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Marquette region, vicinity of Ishpeming, Michigan. No. 122 1891

Bayley, William Shirley, 1861-1943

[s.l.]: [s.n.], 1891

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Ishpeming

No 2.

Plane Table

Notes

U. S. GEOLOGICAL SURVEY
FIELD SECTION BOOK

LAKE SUPERIOR DIVISION.

INSTRUCTIONS.

1. Ordinarily at least two pages of this book will be devoted to one section. On the left-hand page, place a map of as much of the section as has *actually been seen*. Denote rivers, lakes, marshes, etc., by the usual topographical signs. Denote the ledges of rock, when no structure is made out, by cross-hatching, making the cross-hatching cover as nearly as possible the areas occupied by the exposures. If the rock is a massive one, but still more or less plainly bedded, use the same sign with a dip arrow and number attached, showing the direction and amount of the dip. Denote a shaly or other very plainly bedded ledge by right parallel lines, and a ledge having a secondary structure by wavy parallel lines running in the direction of the strike, with dip arrow and number attached as before. The greatest care must be taken to avoid confusing slaty or schistose structure with bedding, and in all cases where there is the least doubt about the true bedding direction, indicate it by a query. To each exposure on the face of the map attach the number of the specimen representing it. In mapping the section count each of the spaces between the blue lines as 100 paces, and twenty of these spaces to one mile, or 2,000 paces. Usually the southeast corner will be placed at the bottom of the page, or at the first black line above the bottom of the page, and at the right-hand side. If, however, for any reason, it is desirable to show portions of an adjoining section, the southeast corner may be shifted up, or the map may be turned around and the north placed at the left-hand side of the page. The ruling of the left-hand page is also arranged so that, if desirable, a smaller scale can be used, two inches, one inch, or even one-half inch to the mile. With the two-inch scale, the squares outlined in black represent sections, and those in red, quarter sections and "forties," while the space between the blue lines is 200 paces.

2. On the right-hand page place the notes descriptive of the exposures. Begin in each case with the number of the specimen, placing the number on the left-hand side of the red line, after which give in order on the right of the same red line the position of the ledges as reckoned in paces from the southeast corner of the section, and the dip and strike when observable, for instance 4025, 250 N., 300 W., *Strike, N. 6° E., Dip, 50° E.* Then follow with as full a description of the ledge as possible. When topographical maps are used for locations this paragraph applies only in part.

3. Collect a specimen from every ledge, or wherever there is a change of rock on any one ledge, taking care to get fresh material, unless for a special purpose the weathered surface is desired. In case of trips made on foot or in canoes, for long distances, neighboring ledges, unquestionably of one kind of rock, need not be specimened, but chips of them must be taken. The position and extent of the ledges not specimened should be marked on the map, with notes that each is of a rock identical with specimen so-and-so. Under the same conditions small sized specimens, trimmed to a uniform size of $2 \times 2\frac{1}{2} \times \frac{3}{4}$ inches will be allowed, but in all other cases *large sized specimens*, trimmed to a size of $3 \times 4 \times 1$ inches, must be selected, in accordance with section 3, chapter IV, p. 44, Regulations of the U. S. Geological Survey. In all cases collect chips for slicing. Specimens should not be placed together without protection in the collecting bag as the fresh surfaces, important in determining the character of rocks, are thus destroyed. They should be damaged by no temporary mark, but the numbers should be at once marked in at least two places upon the inclosing paper or cloth bags. It is desirable that specimens be permanently marked in camp by painting the numbers upon them in white upon a black background, using Silver White and Ivory Black oil tubes for color, with turpentine as a diluent.

4. On the last twenty-five pages of the book give, as may seem desirable, a general account of the examination of the region mapped in the previous pages, correlation of observations, sketches, cross sections, etc.

5. Forward this note book as soon as filled as registered mail matter to C. R. Van Hise, U. S. Geologist, Madison, Wis.

19539-19649

19665-19666

19676-19704

19737-19744

Plane 17 Book #122

19629-30-31 Grambs. Byley
In fibres?

Plane Table Notes
Marquette Region
Vicinity of
Ishpeming

July 14 to
1891

W. S. Bailey

E. J. Erickson - assistant

Following specimens not on plate
of notes and consequently not catalogued

19568

14637

19580 to 83

19690

19585

19691

19602 to 05

19704

19633

19742

It having been learned that the most of the iron belt of Economic importance was sufficiently clear to allow of the use of plane table methods for the location of specimens, it was determined to attempt the construction of an accurate map of the region, locating all the ledges belonging to the iron series by stadia, and the bordering ledges of non-iron-bearing rocks, viz: those of granite and greenstone. No attempt was made to locate all the ledges of greenstone, though it is believed that nearly all that border the elastic and sedimentary formation have been plotted.

It is further believed that every ledge of the sedimentary series was examined and located so far as they occur in the area of the maps.

Geology of the areas surrounding those mapped by the plane table was studied by the usual traverses method of the woods, and

2

The large greenstone areas within the limits of the maps were worked by the same method.

N. B. The maps of the Ogish and Mine was made by W. H. Merriam and E. G. Erickson. Those of the other region by W. S. Bailey with the assistance of E. G. Erickson and G. P. King.

N. B. The figures in brackets are the numbers of the sights taken. The correspond to ticked numbers in the maps. The numbers in the 19000's are those of specimens.

Topographical details are left out of this copy of the notes, since the maps have been twice examined and carefully compared and corrected. As they now stand they contain all the results of notes taken by W. S. B. as well as those taken by Mr. Erickson.

July 14/91

- (1) Middle of road, East end of bluff composed of boulders and sand
- (2) Ledge at highest point of knob, which is a small one beyond (1).
- 19559 The rock is greenstone, the ledge measuring 15 x 15 paces.
- (3) Southernmost end of knob East of (2). There begins another ledge
- 19560 of coarse greenstone, extending 40 ft. west of station, and exposed
- (4) all the way to (4), the whole forming a precipice facing South.
- (5) Base of precipice, to East.
- (6) S.W. end near Eastern swell
- (7) High bluff with precipitous face
- 19561 South. The rock, a greenstone, runs back to forty feet North of (8) forming a tongue of rock extending South from the hill.
- (8) On top of this tongue for station. 35 paces west of (7) is another smaller knob with precipitous face South.
- (9) Valley
- (10) Southern escarpment of hill East of (8). The entire escarpment is greenstone, which forms the precipice and

in its top. Extends north to within
40 paces of (12)

(111) East end in top same escarp-
ment, which is still precipitous
19562 to the south

(121) Highest point in this hill. Green-
stone is practically continuous from
(10) & (11) to within 40 paces of (12).

(131) Southern edge of schistose green-
19563 stone forming a precipice facing
south in line east of (12)

(141) Northern end of face of cliff.

(151) Ledge of greenstone high in the hill.
40 paces N.E. of (151) is a little ledge
19564 in the woods, low down in the slope
of the next eastern hill.

20 S.E. of (151) the rock extends a-
bout 50 ft

Another ledge of schistose greenstone
is in the wood low down between
the hills (15) and (16).

(161) Highest point in next hill. Green-
19565 stone exposure

35 paces west of this in the woods is
another ledge that is more or
less schistose.

(171) Ledge of greenstone; foot of southern

precipice of hill

- (18) On face of Southern precipice East of (17). The rock here as elsewhere is greenstone
- 19566 (19) Center of ledge of greenstone of which (20) is the Southern extremity
- (20) Northern (?) extremity of the ledge is 15 ft. further N. and the ledge is about 80 ft. wide.
- (21) Large ledge of greenstone, measuring 100 ft. S.E. and 30 N.E. on Northern side of tongue extending S.E. from hill. (21) is at the middle point of ledge, which is perpendicular to the N.E. for about 40 ft.
- (22) High point on hill.
- (23) Eastern end of high portion of hill, which so far as can see is drift-covered.
- (24) Valley
- (25) North end hill, on East of basin. Here a round knob of greenstone with perpendicular sides on the E. W. & N. extends from body of the hill
- 19569 (26) Top of greenstone ledge W.S. of (25)
- (27) West end of same ledge where precipitous to the plain.

- (28) Center of large greenstone ledge,
19570 running 75 ft. back in the hill,
and extending north to join ledge
there.
- (29) Knob of greenstone near the top
19571 of the hill
- (30) Top of hill for Station. No ledge
here, but a small one of greenstone
20 ft. west.
- (31) Ledge jutting to the west, on steep
slope of hill. The rock here is
19572 weathered red in most places, and
occurs in patches separated by a
19573 greenstone schist.
- (32) Ledge precipitous to the S.W. on S.W.
19574 side of hill. It is a greenstone
extending back in hill about 20 paces.
Another small ledge of the same
rock is 20 paces from (32) in a di-
rection N. 50° W.
- Another one begins 40 paces
200 N of W. from (32) on the South
side of the hill and runs all the
way to (30)
- (33) Bare knob of greenstone on S. side
19575 of hill.
- (34) Another ledge of greenstone at the

- 19576 South end of the same hill
 (357) N.E. end of hill, S.E. of basin. Small
 19577 ledge of greenstone
 (36) ledge of coarse grained greenstone,
 with patches of fine grained ditto,
 19578 forming a rounded knob at the N.W.
 end of hill.
 (37) Top of hill. No ledge.
 (38) Top of next hill South
 60 ft. S. of (38), is a ledge facing
 the road, almost overhanging it.
 19579 It is 20 paces long in a S.E. direc-
 tion and 5 paces wide at widest
 part
 (39) S. end of same hill behind (38),
 near road. No rock.
 (40) Top of hill S. of road. No ledges.
 (41) Top of next hill S.W. No rock.
 (42) North end of next hill S. There are
 19580 small exposures of cherty iron rocks
 (43) Ledge of same rocks 30 ft long E.W.,
 and 20 ft wide. The bands are chert
 and brown earthy ones, more or less
 19581. continued, though general dip ap-
 pears to be S.E. and the strike a-
 bout N.E.
 (44) S.W. end of ledge of which (42) is N.E.

End. It forms a precipice between (42) & (44) facing North.

(45) Another point in same ledge.

(46) Ledge of same contorted cherts, near

19582 E. end of top of hill.

Another small ledge of the same rocks is half way between (45) & (46)

Distant from (46) in a direction 25° S of E about 56 paces is another ledge of the same contorted schists, and at intervals between the two are small exposures of others.

(47) W. side of next hill to west. Small ledge of same cherts.

(48) Cherty iron ledge

(49) Cherts etc, striking 30° N of W and dipping about 35° N. The rocks

19583 here are very well banded and are exposed in ledge some 30 ft. long

(50) W. end top of hill. No rock.

(51) Ledge of cherts at west end of hill in low plateau. Rock extends about

19584 10 paces north of (51), dips about N.E. and strikes about S.E.

(52) Highest point in small western knob in plain. Greenstone.

(53) Ledge of cherty iron, well shown in

N.W. side of hill. The dip is 40° a-
bout NE and strike NW.

(54) Ledge of same cherty rocks, with
19585 usual strike and dip

(55) Ledge of same rocks well down on N.
side of hill.

(56) Low flat ledge of same rocks, whose
19586 seems to be toward plane table.

(57) West end of ledge of same rocks
forming a precipice to N.E. Strike
nearly EW, with dip S. at low angle.

(58) Eastward in same ledge, which
was about 25 ft further in the line
of sight.

(59) Ledge of same rocks higher in hill;
19587 than (56).

(60) Test pit at bottom of hill on north
side. Learn one and chest in deep
heap.

(61) Check against (52)

(62) West end of little hill. Greenstone
19588 Specimen from near where road head
up.

July 15

About 2 ft north of (61) is a contact between the greenstone 19588 and a schistose material, that may be either a schistose greenstone or a much decomposed phase of the iron schist or cherts.

(62) Ledge of greenstone 21 x 10 ft. in west end of hill (602).

(64) Large ledge in north end of ~~same~~ ^{the 2nd} hill. The rock is greenstone and

19591 ledge measures 28 paces N. S. A line to the S.E. of (64) in the same hill the greenstone includes a banded area, in which the bands are sometimes very long and narrow, sometimes are broad and short. In all the bands are more or less curved. The material of the bands appears like the iron schist. Some of the inclusions are many feet long and only the width of two narrow layers. This precludes the notion that the schist was caught up by the greenstone in its ascent, and included in it.

11

in the manner of the ordinary
inclusions so frequently found
in gneisses. It seems more
probable that the greenstone in-
cluded the schists are a series
of dykes or as a great frayed dyke,
and that the schist portions are
parts of material not pushed
aside. The phenomena are
best exposed on the N.E. side of
the hill in a cliff facing road.

(65) Contorted iron schists, on the
19593 S.W. end of the hill N.E. of (64).
N.B. By iron schists include
the carbonate rock and all
others belonging to iron formation
whose true nature is not de-
terminable in the field.

(66) In plain
(67) Edge of swamp.

(68) " " "

(69) " " "

(70) " " "

(71) W. end of plane table knob

(72) S.W. end of same hill.

(73) Valley.

- (74) Ledge of iron cherts well down in valley.
- (75) Small ledge of iron cherts toward west end of hill. Dip N.W. about 40° . General strike about N. E.
- (76) Larger ledge of same iron cherts
19594 further up the hill. Dip about 45° N.W. Strike about 30° N of E.
- (77) Large ledge of same rocks of N.W. side of hill.
- (78) Ledge from a spur west of (77)
The rock shows at a great number of places in the hill. The specimen is from (78)
- 19595
- (79) Bottom of hill.
- (80) Easternmost and bottom end of long ledge of cherty iron rock. Strike about 5° S of E and Dip 50° N. Between (78) and (80), about 110 ft. S. of (78) is another small ledge of the same rocks.
- (81) Uppermost edge of ledge (80). The rocks here vary in dip, while strike is about 15° N of E.
19596
- (82) Bottom of hill.
- (83) Large ledge of same rocks. These were banded, with slightly varying

strike and dip. The ledge is exposed almost all the way from (81).

- (84) East end top of hill. No rock.
 (85) On slope No rock.
 (86) N. side of N. spur. No rock.
 (87) N.W. edge of large ledge running S.E. in line of sight 25 ft. The rock is the usual cherty iron.
 (88) S.W. end of another large ledge running N.E. about 40 ft and 20 ft wide. It is a shattered and broken chert, cut by cross veins of chert etc.
 (89) N.E. end of ledge same rock, stretching to (90) but covered in places.
 (90) Same rock on S. side of hill forming almost a precipice of considerable height.

The precipice runs N.W. Strike of rock in it is about 15° N of E and the dip about 40° N.W.

- (91) Valley
 (92) Bottom of hill.
 (93) W. end of little precipitous ledge of iron cherts, about $\frac{1}{3}$ way up the hill, at whose bottom was (92).
 19598 Ledge extends about 20 paces west

- 7 (93) and all the way to (94)
- (94) West end of ledge near top of hill. Entire end of hill is knob of bare iron cherts.
- (95) Ledge on top of hill toward which western ledges converge. Here
- 19599 much of the rock is black and irony, and is spangled with little crystals of hematite?
- (96) S.E. end of valley
- (97) Joining ledge of iron cherts, extending back in line of sight up the hill, where it widens.
- (98) Near top of hill, west end.
- (99) Ledge forming little precipice on S. side of S. ridge of hill. Rock is the cherty-iron
- (100) Edge of same precipice further west.
- (101) Top of knob.
- (102) N.W. edge of plateau, where is little precipice 10 ft. high facing N.W. and running E on N. side of hill. Cherts.
- (103) N.W. end of ledge on knob south. West of (103) the ledge runs 100-125 ft. At (103) the rock is greenstone, but in lower ground a greenstone dyke is in contact with a well banded

rock striking about 15° S of E and dipping N.

19601

(1104)

Further East, up in hill. Further up in hill than this point is a very coarse grained greenstone forming a rounded knob, which at 11041 is almost precipitous to the N.

19600

South 60 ft from 1104 is another ledge beginning here and running 60 ft. N.E.

(1105)

Ledge of greenstone runs also all the way from 11051 to 150 west of this point.

(1106)

East end of hill. Bare knob of greenstone.

(1107)

19602

Small ledge of greenstone, very similar to other ledges hereabouts.

(1108)

Ledge of iron cherts on south side of top of hill. Much embayed. East end is 30 ft. E.

(1109)

Practically west end of same ledge, though ledges are so numerous on this side of the hill that it is almost impossible to distinguish them from one another.

(1110)

Center of large ledge of iron-cherts on south side of hill, near its top.

about 20 ft. toward the plane table
is a sheer precipice 10 ft. high.

- (1111) The ledge extends all the way to 1114,
which is near its western extremity.
The dips and strikes in the south side
of the hill are not very different
from those in the north side.
- (1112) East end of very large ledge forming
an E.W. running precipice
about 10 ft. in height.
- (1113) West end of same precipice, where
it is 20 ft. high. The strike here is
 15° N of E and dip high, about 75° ,
to the south.
- (1114) Eastern end of another precipice
higher in the hill. Ledge extends
all the way to 1117
- (1115) Western end of same bluff.
- (1116) West end of large ledge same rocks
- (1117) Bottom west end of same ledge
- (1118)
- (1119) E. end large bare knob of same rocks
- (1120) W. ditto.
- (1121) Highest point of hill in which plane
table placed. Well toward E. where
top of hill very narrow. The entire
top is bare greenstone, where north

and South edges are respectively 20 ft and 25 ft. distant from (121). Near the foot of the hill the rock extends 80 paces E and 30 paces west. At 220 paces E of this point is another ledge 40 paces long, ending at 280 paces E.

- (122) Contact of greenstone with schistose rock to the South.
- (123) Center of ledge of schist 40 ft long E-W, and 5 ft. wide.
- (124) S. side of bluff, schist a few feet north seems to be a belt between two dykes of greenstone.
- (125) South side of hill, where it consists of a precipitous bluff of greenstone. N.W. of this point and 40 ft distant is another ledge of schist, about 40 ft long E-W and 5 ft wide. It is but a few feet south of greenstone.
- (126) S. side of bluff of greenstone.
- (127) Center of long ledge showing contact of schistose and greenstone to the north.

The ledge is about 60 ft long and 10 ft wide. on the contact the schists are slightly curved and twisted, but

at some little distance from the
greenstone the bands run straight
and dip nearly vertically, perhaps
at 85° to N.

- (128) Greenstone on S. side at top of
bluff.
- (129) Center of ledge of schist. 60 ft. long.
25 ft wide.
- (130) Center another ledge of schist 30
ft. long and 25 ft wide.
- (131) N. edge of granite to S. across
swamp.
- 19604 Granite
- 19605 Gneiss.
- (132)
- (133) N. edge of granite to S. This gran-
ite is here cut by greenstone dyke
- 19606 Greenstone, probably in granite
- (134) is specimen of the greenstone
- 19607 Granite
- (135)
- 19608 From this ledge
- (136) Granite
- (137) Gneiss to S. at north edge of
granite area.
- 19609 Specimen of gneiss
- (138)
- (139) Small ledge of in south

- 19610 Side of creek. Strike $N 35^{\circ} E$. Dip about vertical
- (140) E. end of main knob of greenstone
- (141) Little knob E of main knob. Also located by pacing from (121)

At the west end of this same ridge, near the railroad, are good exposures of greenstone and the schist that has already been spoken of.

- 19611 The greenstone is coarse and is filled with veins, etc., of a soft chloritic rock, which in its weathered surface is speckled with red feldspar and green epidotized feldspar. This rock forms the main mass of the hill, which is very narrow at top.

- 19612 South of this appears a band of rock striking $50^{\circ} S E$. It is 20 ft wide forming a portion of the S. slope of the hill. Dip $50^{\circ} S$.

- 19613 South of this again is another mass of greenstone, so that the banded rock appears well enclosed between two dykes.

Close to the contact the southern

19615 greenstone is filled with red feldspar, and besides it contains a lot of tiny vacuoles. Sometimes filled with a black substance, sometimes empty. The rock looks remarkably like an amygdaloid, but the contact with the schists is wavy, the laminae of the latter being twisted and turned. If an amygdaloid, it is evidently a local one formed in the edge of a dyke.

There seems also to be a narrow contact belt in the edge of the schist.

The broken dyke is quite narrow and amygdaloidal on both sides, with the larger cavities in the northern contact. These larger cavities like the pinacles ones are sometimes empty and then again
19616 are filled with quartz.

19617 South of the southern dyke is more of the banded rock, extending some distance south. Specimen was taken from near the contact.

(1452)

65

Topographical.

(149)

- (150) Northern Contact. between west end of northern greenstone and the banded rock.
- (151) Southern contact of same banded rock with greenstone to the south.
- (152) North contact of Southern belt of banded rock (15 ft wide) with south side of Southern greenstone, on line knob west of station.
- (153) Another point in same contact further west.
- (154) Another point in same contact.
- (155) Point in westernmost edge of ridge far station.

July 16/91

- (156) Bottom of hill
- (157) Large knob of greenstone in S.W. and of hill. Ledge runs S.W. about 60 ft and is precipitous on the S.E. side
- (158) Small ledge on E side of same hill.
- (159) Exposure at highest point in south half of hill. This ledge covers the entire top of the hill. It is 25 paces long running S.W. to swamp.
- 19619
- (160) East end of ledge of greenstone on east side of hill. Just E. of this point the ledge faces perpendicularly for 10 ft.

- (161) Upper edge of same ledge
- (162) Highest point in North portion of hill
- (163) Top of another high ledge of greenstone that practically continues all the way to (160); with a precipitous face to the East.
- (164) Northernmost knob of greenstone in line E of Wierthrop Mine [Same as (64)]
- (165) Same as (65) of June 15.
Another small ledge of the same iron schists is about 15 ft to N.E. Other ledges in which the bands are contorted occur here and there about the E face of the hill.
- (166) Large ledge of same rocks on East side of hill. In reality - continuous with other ledges to the S.
- 19620
- (167) Near bottom of hill.

The west side of the hill is drift covered.

A low ledge of greenstone was found in the plains 44 paces distant in line of sight from (164).

- (168) Contact between greenstone and iron schists. The north edge of

greenstone 30 ft. north, where edge is precipitous.

- (169) Near center of north area of schists ledge here 20x10 ft.
- (170) South contact of northern schists with southern greenstone. The schist exposes a surface of about 10 square ft and the greenstone an equal area.
- (171) Center of knob of greenstone. Ledge 20x20 ft.
- (172) Ledge of schist 10x10 ft. A greenstone ledge is 20 ft north of this point. Ledge 40 ft wide and extending east within 10 ft of (171) and west 100 ft. from (171).
- (173) Another contact of schist and greenstone.
- (174) North side of greenstone ledge, where it drops 30 ft. to the north. Ledge measures 20 ft N-S.
- (175) Ledge of black slate dipping and striking like schists. Ledge about 20 ft long running in direction of the line of sight.
- 19621 A large ledge of schist-bernis about 20 ft N.E. of and near frac-

tracely all the way to the S. side of the big bluff.

- (176) East End of long knob of schist running along line of sight 30 paces
 19622
 (177) Another edge of schist running East for about 12 paces along bottom of bluff.
 (178) East End of another schist ledge.
 (179) South Contact of South greenstone and schist. (?)
 (180) North Contact of schist and north greenstone.

The schist is also exposed at the bottom of the hill used as station, not more than 5 ft from the plateau in the south edge of top of hill. It extends all the way along the hill on its south side, even as far as its west end.

- 19623 Greenstone near contact at west end of hill.

- (181) East end
 (182) N.W. corner
 (183) S.W. corner } of a pit in iron chert. Their strike is a few degrees N of E and dip N.

25

19624 Specimen from North side of pit.

(184) S. side of near northerly pit in same rocks

(185) N. side of same pit, which is only 3-10 ft. wide.

(186) Small ledge of iron chert on East side of hill. Strike E or W, Dip about

19625 40° N.

(187) Another ledge nearer top of hill.

(188) Top of hill.

(189) Valley

(190) Large ledge of greenstone, sloping S.E. from East side of hill to S. of valley. Ledge extends 100 ft toward observer and extends back in line of sight 30 ft.

(191) Very long ledge, seemingly a S.W. extension of former one. 80 ft x 30.

(192) Granite knob.

(193) Large ledge of greenstone running at right angles to line of sight for about 150 ft.

(194) Greenstone ledge forming a little precipice running along

19626 The South side of the bluff and

Extending up the hill to 15 (195)

(195) Upper limit of ledge.

Station (195) is on the S. side of a big hill. The whole top of the hill back of the knob contains ledge knobs of the same coarse greenstone.

(196) West end of small bluff at bottom of big one. Ledge of greenstone runs interruptedly at least 100 ft.

(197) E end of same bluff.

(198) Middle of 50 ft ledge of greenstone west of (195 Station)

(199) Knob of greenstone high on hill to west. Ledge measures 45 x 30 ft. E.W.

(200) Knob of greenstone at bottom of hill from which took specimen

19628 19627. At this place it is Schistose

(201) Bottom of hill

19629 Coarse granite

19630 Fine do.

19631 Fine do.

19632 Diabase

(202) Station

(203) Greenstone ledge N. side of hill

(204) " " " " " "

} From print used
as Station. S of
Swamp, W of R.R.

- (205) North side of hill further East.
Greenstone ledge
- (206) N.E. side of hill, where greenstone
19633 again exposed.
- (207) Greenstone ledge further East.
- (208) Greenstone, East end of hill
- (209) Greenstone, North side, near bottom.
- (210) Greenstone S.E. end of hill.
- (211) West end of hill. No ledges west
of 10 ft. west of Station.
- (212) Pits in pits of Winthrop Mine
- (213) The southern of the two pits
- (214) contains but little rock. The
- (215) northern one, on the contrary,
- (216) shows much well exposed banded
- (217) limonite and chert.
- (218) The rocks dip about 40° . True direction
- (219) of dip and strike could not
be obtained from pit, but was
afterwards seen in surface and
then noted.
- 19634 Predominant rock in the pit.
- (220) Round knob of greenstone north
19635 of the pits
- 110 paces S.E. from 220 is the
E. end of a cut in side track.

of railroad to mine. The cut is 120
 feet long and has a general
 N.E. direction. The rocks in it
 dip about 40° , N of E, strike
 30° W of N. The dip and strike
 were so difficult to take that
 they must not be depended
 upon.

In one place on the N.W. side of
 the cut is what looks like a

- 19636 dyke some 25 ft. wide
 19637 Ore, from Louthrop Mine.
 (221) Long bare ledge on the side, near
 the bottom of the hill. The rock
 19638 seems to be a cherty iron ore, dip-
 ping 40° N of N and striking 35° N of E
 (222) Iron-cherts, low down on hill.
 19639 Specimen from (222).
 (223) Another ledge of same rock in cut
 on west side of railroad. Cut
 some 125 ft long, with rocks con-
 19640 sisting of iron cherts. (223), S. End
 of cut.

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(224)

(225) W. end bottom of hill. No rock

(226) Edge of well down in

19641 South side of hill.

(227) East end of hill. No rock.

(228) Top of hill. No rock.

(229) Middle of large ledge of crystallized iron and chert schists on west side near bottom of hill. The general dip is north and general strike 31° S of E. ✓

19642 Large ledge S.W. of (229) and E. end of pit.

(230) W. end of pit, which is in a contact between conglomerate and cherty ones, the latter on the southern side, former on north wall. In the N.W. corner is a soft

19643 fissile rock that may be a dyke. A shaft is in the west end of the pit, and from it some ore

19644 conglomerate was taken.

The north wall of the pit (the hanging wall) is Jasper conglomerate, overlain by black slates.

19645 Some of the conglomerate near

the ore is schistose, Strike $10^{\circ} S \gamma E$. Dip $50^{\circ} N$.

Other portions at a distance from the ore are massive. Specimen
19646 top of north side of pit.

19647 Black slate from north side of pit.

Toward the East end of the pit conglomerate is in the south side and slate in the north.

at the East end are seams of
19648 iron slate lying in conglomerate with same strike and dip as this

19649 100 S of W. end of pit.

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(232)

(233)

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(237)

(238)

(239)

(240)

(241)

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(244)

(245)

(246)

(247) Top of hill. N. of road. No ledges

(248) Near bottom of hill

(249) Small ledge of greenstone

(250) Round small knob of greenstone, that is western extension of (220)

19665 From (250) the ledge extends west 50 paces

(251)

(252)

(253)

(254)

(255)

(256)

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(257) Shaft in new workings of Winkhof mine.

(258) Small ledge of iron chert on S. side of hill north of road.

(259)

(260) E end of eastern pit of Louthian mine. on the sides of the pit, which is about 60 ft. wide are well bedded cherty rocks, striking about 70° S of E and dipping about 45° N.

no specimen
19666

July 24/91

- (261)
- (262)
- (263) Success ledge of greenstone on north side of success hill
- (264) Small ledge greenstone
- (265) Small knob of greenstone
- (266) Small ledge greenstone on top of hill.
- (267)
- (268) East end knob of greenstone
- (269) E } ends of greenstone ledge.
- (270) W }
- (271) Bottom of hill.
- (272) N.E. end ledge of greenstone at bottom of hill.
- (273) N.E. end of hill, whose East side on top is greenstone.
- (274) Top of hill. Ledge extends all the way from (273) as a solid exposure.
- 19676 Specimens from (274).
- (275) S.E. corner of top of hill. Ledge of greenstone extends from this point some 15 paces in a line North of West. At this point there appears to be an inclusion or a dyke of the Schistose rock in the massive

varied?

[90 paces west of the Sec. line on the south side of the hill, is a small ledge of schistose ^{greenstone} conglomerate, well down toward bottom of the hill.]

The flag on top of the hill is in the center of a ledge of greenstone 20 paces N. & 5 paces E. W.

(276)

(277)

(278)

Jasper conglomerate on south side of hill. 40 ft. E. W. 20 ft. N. S.

(278) is the middle of the north side of the ledge.

(279)

West end of ledge of much contorted chert etc. It has no general strike and dip. The ledge runs 40 ft. E and is about 30 ft. wide, though exposed only in small patches.

19678

(280)

Another ledge of the same rock, a little south of (279), and practically continuous with it. The banding here is more regular than in the more northern ledge, and the general strike is clearly near E. W., while the dip is high to the north. Individual layers are much

contorted and some bands are quite brecciated.

19679 Banded rock

19680 Brecciated band

A miniature synclinal is on the west side of the East end of the ledge, with breccia at the lower bend.

(281) Small ledge of iron cherts also

(282) " " " Jasper conglomerate.

About 100 ft S of (279) is a small pit on the side of the hill. The rock in it strike about E-W, with a

19681 dip to the north. The material is one conglomerate.

(283) West end of westernmost pit on N. side of hill, south of road.

(284) Between two pits.

(285) East end of middle pit.

(286) North side of pit.

These pits are those of the old Loothian Mine. Since the day was cloudy it was found impossible to study the rock found in them. Since no opportunity was afforded for recovering them again, they have not been ex-

mined. The rock in them is the chert and one of the old formation.

(287) East end of small jasper conglomerate bluest on north side of road. The strike is in the line of sight, with the pebbles beautifully arranged parallel to the strike. Still so far E.W.

(288) To point in road 35 paces from shaft in the west end of a pit in drill on north side of road. The hill, though small, exhibits several peculiarities. The conglomerate in the north extends to very near the edge of the pit, where it is cut by a small dyke of chlorite schist, apparently conformable with it. Under this is a 20 ft arc of belt of finely schistose rock

19682 resembling slate, and below this, to the south are the iron cherts, contorted etc as elsewhere.

19683 a few feet away from the contact this chert-schist strikes 50° N of E and dips to the north. There seems to be a slight unconform-

quartz between the cherts and the slate, but this could not be determined with positiveness.

19684 On the south side of the pit between the slaty rock (19682) and the iron cherts is a fine grained Jasper conglomerate.

July 25.

- (289) Near top of precipice of greenstone on the north side of the hill. Precipitous 20 ft on the north side, and 30 ft both to the east and to the west.
- (290) Smaller ledge of greenstone further east.
- (291) Smaller ledge greenstone
- (292) Ledge of greenstone on top of hill.
- 19685 Extends about 20 paces toward alio-
Dade table.
- (293) Ledge of soft, well banded rock on top of hill. It may possibly be an old greenstone, as it seems to
- 19686
- 19687 Soft for chert
- 22 paces E of (293) is a long ledge of greenstone running 30 paces in

a direction a little west of south.

90 paces south is another ledge, this one of massive greenstone.

- (294) On top of ledge of greenstone on north side of hill. Ledge runs 40 paces E & W. The north side is precipitous, with the edge of the precipice 20 ft. north of (294)

- (295) Top of same precipice further west.

- (296) Top of same precipice further west.

- (297) West end of precipice, where rock resembles 19686 & 19687.

19688 Specimen.

(298)

- (299) West end of hill of greenstone.

- (300) West end of Eastern knob of hill. Greenstone runs 50 paces E.

- (301) East end of same ledge

- (302) Contact of greenstone with greenstone conglomerate to the south. It now looks as if the greenstone were large debris in the conglomerate on the one side and thin sheets on the other.

19689 Greenstone agglomerate.

- 20 paces S. of (302) is another ledge
of the same agglomerate.
- (303) East end of next smaller western
bluff of greenstone agglomerate?
- (304) West end of same bluff, at least 100
feet away from observer in line
of sight.
- (305) Small ledge of greenstone agglom.
- (306) " " " " " "
- (307) Quite large ledge of banded rock
on side of hill.
- (308)
- (309) Greenstone near bottom
- (310) Center of S. side of pit on side of
hill. 50 ft E.W. 30 ft N.W.
The rock is soft chert and limon-
ite.
- Another small ledge of chert
at is 25 paces South of Station.
Here they strike 120° N of E.
- (311) Jasper conglomerate.
- (312) Hard iron chert
- (313)
- (314) Quartzite in small ledge on
north side of hill.
- 19691
- (315) Quartzite ledges, small.
- (316)

- (317) Small quartzite^d ledge.
 (318)
 (319) Quartzite^d, striking 15° N of E and
 dipping E of N about 30° . (319) is
 at west end of clump of ledges, where
 other limbs^d are 50 paces N, 70
 paces W and 100 paces E of 319.
 (320) Small ledge of black quartzite^d.

July 27.

- (321) } Small ledges on west side of
 (322) } long hill. Greenstone.
 (323) Another ledge of greenstone.
 (324) Bottom of hill.
 (325) To bare ledge of greenstone run-
 ning 50 paces East to little stream
 19692 running South. To the west it ex-
 tends 20 paces beyond (325)
 (326) South end of hill of greenstone
 (327) Small bare knob of greenstone
 50 x 10 ft.
 60 ft S.E. of (327) is a small ledge
 of the same rock on the west side
 of hill (325).
 40 ft N.W. is another in the plain

and soft south of the latter see another.

- (328) Bottom of hill. No rock
- (329) Small ledge of greenstone, on N.E. end of small rise in the field between two hills.
- (330) Ledge of greenstone on S.W. side of hill. Width 15 ft. Length 30 ft S.W. The south side of the hill is very precipitous and is all greenstone
- (331) Ledge of greenstone, from which
19693 took specimen 19693.
- (332) Ledge of greenstone jutting E from E. side of hill. Runs 20 ft further E and to the west joins top of hill, which is all ledge.
- (333) Top of hill, west side, where hill is precipitous 30 or 40 ft, all greenstone. To the south this greenstone, which is a fresh, coarse grained, diabase runs all the way to the south precipice
- (334) Within 20 ft of East end of a ledge jutting to the west 75 ft beyond (334) and then precipitous for 20 ft.
- (335) Another west jutting ledge of greenstone

About half way between (334) and (335) is still another large ledge jutting to the west and precipitous to the plain.

(336) Bare knob of greenstone. Easternmost of a pair of ledges, precipitous to the S.E. and extending 100 ft. S.W. and 100 N.W. of (336).

(337) Small ledge

(338) Small ledge

(339) Ledge half way up next hill.

(340) Top of hill.

From (339) to (340) is solid ledge of greenstone, which besides extends 100 ft. S.W. and East 20 paces.

(341) East side of small knob that is almost all ledge. Extends 20 ft. E. of (341).

(342) Center small knob of greenstone some 100 ft. long S.W. & N.E. and 25 ft. wide.

(343) Center of ledge to S.E. of (342). Runs 100 ft. N.E. of (343).

(344) Small ledge of greenstone in the top of the hill.

Another of same rock is about 25° E. of S. and distant 100 ft. from

- (344), Its dimensions are 30 ft x 15.
- (345) South side same hill. The greenstone ledge here runs 50 ft. East. Another small ledge is 35 ft W. of (345).
- (346) Ledge greenstone
- (347) Small ledge in same hillock as (346). The greenstone here is pitted with little hollows. The ledge thins to the west about 80 ft. and is separated from a larger one to the north by a small gully 20 ft deep and 40 wide.
- (348) Another knob of greenstone
- (349) S.W. end of same ledge.
- (350) Trench toward top, on ~~East~~ side of hill. Ledge of greenstone runs about 10 ft SW of (350) and 30 ft N.E.
- (351) Small ledge of greenstone
- (352) " " " "
- (353) N.E. end of hillock of greenstone. At the S.W. end of the hill in which 1/8 post is located, and near its bottom is a cut in iron-schist.
- 19696 No rock is exposed on the surface, but considerable may be seen

in the side of the cut.

- (354) } Large bare knobs of greenstone,
 (355) } joining from west side of hill.
 (356) } near top.
 (357) }

(358) Precipitous ledge lower down in same hill.

(359) Precipitous ledge of greenstone. Rapp. way to top of hill.

(360) Ledge higher in hill.

(361) Ledge of greenstone in small gap between higher points of hill.

(362)

(363)

(364)

(365)

(366)

(367)

(368)

(369)

(370)

(371)

(372)

(373) East end of a series of ledges of quartzite dipping N. and striking about 30° N. of line of dipst.
 (Poor strike)

19697

- (374) W. end of this series of ledges. Here it comes in contact with the west with a ledge of very fine grained conglomerate, that seems to be underlying the quartzite. South of the conglomerate for about 10 paces are other ledges of white quartzite and 18 paces north is more of the conglomerate, and 40 paces East is a 30ft ledge of mottled red and white quartzite, containing martite. It strikes N.E. and dips about 30° to N.W.
- 19698
- (375) Near crest end of the next of ledges. The extreme west end is 80ft further west and 40ft N. Here the strike of the quartzite is 30° N of E.
- 19699
- (376) Ledge of mottled quartzite 80 x 20 ft.
- (377) E end of a triangular ledge of black quartzite whose south end is
- 19700
- (378) ? and west
- (379) end. ?
- (380) E end ledge of fine grained conglomerate.
- (381) W end same ledge

- 40 ft Sw of (380), are other small
 19701 ledges of same kind of rock.
 (382) Small ledge of conglomerate on
 north side of hillcock. The East
 end runs 20 ft. back of sight (382).
 (383) Small ledge of black quartzite
 further down on north side of
 hillcock.

- (384)
 (385) } Small ledges black quartzite.
 (386)
 (387) }

40 paces further from observer
 on line of sight W (387) is another
 similar ledge.

- (388) on the side of the hill north of
 Winthrop Mine is a stripped
 ledge of Jasper conglomerate
 measuring about 40 ft. E-W,
 and almost perpendicular 30 ft.
 (388) is about the center in all re-
 spects. The dip is about 45° to N.
 and strike about 15° N of E. It
 was difficult to get good dip
 and strike because of lateness
 of the day and bad position of
 the ledge. Some of the large

pieces at foot of stripped portion of the ledge is a bed of slate, whose weight indicates great richness in iron.

19702 Slate

19703 Schistose ore conglomerate.

(389) $\frac{1}{4}$ foot.

(390)

(391) } Ends of pit of National Mine.

(392) } On the north side the pit shows

(393) } no rock. but on its SE side are good exposures of the older iron-cherts.

(394) Near the end of a little pit getting into S.E. side of pit. Here

19704 the rock is a well banded iron chert, more or less contorted, with a general strike ? and a dip N. ? As at Goose Lake, there is some hematite crystallized in flat tabular pieces in joints in the rocks and small scales scattered over joint planes.

(395) } Sides of mine north of pit. On

(396) } north side are old cherts. Other

(397) } sides drift.

At the station occupied for these
sights is a large ledge of con-
glomerate dipping about 30° N
and striking about 40° N of E.

(398)

(399)

(400)

(401)

(402)

(403)

(404)

outlines of greenstone ledge
forming a little knob.

(405)

Top of ledge of greenstone over
hanging road. The ledge runs
south about 10 ft.

(406)

Top of hill. Greenstone Ext. 35 ft E.

(407)

East end of ledge whose west
end is (405).

(408)

S. end of bluff of greenstone,
west of little lake.

(409)

Similar knob in valley.

(410)

(411)

(412)

(413)

(414)

(415)

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(417)

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(419)

(420)

(421)

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(424)

(425)

(426)

(427)

(428)

(429)

(430)

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- (431) Near west end of ledge of mottled
 19737 martitic quartzite 15 ft wide, and
 runs 10 ft west and 5 ft E of (431)
- (432) West end ledge of black quartzite
 19738 forming south side of hillock.
- (433) East end same ledge which is 20 ft
 wide.
- (434) West end of little ledge of white or

red quartzite 15 ft long and 8 wide.
 (435) East end ledge of mottled quartzite
 running west 35 ft. forming the
 entire north slope of hill, which
 is 30 ft. high.

Other small ledges of same rock
 are 40 ft S and 60 ft S.E. of (435).

(436) Very small ledge of black quartzite
 well down on south slope of hill.

(437) Small ledge of black or dark red
 conglomeratic quartzite?

(438) White quartzite at top of hill. Ledge
 10 x 10 ft., with another 5 x 5 - same
 10 ft west

30 ft north of (438) is a large quartz-
 ite ledge exposed for 30 or 40 ft E.W.

(439) East end of large mottled quartz-
 ite ledge 20 ft wide, dipping north
 and running about 45 ft 30°
 S of W.

10 ft S of (439), at top of the hill
 and underlying the white quartz-

19739 it is an exposure of red conglom-
 eratic

(440) Ledge of conglomeratic quartzite on
 the S. side of the hill, near road.

(441) West end of large ledge of same

rock, runy 10 ft E

(442) Ledge of black quartzite near East end of hill.

(443) Black conglomeratic quartzite on north side of hill, south of road.

(444) ditto

(445) West end of ^{conglomerate} jasper ledge

(446) East

19740 The ledge is exposed continuously along the south side of the hill, but not on top. There are two large ledges, of which one extends westward to (445) and the other eastward to (446).

Where the rock is exposed on the west side of the hill it is a black quartzite, into which the conglomerate grades as is indicated by the exposures.

30 ft E of (445) and 5 ft north of line between (445) and (446) is a large ledge of black quartzite.

(447)

(448) West end precipice of conglomerate forming south face of little hill between road and railroad.

(449) S.E. end of same ledge. Strike

45° N of E.

(450) E. end of same rock ledge. Here the ledge is not precipitous, but it extends back in line of sight 20 ft. The northernmost layer seems like black quartzite.

(451) W. end another ledge of same rocks.

(452) East end same ledge.

At East end little less conglomeratic than at west end.

(453) West end another precipitous ledge of conglomerate.

(454) Midway of ledge

(455) E. end same ledge

The ledge shows only along face of precipice the top being entirely covered

(456) Conglomerate ledge

(457) " "

(458) West end of conglomerate ledge where rock graduates into black quartzite.

Another ledge of black quartzite 10 ft. nearer observer.

(459) Another ledge of conglomerate

about 30 ft long at right angle to line of sight.

(460)

(461)

(462)

(463)

(464)

(465)

(466)

(467)

(468)

NW side of greenstone hill.

N.W. corner greenstone hill to S.

(469)

W. end of greenstone ledge, next E of (468)

(470)

W. end another greenstone ledge further East, 30 x 15 ft, on north slope same hill

(471)

Ledge of greenstone 40 ft E.W. 30 ft N.W. (471) West end.

(472)

E. end of ledge on south side

(473)

W. of station hill.

19742

Greenstone like others

(474)

E end ledge (471)

(475)

About 20 ft from E. end of large ledge of greenstone 20 ft wide, on S.E. end of Knob 1st of observer.

- (476) W. end of same ledge
- (477) N.E. end of greenstone ledge.
Extending 10 ft beyond right and
20 ft west.
- (478) Bottom piece
- (479) Greenstone ledge
- (480) " "
- Another small ledge west of
(479).
- (481) Small ledge greenstone
- (482) Middle of greenstone ledge 70 ft
long and 40 ft wide.
- (483) 20 ft west of East end of ledge
of greenstone. Ledge extends 50 ft.
further west.
- (484)
- (485) } Points in pit.
- (486) } The pit is under the drift
- (487) } on the west side of a green
- (488) } stone hill. The drift covering
has been stripped from the
rock exposing at the East end
a fine grained Jasper con-
glomerate
- 19743
- 19744 To the S.E. the conglomerate
becomes finer

19743 + 19744 are both from the
side of pit between (485) and (486),

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Strike of rock in pit located by Erickson 20° S of E.



