen apparently lacks the r markable graphite-troilite nodules noted in earli finds. Huntington (1894), in describing a 9 x etched plate from one of the three masses found i 1892, remarked that "nodules of graphite and tro ite are abundantly scattered over the surface. Usu ly these nodules are troilite embedded in graphit and this in its turn is surrounded by schreiberse though there is considerable variety in the relati arrangement of these three minerals." One of th nodules was 2 inches in diameter. Huntingto found angular transparent particles in the graphi

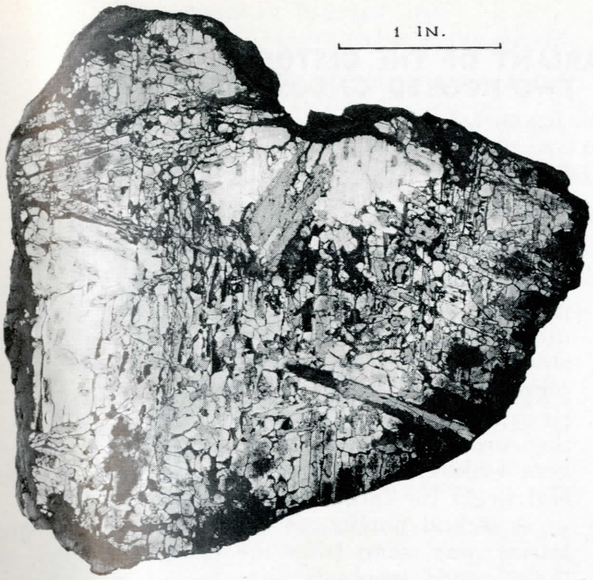

Figure 3. Etched section. Black around margins is oxidation. Angular black areas toward center are depressions due to chipping. Schreibersite patches slightly greyer than nickel-iron.

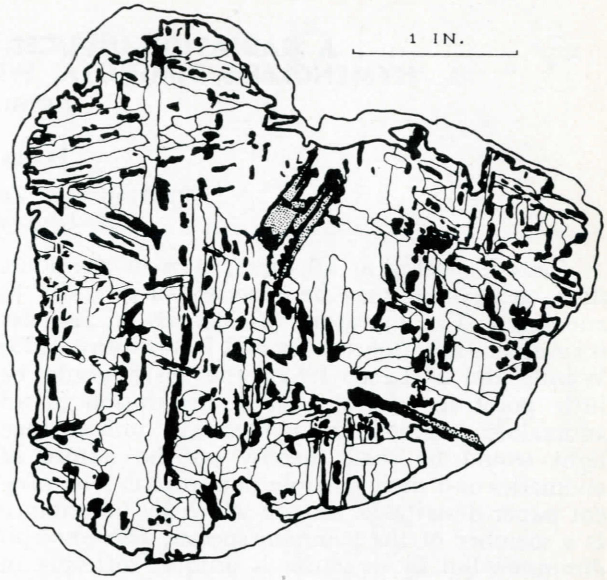

Figure 4. Tracing from Figure 3. Black: normal schreibersite. Stippled: "core" schreibersite.

which he identified as probable diamond. This has not been verified.

It is evident that this meteorite contains abundant lawrencite, the iron chloride. Rusting of the etched surface, even after prolonged soaking in alcohol and coating with shellac, has been a serious problem. Apparently the chloride is irregularly distributed. Very little rust formed on the outer half inch of the etched surface. Presumably, the chlorine originally present here "leaked out" while the specimen lay in the ground. Toward the center, rusting was much heavier in some places than in others. It tended to be almost totally lacking in the two areas of minimum oxidation (top and left center, Figure 3). When the rust is removed, underlying kamacite plates show minute black hemispherical pits about .05 mm. in diameter. Kamacite plates lacking these pits show no rust. It seems likely that the pits mark the locations of very small inclusions of lawrencite.

The effects of weathering are noteworthy. As usual, oxidation has penetrated farthest between kamacite plates and along fractures within the plates. As the plate itself begins to succumb, fine disseminated alteration appears first in the core, gradually intensifying and spreading out toward the plate borders. This strongly suggests a zonal variation in the composition of the plates. Taenite and schreibersite are much more resistant.

The principal oxidation mineral appears to be magnetite. Limonite is present in lesser amounts.

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