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FINAL

GEOLOGICAL REPORT

on

"SCHOONER CREEK AREA"

N.W.T. (Canada)

IMPERIAL OIL LTD., CANOL PROJECT.

Preliminary Assignment.

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Read and accepted by:- Herb A. Link

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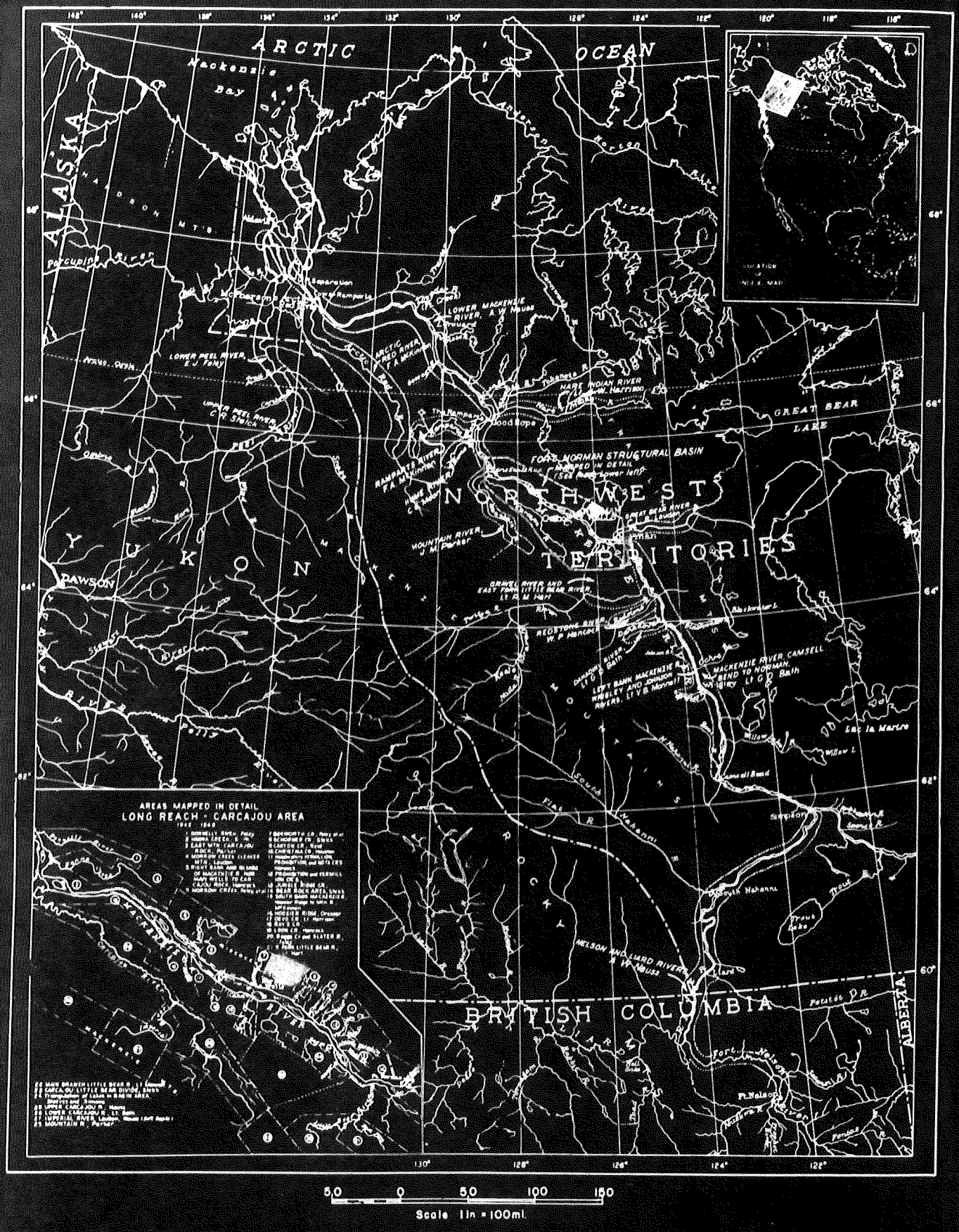
PLATE I.



Index Map of North Western Canada, Showing Location of Schooner Creek Area

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ON

"SCHOONER CREEK AREA"

A B S T R A C T

The Schooner Creek area is a portion of the southern flank of Discovery Range and all dips are southerly.

Ninety percent of all the strata exposed ranging in age from Silurian to Upper Devonian is limestone. Strata of Lower Silurian age, Middle Silurian, post Middle Silurian - pre Middle Devonian age, Middle Devonian and Upper Devonian age were recognized.

The Kee Scarp limestone, which is correlated with the producing horizon at Norman Wells is distinct and much higher stratigraphically than the Middle Devonian limestones. The Kee Scarp limestone was apparently formed as a coral reef. No "structures" worth testing were found in the entire area.

Chapter I

I N T R O D U C T I O N

Schooner Creek area lies about four miles north of the Norman Wells field. The area had been previously mapped and the objective of this report was to check on the "Kee Scarp" as an oil structure possibility and to set up a detailed stratigraphic section for post-Silurian beds.

Field Work

On April 18, 1943, Party "B", consisting of C.R. Stelck, and H.A. Gibson, went into Fish Lake and the mouth of Schooner Creek by dog team. Larry Dennis was the dog driver. The snow was soft and the trip in took two days. The driver returned to Norman Wells the third day. A base camp was set up at the head of the fan delta of Schooner Creek. A plane table survey was made of Schooner Creek and detailed sections were measured and collected.

On April 28, the party joined S. Houston and E. Umbach, and the remaining work was carried out in conjunction with them from a schooner base on Kee Scarp. On May 5th the party returned to Norman Wells.

On May 8th the writer accompanied the large party under Mr. Foley up Bosworth Creek. The data on the Fort Creek - Beavertail contact was gathered at this time. On May 14, this party returned to Norman Wells.

The base map for this Report was constructed from aerial photographs C.P.A. #199, 234-236, 409-411, and from Schooner Creek plane table traverse by Stelck and Gibson (1943), and from Kee Scarp the plane table traverse by Houston, (1942) Robb, and Umbach was used.

Suites of Fossils 3500 to 3543 were collected on this trip. Suites 3569 to 3583 were collected on the Bosworth Creek trip. Beavertail-Fort Creek contact suites on Bosworth Creek were collected in conjunction

with F.A. McKinnon and bear his suite numbers 6509 to 6515.

Geographical Position and Accessibility

The Schooner Creek map area is in the District of Mackenzie Northwest Territories of Canada. Latitude 65° 18' N., Longitude 126° 40' W. (See Fig. 1). It is 4 miles north of Norman Wells and is a portion of the south west flank of Discovery Range.

The area is easily reached by a "cat" road that runs north to Kee Scarp from the east end of the Norman Wells airport. A dog team trail runs along Kee Scarp for the entire length.

Small pontoon planes and ski planes can land on Fish Lake.

Culture and Vegetation

This area is part of J. LaPlante's trap line and he has a small cabin at the east end of Fish Lake. The lake is used by LaPlante and by Indians for fishing.

The timber of the area is small and quite open on Kee Scarp and on the lower slopes of Discovery Range. The northern part of the map sheet is above the timber line and carries only thin tundra over the bare rock.

Previous and Pertinent Reports

The Schooner Creek area is sufficiently close to Norman Wells that most of the Canol Geologists were able to visit the area or areas adjacent. Early workers in the region included this area in their map sheets.

Dr. T.A. Link (Ref. 7 & 8) in 1920 and 1921 shows the general boundaries of formations of this area in his report. G.S. Hume's report on the Norman Wells area (Ref. 1) also shows these same general boundaries. In 1942, S. Houston (Ref. 6) and Lt. G.D. Bath (Ref. 2) reported on Kee Scarp for the Canol Project and S. Houston ran a survey from Kee Scarp to Schooner Creek.

The preliminary report on Schooner Creek area by the writer is listed under File No. G.C. 43-5 (Ref. 10).

The Canol reports dealing with adjacent areas are those of W. Reid and F. McKinnon on Canyon Creek (Ref. 9) to the east, 1943; E.J. Foley et al on Bosworth Creek (Ref. 5) to the west, 1943; O.D. Boggs (Ref. 3, 4) several reports and Annual reports on the Norman Wells field to the south, 1942 and 1943. No report has been made on the country to the north of the Schooner Creek area.

Acknowledgments.

The writer wishes to express his indebtedness to H.A. Gibson who ran the instrument in very miserable weather and later did the drafting of the plates for this report. Pvt. E. Umbach assisted in making the collections on the face of Kee Scarp.

This seems an appropriate place to give O.D. Boggs just credit for being the first one to properly outline the concept of the biohermal nature of the Oil Horizon at Norman Wells and the proper relationships of the Kee Scarp limestone to it. The evidence gathered by this report and later work has only succeeded in establishing his original tenet. In fact, the object of this investigation was to verify the sub-surface data interpretations of Mr. Boggs that the producing zone at Norman Wells is a "Reef" limestone stratigraphically equivalent to the "Kee Scarp" reef.

Chapter II

T O P O G R A P H Y

The Schooner Creek area is located on the southern flank of the Discovery Range and physiographically consists of a number of dip-slopes and cuestas carved from Silurian and Devonian limestones.

Drainage

This area is part of the Mackenzie river drainage and more particularly of Bosworth Creek. Schooner Creek joins Bosworth Creek just below Fish Lake draining the dip slopes to the north. Schooner Creek is a consequent stream incised in a canyon a few hundred feet deep in the middle reaches, heading in the various notches along the crest of the range and spilling over a fan delta in Fish Lake valley to join the east fork of Bosworth Creek. Bosworth Creek is a subsequent stream that meanders through Fish Lake valley in a shallow channel that becomes straighter and more incised to the west down stream. Fish Lake was formed by the damming of the valley by the fan delta of Schooner Creek. The lake is a half mile wide and two miles long and is suitable for float planes. The waters north of the crest of Discovery range flow into the Oscar-Morrow Creek drainage system.

Land Forms

The drainage pattern of the area is subsequent, juvenile. The blocking of the valley of Bosworth Creek by the fan deltas of the various streams running down the dip slope has formed lakes and superimposed meandering patterns on the upper parts of Bosworth Creek.

The dominating feature is the Discovery Range. Relief is around 2000 feet with the crest of the Discovery range at about 2500 feet elevation and Kee Scarp around 1200-1300 feet elevation. This range is carved from a southwest dipping block of Silurian limestones. The north face

of Discovery Range is almost vertical and is straight enough to suggest a fault line scarp. This scarp stands boldly out over a dissected rolling country that extends northward for several miles. The southern slope of Discovery range carries successive ridges and dip slopes of higher beds of limestone, with the occasional rounded outlier of later formation retained on the preceeding dip slope.

Dominating the valley of Fish Lake are the steep 275 feet limestone cliffs of what is known as "Kee Scarp". Fish Lake valley itself is a U-shaped glaciated valley with an aggraded flat bottom and the long steep face of Kee Scarp is the glaciated wall. The dip slope of Kee Scarp is carved into long pronounced subparallel grooves so the ice covered the entire scarp at one time. The limestone on the north side of the valley shows similar deep grooving. These grooves are 20 to 30 feet in relief. Schooner Creek has built a large fan delta that has extended across the Fish Lake valley and shifted Bosworth Creek close to Kee Scarp.

Physiography

The entire area is carved from southerly dipping beds resulting in dip slopes on top of the massive limestone members and valleys and scarps indicating the softer beds. Discovery Range is carved from Silurian limestones with the subsequent valley of the west fork of Schooner Creek carved in Ramparts shale. The ridges of Beavertail and Kee Scarp limestones flank a valley gouged out of Lower Fort Creek shales. Morainal blocking of this latter valley caused aggrading of the bottom. Kee Scarp dies out to the east and west by the actual thinning of the limestone that makes the cliffs.

Vertical cliffs are maintained by jointing in the Kee Scarp limestone, the Beavertail limestone, and the Silurian limestone. Gorges, "hoodoo" forms, and rounded outliers are usually found to be associated

with the Bear Rock formation.

Geography

Only one note is necessary on nomenclature. Schooner Creek was termed Gibson Creek in some of the earlier drafts of reports and in some of the note books. Schooner Creek has precedence (Ref. 6) and a later named "Gibson Creek" is now used for a stream in Foley's Donnelly River area.

Chapter III

S T R A T I G R A P H Y

General

The Schooner Creek area contains strata ranging in age from Silurian to Upper Devonian. The formations are mainly limestone with some shale in the lower Middle Devonian and several hundred feet of shale at the base of the Upper Devonian. One definite angular unconformity is recognized in pre-Middle Devonian post-Middle Silurian rocks at the base of the Bear Rock formation. The arbitrary division of Beavertail - Ramparts was set up for Canol geologists in this area.

Table of Formations

QUATERNARY	Recent	Silts, gravels	----
	Pleistocene	Glacial drift	----
UPPER DEVONIAN	Upper Fort Creek	Shales	----
	Kee Scarp	Biohermal limestone	178' +
	Lower Fort Creek	Shales	300-500'
MIDDLE DEVONIAN	Beavertail	Limestones with some shale at top	56½'
	Ramparts ls.	Brown Limestones	45½'
	Ramparts sh.	Shales and limestones	239½'
DEVONIAN or SILURIAN	Bear Rock	Limestone breccia	219'
SILURIAN	Mount Kindle	Massive limestones	0-100'
	Franklin Mts.	Thin bedded limestones	1000' +

Silurian

The Silurian rocks were not examined in any detail as the snow was still deep on the uplands of Silurian outcrop when the writer visited them. Over 1000' of thin bedded limestones and thin shales outcropping on the scarp face and along the crest of Discovery Range are correlated with the Silurian section on Bear Mountain. This in turn is correlated with the Franklin Mountain formation of Williams. The lithology is similar and the only fossils collected in the area were duplicated in the Bear mountain Silurian. Overlying these thin bedded limestones are heavy massive crystalline limestones that appear as an erosional remnant below the Bear Rock formation. A scanty coralline fauna collected from the few hundred feet of uppermost Silurian beds would tend to indicate that the basal part of the Mount Kindle formation is present in some parts of the area. The upper beds are very porous and coarsely crystalline and would serve as excellent reservoir strata.

The upper contact of the Silurian is definitely erosional, and as much as 75 feet of erosional relief on the old Silurian surface can be noticed on the west fork of Schooner Creek. Several large monadnock-like outliers of upper Silurian can be seen to the immediate west of the map sheet.

Fossil suites 3401, 3402, 3404, 3523, 3524, 3525B, were collected from the Silurian of this area.

Devonian or Silurian Bear Rock formation.

Overlying the Silurian, with a definite erosional unconformity, is a formation 219 feet in thickness made up of a limestone breccia. It is known as the Bear Rock formation and both its age and origin are under dispute.

A complete exposure of the formation was obtained on the east fork

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of Schooner Creek and yielded the following sections:

—— Limestone, blocky (top of cliff) Ramparts
4' Dolomite, dark
1' Limestone, soft
4' Limestone, dark hard
15' Limestone, thin bedded blocky, with thin shales, carries basal Ramparts fossils, 1" bed of grey soft shale at base chosen as "base of Ramparts".

—— Contact of Ramparts & Bear Rock, apparently conformable.

1' Dolomite, hard, angular fracturing, fine grained, massive.
4' Dolomite, brown with thin bedding laminae.
3' Dolomite, brown, argillaceous soft.
23' Limestone, dolomitic brown, carries breccia inclusions but is partially bedded. Matrix looks like the inclusions. Similar to lithology of the inclusions in the hoodoo zone below.
12' Limestone, dolomitic, brown, breccia, very little matrix other than brown dolomite.
112' Breccia, coarse. Large angular blocks of sandy appearing brown dolomitic limestone are contained in a soft argillaceous dark brown dolomitic matrix. There seems to be no bedding and the formation weathers into hoodoo forms. Dolomite boulders reach 3' in size.
20' Breccia, as above poorly bedded with thin hard shaly streaks.
2' Shale, yellow limy.
6' Breccia, brown dolomite boulders in a brown limestone matrix.
7' Dolomite, brown, sandy, sulphur stained.
1' Dolomite, thin cherty.
11' Breccia, bedded, dolomite inclusions, dolomite matrix.
4' Shale, light weathering sandy limy.
5' Dolomite dark brown with dolomite breccia included.
1' Conglomerate, fine yellow weathering soft.
2' Limestone, thin bedded, blocky weathering.
3' Dolomite, thin bedded, sandy, grey and brown.
4' Limestone, fine, blocky, brown angular weathering.
1' Chert pebble conglomerate (sometimes absent).
—— Contact of Bear Rock and Silurian, angular erosional unconformity.
—— Limestone, greyish white, coarsely crystalline, porous. Mount Kindle (?) formation.

The writer would prefer to assign a Devonian age to the Bear Rock formation as the basal contact is angularly unconformable and the upper contact is not yet known to be disconformable. However, on the west fork of Schooner Creek a small conglomerate is developed at the top of the Bear

Rock and there is a slight suggestion of possible disconformity. However, this conglomerate may indicate merely a local condition.

On the west fork of Schooner Creek the basal Bear Rock carries fragments of the underlying coarsely crystalline white limestones of the Mount Kindle formation and lacks the bedded basal portion as given in the above section.

The writer suggests that the origin of the breccia in the Bear Rock is primary and the beds were originally laid down as a conglomerate. It seems unreasonable that the basal beds of the Bear Rock could have selective brecciation in place, of the harder members without crumpling the interbedded shales and thin chert conglomerates. There is over 100 feet of demonstrable Silurian relief in this small area alone. The basal beds of Bear Rock where not bedded, carry fragments of rocks of the underlying Silurian type.

The amount of unconformity between the Bear Rock and Silurian is best shown by the following figures:

P.T. Sta 27	Silurian dips 16½° S.W., strike 105° Bear Rock dips 30° S.W., dip southerly
P.T. Sta 26	Silurian dips 13° S.W., dip S.W. Bear Rock dips 24° S.W., dip S.W.
P.T. Sta 41	Silurian dips 23° S.W., strike 115° Bear Rock dips 18° S.W., strike 95°
P.T. Sta 43	Silurian dips 15° S.W., strike 135° Bear Rock dips 18° S.W., strike 110°
P.T. Sta 19	Silurian dips 13° S.W., dip S.W. Bear Rock dips 23½° S.W., strike 110°

Middle Devonian: Ramparts and Beavertail

The Middle Devonian formations of the area consist of 341½ feet of limy beds. These beds have been divided arbitrarily into three parts; Ramparts shale 239½ feet, overlain by 45½ feet of Ramparts limestone, and above this 56½ feet of beds assigned to the Beavertail. The writer would

prefer terming the whole section "Ramparts" and drop the term Beavertail. There seems to be no essential difference lithologically although the arbitrary divisions can be recognized faunally.

The following section of Middle Devonian is taken on lower Schooner Creek with the Fort Creek - Beavertail contact described from Bosworth Creek.

---- Shale, black, carries Tentaculites, Fort Creek, Suites 6509, 3579.
2' Argillite, black, Suites 6510, 3569. Suite 6516 from this bed and subjacent 8' of beds.
0.3" Shale, black carrying Leiorhynchus. Suite 3570 from this bed and bed below.
0.3" Argillite, black carrying L. castanea. Suites 6511, 3578.
---- Contact Fort Creek - Beavertail, conformable.
7½' Limestone, rubbly, brown, nodular and marly. Suite 6513.
11' Limestone, brown with thin shale partings. Suite 6514, 3580.
10' Limestone brown, bedded. Suite 6515, 3573, 3571.
5' Limestone, brown to grey.
4' Limestone, brown massive. Suite 3583.
7' Limestone, brown jointed dark.
12' Limestone, light grey brown with corals and porous zone at top. Suite 3572.
---- Shales 3" contact Beavertail and Ramparts. Contact, arbitrary, conformable. Section below here continued from Schooner Creek.
13' Limestone, dark brown, massive, fine fractures.
6½' Limestone, as above, rubbly weathering toward base.
4' Limestone, dark brown finely porous, fractured.
1' Limestone, hard buff brown.
3½' Limestone, light brown, fractured, porous. Suite 3523.
6' Limestone, brown bedded.
2' Limestone, shaley soft.
4' Limestone, grey buff, very fine.
4' Limestone, brown, bedded. Suite 3524.
1½' Limestone, thin bedded, hard.
---- Arbitrarily drawn contact, Ramparts Limestone and Ramparts Shale.
1' Limestone, fine grained, Suite 3532 collected from here and subjacent 30 feet of beds.
5½' Limestone, brown rubbly weathering. Suite 3514.
8½' Limestone, rubbly weathering with interbedded marly shale. Suites 3515, 3516.
12' Limestone, heavier beds with very thin shales. Suite 3517 large Prismatophyllum bioherms.
4' Limestone and shale interbedded. Suite 3518.
15' Limestones and shales, nodular and marly.
42' Shales and limestones nodular and marly, more shaly toward the base, badly covered.
4' Shale, dark grey calcareous. Suite 3528A, 3520.

6' Limestone, shaley. Suite 3519.
2' Shale, dark grey.
2' Limestone, light colored shaley with shales. Suite 3506.
2' Limestone and shales, lenticular weathering. Suites 3508 from here and subjacent 15'.
3' Limestone, shaley weathering and soft shale.
16½' Limestone, rubbly weathering and soft brown marly shale. Suite 3510, 3507.
1½' Limestone, shaley.
4' Limestone, soft weathering, brown and marly shales.
2' Coquina, hard, Suites 3522, 3521.
5½' Shales, soft weathering nodular brown.
4' Limestone, hard dark brown. Suite 3525A.
6' Shale and rubbly limestone, soft weathering.
2' Stromatoporoidal limestone. Suite 3526.
31½' Shales and limestones, mainly covered.
5' Shale and limestone, soft marly rubbly.
1' Limestone, brown.
5' Limestone, soft shaley.
3' Limestone, hard, dark, rusty.
3' Limestone, thin even bedded shaley slatey.
2½' Shale, limey, silty, crenulated bedding.
2½' Limestone, blocky, dark.
7½' Dolomite, dark grey brown sulphurous bedded. Suite 3527A.
4' Limestone, shaley thin bedded crumbly. Suite 3509 collected from here to Bear Rock contact.
5' Limestone, massive, dark.
2' Limestone and shale, brown.
3' Limestone, massive, dark.
1' Limestone, black, blocky weathering, argillitic.
2' Shale, soft brown with limey bands.
1' Shales, paper thin, brown.
1½' Shales, thin brown with limey bands.
1' Shale, soft thin bedded brown.
5' Limestone, black shaley fossiliferous, Suite 3512.
2½' Limestone, shaley to slaty with some soft grey shales weathering into algal type concretions.
1' Fine conglomerate or breccia, usually absent.
—→ Contact Ramparts and Bear Rock, disconformable?
—→ Dolomite, brown sandy weathering, bedded Bear Rock.

The above Middle Devonian section is given as a basis for correlation with the Norman Wells area by workers elsewhere. The type section of Beavertail is ill defined and the type section Ramparts is based on a Stringocephalus Newberria fauna that is of very local occurrence. The type sections do not adequately define the base of the Ramparts. This section is offered as a type section of Middle Devonian for the Norman Wells region.

The Middle Devonian of the Schooner Creek area correlates directly

with the Middle Devonian of all the area south to Great Slave Lake and with the Middle Devonian of the Carcajou River - Little Bear River Divide area. Some difficulty is found in correlating with the Middle Devonian formations in the type section areas as part of the section seems to have been eroded off before Upper Devonian time.

Although certain thin zones of porosity are present in the Ramparts and Beavertail limestones they are not considered favorable as reservoir rocks in this area.

The fossils collected from the Middle Devonian include the followings

see above section for stratigraphic position.

Suite 3506 Sta 6A -	Odontocephalus Actinopteria Martinia Sea-weed	Nucula Alveolites	
Suite 3507, Sta 7 -	Favosites Phillipsastrea	Crinoid stems Cladopora	
Suite 3508, Sta 6(a)	Cladopora Cystiphyllum Chonetes	Spirifer (Martinia) Atrypa spinosa Acervularia Heliophyllum	Alveolites Favosites Euomphalus Sponge
Suite 3509, Sta 15	Dalmanella Actinopteria Pelecypod	Martinia	
Suite 3510, Sta 7	Atrypa spinosa Chonetes Martinia Alveolites	Cladopora Favosites Fenestella	
Suite 3520, sta 10 (above)	Productella spinulicosta Actinopteria		
Suite 3521, Sta 10	Paleocyclas Reticularia		

Suite 3522, near Sta 7	Paleocyclas	Martinia
	Atrypa reticularis	Fenestella
	Atrypa devoniana	Crinoid stems
	Atrypa spinosa	Eucomphalus
Suite 3514, above Sta 10	Cladopora	Alveolites
	Cyathophyllum caespitosum	Prismatophyllum
	Stromatoporoid	
Suite 3516, above Sta 10	Cladopora	Alveolites
	Cystiphyllum (colonial)	Stromatoporoid
	Favosites	
Suite 3517, above Sta 10	Prismatophyllum	Favosites
	Eucomphalus	Paracyclas
	Alveolites	Stromatoporoid
	Cystiphyllum	
Suite 3518, above Sta 10	Acervularia	Zaphrentis
	Stromatoporoid	Atrypa spinosa
	Cyathophyllum caespitosum	Martinia
	Gyroceras	Proetus
	Combophyllum (?)	
Suite 3519, above Sta 7	Zaphrentis	Paracyclas
	Crinoid stems	Atrypa spinosa
	Actinopteria	Martinia
	Cystiphyllum	

These suites from Schooner Creek give a general idea of the prolific fauna of the Ramparts formation. The upper part of the Beavertail, as exposed on Oil Creek, brings in Upper Devonian ancestral types and the more primitive forms such as Favosites have disappeared. These faunal lists are included in the report on Bosworth Creek (Ref 5).

Upper Devonian - Lower Fort Creek Shales

The Lower Fort Creek shales are nowhere exposed in the Schooner Creek area but are believed to be from 300 to 500 feet in thickness. The valley of Fish Lake was gouged out of the strike of these beds and later alluviation has covered them up.

Where they are exposed on Bosworth Creek, they are argillitic and bituminous toward the base. They conformably overlie the Beavertail with the contact marked by a three to six inch continuous band of black argillite that carries Leiorhynchus castanea in considerable abundance.

The Lower Fort Creek shales are correlated with the Simpson shales of the upper Mackenzie River.

Upper Devonian - "Kee Scarp" limestone

The Kee Scarp limestone is a member of the Fort Creek shales and is named for its type exposure on Kee Scarp within the Schooner Creek area. The type exposure reveals a lenticular limestone, over 200 feet in thickness, made of yellow weathering, light brown coralline limestone carrying bedded limestone, bedded coralline clastic and coral and stromatoporoidal bioherms. The "reef" nature of the member is betrayed by the steep primary dips on the overlying shales and the pinch out of these shales against the thicker parts of the limestone.

The Kee Scarp is an ideal reservoir horizon for stratigraphic trapping of oil and its stratigraphic equivalent has produced oil in the Norman Wells field and on the Bear Island and Goose Island extensions.

A partial section of the Kee Scarp limestone obtained at its thickest portion on Kee Scarp reveals the following lithology:

—— Biohermal facies, cut into by glacial grooves 30' or more of beds. Suites 3542, 3543.

7' Limestone, blocky breaking yellow weathering.
17' Limestone, angular weathering, brown.
35' Limestone, coralline, partly, bedded, Suite 3527B, from here and subjacent bed.
17' Limestone, coralline and fin coralline rubble.
10' Coralline rubble, fine, soft (Coral sand?) Suite 3528B.
30½' Limestone massive coralline, (Rice pudding), Suite 3529.
8' Corals and Stromatoporoids with coralline sand matrix.
7½' Limestone dark brown with sparse corals, Suite 3530.
1' Coralline rubble, soft, dark, brown.
9' Limestone, light brown with large coralline colonies, Suite 3531.
23' Limestone, coral bearing, rubbly weathering. Corals increase in size downward, Suite 3534.
165' Total of partial section of Kee Scarp limestone.

The faunal assemblage of the above collections has representatives in the limestone of the producing horizon of the Norman Wells field.

The similar lithology, lenticular "reef" pattern, and similar stratigraphic position of the Kee Scarp and the Norman Wells producing horizon leaves little room for doubt that the two horizons are stratigraphic equivalents which may, however, not be continuous. The writer has no hesitation in correlating these beds with the "Reef" horizon outcropping on and forming Hoosier Ridge. Pending further study of fossil collections further correlation is not proposed as yet.

The primary object of this report was to distinguish between the age of the limestone at the mouth of Schooner Creek and the Kee Scarp limestone. The faunal assemblage from the limestone at the mouth of Schooner Creek is Middle Devonian in age and the faunal assemblage of the Kee Scarp limestone is Upper Devonian in age. The horizons are discrete and the Kee Scarp is much younger and much higher stratigraphically.

The bottom contact of the Kee Scarp limestone was not observed. The upper contact is known to be disconformable with the top of the reef irregular, and the overlying beds lapping against the wedging out portions with anomalous strikes. In some places, at the east end of Kee Scarp, the coralline limestone near the top is laterally replaced by black shaley limestone and shale.

The origin of the Kee Scarp limestone has been adequately discussed by O.D. Boggs (Ref. 3 & 4) and the writer is in full conformity with his views.

The faunal assemblage of Kee Scarp contains Cyrtina, Atrypa spinosa, Martinia, Ostracods, Stromatoporoids, Cladopora, Bryozoon, Cup corals, Eucamphalus, Schizophoria, Alveolites, numerous unidentified coralline or algal colonies.

Upper Devonian, Upper Fort Creek.

The upper Fort Creek was arbitrarily defined as the shale beds

lying above the Kee Scarp limestone and below the Bosworth sandstone. The writer suggests that this term should be restricted to only the bituminous and non sandy shales above the Kee Scarp limestone and the introduction of sand be made the criteria for the top of the Fort Creek. The term Carcajou series would then be used for beds lying above the Upper Fort Creek in the restricted sense.

Very little of the beds overlying the Kee Scarp limestone is exposed in the area. They lie on the limestone with a primary dip conforming to the original uneven top of the limestone. Where the "reef" thickens too rapidly the shale beds pinch out. Several collections were made from the shales where the top of the reef is replaced by the argillaceous facies.

Suites 3541, 3535, 3537, 3539, 3536, 3540, were collected from the base of the Upper Fort Creek shales on the east end of Kee Scarp and included:

Martinia sp.	Productella
Chonetes	Hypothyridina cf. castanea
Cladopora	

The "bituminous" zone above the oil horizon in the Norman Wells field is correlated with the Upper Fort Creek shales, (restricted). Both horizons are correlated with the top of the Simpson shale.

Chapter IV

S T R U C T U R A L G E O L O G Y

The Schooner Creek area is on the southwest flank of the Discovery Range which is part of the Franklin Mountains, and all formations dip toward the southwest. Dips vary from 8 to 10 degrees on the southern edge of the map sheet to 25° on the northern edge of the map sheet. Outside of crumpling, involving but a few beds, there are no "reverse" dips outcropping within the map sheet.

The strikes are usually around N 60° W. The strikes are locally affected within the Bear Rock formation by the pattern of the underlying Silurian erosional surface. The primary dips on the Bear Rock where it filled old gullies and the Silurian surface is sufficient to distort the present strike on basal Bear Rock around as far as N 80° E locally. Primary dips in the shales away from the Kee Scarp biohermal reef have resulted in anomalous strikes of N 82° E on the east end of Kee Scarp. These anomalous strikes swing back to normal in the neighbourhood of Edie Lake to the east.

The location of the lower part of the west fork of Schooner creek is controlled by a sheared monocline where the dip steepens from 35° to 45° southwest. The fault plane (normal) dips 45° southwest, strikes N 55° W and shows some slickensiding. The involved throw is around 60 feet. Small displacement overthrust strike faults occur in the Ramparts of negligible importance. The overthrust is from the south.

The valley occupied by Fish Lake is on strike alignment with terraces and low angle dips recorded along Bosworth Creek. A dip profile of the formations, (Fig 2) indicates that this terrace continues to Fish Lake although not so pronounced. No structure within the area was found worthy of a drilling test or further investigation.

Chapter V

H I S T O R I C A L G E O L O G Y

The history of the Schooner Creek area is here discussed only in as far as the rocks now present there reveal it.

Silurian

Silurian time was a period of limestone depositing seas with fairly quiet conditions. Late Silurian or Early Devonian time brought uplift and tilting and considerable relief was carved out of the Silurian limestones and much of the Middle Silurian and later strata were eroded off. On top of this mature surface fine chert conglomerates and coarse limestone breccias were deposited. These in turn gave way to bedded limestones as the land subsided.

Devonian

Marine conditions were restored by Middle Devonian time and argillaceous limestone deposition soon gave way to cleaner marls and massive limestone deposition.

Upper Devonian time was introduced by a flush of fine clastics into the seas that deposited as bituminous shales of several hundred feet in thickness. For a short period limestone forming conditions were reached and coral colonies started. These colonies built a reef that reached several hundred feet in thickness in the area south of Fish Lake. This reef lensed out to the east and to the west and shales were deposited on the flanks. This reef was at least four miles in length.

Meanwhile the seas were carrying more and coarser clastics and the coral colony died out. The shales then covered the reef itself and left an ideal reservoir and cap rock.

No later strata are found within the area, but in Laramide time

the area was tilted as the southwest flank of Discovery Range and minor faulting took place. Considerable erosion followed to uncover the Silurian rocks on the top of Discovery Range.

Quaternary

During the glacial period the ice moved from east to west gouging out the valley of Fish Lake and steepening the erosional scarp face of the "reef" limestone. The ice also gouged long, parallel, grooves on top of the "reef" limestone and on the Middle Devonian limestone.

When the ice retreated, morainal material blocked a long lake in the Fish Lake valley. This long lake has been since cut into several smaller lakes by the fan deltas of the creeks coming down the dip slope of Discovery Range.

Bosworth Creek, at present, is cutting back through a canyon around the west end of the reef limestone, to drain the Fish Lake valley.

Chapter VI

OIL, GAS AND MINERALS

Except for one small geodal cavity in the Ramparts limestone that carried bitumen, no manifestations of Oil or Gas were encountered, but a seepage is known to exist near the foot of south flank of Kee Scarp.

No minerals of economic importance were encountered.

Chapter VII

CONCLUSIONS AND RECOMMENDATIONS

Two satisfactory reservoir horizons were encountered viz. the top of the Silurian and the Kee Scarp limestones. Both horizons were non petroliferous within the area.

No suitable structures were encountered in the area for making drilling tests. The suggestion of Lt. Bath that Kee Scarp is an anticlinal uplift was not substantiated (2).

The writer recommends that further detailed work be done on the topmost Silurian in the nearby areas to help outline the paleogeography.

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B I B L I O G R A P H Y

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3. Boggs, O.D. "Development and Future Possibilities in Norman Wells Area, 1922". Imperial Oil Ltd., Canol Project Report, 1943.

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5. Foley, E.J. "Report on Bosworth Creek", Imperial Oil Ltd., Canol Project Preliminary Report, 1943.

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7. Link, T.A. "Geological Report on Fort Norman Oil Field", Imperial Oil Report, 1920.

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9. McKinnon, F.A. "Report on Canyon Creek", Imperial Oil Ltd., Canol Project Report, 1944.

10. Stelck, C.R. "Preliminary Report on Schooner Creek", Imperial Oil Ltd., Canol Project Preliminary Report, 1943.

APPENDIX

FOSSIL IDENTIFICATION - SCHOONER CREEK AREA

Suite No.	Date 1943	Location	Fossil	Accession No.	Age
----	Apr. 27	P.T. Sta. 12, Schooner Creek	Cyroceras	43001	L. Ramparts
3532	Apr. 30	S. Sta. 6 on east side Schooner Creek	Hederella on Cystiphyllum	43002	L. Ramparts
			Favosites	43003	"
			Paracyclas	43004	"
			Reticularia	43005	"
			Modiola	43006	"
			Martinia	43007	"
			Odontocephalus?	43008	"
			Cystiphyllum (small)	43009	"
			Productella	43010	"
			Chonetes	43011	"
			Leiorhynchus?	43012	"
			Proetus	43013	"
			Bryozoan	43014	"
			Ostracods	43015	"
			Productella	43016	"
			Crinoid stem	43017	"
			Pugnax	43018	"
			Crania	43019	"
			Pterinea?	43020	"
3522	Apr. 27	40' N. of Sta. 7 Coquina bed, Schooner Creek	Schuchertella?	43021	L. Ramparts
			Paleocyclas	43022	"
			Alveolites?	43023	"
			Streptelasma?	43024	"
			Cystiphyllum (cup)	43025	"
			Cystiphyllum (branch)	43026	"
			Martinia	43027	"
			Atrypa spinosa	43028	"
			Atrypa devoniana (flared)	43029	"
			Pugnax	43030	"
			Favosites	43031	"
			Stromatoporoid	43032	"
3516	Apr. 27	On hill above Sta. 10, Schooner Creek	Cystiphyllum (branch)	43033	L. Ramparts
			Cyathophyllum	43034	"
			Alveolites	43035	"
			Aulopora	43036	"
			Cystiphyllum (single)	43037	"
			Cladopora	43038	"
			Cyathophyllum	43039	"
			Favosites	43040	"

Fossil Identification

Suite No.	Date 1943	Location	Fossil	Accession No.	Age
3516	Apr. 27	On hill above Sta. 10, Schooner Creek	Cyathophyllum--caespitosum	43041	L. Ramparts
			Atrypa devoniana?	43042	"
3541	May 4	Sta. A East End Top of Cliff, Kee Scarp	Martinia	43081	Kee Scarp
			Atrypa reticularis	43082	"
			Alveolites?	43083	"
			Stromatoporoid	43084	"
			Martinia	43085	"
3539	May 4	Sta. D. East end Top of Scarp, Kee Scarp	Bryozoan	43087	Kee Scarp
3543	May 4	Small Ridge S.of Kee Scarp, E. of Tractor road. Bioherms, Kee Scarp	Stromatoporoid	43088	Kee Scarp
			Stromatoporoid	43089	"
			Stromatoporoid	43090	"
			Coral?	43091	"
3540	May 4	Sta. F. East end Top of Scarp, Kee Scarp	Hypothyridina	43092	Kee Scarp
----	May 4	Float near Headwaters of Schooner Creek, Discovery Range	Favosites	43117	Silurian (top)
			Streptelasma	43118	"
			Coral (Branching)	43119	"
			Zaphrentis	43120	"
----	May 4	Talus near Forks, Schooner Creek	Pugnax pugnus	43121	L. Ramparts
			Atrypa reticularis	43122	"
			Crinoid stems	43123	"
			Productella	43124	"
			Crinoid stem	43125	"
----	May 1	2nd Ridge S.W. Tractor Road, Back of Kee Scarp	Stromatoporoid	43143	Kee Scarp
			Stromatoporoid	43144	"
----	May 3	1 mi. E. tractor road Reef thickest, Top of Kee Scarp	Stromatoporoid	43145	Kee Scarp
6516	May 8	Below 2nd Waterfall, Bosworth Creek	Pugnoides	43146	U. Beavertail
			Martinia	43147	"
			Proetus (pygidium)	43148	"
			Trilobite (glabella)	43149	"
			Actinoceras	43150	"
			Atrypa spinosa	43151	"
			Spirifer	43152	"
			Chonetes	43153	"

Edmonton, Alberta,
February 18, 1944.

TO: Dr. T. A. Link
RE: Fossil Identification

Attached is a tentative identification of fossils collected by Mr. C. R. Stelck in the Schooner Creek Area.

C. R. Stelck

KH/tm

Fossil Identification

Suite No.	Date 1943	Location	Fossil	Accession No.	Age
6516	May 8	Below 2nd Waterfall, Bosworth Creek	Trilobite (Free cheek)	43154	U. Beavertail
Immediately below 6516	May 8	Below 2nd Waterfall, Bosworth Creek	Heliophyllum	43155	U. Beavertail
			Atrypa reticularis var.a.	43156	"
			Cystiphyllum	43157	"
			Streptelasma	43158	"
			Pugnoides	43159	"
			Sponge	43160	"
----	May 9	Above 4th Waterfall, Bosworth Creek	Cyathophyllum	43161	Lower Ramparts
			Productella	43162	"
			Productella?	43163	"
			Cladopora	43164	"
			Orthoceras	43165	"
20004	----	------- -------	Productella	43166	----
----	May 9	Above 4th Waterfall, Bosworth Creek	Pelecypod	43167	L. Ramparts
----	May 9	Above 4th Waterfall, Bosworth Creek	Paleocyclas	43168	M. Ramparts
----	May 9	Above 4th Waterfall, Bosworth Creek	Stromatoporoid	43169	Ramparts
			Odontocephalus	43170	"
			Martinia	43171	"
			Atrypa spinosa	43172	"
			Martinia	43173	"
			Alveolites	43174	"
			Cladopora	43175	"
			Crinoid stems	43176	"
----	May 9	Above 4th Waterfall, Bosworth Creek	Atrypa spinosa	43177	Ramparts
			Favosites	43178	"
			Atrypa devoniana	43179	"
			Fucoids	43180	"
			Acervularia	43181	"
			Schuchertella	43182	"
3535	May 3	East end of Kee Scarp, Kee Scarp	Martinia	43183	Kee Scarp
			Ostracod	43184	"
----	----	Sta. 21 & 22; East Fork Schooner Cr.	Geodal Quartz	43185	Top of Silurian
3521	Apr. 27	Sta. 10, Schooner Creek	Paleocyclas	43304	L. Ramparts
			Reticularia	43305	"
			Orthoceras	43306	"

Fossil Identification

Suite No.	Date 1943	Location	Fossil	Accession No.	Age
----	Apr. 21	Headwaters of Sta. 1 & 2 (picture) E. Fork Schooner Creek	Algae?	43321	Upper Silurian
			Corals	43322	"
3520	Apr. 27	Above Sta. 10, Schooner Crk.	Productella spinulicosta	43323	L. Ramparts
			Actinopteria	43324	"
----	May 3	East of Tractor road where Reef is thickest, Kee Scarp	Stromatoporoid	43325	Kee Scarp
			Stromatoporoid	43326	"
			Stromatoporoid	43327	"
3527	Apr. 30	At end of Tractor road, Kee Scarp	Coral	43328	Kee Scarp
			Stromatoporoid	43329	"
			Stromatoporoid	43330	"
3506	Apr. 22	Sta. 6 (a), Schooner Crk.	Phillipsastrea	43331	L. Ramparts
			Favosites	43332	"
			Alveolites	43333	"
3507	Apr. 22	Sta. 7, Schooner Crk.	Favosites	43334	L. Ramparts
			Cystiphyllum	43335	"
3508	Apr. 23	Sta. 6 (a), Schooner Crk.	Cystiphyllum	43336	L. Ramparts
3519	Apr. 27	Sta. 7, Schooner Crk.	Actinopteria	43337	L. Ramparts
3510	Apr. 23	Sta. 7, Schooner Crk.	Alveolites	43338	L. Ramparts
			Favosites	43339	"
3506	Apr. 22	Sta. 6, Schooner Crk.	Alveolites	43340	L. Ramparts
3536	May 3	S. Side Fish L. where bedding replaces reef, Kee Scarp	Cladopora	43341	Kee Scarp
			Productella	43342	"
			Atrypa spinosa	43343	"
			Martinia	43344	"
			Hypothyridina	43345	"
3538 There is a Ramparts Collection of Apr. 29. Not same horizon.	Apr. 30	Just beyond end of tractor road, Kee Scarp	Bryozoan	43346	Kee Scarp
			Stromatoporoid	43347	"
			Martinia	43348	"
			Atrypa	43349	"
3510	Apr. 23	Sta. 7, Schooner Crk.	Euomphalus	43350	L. Ramparts
			Fenestella	43351	"
			Cladopora	43352	"
			Cystiphyllum	43353	"
			Alveolites	43354	"

Fossil Identification

Suite No.	Date 1943	Location	Fossil	Accession No.	Age
3510	Apr. 23	Sta. 7, Schooner Creek	Stromatoporoid	43355	L. Ramparts
			Leiorhynchus? with Martinia	43356	"
			Martinia	43357	"
			Atrypa spinosa	43358	"
			Paracyclas?	43359	"
			Pteria?	43360	"
			Ostracod?	43361	"
			Pleurotomaria	43362	"
			Crinoid stems	43363	"
			Syringopora?	43364	"
----	Apr. 24	Talus W. Bank between Sta. 16 & 17, E. Fork Schooner Creek	Favosites	43365	Uppermost Bear Rock or basal 30' Ramparts
			Pelecypods	43366	
----	Apr. 23	Sta. 12 Horizon of 43001, Schooner Creek	Euomphalus	43367	L. Ramparts
----	Apr. 23	Sta. 10, Schooner Crk.	Paleocyclas	43368	L. Ramparts
			Actinopteria	43369	"
			Zaphrentis	43370	"
3508	Apr. 23	Sta. 6 (a), Schooner Crk.	Cladopora	43371	L. Ramparts
3508	Apr. 23	Sta. 6 (a), Schooner Crk.	Chonetes	43372	L. Ramparts
			Reticularia?	43373	"
			Atrypa spinosa	43374	"
3527	Apr. 30	Just beyond end tractor road, Kee Scarp	Stromatoporoid	43375	Kee Scarp
3529	Apr. 30	Just beyond end tractor road, Kee Scarp	Cladopora	43376	Kee Scarp
			Stromatoporoid	43377	"
3535	May 3	East end Kee Scarp	Atrypa reticularis	43378	Kee Scarp
			Martinia	43379	"
3530	Apr. 30	Just beyond end tractor road, Kee Scarp	Atrypa spinosa	43380	Kee Scarp
			Aulopora	43381	"
			Cladopora?	43382	"
			Cladopora?	43384	"
			Cladopora	43385	"
			Cladopora	43386	"
			Stromatoporoid	43387	"
3527	Apr. 30	Just beyond end tractor road, Kee Scarp	Stromatoporoid	43388	Kee Scarp
			Corals?	43389	"

Fossil Identification

Suite No.	Date (1943)	Location	Fossil	Accession No.	Age
3509	Apr. 23	Sta. 15 E. Fork Talus Talus from beds 40' above Bear Rock, Schooner Crk.	Ostracods	43409	L. Ramparts
			Schuchertella	43410	"
			Paracyclas?	43411	"
			Tellinopsis?	43412	"
----	Apr. 22	Sta. 6 (a) Schooner Crk. (Shale band Actinopteria)	Tellinopsis?	43413	L. Ramparts
			Odontocephalus	43414	"
			Actinopteria	43415	"
			Sea Weed?	43416	"
			Martinia	43417	"
----	Apr. 29	Mouth of Creek, Schooner Creek	Stromatoporoid	43418	U. Ramparts
			Cyathophyllum	43419	"
			Zaphrentis	43420	"
			Euomphalus	43421	"
			Atrypa reticularis?	43422	"
3523	Apr. 29	Sta. 2, Schooner Creek	Cyathophyllum	43423	U. Ramparts
			Cladopora	43424	"
3527	Apr. 29	Sta. 14, Schooner Creek	Bryozoan?	43425	L. Ramparts
3534	May 1	Small Creek N.W. Tractor road, Kee Scarp	Cladopora	43426	Kee Scarp
			Cyrtina	43427	"
3524	Apr. 27	Sta. 4, Schooner Creek	Murchisonia	43428	Ramparts
			Cyathophyllum	43429	"
3542	May 4	S.W. Schooner Crk. ½ mile. Ridge back of Kee Scarp	Stromatoporoid	43484	Kee Scarp
8504	May 11	-------- Bosworth Creek	Rensselaeria?	43485	----?
			Cyathophyllum	43486	"
3528	Apr. 29	Above Sta. 10, Schooner Creek	Tellinopsis	43487	L. Ramparts
			Actinoceras	43488	"
			Bryozoan	43489	"
			Hederella	43490	"
			Fenestella	43491	"
			Tentaculites	43492	"
			Zaphrentis	43493	"
			Actinopteria	43494	"
			Pleurotomaria	43495	"
			Cladopora	43496	"
			Chonetes	43497	"
3525	Apr. 29	Above Sta. 14, 400' west Schooner Creek	Proetidae	43498	L. Ramparts
			Stromatoporoid	43499	"
			Atrypa spinosa	43500	"

Fossil Identification

Suite No.	Date 1943	Location	Fossil	Accession No.	Age
3525	Apr. 29	Above Sta. 14, 400' west Schooner Creek	Schuchertella	43501	L. Ramparts
			Cladopora	43502	"
			Martinia	43503	"
3526	Apr. 29	Above Sta. 14, 400' south Schooner Creek	Stromatoporoid	43504	L. Ramparts
3515	Apr. 27	Above Sta. 10, Schooner Creek	Phillipsastrea	43505	U. Ramparts
			Cyathophyllum caespitosum	43506	"
			Heliophyllum	43507	"
			Prismatophyllum	43508	"
			Favosites	43509	"
			Prismatophyllum	43510	"
			Alveolites	43511	"
			Zaphrentis	43512	"
			Stromatoporoid	43513	"
			Ostracods	43514	"
			Streptelasma	43515	"
			Cyathophyllum	43516	"
3517	Apr. 27	Above Sta. 10, Schooner Creek	Favosites	43517	U. Ramparts
			Cystiphyllum	43518	"
			Paracyclas	43519	"
			Bryozoan?	43520	"
			Productella	43521	"
			Cyathophyllum,	43522	"
			Prismatophyllum	43523	"
			Euomphalus	43524	"
			Alveolites	43525	"
3519	Apr. 27	Hill above Sta. 7, Schooner Creek	Actinopteria	43526	Ramparts
			Streptelasma?	43527	"
			Alveolites with aulopora	43528	"
			Cyathophyllum caespitosum	43529	"
			Atrypa spinosa	43530	"
			Cystiphyllum	43531	"
			Alveolites	43532	"
			Pelecypod	43533	"
			Cladopora	43534	"
			Bryozoan	43535	"
			Paracyclas	43536	"
3514	Apr. 27	Hill above Sta. 10,	Cyathophyllum caespitosum	43537	Ramparts
			Prismatophyllum	43538	"
			Cladopora	43539	"
			Alveolites	43540	"
			Streptelasma	43541	"

Fossil Identification

Suite No.	Date 1943	Location	Fossil	Accession No.	Age
3508	Apr. 27	Between Stations 6 & 7	Sponge	43542	Ramparts
			Euomphalus	43543	"
			Favosites	43544	"
			Alveolites	43545	"
			Paracyclas	43546	"
			Cystiphyllum	43547	"
			Cystiphyllum	43548	"
			Reticularia	43549	"
			Atrypa spinosa	43550	"
			Crinoid column	43551	"
			Cladopora	43552	"
			Actinopteria	43553	"
			Productella	43554	"
			Phillipsastrea	43555	"
			Aulopora	43556	"
			Stromatoporoid	43557	"
			Prismatophyllum	43558	"
3518	Apr. 27	On hill above Sta. 10, Schooner Creek	Acervularia	43559	Ramparts
			Zaphrentis	43560	"
			Cystiphyllum	43561	"
			Cyathophyllum caespitosum	43562	"
			Trilobite	43563	"
			Stromatoporoid?	43564	"
3543	----	2nd ridge back imm. E. Tractor road, Kee Scarp	Stromatoporoid?	43565	Kee Scarp
3514	Apr. 27	On hill above Sta. 10, Schooner Creek	Cladopora	43566	Ramparts
			Cystiphyllum	43567	"
3537	May 4	Sta. C east end Kee Scarp	Coralline rubble	43568	Kee Scarp
3538	May 4	Sta. Ca, Kee Scarp	Cladopora	43569	Kee Scarp
			Bryozoan	43570	"
3518	Apr. 27	On hill above Sta. 10, Schooner Creek	Proetus	43571	Ramparts
			Prismatophyllum	43572	"
			Alveolites	43573	"
			Cystiphyllum?	43574	"
			Atrypa reticularis var.a.	43575	"
			Combophyllum?	43576	"
			Cyathophyllum	43577	"
			Martinia	43578	"
			Bryozoan	43579	"
3533	May 1	A. N.W. tractor road, Kee Scarp	Cladopora?	43580	Kee Scarp

Fossil Identification

Suite No.	Date 1943	Location	Fossil	Accession No.	Age
3531	Apr. 30	Beyond end tractor road, Kee Scarp	Cladopora	43581	Kee Scarp
----	May 1	1st ridge S.W. tractor road, Kee Scarp	Stromatoporoid Coralline rubble	43582 43583	Kee Scarp "
3532	Apr. 30	East side of Schoomer Crk.	Proetus	43584	Ramparts
3524	----	-------- Discovery Range	Algae	42905	Silurian
3523	----	-------- Discovery Range	Pseudoplants	42906	Silurian
3525	----	-------- Discovery Range	Bryozoan	42907	Silurian

PLATE II

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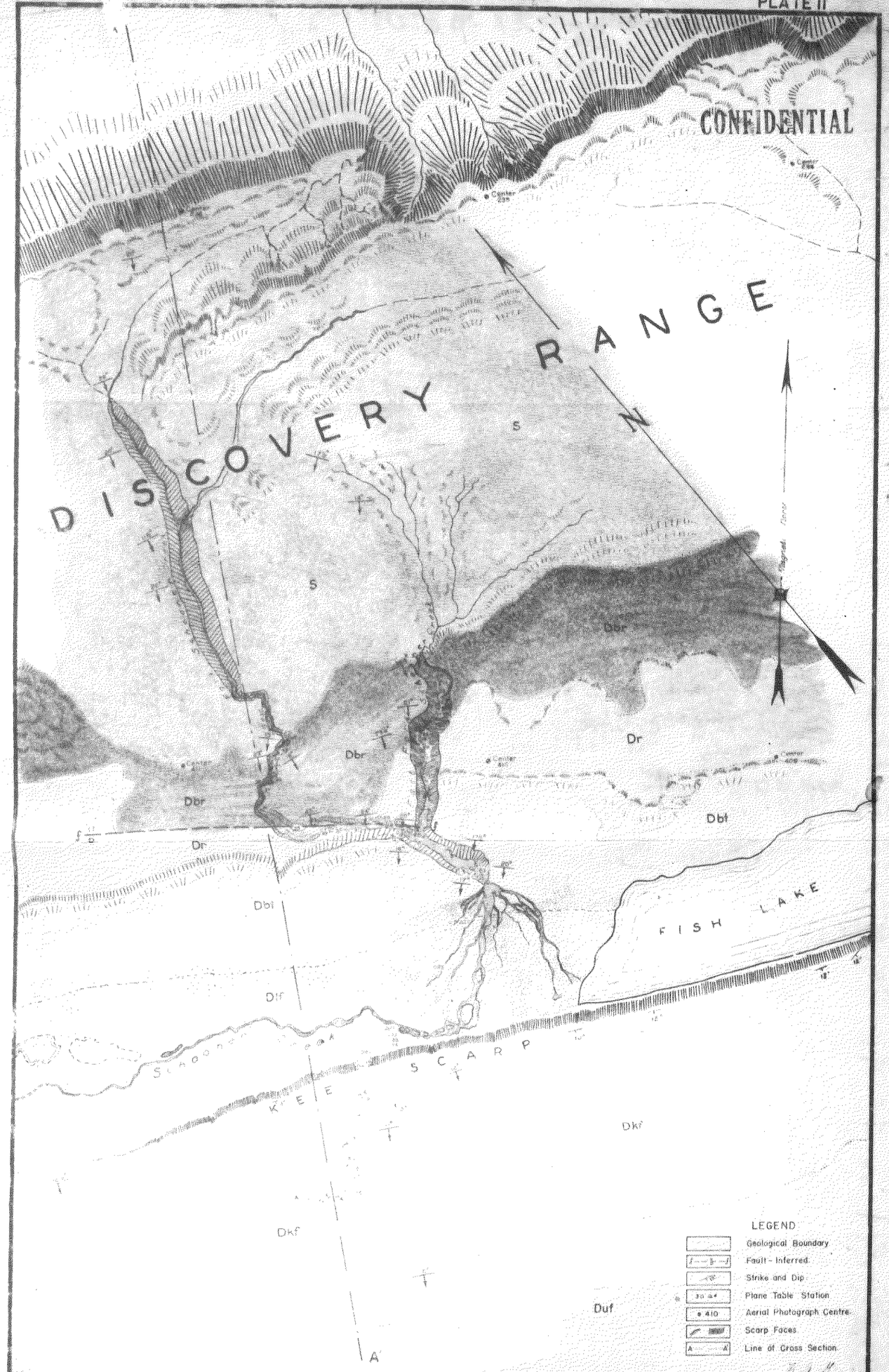

L E G E N D

UPPER DEVONIAN	Duf	Upper Fort Creek
	Dkf	Kee Scarp member
	Dlf	Lower Fort Creek
MIDDLE DEVONIAN	Dbt	Beavertail
	Dbr	Upper Ramparts
	Dr	Lower Ramparts
LOWER DEVONIAN (?)		Bear Rock
SILURIAN	S	

SCHOONER CREEK
AREAL GEOLOGY

SCALE 4" = 1 MILE

SCHOONER CREEK TRAVERSE
BY
C R Stelck Geologist
H A Gibson Assistant geologist
April, 1943

KEE SCARP TRAVERSE
BY
S H. Houston, Lt Gordon Bath
Capt George Robb, Pvt Elmer Umbach
Dec., 1942
Taken in part from Aerial Photographs

F2.97 PLATE II

F2.97

PLATE II

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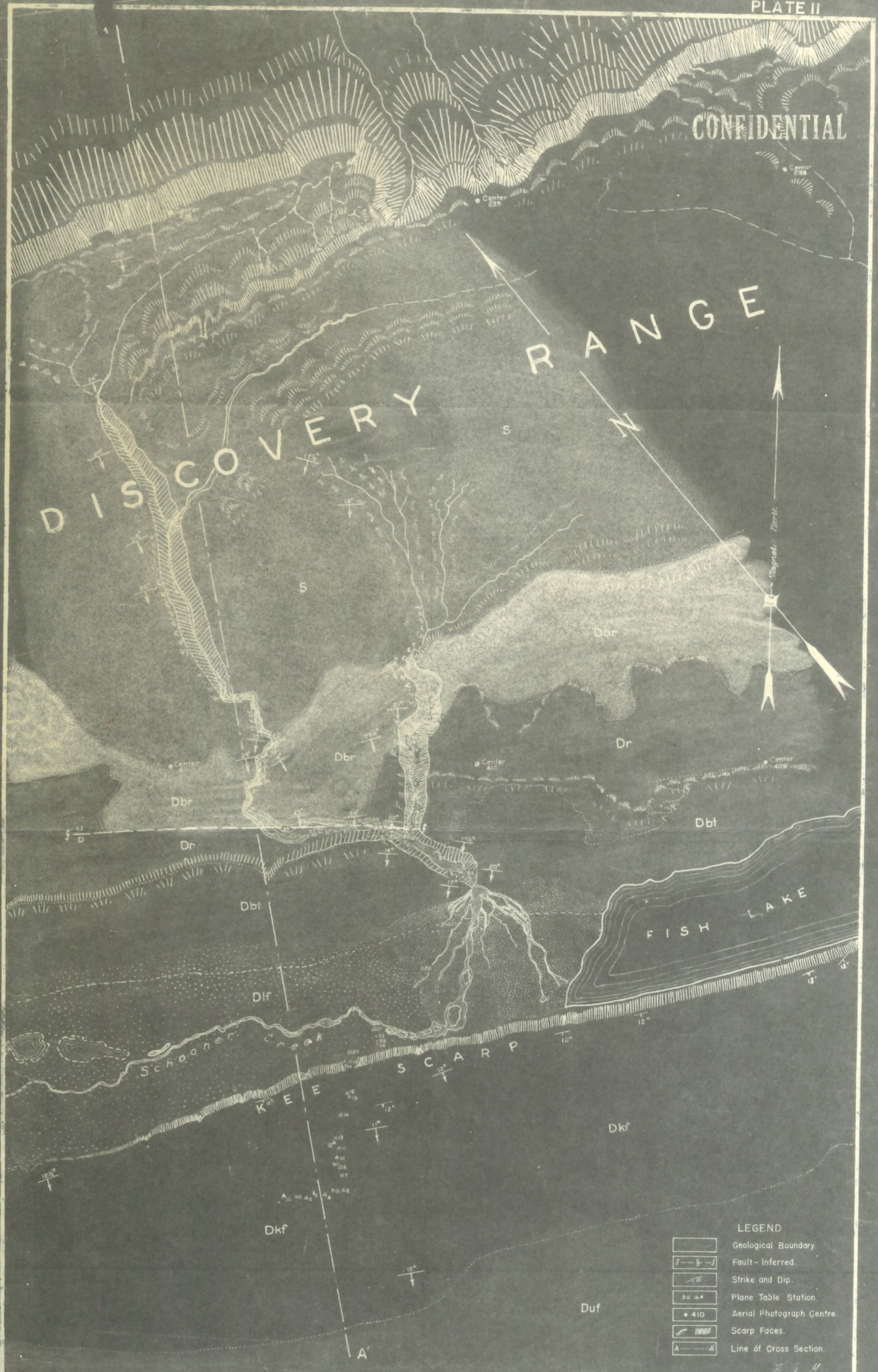


L E G E N D

UPPER DEVONIAN	Duf	Upper Fort Creek
	Dkf	Kee Scarp member
	Dlf	Lower Fort Creek
MIDDLE DEVONIAN	Dbt	Beavertail
	Dbr	Upper Ramparts
	Dr	Lower Ramparts
LOWER DEVONIAN (?)	Db	Bear Rock
SILURIAN	S	

SCHOONER CREEK
AREAL GEOLOGY

SCALE 4" = 1 MILE

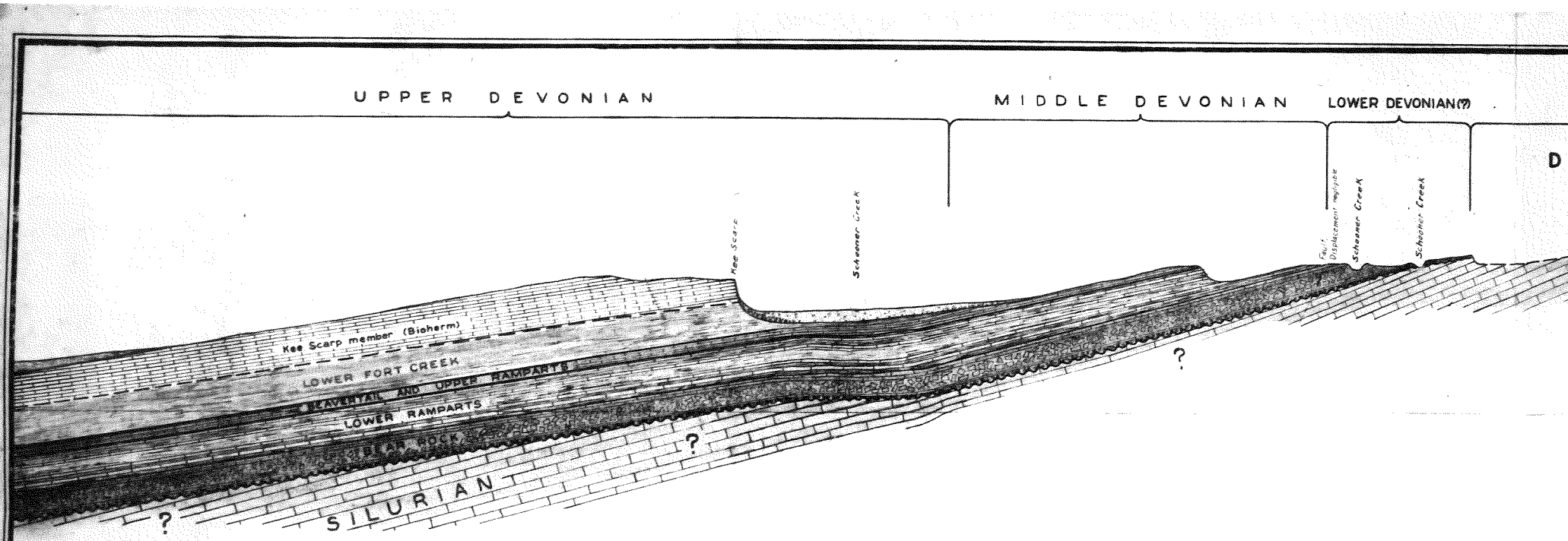
1000' 500 0 1,000' 2,000' 3,000' 4,000' 5,000' 6,000 Ft.

SCHOONER CREEK TRAVERSE
BY
C. R. Stelck Geologist
H. A. Gibson: Assistant geologist
April, 1943

KEE SCARP TRAVERSE
BY
S. H. Houston, Lt Gordon Bath
Capt George Robb, Pvt. Elmer Umbach
Dec., 1942
Taken in part from Aerial Photographs

F2.97 PLATE II

F2.97



CROSS SEC

TO ACCOMPANY RE

SCHOONER CR

VERTICAL AND HORIZONTA

1,000 500 0 1,000 2,000 3,000

By

C. R. Stelck: Geol

H. A. Gibson: Assista

April, 1943

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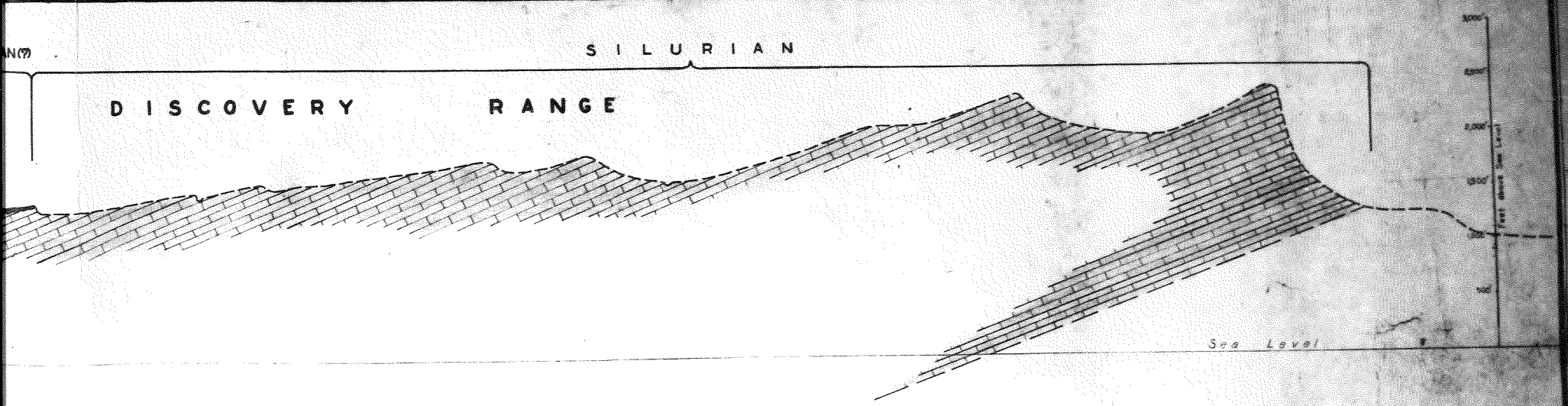
CONFIDENTIAL

PLATE III



SECTION A-A'

OMPANY REPORT ON THE

R CREEK AREA

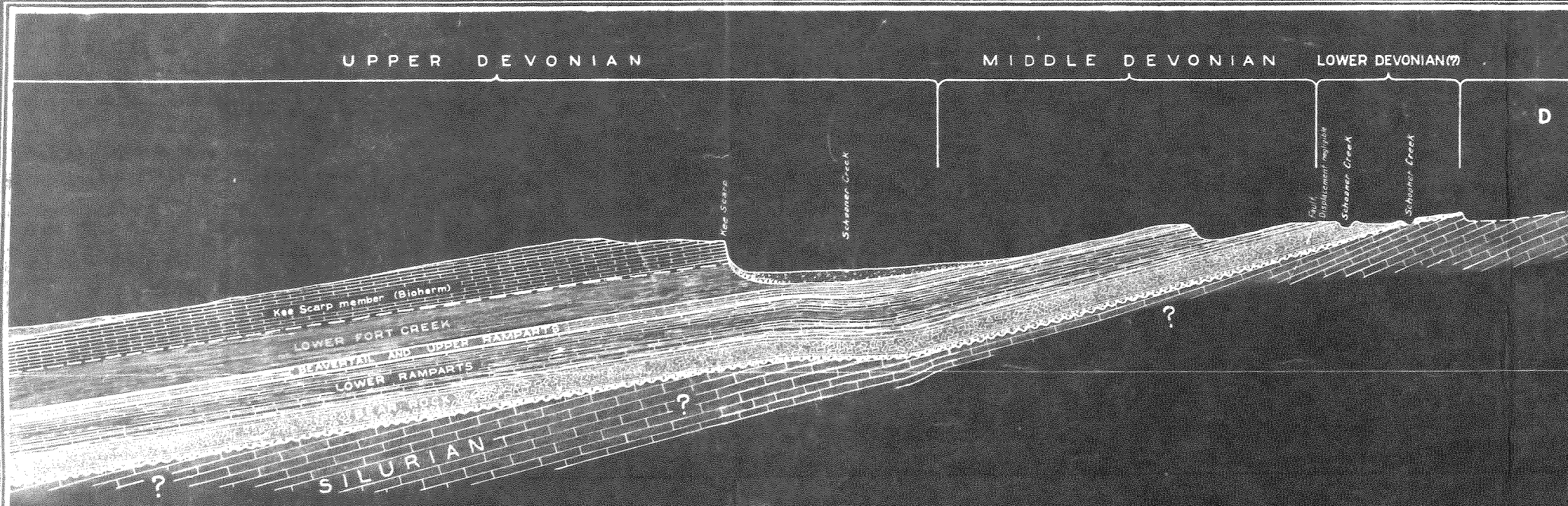
HORIZONTAL SCALE: 8" = 1 MILE

3,000 4,000 5,000 6,000 7,000 Feet

By

C R Steick: Geologist
A Gibson: Assistant geologist
April, 1943

F 2.98



CROSS SEC

TO ACCOMPANY REP

SCHOONER CR

VERTICAL AND HORIZONTA

1,000 500 0 1,000 2,000 3,000

By

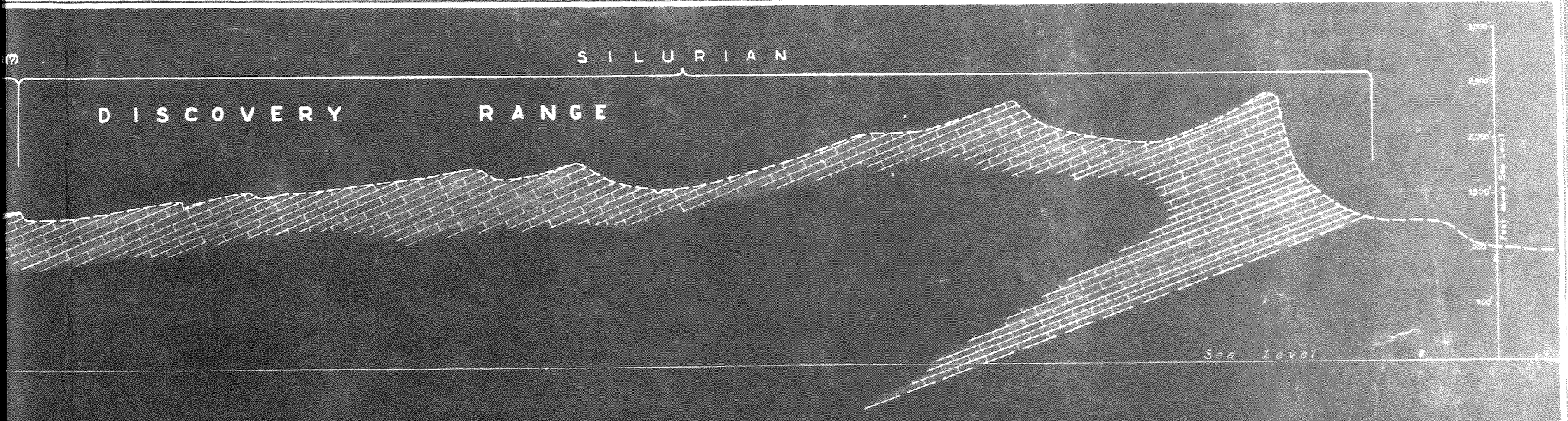
C. R. Stelck: Geolo

H. A. Gibson: Assistan

April, 1943

CONFIDENTIAL

PLATE III



SECTION A-A'

...PANY REPORT ON THE
... CREEK AREA

HORIZONTAL SCALE: 8" = 1 MILE

3,000 4,000 5,000 6,000 7000 Feet

By

...R Steick: Geologist
...Gibson: Assistant geologist
April, 1943

F 2.98

96-17

PLATE IV

STRATIGRAPHIC COLUMN

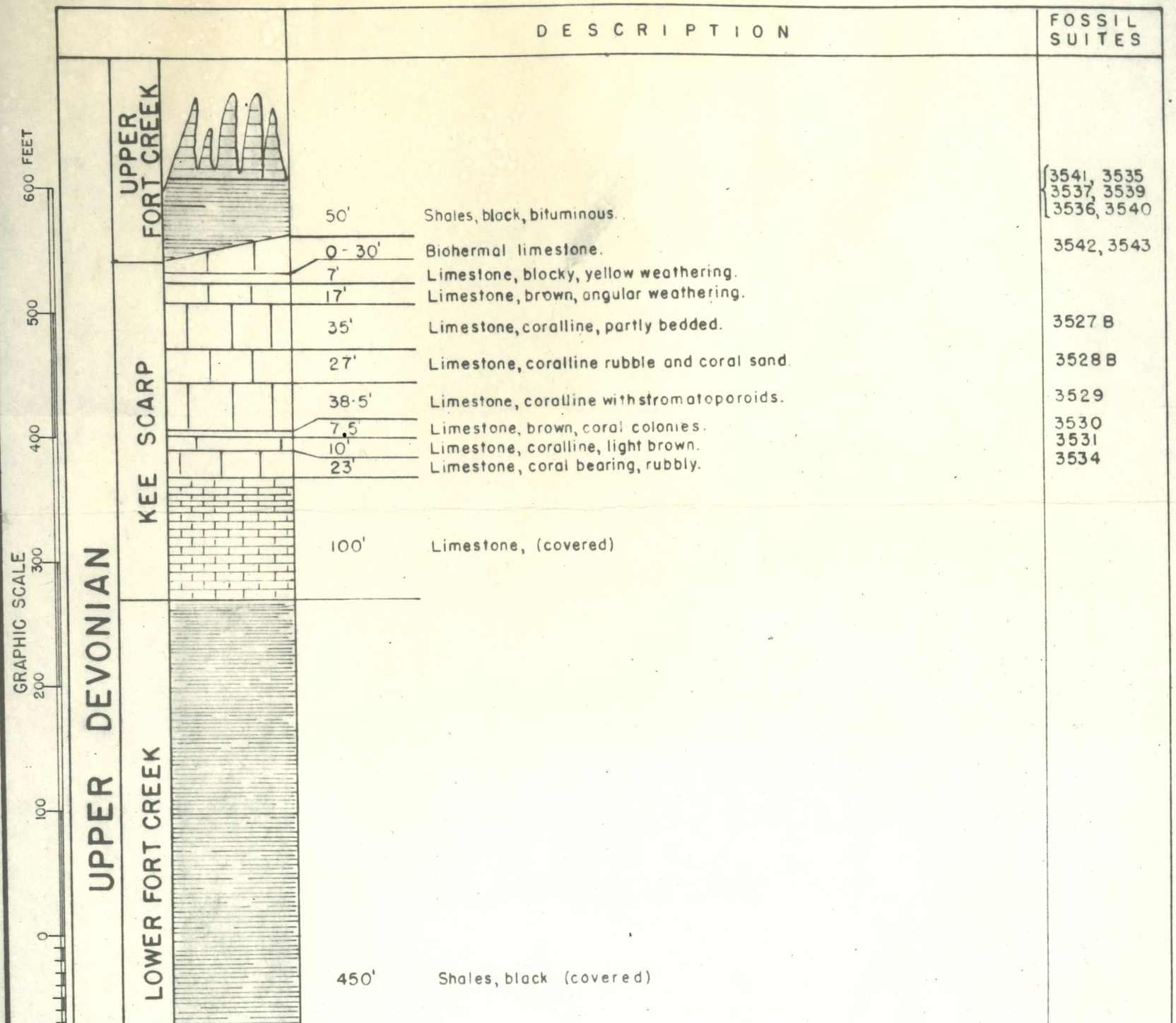
SCHOONER CREEK

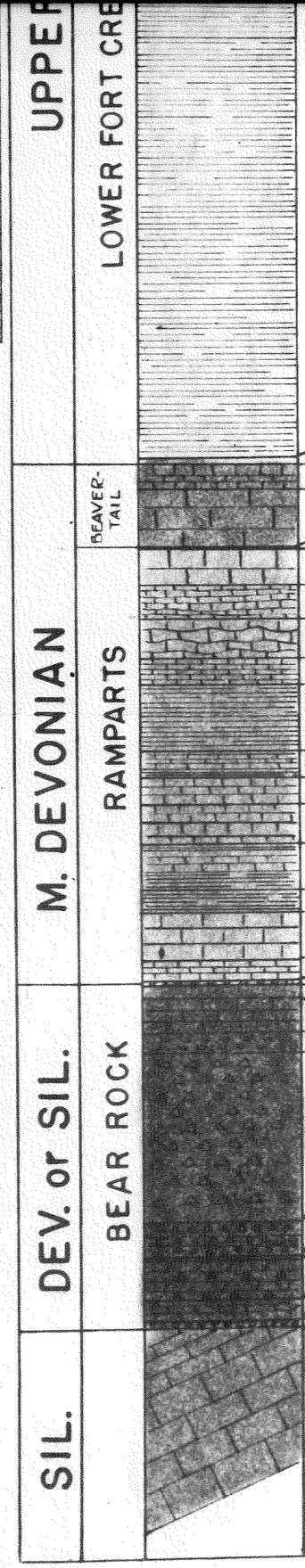
CONFIDENTIAL

1943

C. R. STELCK
H. A. GIBSON

SCALE 1" = 100'





UPPER	LOWER FORT CRE	450'	Shales, black (covered)	
M. DEVONIAN	BEAVER-TAIL	2·5'	Argillites with L. castanea.	6509, 3579 3569, 3570 6513, 3578 6514, 3580 6515, 3573 3583, 3571 3572
		18·5'	Limestone, rubbly weathering and brown shales	
		38'	Limestone, massive, thick bedded.	
		3"	Shale, black with Tentaculites.	
	RAMPARTS	23·5'	Limestone, massive brown.	
		22'	Limestone, thin bedded, grey to brown. Some shale.	3523 3524
		26'	Limestone, irregularly bedded, rubbly and thin shales.	3514 3515 3516 3517 3518
		19'	Limestone, rubbly weathering and brown shales.	
		42'	Shales and limestones (covered)	
		17'	Limestone, shaley and shales.	3528A 3520 3519, 3506 3508
		18·5'	Limestone, rubbly weathering and soft brown shales.	3510, 3507
		24·5'	Limestone, rubbly weathering with shales and beds of harder limestone and coquinas.	3522, 3521 3525A 3526
		31'	Shales and limestones (covered)	
		11'	Shales, soft, brown and shaley limestone	
		32·5'	Limestone, dark, thick bedded with interbedded shales.	3527A 3509 3512
		14'	Limestone, thin, shaley, dark and shales.	
		1'	Conglomerate, chert pebbles (usually absent)	
DEV. or SIL.	BEAR ROCK	8'	Dolomite, bedded.	
		23'	Limestone, dolomitic with thin sandy laminae.	
		12'	Breccia, dolomitic, poorly bedded.	
		112'	Breccia, coarse, dolomitic with soft argillaceous, dolomitic matrix. Dark brown, weathering to hoodoo shapes. No bedding. Boulders to 3'	
		20'	Breccia, dolomitic limestone, poorly bedded.	
		2'	Shale, yellow weathering.	
		25'	Breccia, dolomitic, bedded, silty.	
		19'	Dolomite, thin bedded, sandy	
		1'	Chert pebble conglomerate sometimes absent	
			unconformable contact	3401, 3402 3404
SIL.		1000'	Limestone	3523 3524 3525B

F-2.244.

PLATE IV

STRATIGRAPHIC COLUMN

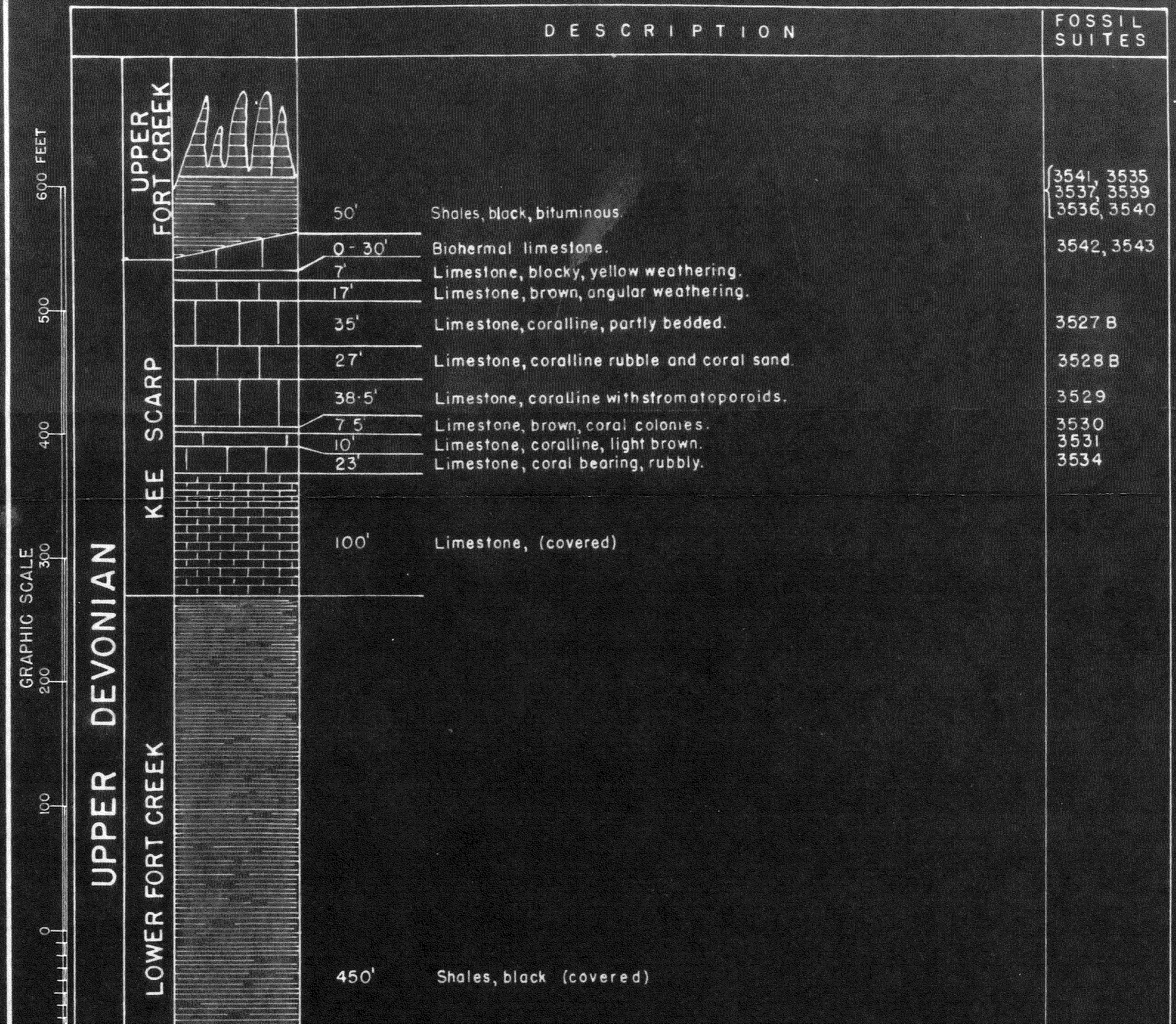
SCHOONER CREEK

CONFIDENTIAL

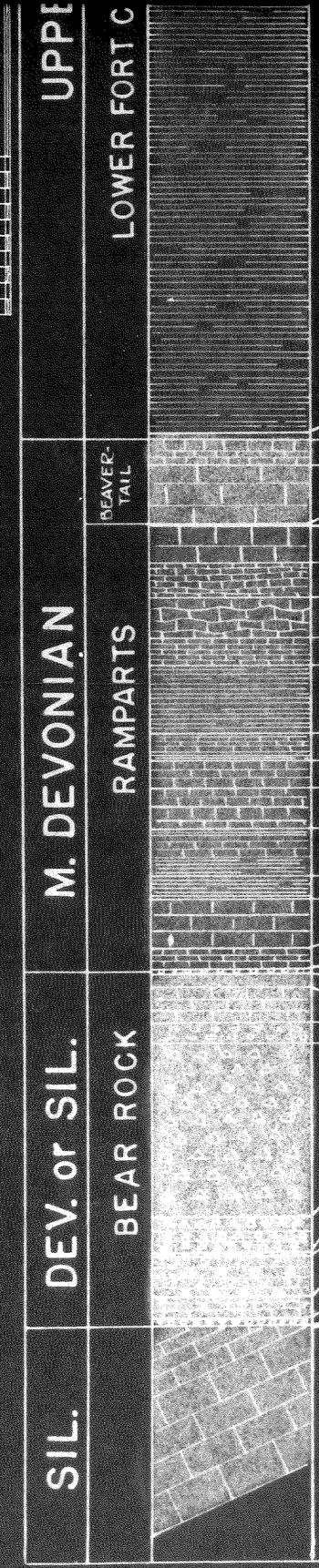
1943

C. R. STELCK
H. A. GIBSON

SCALE 1" = 100'



	DESCRIPTION	FOSSIL SUITES



UPPER	LOWER FORT C		450' Shales, black (covered)	
M. DEVONIAN	BEAVER-TAIL		2·5' Argillites with L. castanea.	6509, 3579 3569, 3570 6513, 3578 6514, 3580 6515, 3573 3583, 3571 3572
			18·5' Limestone, rubbly weathering and brown shales	
			38' Limestone, massive, thick bedded.	
			3" Shale, black with Tentaculites.	
	RAMPARTS		23·5' Limestone, massive brown.	
			22' Limestone, thin bedded, grey to brown. Some shale.	3523 3524
			26' Limestone, irregularly bedded, rubbly and thin shales.	3514 3515 3516 3517
			19' Limestone, rubbly weathering and brown shales.	3518
			42' Shales and limestones (covered)	3528A 3520
			17' Limestone, shaley and shales.	3519, 3506 3508
			18·5' Limestone, rubbly weathering and soft brown shales.	3510, 3507
			24·5' Limestone, rubbly weathering with shales and beds of harder limestone and coquinas.	3522, 3521 3525A 3526
			31' Shales and limestones (covered)	
			11' Shales, soft, brown and shaley limestone	
			32·5' Limestone, dark, thick bedded with interbedded shales.	3527A
			14' Limestone, thin, shaley, dark and shales.	3509 3512
			1' Conglomerate, chert pebbles (usually absent)	
SIL.	DEV. or SIL.	BEAR ROCK	8' Dolomite, bedded.	
			23' Limestone, dolomitic with thin sandy laminae.	
			12' Breccia, dolomitic, poorly bedded.	
			112' Breccia, coarse, dolomitic with soft argillaceous, dolomitic matrix. Dark brown, weathering to hoodoo shapes. No bedding. Boulders to 3'	
			20' Breccia, dolomitic limestone, poorly bedded.	
			2' Shale, yellow weathering.	
			25' Breccia, dolomitic, bedded, silty.	
			19' Dolomite, thin bedded, sandy	
			1' Chert pebble conglomerate sometimes absent.	
			unconformable contact	3401, 3402 3404
			1000' Limestone	3523 3524 3525B

F-2.244.