

## BENTONITE INDUSTRY IN YAKIMA

J. H. Heathman

### Properties and Classifications

Bentonite is a clay material that contains 75 per cent or more of the crystalline minerals montmorillonite,  $(Mg, Ca) 0.71_2O_2 \cdot 5SiO_2 \cdot nH_2O$ , or beidellite,  $Al_2O_3 \cdot 3SiO_2 \cdot nH_2O$ . Some bentonites have the physical property of swelling ten to fifteen times their original volume when in contact with water, and it is this physical property that determines the value of such bentonites.

On fresh fracture, damp bentonite is a green, soft, wax-like material with a high luster. On drying, the luster becomes dull, the material becomes harder and lighter in color and the fracture is roughly conchoidal. The surface of a weathered outcrop is usually white with a rough, crinkly, coral-like appearance.

In the Minerals Yearbook for 1938, a United States Bureau of Mines publication, the bentonites produced in the United States are divided into two classes, (1) those which swell to several times their original volume when in contact with water, and (2) those which swell no more than ordinary plastic clays. Most Yakima bentonites are in the first class and are used as the standard for the United States.

### Uses

The principal uses of bentonite are as a bonding agent in foundry molding sands, oil-well drilling mud, for bleaching petroleum products, in the manufacture of cement products, ceramic products, soaps, refractory materials, paper, cosmetics, water-softeners, sealing agents, paints, medicinal emulsions, roofing,

the cores of earth-fill dams, and as lining for irrigation ditches.

#### Occurrence

Bentonite occurs in seams from a few inches to twelve feet thick in stratified deposits. In Wyoming, bentonite seams are found throughout the upper Cretaceous sediments. The most valuable and the largest number are in the Mowry shale or a short distance above or below it. All of the present production is from the upper part of the Mowry and from near the top of the over-lying Frontier formation. Bentonite has been produced from a seam near the base of the Pierre and from one near the base of the Mesaverde. The bentonite in many of the seams is shaly or sandy, or does not have the swelling property of the better grade material.

#### Factors Controlling Values of Deposits

The commercial value of a bentonite deposit depends upon (1) the type or class of bentonite, (2) the thickness of the seam, (3) dip of the seam, (4) amount of overburden, and (5) transportation costs.

#### Producing Localities

Although bentonite is found in many localities in the state, especially around the major uplifts where the Mowry shale outcrops, present production is confined to a large area near Newcastle and a small area near Greysbull.

The area between Newcastle and Moorcroft is from one to three miles wide and extends from Usage to the Belle Fourche river about seven miles northeast of Moorcroft. There is a small area south

of Newcastle near Clinton. Both of these areas are from one to three miles from the Burlington Railroad and main highways. The bentonite which shows a high degree of swelling is in a seam averaging 20 inches thick, with dips of less than 5 degrees, and with the thickness of overburden averaging 7 feet. The bentonite in some cases is hauled twenty-five miles to mills. Mining methods consist of stripping of the overburden with tractors and loading the bentonite into trucks with power shovels. As the bentonite freezes in the winter, all mining is done in the summer. Large stock piles are accumulated for winter milling.

The Graybull area is located from 10 to 15 miles north of the town. The bentonite seam varies in thickness up to four feet and dips steadily. As the bentonite is found only on the back slopes of several hogbacks, there is no overburden. The bentonite is hauled as far as eighteen miles. Mining methods consist of simply shoveling the material into trucks by hand.

#### Production

Bentonite was first produced in Wyoming in 1886, when William Taylor shipped a small amount from Rock Creek. The price of bentonite was \$25.00 per ton at Rock Creek until 1896, when the consumers refused to pay more than \$5.00 per ton. In 1897 a pit was opened near Newcastle by Messrs. Edgar and Thole, and in that year the total output of the state was 150 tons. Shipments averaged about 60 tons per year until, in 1902, productions rose to 1,200 tons. From that time until 1919 production figures are not available, but in 1919 the price rose to \$7.00 per ton and about 25 cars were shipped.

In 1920 the Oghee Chemical Products Company installed at Cheyenne the first plant for drying, grinding and sacking bentonite.

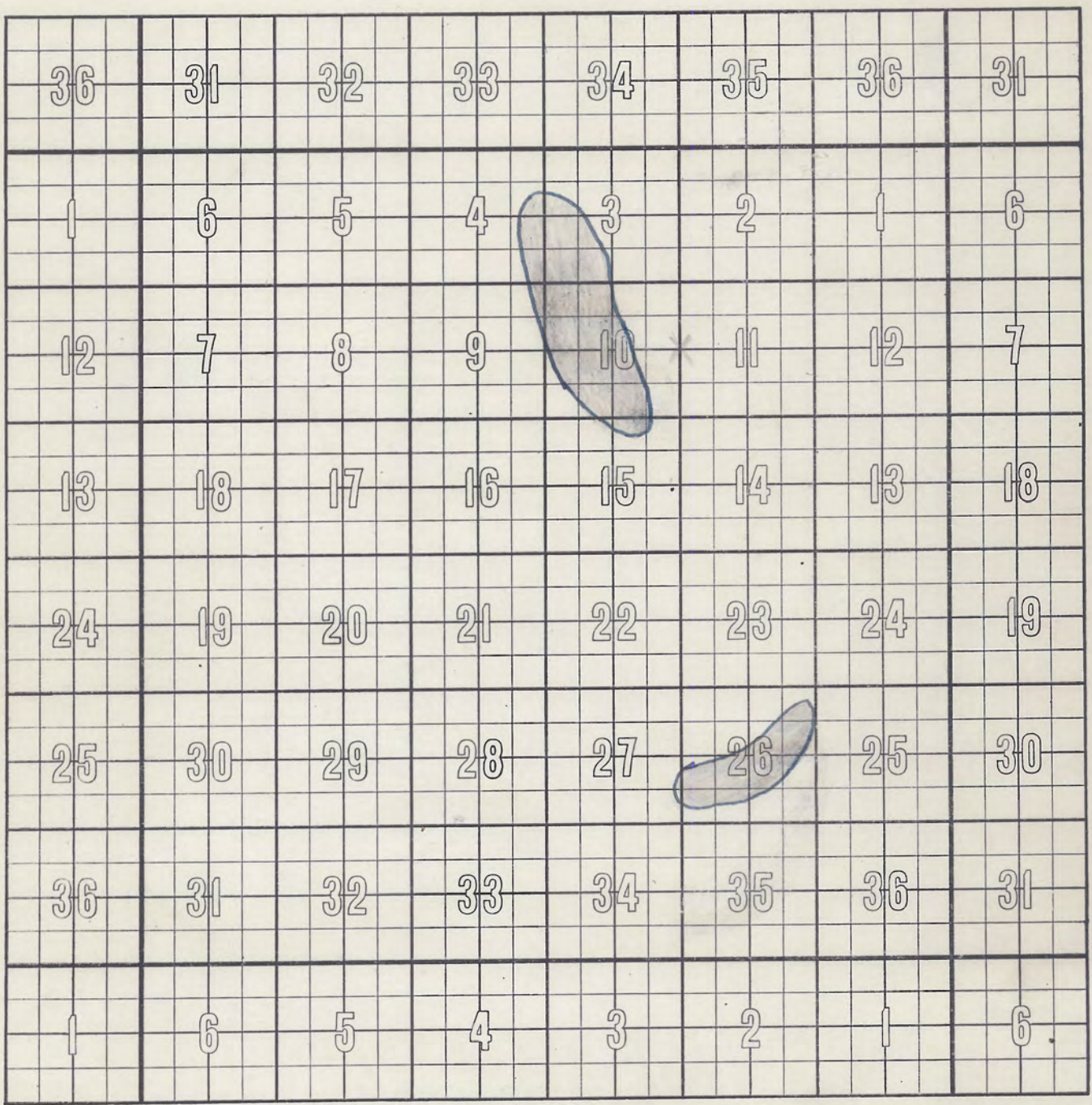
# 1

Heathman - Bentonite field sheets

MR38-2

Township 55N Range, 61W, ----- Meridian.

NORTH



PLOT D.4

SOUTH

Coyote Publishing Co., Colony, Wyoming

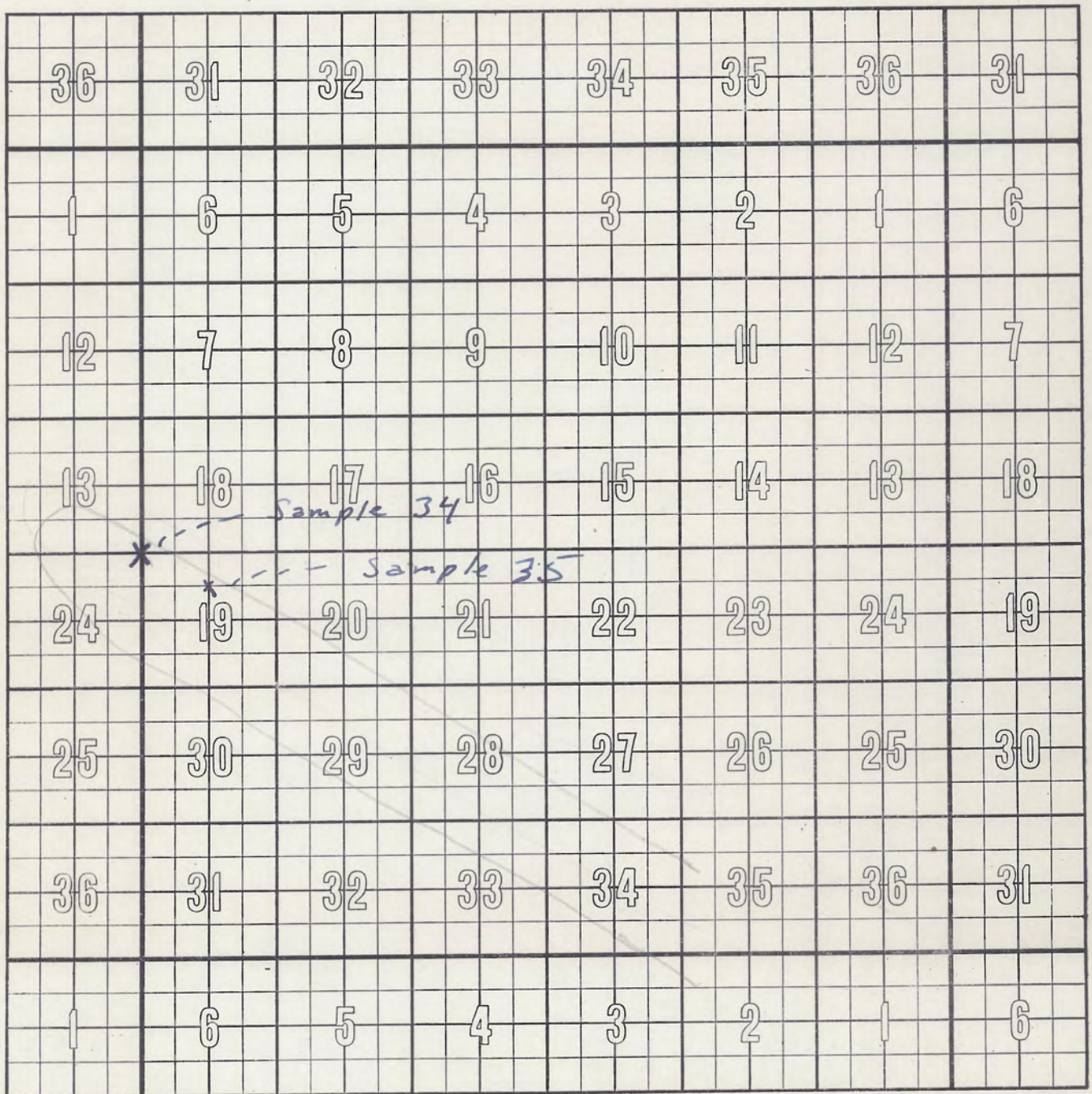
Heathman -  
Field Sheets

A. H. King

See Mr. Thompson

Township 41N Range, 60W, \_\_\_\_\_ Meridian.

NORTH



PLOT D.4

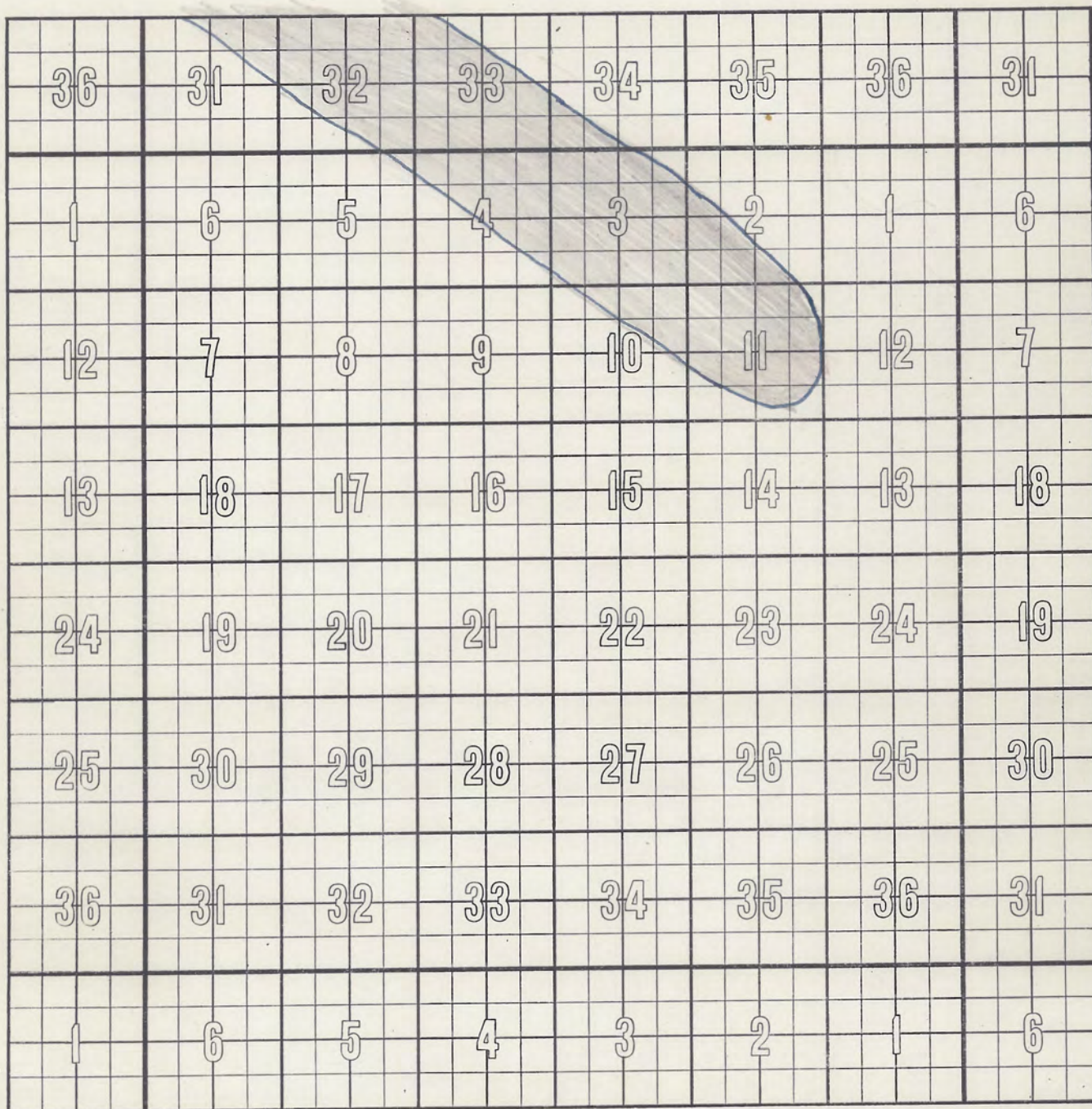
SOUTH

Coyote Publishing Co., Colony, Wyoming

# 2

Township 56N Range, 62W, ----- Meridian.

NORTH



PLOT D-4

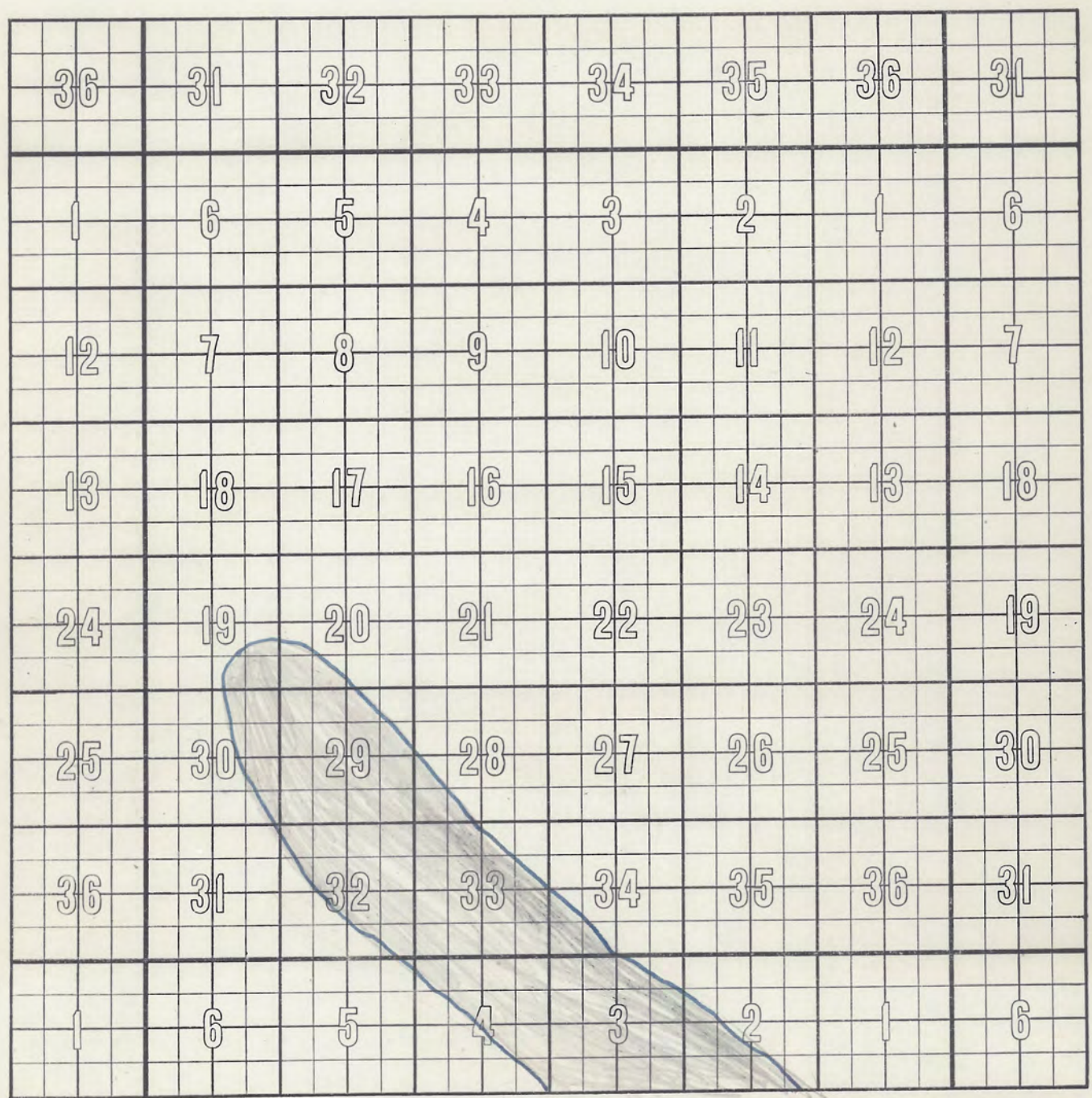
SOUTH

Coyote Publishing Co., Colony, Wyoming

# 3

Township 57N Range, R62W, \_\_\_\_\_ Meridian.

NORTH



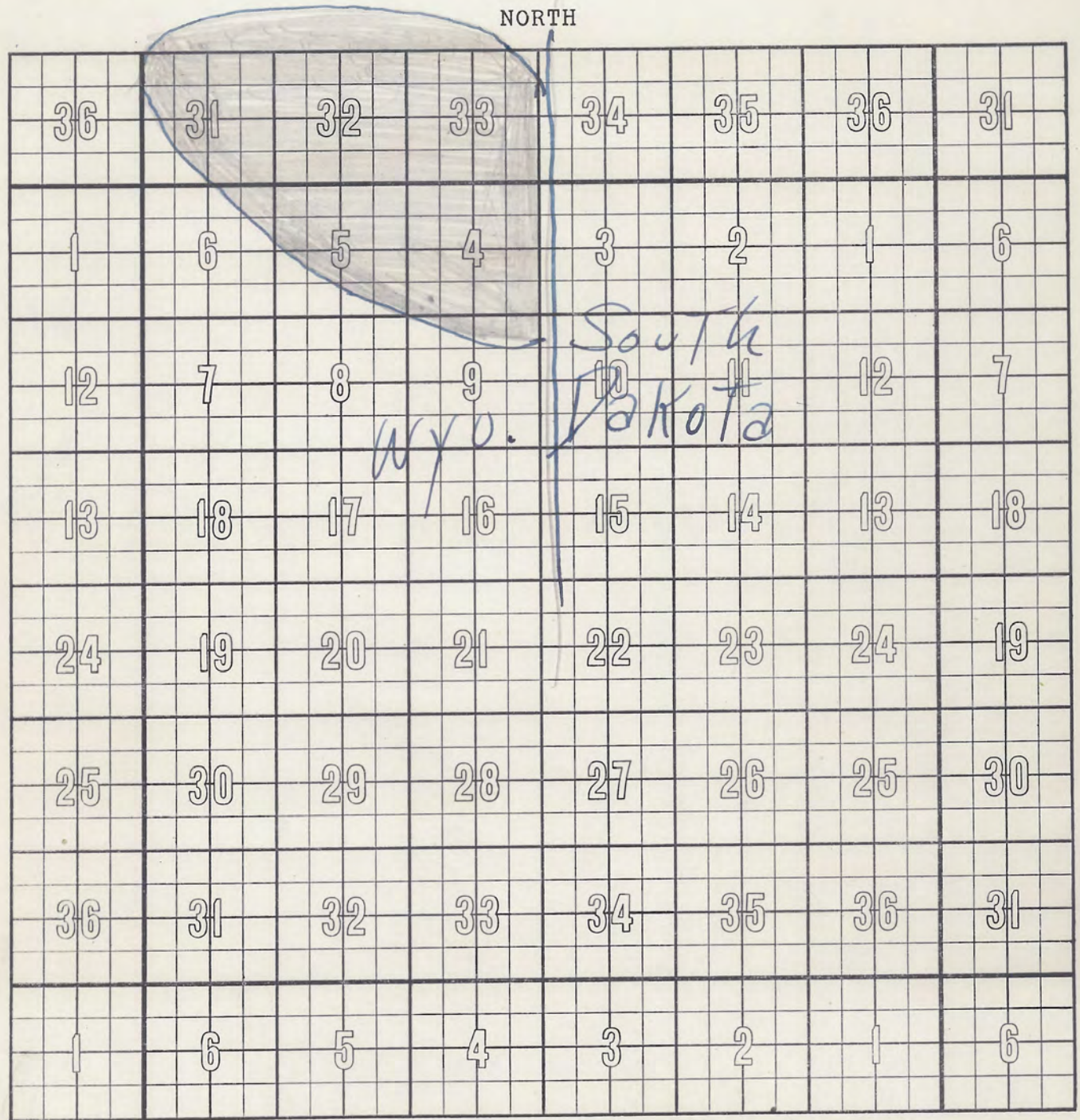
PLOT D.4

SOUTH

Coyote Publishing Co., Colony, Wyoming

#4  
#4

Township 55N Range, 60W, \_\_\_\_\_ Meridian.

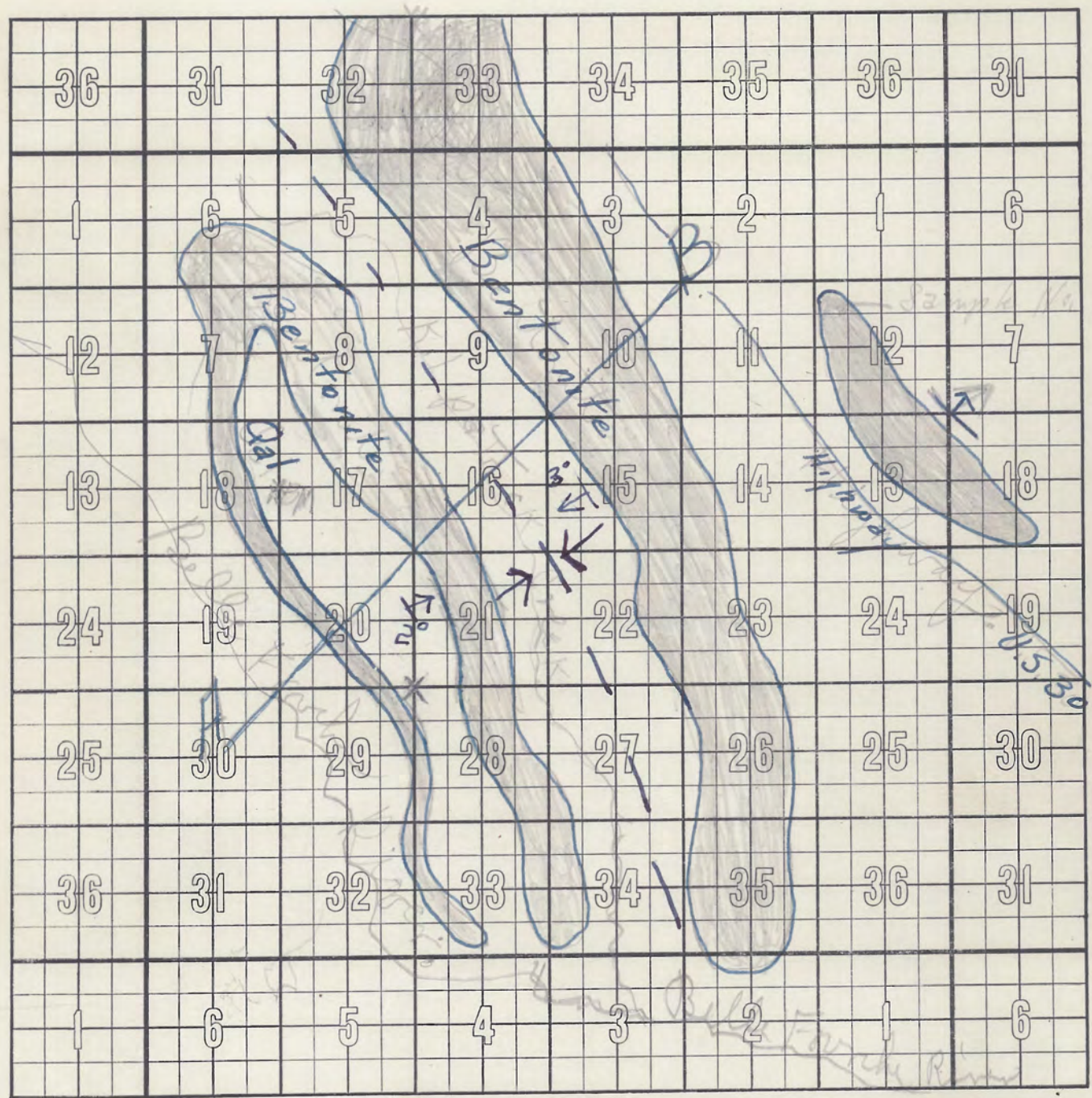




# 5 Township Plat

Township 56N Range, 61W , \_\_\_\_\_ Meridian.

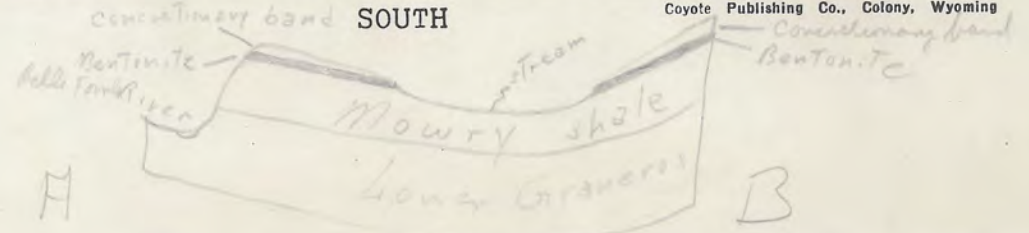
NORTH



PLOT D.4

SOUTH

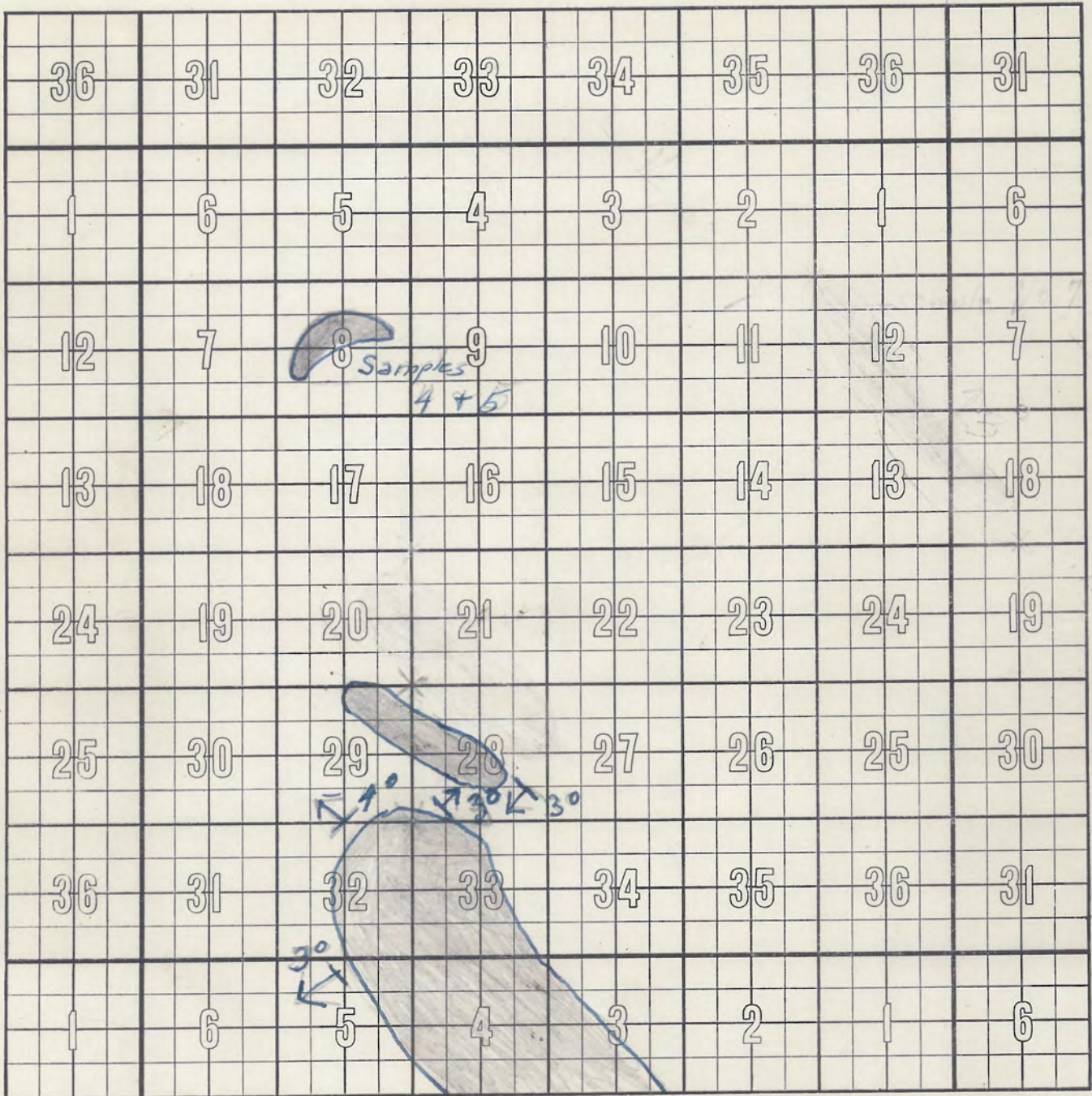
Coyote Publishing Co., Colony, Wyoming



#6

Township 57N Range, 61W, ----- Meridian.

NORTH



PLOT D.4

SOUTH

Coyote Publishing Co., Colony, Wyoming

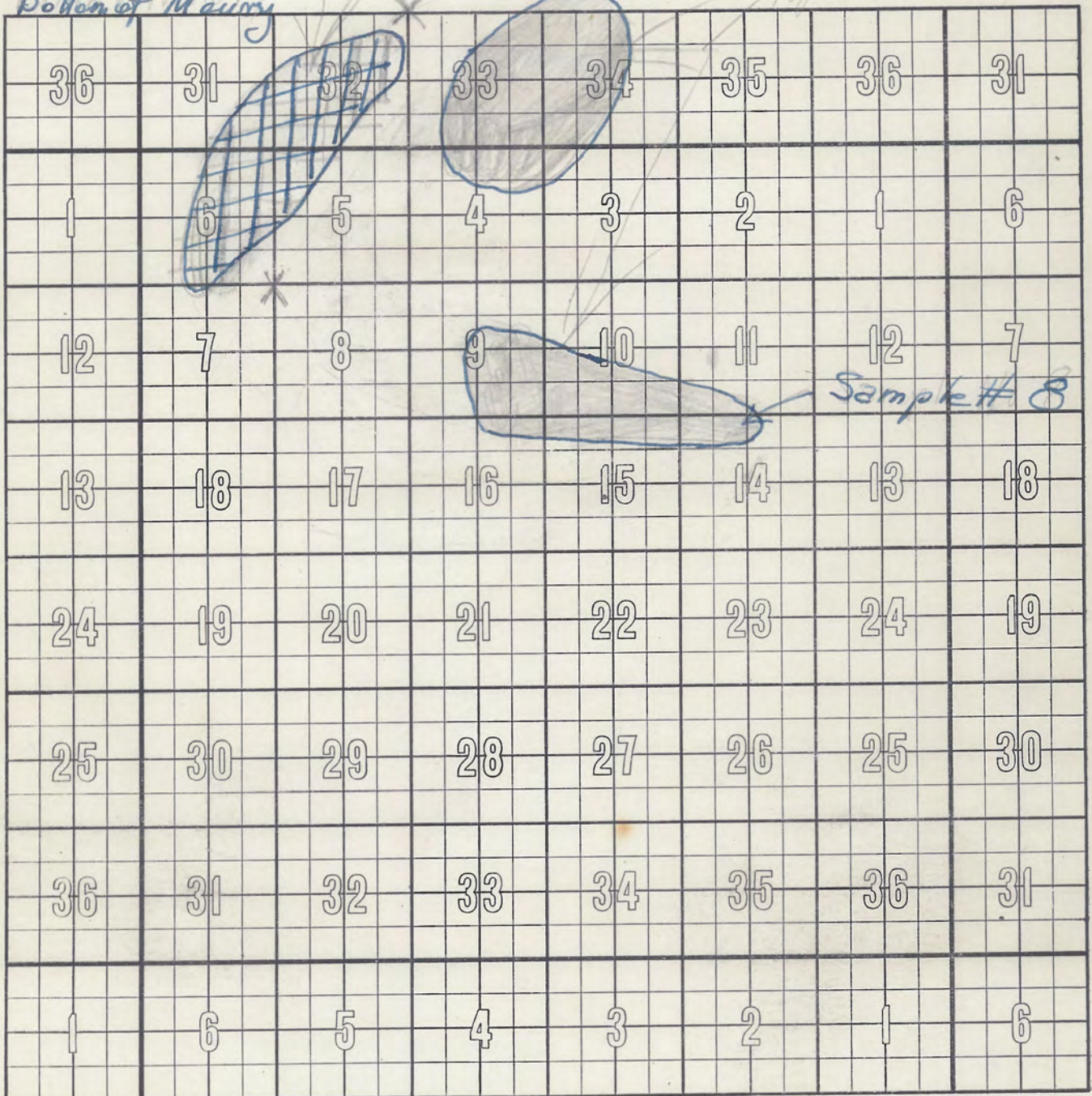
# 7

Township 57 N Range, 63 W, ----- Meridian.

*Bentonite @  
Bottom of Maury*

NORTH

*Bentonite on  
Top of Maury*



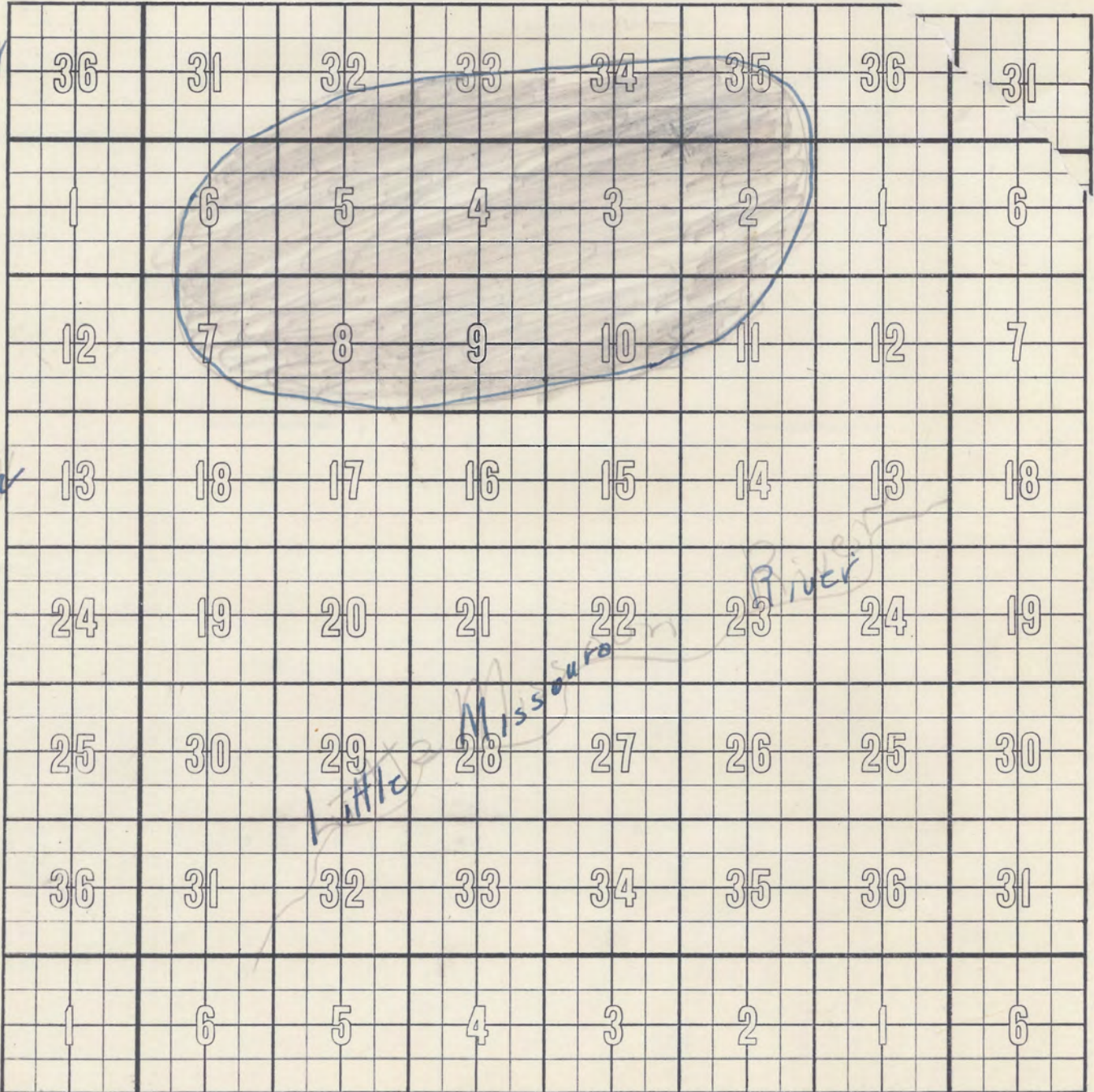
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Township T57 N Range, 65 W, \_\_\_\_\_ Meridian.

NORTH R 65 W

T58 N

T57 N

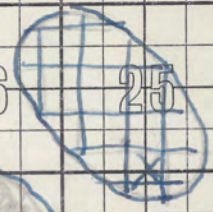


# 9

Township 57N Range, 66W, 6<sup>th</sup> Principal Meridian.

NORTH

36	31	32	33	34	35	36	31
1	6	5	4	3	2	1	6
12	7	8	9	10	11	12	7
13	18	17	16	15	14	13	18
24	19	20	21	22	23	24	19
25	30	29	28	27	26	25	30
36	31	32	33	34	35	36	31
1	6	5	4	3	2	1	6



PLOT D-4

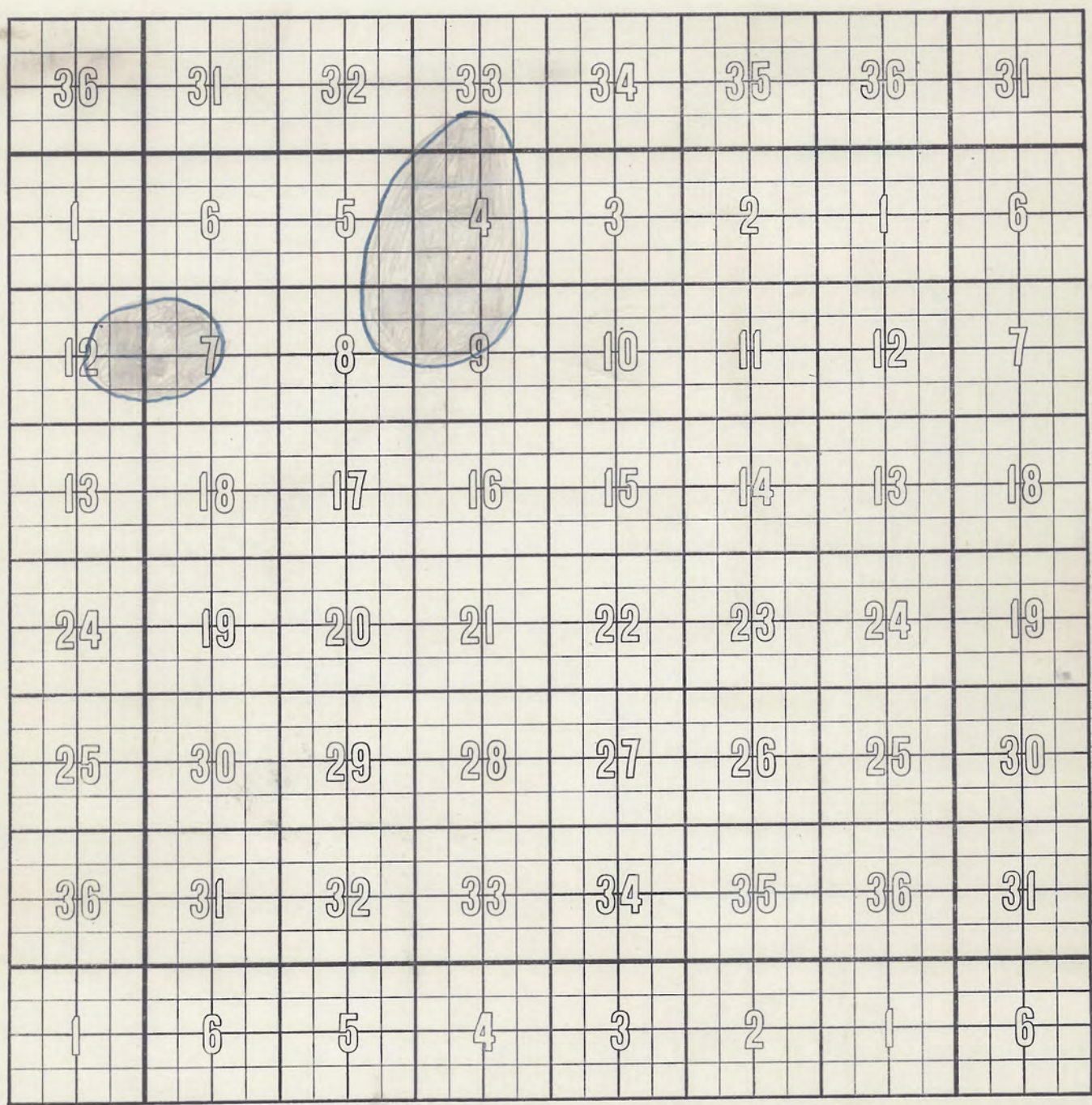
SOUTH

Coyote Publishing Co., Colony, Wyoming

# 10

Township 56 N Range, 66 W, ----- Meridian.

NORTH



PLOT D.4

SOUTH

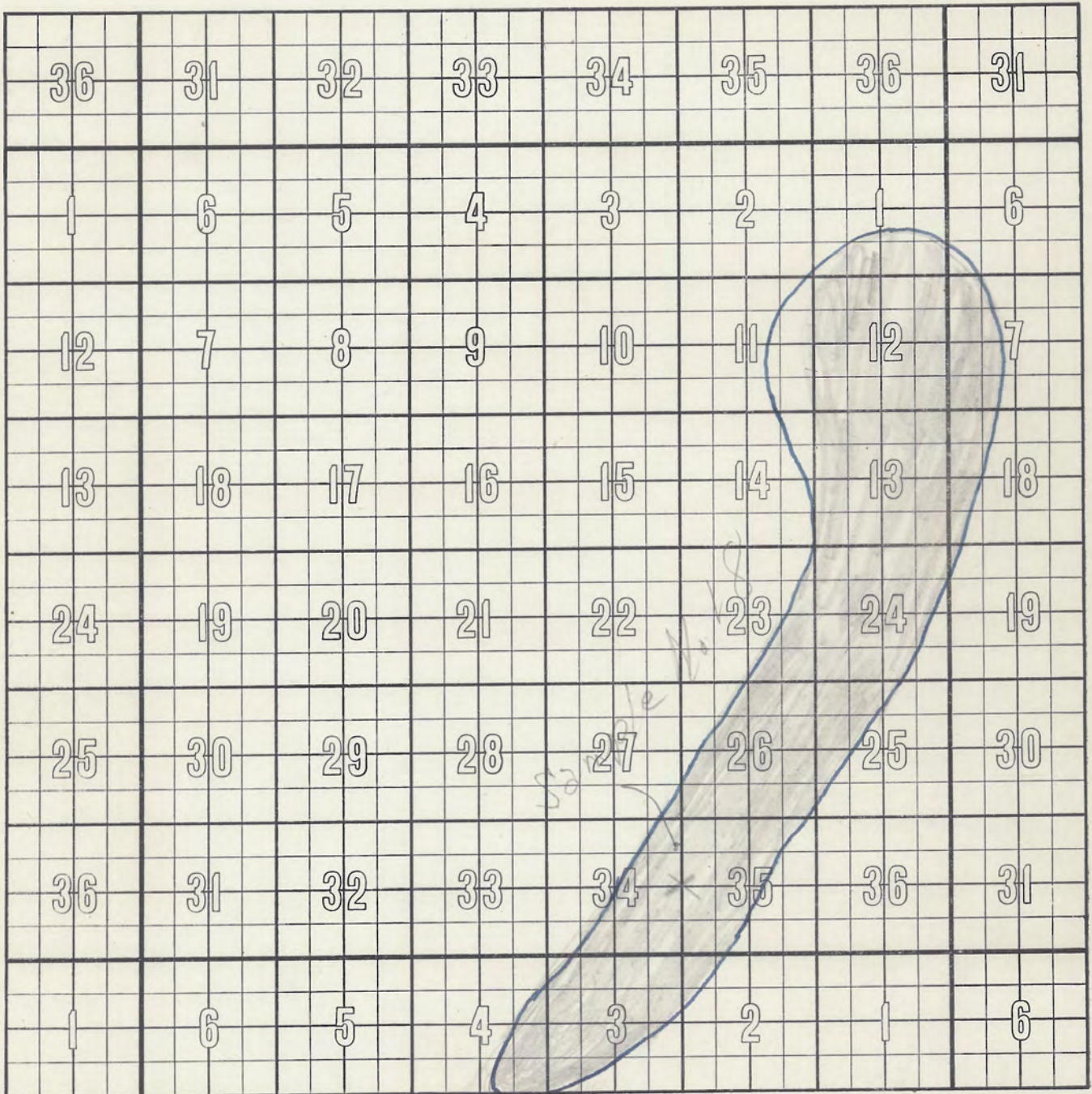
Coyote Publishing Co., Colony, Wyoming

# 11

Arko 123-50

Township 54N Range, 67W, ----- Meridian.

NORTH



PLOT D.4

SOUTH

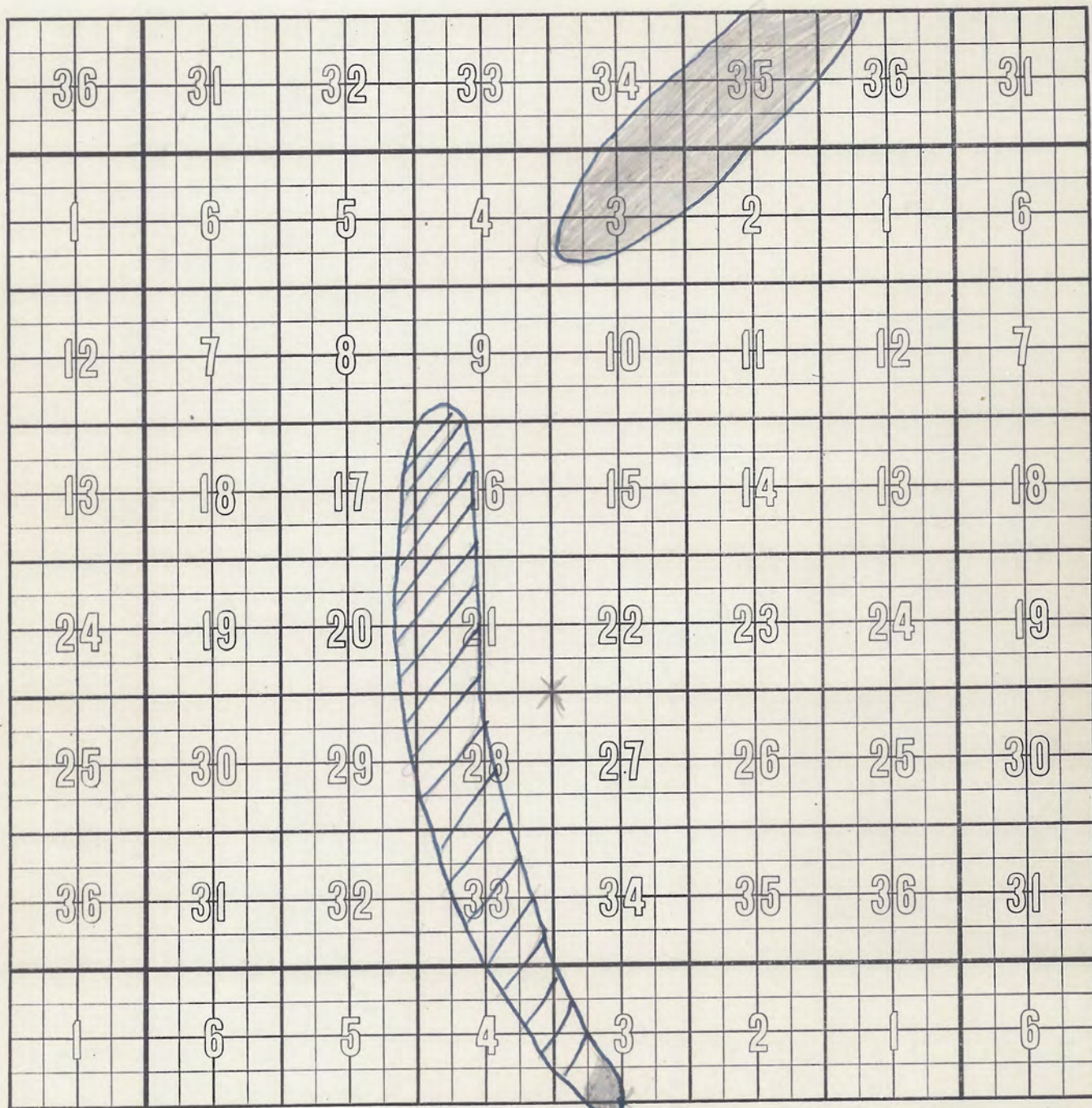
Coyote Publishing Co., Colony, Wyoming

#12

Platt # 12

Township <sup>was E.</sup> 53N Range, R67W, \_\_\_\_\_ Meridian.


NORTH




PLOT D.4

SOUTH

Coyote Publishing Co., Colony, Wyoming

  
 bentonite exposed  
 on surface

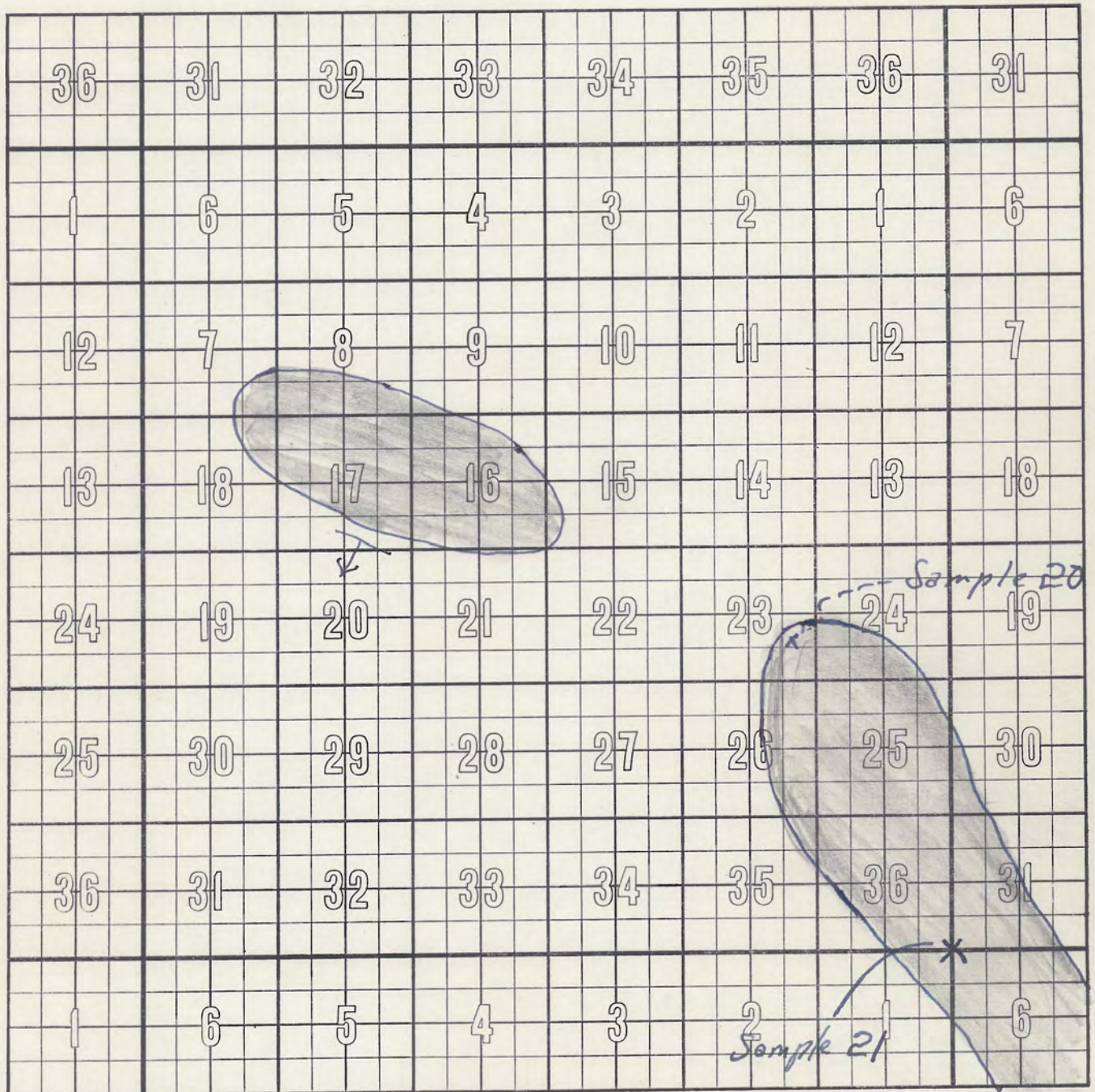
  
 very possible bentonite  
 near surface



# 13

Township 50 N Range, 66 W, \_\_\_\_\_ Meridian.

NORTH



PLOT D.4

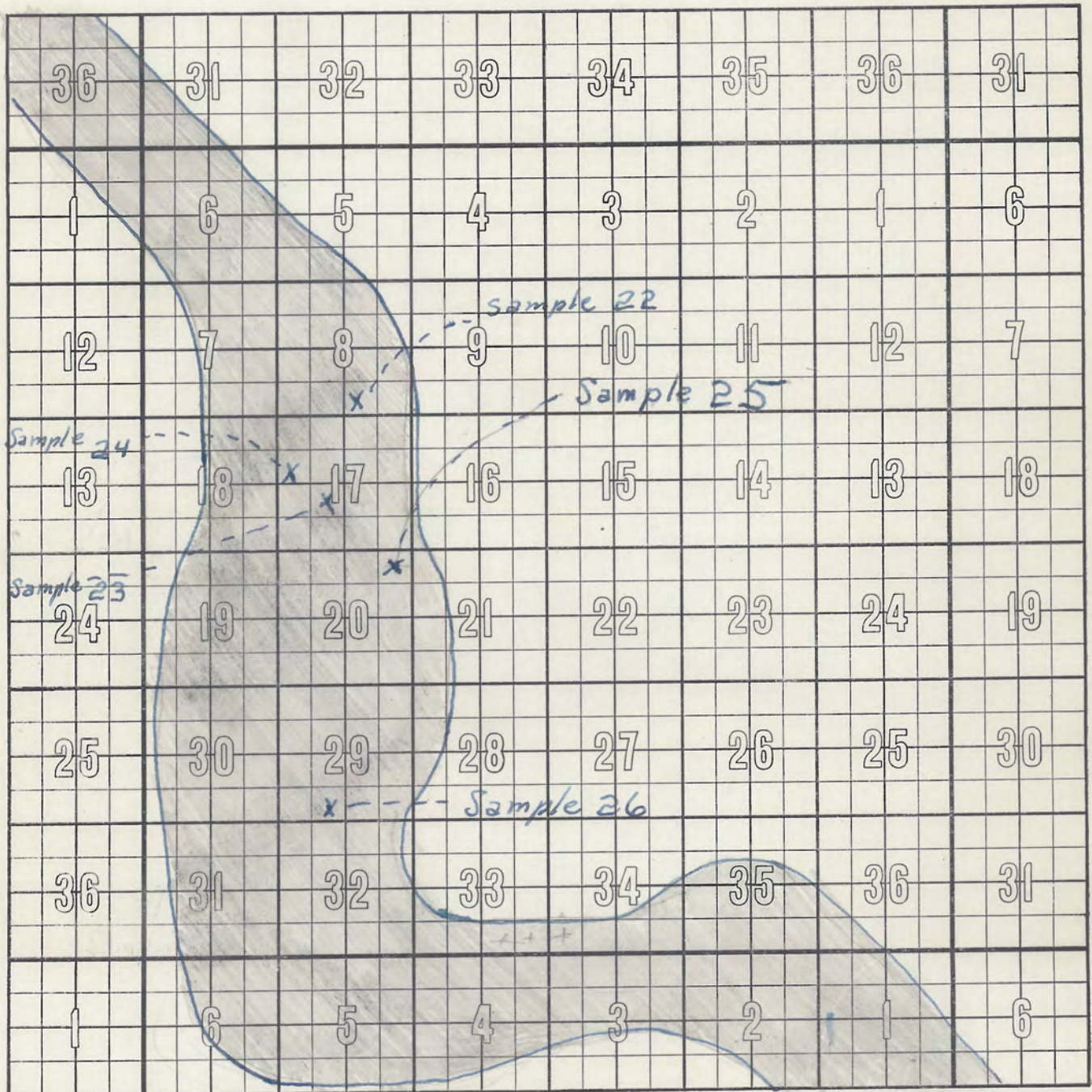
SOUTH

Coyote Publishing Co., Colony, Wyoming

# Platt # 14

Township 49N Range, 65W, \_\_\_\_\_ Meridian.

NORTH



PLOT D-4

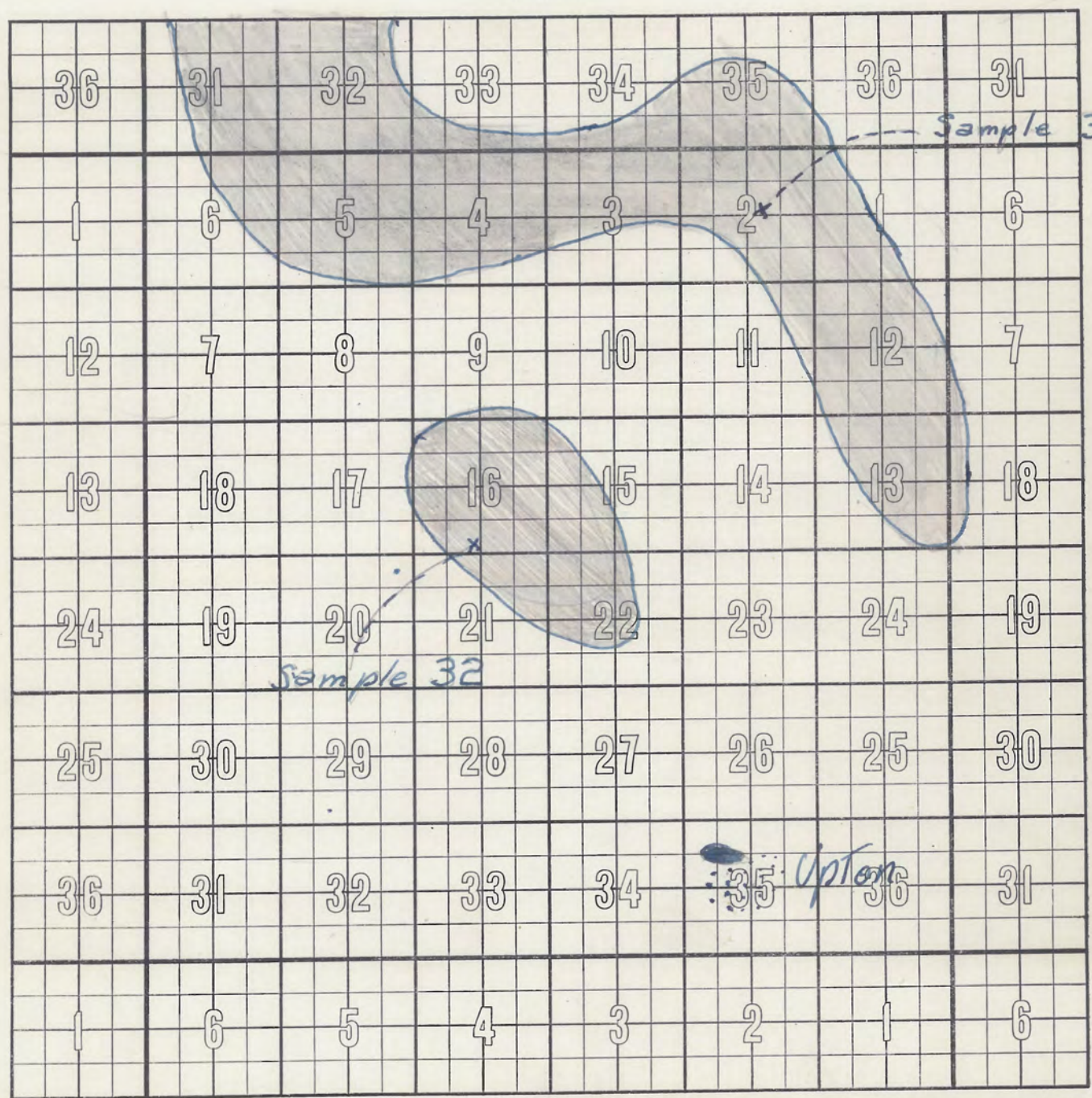
SOUTH

Coyote Publishing Co., Colony, Wyoming

# 15

Township 48N Range, 65W, \_\_\_\_\_ Meridian.

NORTH



PLOT D.4

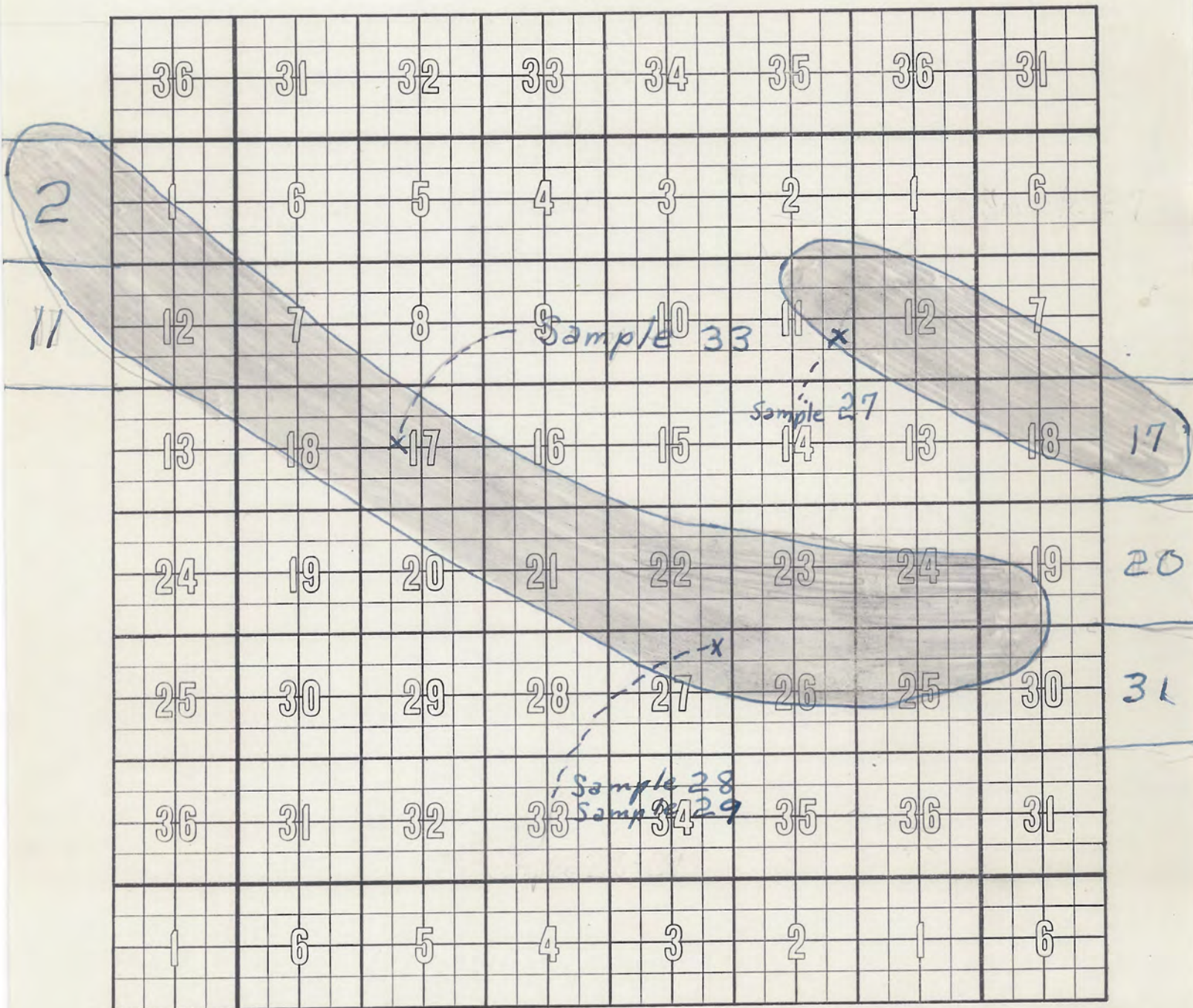
SOUTH

Coyote Publishing Co., Colony, Wyoming

#16

Township 47N Range, 64W, \_\_\_\_\_ Meridian.

NORTH



PLOT D.4

SOUTH

Coyote Publishing Co., Colony, Wyoming

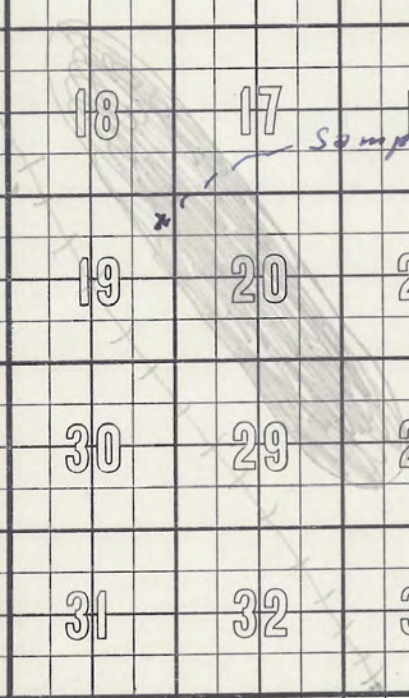
# 17 - See Mr. Thraming

Township 43N Range, 60W, \_\_\_\_\_ Meridian.

NORTH

36	31	32	33	34	35	36	31
1	6	5	4	3	2	1	6
12	7	8	9	10	11	12	7
13	18	17	16	15	14	13	18
24	19	20	21	22	23	24	19
25	30	29	28	27	26	25	30
36	31	32	33	34	35	36	31
1	6	5	4	3	2	1	6

sample 39

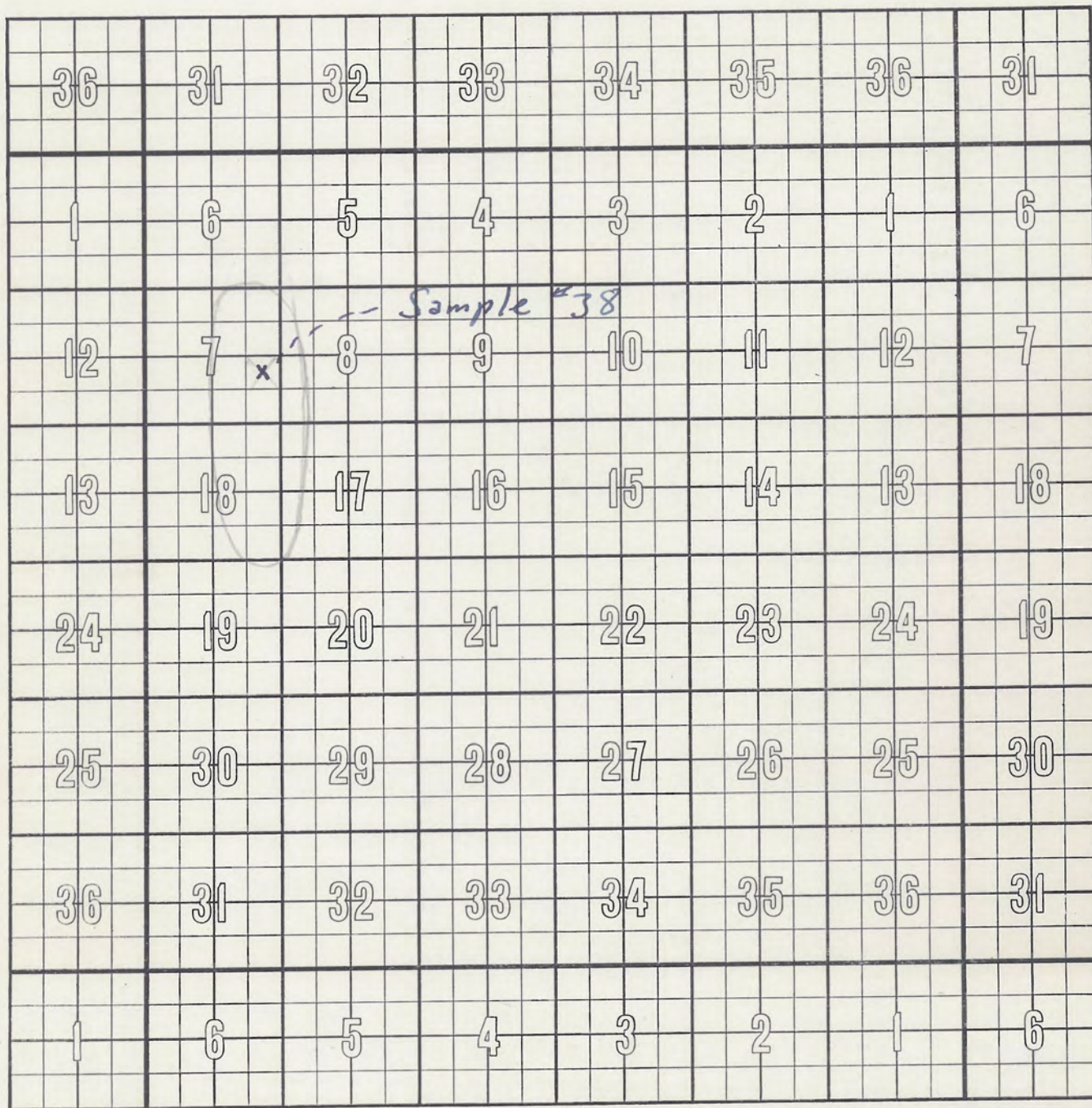


#18

See Mr. Thawing

Township 42 N Range, 60 W, ----- Meridian.

NORTH



PLOT D-4

SOUTH

Coyote Publishing Co., Colony, Wyoming

1. Dockery — SHK.
2. Edwards — SHK.
3. Kivi — H.D.T. R.H.B.
4. Johnson — H.D.T.
5. Blake — H.D.T.?
6. Minton — R.H.B.
7. Bertanelli — H.D.T.
8. Diemer — Beckwith
9. Marovich —

Ralph Hubbard  
Elbert, Colo.  
(Ten-Sleep Ranch)