

CHICAGO AREA
PEAT AND MUCK

J.E. Lamar
June 1947

GEOLOGICAL
RECORDS SECTION
Lamar, J.E.
Ms. #123
ILLINOIS STATE
GEOLOGICAL SURVEY

CHICAGO AREA

PEAT AND MUCK

Peat is composed of remains of plants, including trees, whose decay was stopped while incomplete by their being submerged by or saturated with water thereby excluding atmospheric oxygen. Usually the structure of the organic materials is more or less evident. The term muck is commonly applied to drained areas of peat which have been cultivated or to a black soil or earthy material in which is incorporated large amounts of vegetable organic matter. There is no sharp line of distinction between peat and muck and no attempt has been made in the mapping of the deposits of the Chicago area to distinguish between the two.

The peat and muck deposits of the Chicago area occur in two principal ways, in valleys cut or enlarged by glacial flood waters and in closed depressions largely in regions of till (stony glacial clay). The streams occupying the above valleys after glacial times were small as compared to the glacial floods and in the low tracts within the old glacial floodways, lakes or ponds remained which were gradually changed to bogs or swamps by an influx of various plants from which deposits of vegetable material accumulated and gave rise to the peat and muck. Deposits of this sort are found along the Sag Channel and Stony Creek between Blue Island and Lemont and also ^{to a lesser extent} along in the headwaters of Skokie River west of Glencoe, see Figure A.

The closed depressions were happenstances in the glacier's building of moraines, or many of them may be the result of the melting of large blocks of glacial ice which had broken loose from the

glaciers and were left partly or entirely embedded in the glacial drift. In these too vegetation gained a foothold, ultimately converting them into swamps or bogs, as which many remain.

Fig A
Figure A is a generalized map, showing the location of the larger bogs and marshes in the Chicago area and also areas wherein bogs of lesser size occur in relative abundance. The white area of the map contains a few small scattered bogs but is generally devoid of peat and muck deposits.

Many drained peat bogs in the Chicago area are no longer recognizable as such. Their surfaces are under cultivation and only by boring through the soil into the underlying material is their true character revealed. Occasionally drained bogs catch fire. Undrained bogs or those which have a dry surface but are wet below afford an unstable foundation for highways and other structures and necessitate special precautions in construction to avoid subsidence.

No peat, derived from the growth of sphagnum moss and therefore known as "moss peat," is known in commercial quantities in the Chicago area. Mostly the peat is believed to be the remains of cattails, reeds, lilies, pondweeds, heath shrubs, grasses, trees and other plants.

No good exposures of peat were noted in the Chicago area and such information as is available regarding specific bogs results largely from borings⁽¹⁾. A bog of about 20 acres extent in the SW. 1/4 sec. 16 and the SE. 1/4 sec. 17, T. 39 N., R. 12 E., near Westchester had a maximum reported depth of 20 feet. In an area where the deposits

(1) The writer is indebted to Dr. George E. Ekblaw, Geologist and Head, Division of Engineering Geology and Topographic Mapping of the Survey for his assistance in obtaining and interpreting the data on borings presented herewith.

The northwest part of T. 36 N., R. 12 E., contains a number of closed depressions which are shown on the geological maps of the Chicago area ^{1/} as "basin fills of surface wash." A soil auger boring made in one of these tracts in the NE. corner of sec. 18 encountered $3\frac{1}{2}$ feet of black muck underlain by $3\frac{1}{2}$ feet of brown, rotted peat. The bottom of the brown peat was not reached as water prevented further satisfactory augering. Another tract in the E. $1/2$ sec. 7 was found by augering to be underlain by 18 inches of dark gray silty soil, 18 inches of muck and 36 inches of brown peat. Water encountered at a depth of 6 feet prevented further satisfactory augering. Still another tract in the SE. $1/4$ sec. 6 was underlain by 15 inches of muck and 27 inches of peat at which point water was found. These data indicate that at least parts of these tracts are underlain by peat and it appears likely that other similarly mapped tracts in this general area may also contain peat.

^{1/} Bretz, J. Harlan, Chicago area geologic maps, Surficial geology of the Mokena Quadrangle and Surficial Geology of the Sag Bridge Quadrangle, Ill. Geol. Sur.

in the bog were 10 feet deep they consisted in descending order of a thin mat of vegetable material, a few feet of gray, laminated, silty clay, below which was black muck resting on yellow glacial till.

Another bog of about 40 acres, largely in the NE. 1/4 NE. 1/4 sec. 10, T. 38 N., R. 11 E., near Clarendon Hills, and surrounded by morainic hills was bored in three places near the center of the E. 1/2 NE. 1/4 NE. 1/4 sec. 10. One of these borings penetrated from the surface downward one foot of crumbly black spongy soil, 10 feet of peat grading from brown in the upper part of yellowish-brown in the lower part, and finally 4 feet of clay and gravel. Another boring encountered one foot of crumbly, peaty, spongy black soil, 5 feet of brown much decomposed peat, followed by 8 feet of yellowish-brown peat and lastly 6 feet of pebbly clay. The third boring found no peat but went through 9 feet of clay, thus indicating that the floor of the bog is irregular.

Insert p. 3a → In the SE. 1/4 sec. 15, continuing into the SW. cor. of sec. 14, T. 39 N., R. 11 E., near Villa Park, is another bog of the closed basin type, *Fig B* Figure B shows a longitudinal cross section of this bog as revealed by 23 borings spaced 100 feet apart. The floor of the bog is glacial clay on which rests 0 to 7 feet of muck which in turn is overlain by 7 to 21 feet of peat. The surface of the bog is essentially flat and the sites of the borings vary less than a foot in elevation. The area of this bog is about 45 acres.

Fig A McGinnis Slough north of Orland Park, see Figure A, ^{*Sec. 4, 36N, 12E*} is a swamp containing peat and muck. It is about 300 acres in extent and occupies depressions in a morainal area. Skokie Marsh, west of

Follow by p. 3B

(T. 42 N., R. 12 E.)

Glencoe, lies in a flat valley of low gradient. At one time it apparently was a typical bog but probably never contained a great thickness of peat. At present considerable areas of the Marsh have been drained, much of the peat has changed the muck or black soil, and in some places fires have reduced the original peat to a brownish clay-like ash. Borings made in the Skokie Marsh area in secs. 1 and 2, T. 42 N., R. 12 E., between Dundee Road and County Line Road, by the Forest Preserve District of Cook County ^{1/} indicate the presence of surface material described

^{1/} Morrill, John Barstow, Landscape Architect, Forest Preserve District of Cook County, Ill., pers. comm. 1947.

as "black top-soil," "top soil-humus" or "black top-soil, peat" with a maximum thickness of $2\frac{1}{2}$ feet. At the site of the Glencoe dam in the SE. $1/4$ sec. 12, T. 42 N., R. 12 E., borings encountered 2-6 feet of black dirt which was probably originally peat or muck. At the Pine Street dam site in SW. $1/4$ sec. 18, T. 42 N., R. 13 E., seven of 19 borings found brown clay, regarded as ash from burned peat ^{1/} up to 5 feet thick but mostly less than 2 feet. In general Skokie Marsh is probably not likely to be an important source of peat though it may afford considerable amounts of muck.

Follow by p. 4

Skokie, lies in a flat valley of low gradient and inadequate drainage. Only a foot or so of peat is present in the north part of the Marsh and rests on glacial drift or sand.^{1/}

^{1/} Bretz, J Harlan, Geology of the Chicago area, Part I, General, Ill. Geol. Sur., Bull. 65, Part I, 1939, p. 33.

The largest area of peat occurs along the Sag Channel and is mostly a drained swamp.^{1/} As much as 16 feet of peat is present in places. A considerable number of borings were made by the Cook Co. Forest Preserve in secs. 17 and 18, T. 37 N., R. 12 E., east of Sag Bridge in the area adjacent to the Calumet Sag Channel. Many of these record the presence of peat deposits generally 1 to 2 feet thick, with a maximum of about 5 feet, or of material residual from the burning of peat deposits. Figures C and D show the results of some of these borings, particularly those which extend from the spoil banks on the north side of the Channel in a general northerly direction into the flat to the north of the spoil banks.

Fig C & D

An unusually detailed picture of the character of the peat deposits in the Sag is afforded by borings made in 1932 by the Division of Highways, Department of Public Works and Buildings, State of Illinois, along the right-of-way of Illinois Route 83, in connection with the construction of the road, beginning about two miles east of the village of Sag Bridge and continuing eastward for about four miles, figure X-F. This map shows the locations of the principal sections of road, indicated by the letters, where peat was encountered in borings. Mostly the borings used in making the sections were along

Fig X-F

the center line of the road though some lying either 50 feet to the right or to the left of the center line were employed when they afforded better data than the center line borings. The graphic sections in figure ^{XE}XF employ the descriptive terms used by the Division of Highways in reporting the material found in the borings. Mostly the soil shown is described as black. In some places this soil may be the result of the weathering of peat, especially between the east end of Section C and Section E ^(Fig XE) where a black top soil 2 to 4 feet thick is recorded, with occasional reports of peat, less than 2 feet thick, also as a surface material. In general the peat described as "black" is thought to be a dried out and more weathered material than the brown peat. The blue clay commonly appearing in the sections is regarded as likely to be a clayey silt having a bluish cast.

Fig XA
In Section A, figure X-A, ^(also Fig XF) two beds of peat are shown, an upper black peat having maximum thickness of about 5 feet and underlain by blue clay generally $1\frac{1}{2}$ to 3 feet thick, ^{and} below this ~~is~~ a second peat bed of brown color with a maximum thickness of about 3 feet, which is underlain by marl or clayey marl.

Fig XF
At B, figure X-F, there was an area of burning peat followed at the east end by a short stretch of peat less than 2 feet thick.

Fig XC
Section C, 4400 feet long, ^{Fig X-C and Fig XF} had mostly only one bed of peat having a maximum thickness of about 11 feet, resting on blue clay and therefore probably would be correlated with the upper bed in Section A. In the eastern part of Section ^C ~~B~~ two peat beds are

present, the lower being underlain by marl and clay and probably corresponding to the lower bed in Section A. The increased thickness of the non-peat materials about 800 feet west of the east end of the section is the result of an alluvial fan which extends from the south across the right-of-way.

Fig. X-D, (also Fig X-F)

Fig X D
Section D, [^] crosses section C at approximately right angles and gives a cross section of a part of the Sag Channel. A maximum of 16 feet of peat is reported.

Fig. X-E, also Fig X-F

Fig X E
In Section E, [^] the two north-south cross sections ^{display} follow the same sequence of peat and underlying materials as in Section C, ^{A sub} though the peat beds are relatively thin. ⁼ the blue clay which lies below the upper bed is lenticular.

In general the foregoing data suggest that the limestone floor of the Sag in this area is irregular with a maximum relief approaching 20 feet and that where there are depressions in this ~~surface~~ ^{floor} the peat is apt to be the thickest. Probably the peat thickens from the south valley wall of the Sag Channel northward to the central part of the Sag when the limestone floor of the Sag also lowers in a similar direction.

Uses and production of peat

In some areas, which are devoid of fuel or in short supply, peat is used as fuel, but in the United States in 1944 no consumption of peat as fuel was reported, instead 75 percent of the production was sold for soil improvement, 22 percent for mixed fertilizers, and 3 percent for barn litter, poultry yards, as a packing for fruits,

vegetables, shrubs, fragile articles and other purposes.^{2/} In the

^{2/} Corgan, J. A., and Chiriaco, G. V., "Peat," Minerals Yearbook, 1944, U. S. Bureau of Mines, 1946, p. 1023.

same year 54 percent of the production was peat humus, 37 percent reed or sedge peat, that is peat composed largely of the remains of these plants, and 9 percent was moss peat and other varieties.

J. C. Lamar
6/1947

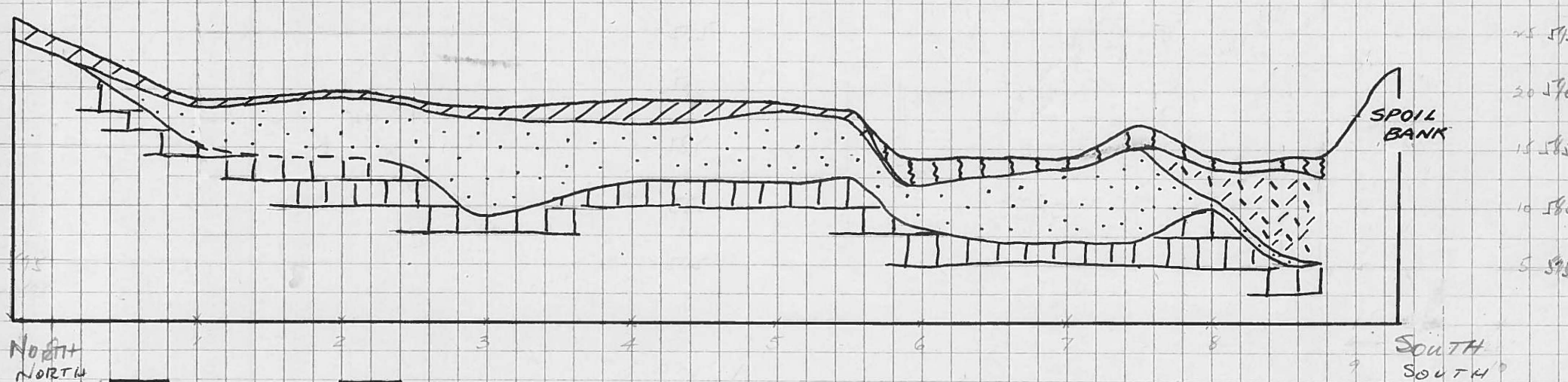
*This work was done to explore the
peat possibilities of the Chicago area
but was not deemed of sufficient
significance to publish.*

Hor. Scale - 1 sq = 50'
Vert Scale - 1 sq = 3'








SCALE
HORIZONTAL - 1 sq = 50'
VERTICAL - 1 sq = 3'

FIGURE B
LONGITUDINAL CROSS SECTION
OF BOG NEAR VILLA PARK



NORTH
NORTH

SOUTH
SOUTH

-  PEAT
-  PEAT AND HUMUS, MIXED,
BURNED IN PLACES
-  LOAM
-  SILT, MARLY IN PLACES
-  ROCK (DOLOMITE)

HORIZONTAL SCALE - 1 SQ = 20 FT.
VERTICAL SCALE - 1 SQ = 2 1/2 FT.

Draftsman - All
over

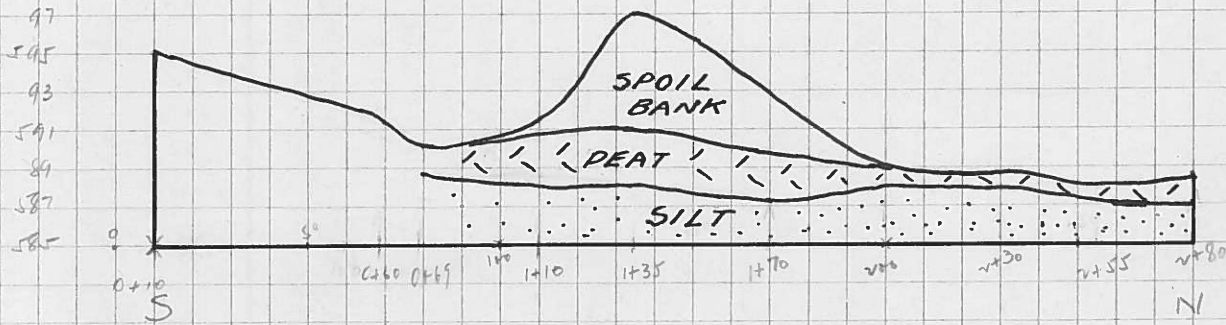
Fig. C

Figure C.

Cross section showing materials encountered in borings made along a line extending N. 45° W. from the west end of the spoil bank near the center N6 1/4, R. 14 Sec. 18, T. 37 N., R. 12 E.

Draftsman - disregard & omit all pencil markings on drawing. In tracing for copy, trace thru this sheet so that the final drawing will have points on the left rather than on the right as it is in this drawing.

OVERFLOW STRUCTURE



HORIZONTAL SCALE - 1 SQ = 10'
 VERTICAL SCALE - 1 SQ = 2'

*Dr. Johnson - Civil
 penciled material from
 drawing*

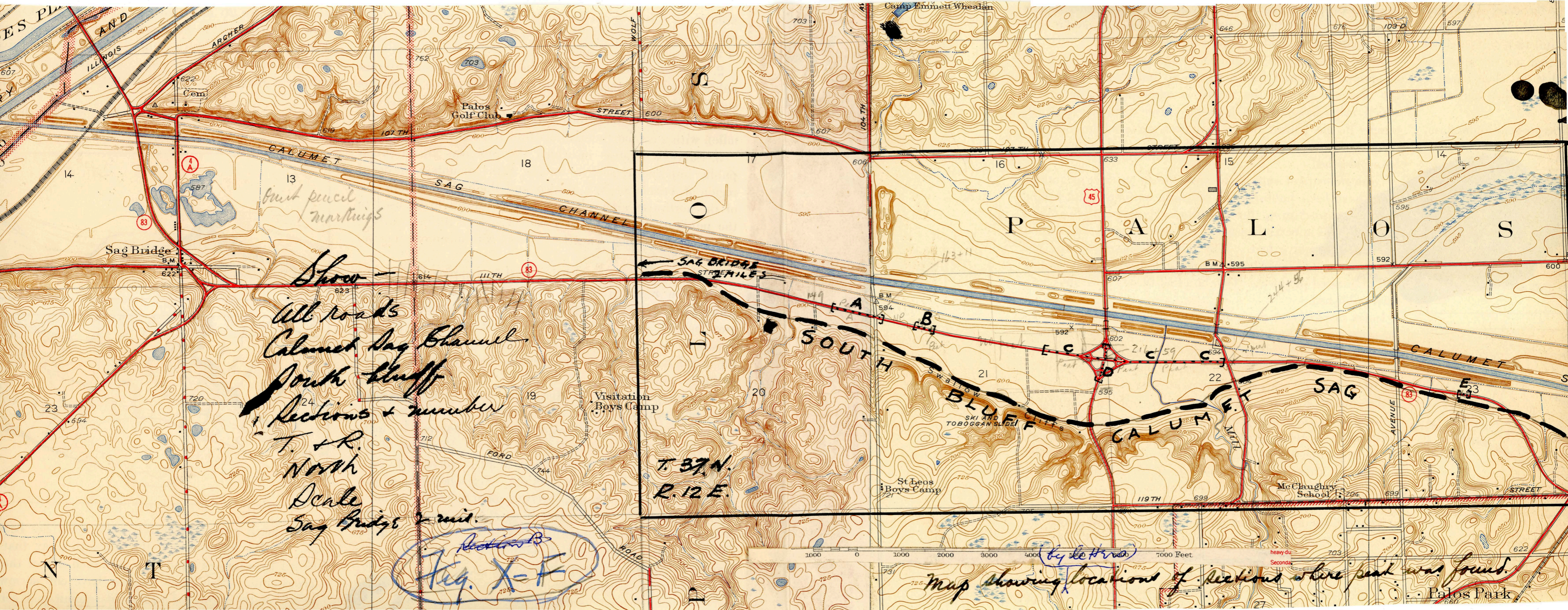
Figure D -

Cross section showing materials encountered in borings made along a line extending north from a point 80 feet west and 69 ft. north of the common corner of sections 16, 17, 20 + 21, T. 37 N., R. 12 E.

LIST OF ILLUSTRATIONS

- Figure A. Generalized map showing distribution of peat and muck in the Chicago area. *see 4104 i5-1 sheet 1*
- Figure B. Longitudinal cross section of bog near Villa Park.
- Figure C. Cross section in Sec. 18, T 37N, R 12E.
- Figure D. Cross section at common corners of Secs. 16, 17, 20, and 21, T 37N, R 12E.
- Figure XF. Locations of cross sections where peat was found.
- Figure XE. Cross sections east of the intersection of Route 83 and 86th Avenue.
- Figure XC. Cross section along Illinois Route 83 in T 37N, R 12E. *see 4104 i5-1 sheet 2*
- Figure XD. Cross section northwest of Palos Park.
- Figure XA. Cross section along Illinois 83 in Sec. 20, T 37N, R 12E. *see 4104 i5-1 sheet 3*

J.E. Lamar
June 1947



Show
 all roads
 Calumet Sag Channel
 South bluff
 sections + number
 T. & R.
 North
 Scale
 Sag Bridge & mid.

Section B
 Fig. X-F

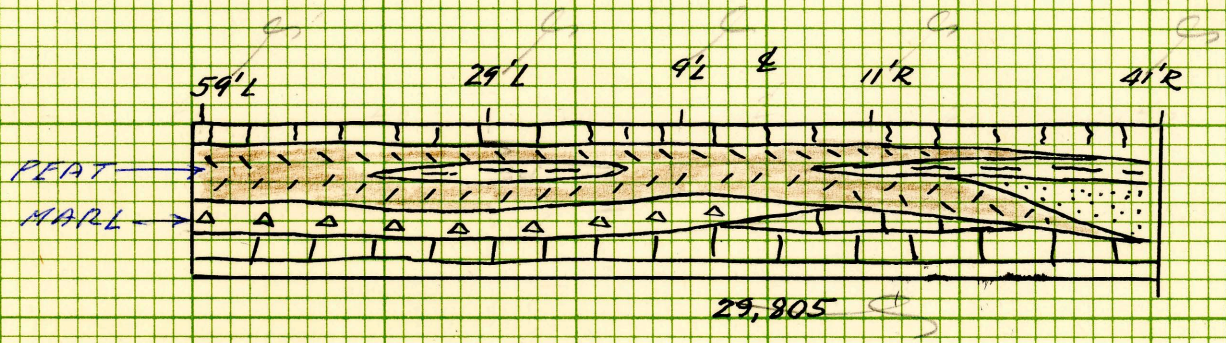
Sag Bridge
 Sag Channel
 Calumet Sag Channel
 South Bluff
 Sections A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z

T. 37 N.
 R. 12 E.

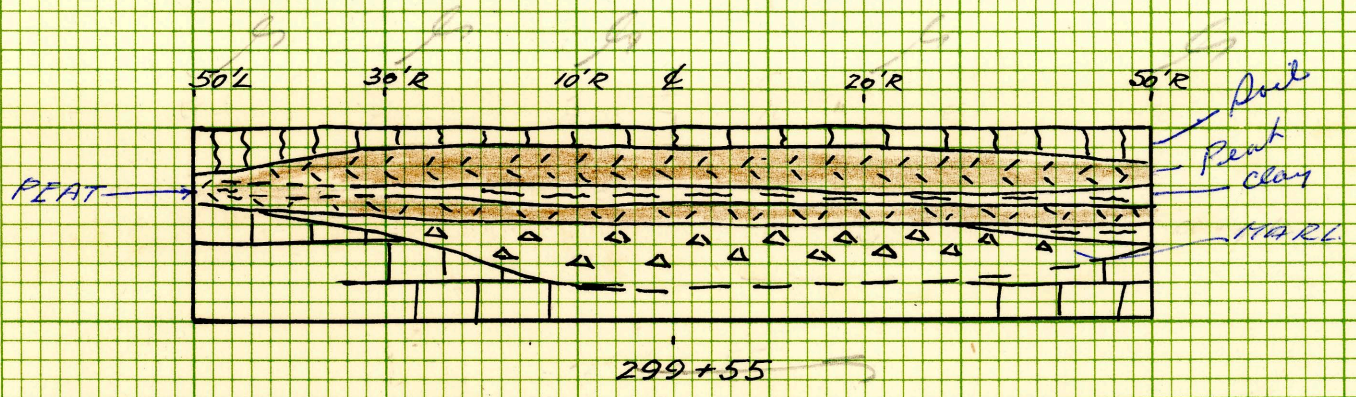
Map showing locations of sections where peat was found.

Palos Park

Fig. X-E



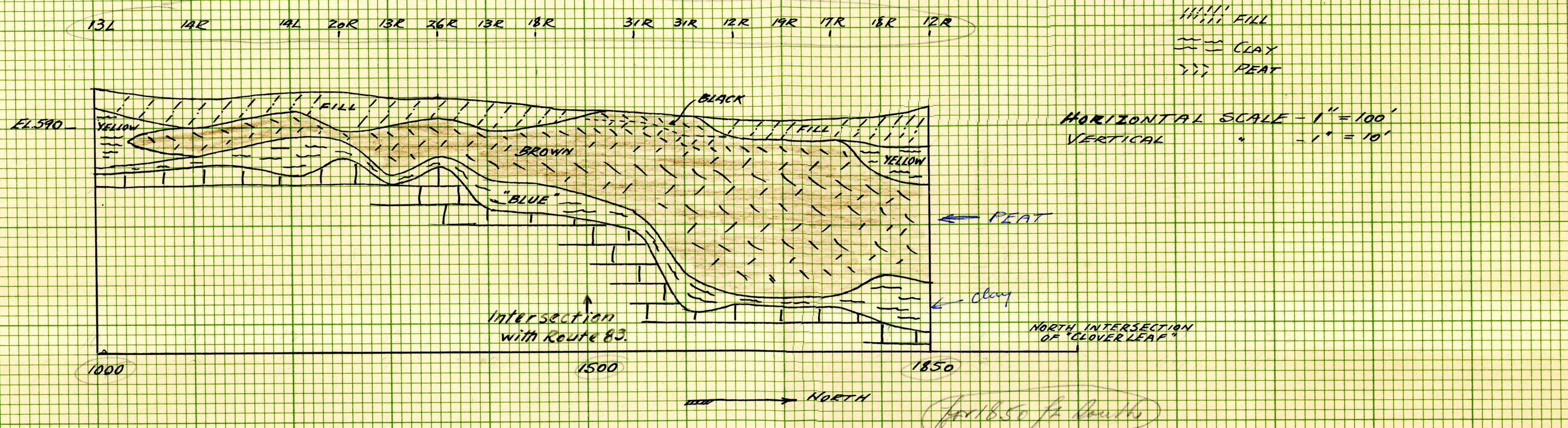
at E. Fig. XF



Horizontal scale - 1" = 20 ft
Vertical " - 1" = 10 ft

Approximately
1 North-South sections, spaced 150 ft. apart, across Illinois Route 83. The top section is the westernmost and is about 1450 ft. east of the intersection of Route 83 and 86th Ave.

EUGENE DIETZGEN CO., CHICAGO-NEW-YORK



Approximately north-south sections along U.S. Route 45, extending from a point 150 ft. South of the center of the north intersection of the "clover leaf" crossing of Route 45 and 52 which is near the center of the E line of the NE 1/4, SE 1/4, NE 1/4 sec. 21, T. 37 N., R. 12 E. northwest of Palos Park.

Fig. X-D

Fig X-D

Draftsman - unit items enclosed by pencil rings