CHAPTER 4

TESTING RESULTS

4.1 Texture Distribution of Bangkok Clay

Table 4 and Table 5 show the soil samples which have high content of clay and silt. Some samples contain high content of sand. Texture classification of soils are heavy clay, silty clay and light clay. Particle sizes distribution of the Bangkok clay can be given in range, that sand fraction is about 1-20%, silt fraction is about 35-65% and clay fraction is about 30-60%. For this classification, only eight samples have been tested. Means are then determined from the results of eight samples. The menas of sand fraction is about 11.26%, silt fraction is about 46.86%, clay fraction is about 41.88%

4.2 Mineralogical Composition of Bangkok Clay

The diffractograms of sample L_1 shows in Fig 3-7. The first peak in Fig 3, shows at 15.08^{o}A of the magnesium saturated sample. The minerals present could be montmorillonite, vermiculite or chlorite. With magnesium saturated plus ethylen glycol pattern, the peak is shifted to 16.81^{o}A. The diffractogram of potassium saturated sample shows peak at 12.66^{o}A and show no peak greater than 10^{o}A of potassium saturated and heating 550^{o}C. Hence, it may concluded that the peak 15.08^{o}A of magnesium saturated clay should be montmorillonite.

The second peak of magnesium saturated sample show the peak at 9.87^{o}A. The minerals present could be illite or hallosite. The diffractogram of magnesium saturated with ethylen glycol shows the peak at the same position. Along with the peak at 4.96^{o}A in Fig 3-6 , it may concluded that the peak 9.87^{o}A produced by the magnesium saturated clay should be illite.

The third peak shows 7.14°A by magnesium saturated sample, this may probably produce by kaolinite or chlorite (2nd order). The pattern of potassium saturated and heating at 550°C shows no peak greater than 9.87°A. The mineral present kaolinite because the crystallinity of kaolinite is destroyed after heating. There are a small peak between 7.14°A and 9.87°A which could be identified by a interstratification of the clay minerals between 7°A and 10°A. To estimate the quantity of the minerals present in sample base on the area under the peak. The area under peak of kaolinite nearly equals to montmorillonite and bigger than three times of illite. It may be concluded that the minerals present in the tested samples compose of 40-50% kaolinite, 40-50% montmorillonite, 10-15% illite with small amount of interstratified clay minerals of 7 and 10°A group. The broad peaks of illite and montmorillonite indicate that the crystalinity of illite and montmorillonite are poor crystalline. The diffractogram of silt fraction of sample L_1 in Fig 7 give the peak at 4.23°A, 3.34°A in the diffractogram. The mineral present should be quartz. It may also concluded that quartz is mainly mineral persent in the diffraction pattern of the silt fraction.

The X-ray diffraction interpetation are summarized in the Table 6. The quantitative interpetation of diffraction pattern presented in these table are only, crude semi quantitative analysis.

From the results of the experiments shown in Table 6, summary can be made that Bangkok clay is considered to be mixed clay minerals which mainly compose of Kaolinite, Montmorillonite and Illite. Small amount of Chlorite and Vermiculite are present in the soil samples from some locations. However, Kaolinite is the predominant mineral in Bangkok clay layers. Vermiculite, which was found in the soil samples, may be derived from either, Magnesium was leached out from Illite or Chlorite. Conclusion can be made that the above state-

It seems that the influence of marine depositions was higher in the south of Bangkok, since the experiment show higher content of Montmorillonite in this part of Bangkok. This experimental result was also supported by Moum and Roseqvist (1957) that montmorillonite was derived from illite which was deposited by marine depositions. Nedeco (1965) also stated that the percentage of montmori-llonite would be increased by the distance from the source of the sediment in terrestrial depositions. During the transportation illite was being changed to montmorillonite.

Table 4

TEXTURE DISTRIBUTION

Sample No.	SampleDepth (m)	Totalweight of soil(gm)	Clay+Slit		Sand	
			weigh(gm.)	%	weigh(gm.)	%
BS 3	9.00-9.60	88.75	87.85	99.0%	0.90	1.0%
AS 1	9.00-9.60	106.79	101.10	94.7%	5.69	5.3%
TH 2	4.50-5.00	133.2	122.40	91.9%	10.80	8.1%
TS 4	9.00-9.60	87.45	71.70	82.0%	15.75	18.0%
BA 4	9.00-9.50	62.92	56.25	89.4%	6.67	10.6%
L 3	4.10-4.20	50.18	34.45	68.7%	15.73	31.3%
NI 4	7.50-8.10	92.9	80.73	86.90%	12.17	13.10%
LP 5	7.50-8.10	86.72	84.40	97.3%	2.32	2.7%

Table 5

Texture Distribution

Lab.No.in	wt.of clay dispersing 1,000 c.c	wt. of can+clay	wt.of can	% Sand	%Clay	% Silt	Texture
Calgon	-	35.941	35.931	wt.of (calgon in 20 c.c=0.010			
BS 3	10.00	36.636	36.511	1.00	57.50	41.50	H.C.
AS 1	10.00	36.917	36.818	5.30	44.5	50.20	Sic.
TH 2	10.00	37.153	37.035	8.10	54.0	37.90	HC.
TS 4	10.00	36.718	36.628	18.00	40.0	42.00	Lic.
BA 4	10.00	37.174	37.097	10.60	33.5	55.90	Sic.
L 3	10.00	36.642	36.574	31.30	29.0	39.70	Lic.
NI 4	10.00	36.677	36.582	13.10	42.5	44.4	Lic.
LP 5	10.oo	36.774	36.696	2.70	34.0	63.30	Sic.
			Mean	11.26%	46.86%	41.88%	

Remark: Date 23 December 1977

Room Temperature 31.°C., time required for clay fractions to sediment 5 CM. is 2 hrs.55min. by Stroke' slaw.

Pippete time at 10.40 o'clock.

Use 5 % 10 ml. $NaPO_3$ (Sodium metaphate or Calgon). Shake the tube and let it stand overnight.

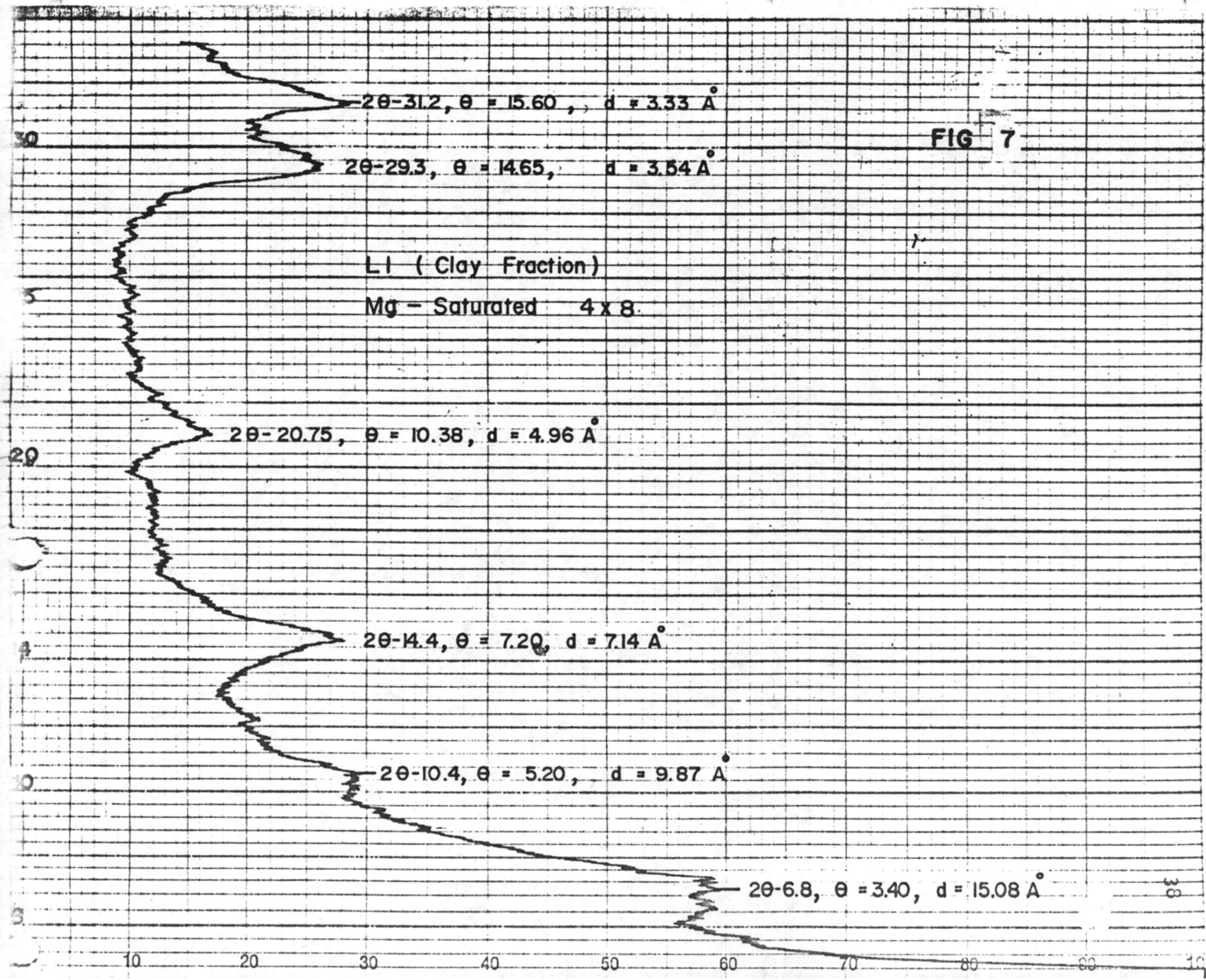

L1 (Clay Fraction)
Mg – Saturated 4 x 8
2θ-31.2, θ = 15.60 , d = 3.33 Å
2θ-29.3, θ = 14.65, d = 3.54 Å
2θ-20.75, θ = 10.38, d = 4.96 Å
2θ-14.4, θ = 7.20, d = 7.14 Å
2θ-10.4, θ = 5.20, d = 9.87 Å
2θ-6.8, θ = 3.40, d = 15.08 Å
10
20
30
40
50
60
70
80
90
100
30
20
10

FIG 7

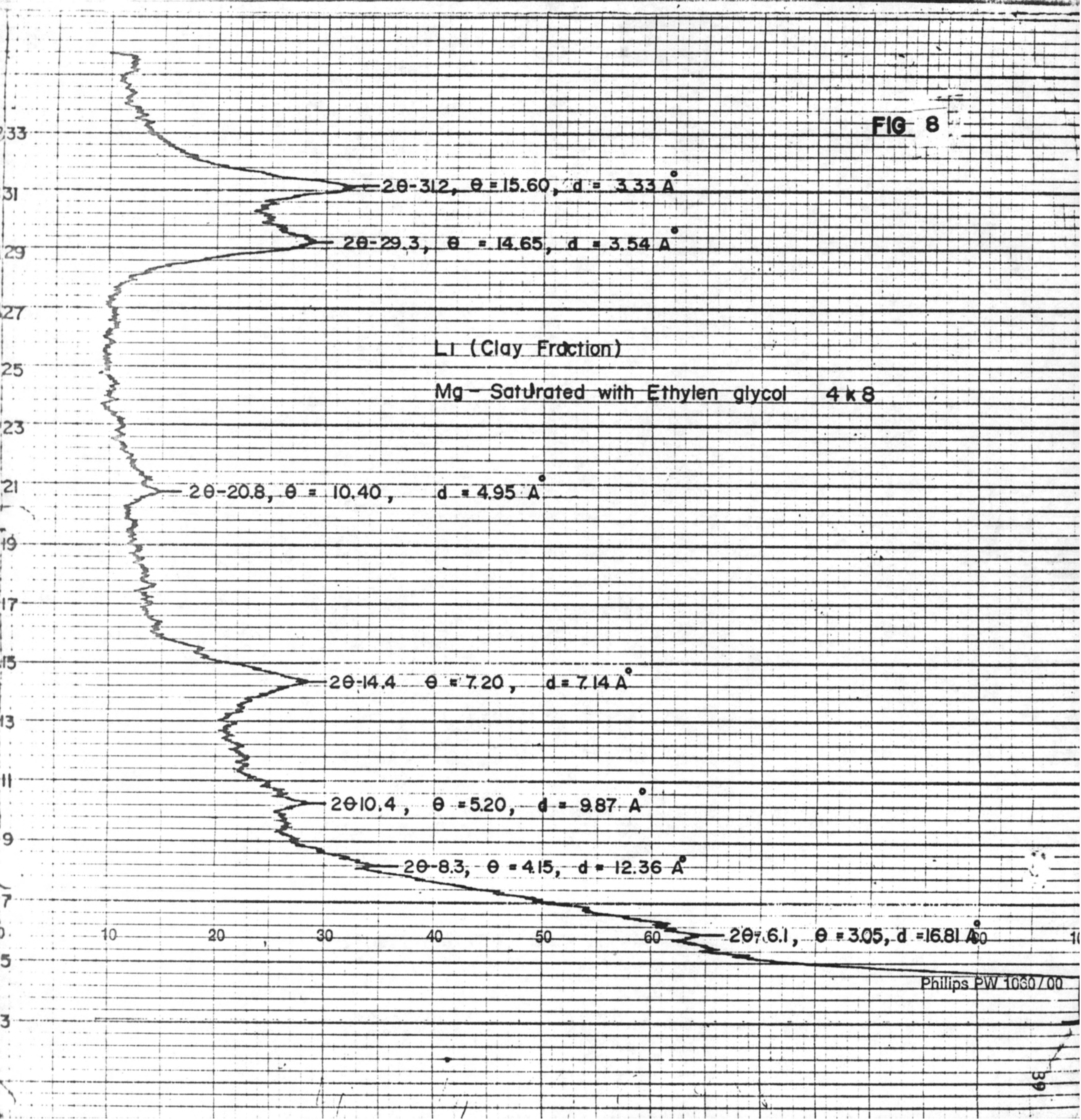
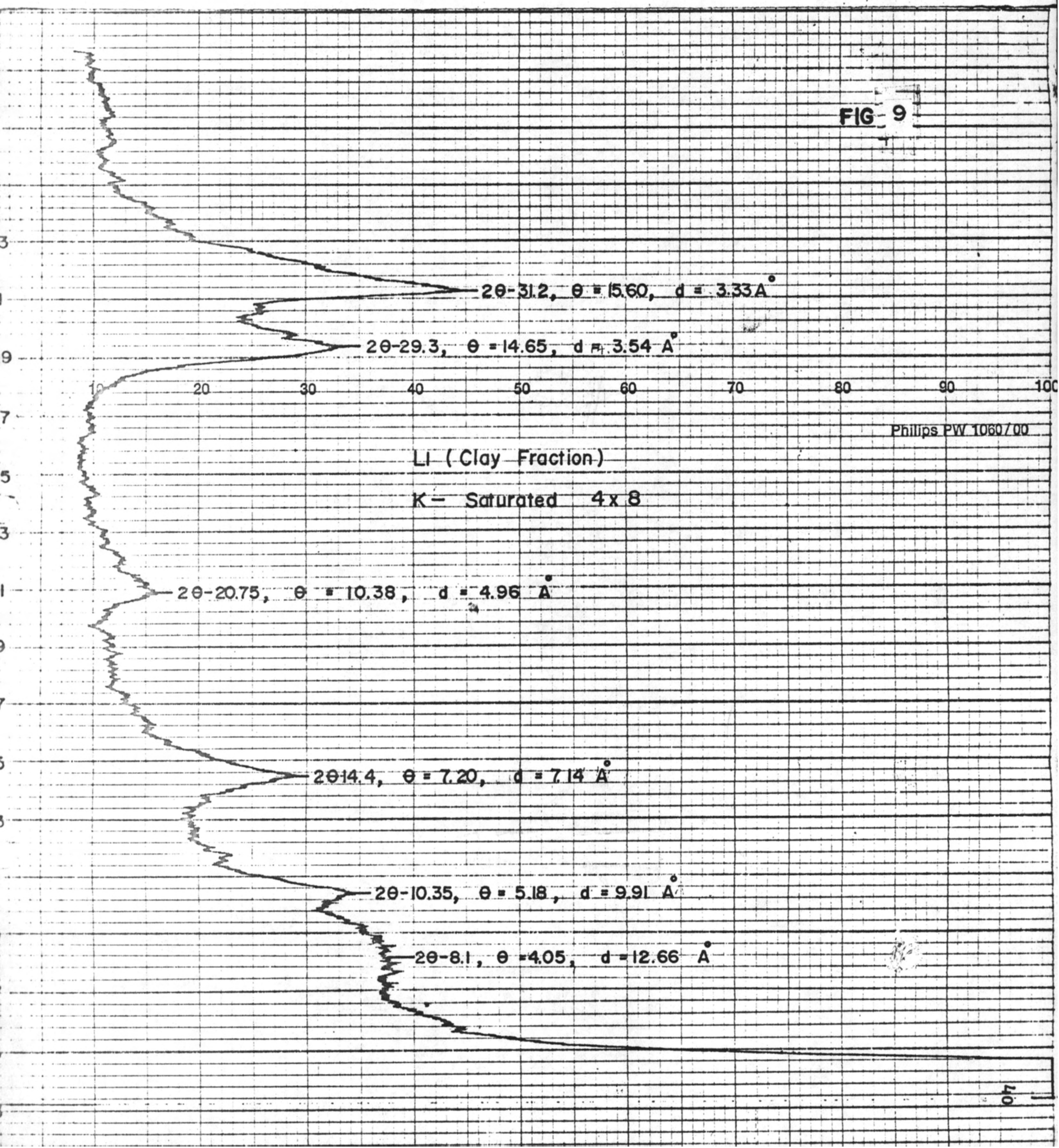
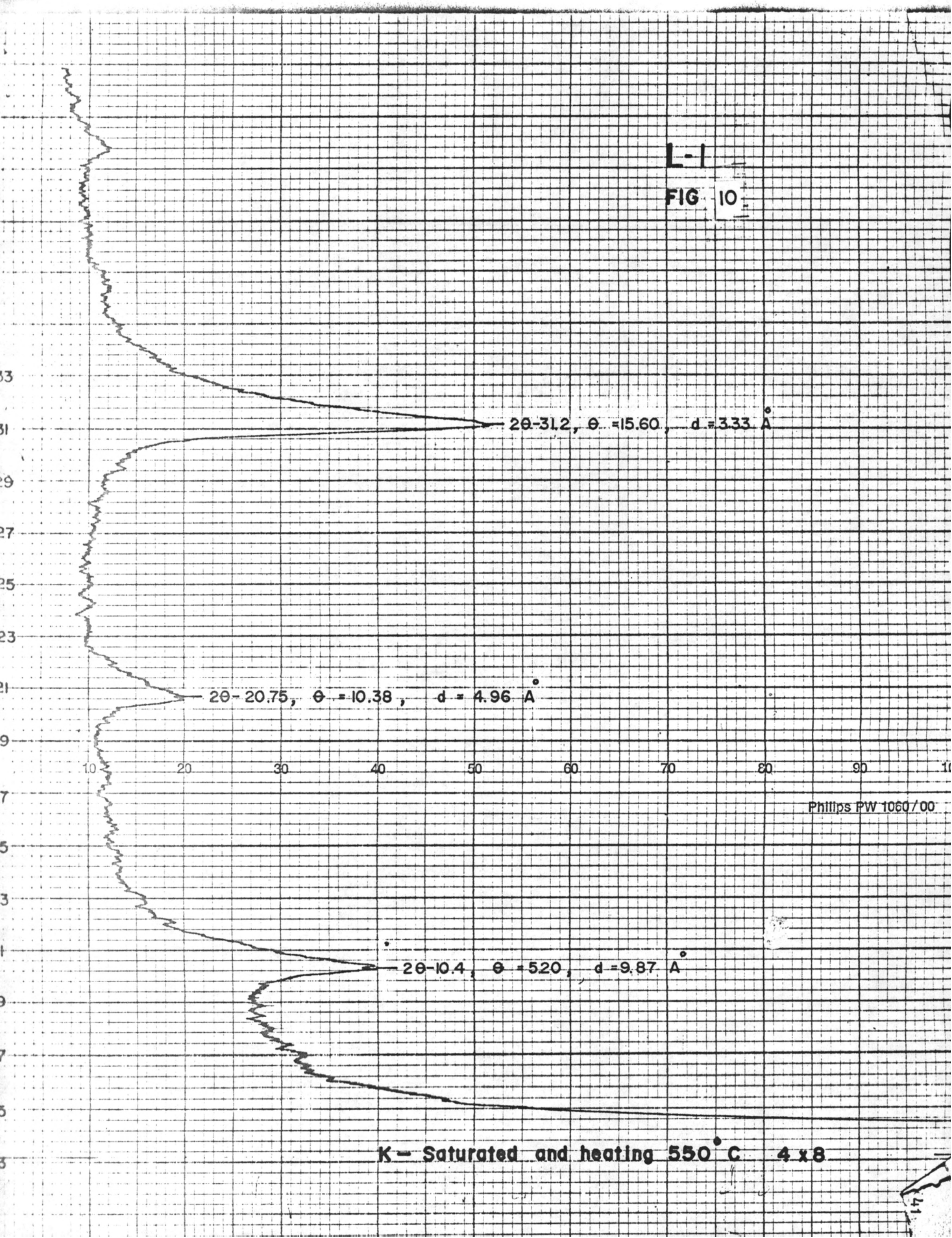
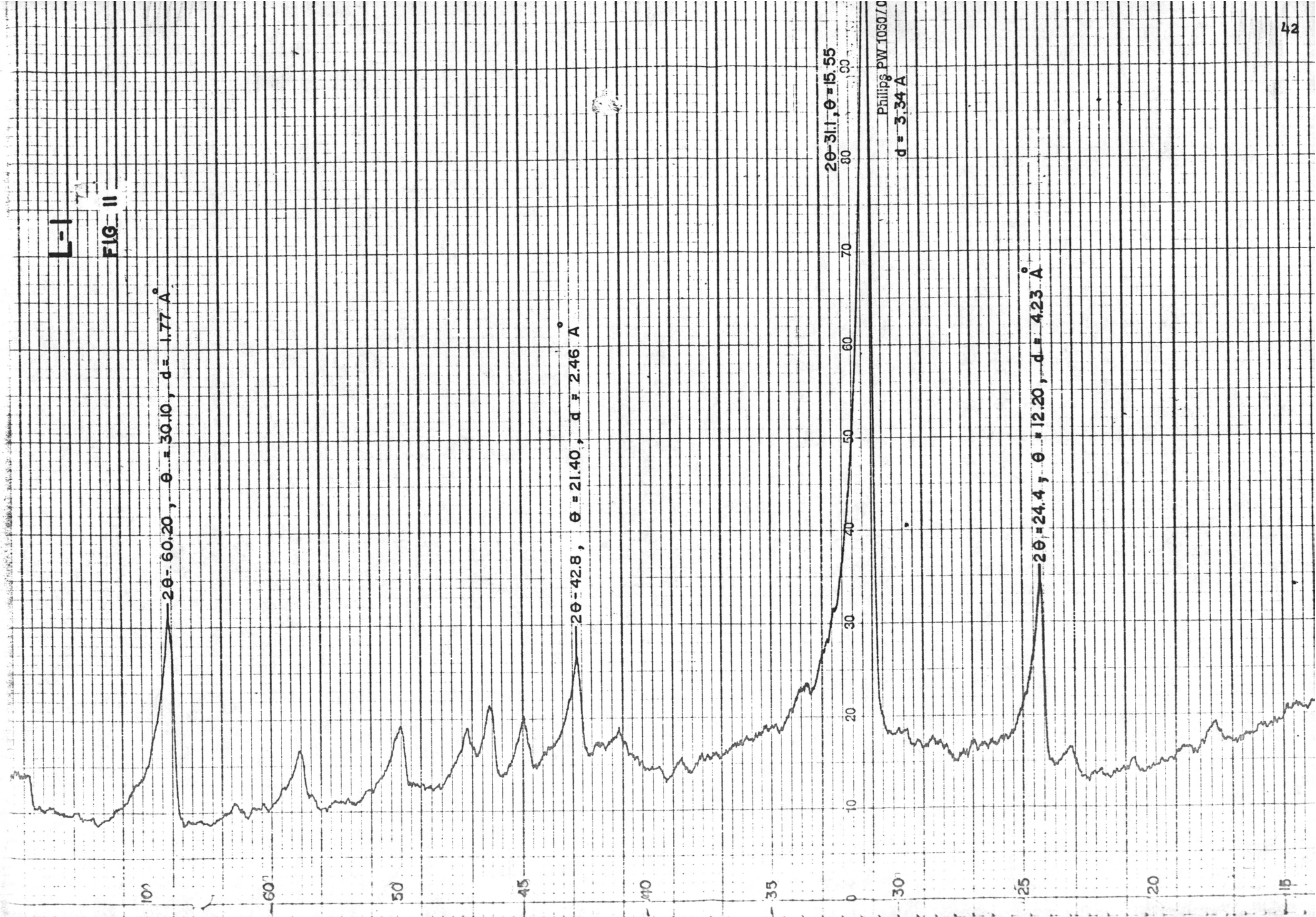


FIG 8
L1 (Clay Fraction)
Mg – Saturated with Ethylen glycol 4 x 8
2θ-31.2, θ = 15.60, d = 3.33 Å
2θ-29.3, θ = 14.65, d = 3.54 Å
2θ-20.8, θ = 10.40, d = 4.95 Å
2θ-14.4 θ = 7.20, d = 7.14 Å
2θ 10.4, θ = 5.20, d = 9.87 Å
2θ-8.3, θ = 4.15, d = 12.36 Å
2θ 6.1, θ = 3.05, d = 16.81 Å
Philips PW 1060/00

FIG 9


2θ-31.2, θ = 15.60, d = 3.33 Å
2θ-29.3, θ = 14.65, d = 3.54 Å
10
20
30
40
50
60
70
80
90
100
Philips PW 1060/00
LI (Clay Fraction)
K- Saturated 4 x 8
2θ-20.75, θ = 10.38, d = 4.96 Å
2θ14.4, θ = 7.20, d = 7.14 Å
2θ-10.35, θ = 5.18, d = 9.91 Å
2θ-8.1, θ = 4.05, d = 12.66 Å
40


L-1
FIG 10
2θ-31.2, θ =15.60, d =3.33 Å
2θ-20.75, θ =10.38, d = 4.96 Å
2θ-10.4, θ =5.20, d =9.87 Å
Philips PW 1060/00
K– Saturated and heating 550°C 4 x 8


2θ- 60.20 , θ = 30.10 , d = 1.77 Å
2θ - 42.8 , θ = 21.40 , d = 2.46 Å
2θ-31.1 , θ = 15.55
d = 3.34 Å
Philips PW 1050/0
2θ = 24.4 , θ = 12.20 , d = 4.23 Å
10
20
30
40
50
60
70
80
90
60
50
45
40
35
30
25
20
15

L-1
FIG. II

Table 6

X-Ray Diffraction Results

Lab, Code	Type of clay minerals and other minerals.	
	< 2 μ	> 2 μ
L_1	Kaolinite 40-50% rather poor crystalline montmorillonite 40-50% illite 10-15%, and possibly trace amount of interstratified clay minerals between 7+10 A^O	Mainly quartz
L_2	Kaolinite 40-50% rather poor crystalline montmorillonite 40-50% illite 15-20% small amount of chlorite	Mainly quartz
L_3	Kaolinite 40-50% poor crystalline montmorillonite 30-35% illite 15-20% small amount of chlorite; trace amount of quartz.	Mainly quartz
L_4	Kaolinite 50-60% montmouillonite and small of chlorite 30-40% illite 5-10%	Mainly quartz
L_5	Kaolinite 60-70% illite 15-20% 14 A^O gr. of clay minerals presumably montmorillonite and chlorite 15-20% small amount of quartz.	Mainly quartz
AS_1	Kaolinite 60-75% illite 10-20% poor crystalline montmorillonite 10-20% trace amount of quartz.	Mainly quartz
AS_2	Mostly kaolinite; some illite, trace amount of quartz.	
AS_3	Mainly kaolinite; small amounts of illite and quartz; trace amount of 14^O gr. of clay mineral presumably chlorite.	Mainly quartz with trace of mica
LP_1	Kaolinite 50-60% illite and poor crystalline 14 A^O gr. of clay minerals 40-50 and possibly very small amount of interstratified clay minerals between 10 & 14 A^O	

Table 6 (Cont.)

X-Ray Diffraction Results

Lab, Code	Type of clay minerals and other minerals.	
	< 2 μ	> 2 μ
LP_2	Kaolinite 40-45% rather poor crystalline montmorillonite 40-45% (possibly with small amount of chlorite); illite 5-10%, and possibly very small amount of inferstratified clay minerals between 10 & 14 A°	
LP_3	Kaolinte 40-50% illite 15-20% poor crystalline montmorillonite 30-40% trace amount of quartz.	Mainly quartz.
LP_4	Kaolinite 40-55% illite and 14 A° gr. of clay minerals 40-50%, and possibly small amount of interstratified clay minerals between 10 & 14% trace amount of quartz.	
LP_5	Kaolinite 40-50% illite 20-30% rather poor crystalline montmorillonite and small amount of chlorite 20-30%	Mainly quartz; trace amount of mica.
LP_6	Kaolinite 50-60%, 25-35% of rather poor crystalline 14 A° gr. of clay minerals; 10% illite; trace amount quartz and possibly trace amount of interstratified clay minerals between 10 & 14 A°	
LP_7	Kaolinite 60-70% montmorillonite 20-30% poor crystalline illite 5%	Mainly quartz.
LP_8	Mainly kaolinite, trace amounts of illite and quartz; and possibly small amount of chlorite.	Mainly quartz.
TH_1	Montmorillonite 70-80% kaolinite 20-25% and poor crystalline illite 5%	
TH_2	Montmorillonite 45-55%; kaolinite 40-45% and illite 5-10%	

Table 6 (Cont.)

X-Ray Diffaction Results.

Lab, Code	Type of clay minerals and other minerals.	
	< 2 μ	> 2 μ
BS_1	Kaolinite 50-55%; 25-35% of rather poor crystalline montmorillonite and 20% illite; trace amount of quartz.	
BS_2	Kaolinite montmorillonite; 10-15% illite.	
BS_3	kaolinite 50%, illite and rather poor crystalline 14 A° gr. of clay minerals 50%	
BS_4	Kaolinite 50%, illite and rather poor crystalline 14 A° gr. of clay minerals 50% trace amount of quartz.	Mainly quartz. small amount of mica.
BS_5	Mainly kaolinite, some poor crystalline illite and small amount of 14 A° gr. clay minerals.	Mainly quartz.
TS_1	Kaolinite, some illite and 14 A° gr. of clay minerals presumably montmorillonite and vermiculite.	Mostly quartz, some feldspar.
TS_2	Kaolinite 40-45%, montmorillonite 40-45% illite 5-10%	Mainly quartz trace of mica; some feldspar.
TS_3	Kaolinite 40-45% montmorillonite (with some vermiculite and possibly chlorite too) 30-40% illite 10-15%	Mainly quartz.
TS_4	Kaolinite 60% illite and poor crystalline montmorillinite (possibly) small amount of vermiculite) 40%	Mainly quartz; small amount of mica.
TS_5	Kaolinite 40-45%, montmorillonite 40-45%, illite 10-15%, trace amount of quartz.	Mainly quartz.

Table 6 (Cont.)

X-Ray Diffraction Results

Lab, Code	Type of clay minerals and other minerals.	
	< 2 μ	> 2 μ
TS_6	Kaolinite 50-60%, rather poor crystalline montmorillonite 25-35% illite 10-15%, possibly small amount hydroxy alumina vermiculite.	Mainly quartz.
S_1	Kaolinite 50-60%, rather poor crystalline montmorillonite (possibly with small amount of chlorite) 20-30%; illite 10-20%	
S_2	Kaolinite 50-60%, illite and 14 A^o gr. of clay minerals 40-50%	
S_3	Kaolinite 50-60%, illite 10-15%, rather poor crystalline 14 A^o gr. of clay minerals (premumably montmorillonite and small amount of chlorite) 20-30%	
S_4	Kaolinite 40-50% rather poor crystalline montmorillonite 25-35%; illite 10-20% trace amount of quartz, small amount of chlorite:	
B_1	Kaolinite poor crystalline montmorillonite (probably) small amount of vermiculite too); illite 10-20%, trace amount of quartz.	
B_2	Kaolinite rather poor crystalline montmorillonite 10-15% illite; trace amount of quartz.	
B_3	Kaolinite 60-75%, illite and 14 A^o gr. of clay minerals 25-30%	
BA_1	Montmorillonite 50-60%; kaolinite 30-40% illite 10-15%	

Table 6 (Cont.)

X-Ray Diffraction Results

Lab, Code	Type of clay minerals and other minerals.	
	< 2 μ	> 2 μ
BA_2	Kaolinite 70%; illite and poorly crystalline 14 A° gr. of clay minerals 30%; and possibly interstratified clay minerals between 10&14 A°	
BA_3	Montmorillonite (with small amount of chlorite) 40-50%, kaolinite 30-40%, illite 10-20%	
BA_4	Montmorillonite and small amount of chlorite 40-45%; kaolinite 30-40%, illite 10-20%	
BA_5	Montmorillonite and small amount of chlorite 40-50%, illite 10%; trace amount of quartz.	
BA_6	Montmorillonite 50-60%; kaolinite 30-40%, illite 10-15%; trace amount of quartz.	
NI_1	kaolinite 40-50%, rather poor crystalline montmorillonite 30-40%, illite 20%	
NI_2	Kaolinite 50-60%; montmorillonite and vermiculite 20-30%; illite 10-20%.	
NI_3	More or less the same result as sample NI_2	
NI_4	Kaolinite 40-50% montmorillonite, with small amount of chlorite 40-50%, illite 10-15%	
NI_5	Kaolinite 60-70%; illite and rather poor crystalline 14 A° gr. of clay minerals 30-40%;	
NI_6	Kaolinite 50-60%; montmorillonite 30-40%; illite 10-20; and possibly trace amount of interstratified clay minerals between 10 & 14 A°	

4.3 Cation Exchange Capacity

The determination data of cation exchange capacity was shown in Table 7. The cation exchange capacity of Bangkok clay is grouped by locations as follows:

Northern part of Bangkok, cation exchange capacity from locations at Lad Prout (L.P), Bang Sue (B.S) and Pakget (S) is in the approximate range between 20-27 meq.

Eastern part of Bangkok, cation exchange capacity from locations at Asok Din Daeng Road (A.S) and Lumpini Park (L) is in the approximate range between 23-27 meq.

Western part of Bangkok, cation exchange capacity from locations at Bang Kun Pumn (B) and Klong Sran (N.I) is in the approximate range between 22-28 meq.

Southern part of Bangkok, cation exchange capacity from locations at Tha Rue (T.H), Phrapradaeng (T.S) and Bangna (B.A) is in the approximate range between 24-30 meq.

Notice can also be made from Table 7 that the cation exchange capacity, as being classified by the profile of Bangkok soil layers, is obtained as follows.

Weathered Crust Layer, approximate cation exchange capacity is in the range between 23-30 meq.

Soft Layer, approximate cation exchange capacity is in the range between 20-30 meq.

Stiff to hard layers, approximate cation exchange capacity is in the range between 13-24 meq.

TABLE 7

CATION EXCHANGE CAPACITY(C.E.C.)

DETERMINE,DATA

LOCATION.....LUMPINI PARK.....

No.	Lab. No.	DEPTH	READING	(T) TITRATE	(B) BLANK	B -T	CEC/MS PER 100gm.	MOISTURE w%	percent drysoil	C.E.C/DS	REMARK
1.	L 1	1.40-1.50	39.85-27.30	12.55	24.35	11.80	23.80	4.87	95.36	24.96	
2.	L 2	3.50-3.60	13.65-0.30	13.35	24.35	11.00	22.18	4.62	95.58	23.21	
3.	L 3	4.10-4.20	42.6 -30.05	12.55	24.35	11.80	23.80	4.59	95.61	24.89	
4.	L 4	4.80-4.90	13.60-0.50	13.10	24.35	11.25	22.69	5.84	94.48	24.02	
5.	L 5	5.80-5.90	12.80-1.15	11.65	24.35	12.70	25.61	6.38	94.00	27.25	

TABLE 7 (Cont.)

CATION EXCHANGE CAPACITY

DETERMINE, DATA

LOCATION ASOK - DINDAENG

No.	LAB.No	DEPTH	READING	(T) TITRATE	(B) BLANK	B-T	C.E.C/MS PER100cm.	MOISTURE w%	PERCENT DRYSOIL	C.E.C/DS	REMARK
1.	AS 1	9.00-9.60	30.05-13.65	16.40	24.35	7.95	16.03	4.28	95.90	16.72	
2.	AS 2	12.00-12.60	35.90-23.60	12.30	24.35	12.05	24.30	6.89	93.55	25.98	-
3.	AS 3	13.00-14.10	43.80-25.90	17.90	24.35	6.45	13.01	3.56	96.56	13.47	

TABLE 7 (Cont.)

CATION EXCHANGE CAPACITY

DETERMINE, DATA

LOCATION LAD PROUT

No.	LAB No.	DEPTH	READING	(T) TITRATE	(B) BLANK	B-T	C.E.C/MS PER100gm.	MOISTURE w %	PERCENT DRYSOIL	C.E.C/DS	REMARK
1	LP1	1.50-2.10	24.60-13.60	11.00	24.35	13.35	26.92	6.26	94.11	28.60	-
2	LP2	3.00-3.60	28.75-19.70	9.05	24.35	15.30	30.82	6.37	94.01	32.82	-
3	LP3	4.50-5.10	34.75-24.60	10.15	24.35	14.20	28.64	6.46	93.93	30.49	-
4	LP4	6.00-6.60	47.55-34.75	12.80	24.35	11.55	23.29	5.01	95.23	24.46	-
5	LP5	7.50-8.10	26.80-12.80	14.00	24.35	10.35	20.87	5.52	95.77	22.02	-
6	LP6	9.00-9.60	19.70- 8.00	11.70	24.35	12.65	25.51	6.27	94.10	27.11	-
7	LP7	10.50-11.10	13.85- 0.40	13.45	24.35	10.90	21.98	4.33	95.85	22.93	-
8	LP8	12.00-12.60	31.85-13.85	18.00	24.35	6.35	12.81	3.27	96.83	13.23	-

TABLE 7 (Cont.)

CATION EXCHANGE CAPACITY (C.E.C)

DETERMINE, DATA

LOCATION..THA.RYE.....

No.	LAB. No.	DEPTH	READING	(T) TITRATE	(B) BLANK	B-T	C.E.C/MS. PER100gm.	MOISTURE W%	PERCENT DRYSOIL	C.E.C/DS	REMARK
1	TH1	3.00-3.50	9.05-0.30	8.75	24.35	15.60	31.46	5.48	94.80	33.19	-
2.	TH2	4.50-5.00	33.80-26.80	7.00	24.35	17.35	34.99	5.95	94.38	37.07	-

TABLE 7 (Cont.)

CATION EXCHANGE CAPACITY (C.E.C)

DETERMINE, DATA

LOCATION.....BANG SUE.....

No.	LAB. NO.	DEPTH	READING	(T) TITRATE	(B) BLANK	B-T	C.E.C/MS PER100gm.	MOISTURE PERCENT W%	DRYSOIL	C.E.C/DS	REMARK
1	BS1	1.50-2.10	24.55- 9.05	15.50	24.35	8.85	17.85	4.42	95.77	18.64	-
2	BS2	4.50-5.10	38.80-24.55	14.25	24.35	10.10	20.37	4.97	95.27	21.38	-
3	BS3	9.00-9.60	50.20-38.80	11.40	24.35	12.95	26.12	5.73	94.58	27.62	-
4	BS4	10.50-11.10	41.00-29.00	12.00	24.35	12.35	24.91	6.06	94.29	26.42	-
5	BS5	13.50-14.10	27.50-11.90	15.15	24.35	9.20	18.55	4.27	95.90	19.34	-

TABLE 7 (Cont.)

CATION EXCHANGE CAPACITY

DETERMINE, DATA

LOCATION....THAI SUGAR (PHRAPADAENG)....

No.	LAB NO.	DEPTH	READING	(T) TITRATE	(B) BLANK	B-T	CEC/MS PER100gm.	MOISTURE W%	PERCENT DRYSOIL	C.E.C/DS	REMARK
1.	TS 1	1.50-2.10	46.00-33.80	12.20	24.35	12.15	24.50	6.12	94.23	26.00	-
2.	TS 2	3.00-3.60	12.50-0.05	12.45	24.35	11.90	24.00	5.23	95.03	25.26	-
3.	TS 3	6.00-6.60	49.55-37.40	12.15	24.35	12.20	24.60	4.86	95.37	25.79	-
4.	TS 4	9.00-9.60	29.00-16.20	12.80	24.35	11.55	22.29	4.39	95.80	23.27	-
5.	TS 5	13.50-14.10	16.20-0.70	15.50	24.35	8.85	17.85	3.33	96.78	18.44	-
6.	TS 6	15.00-15.60	42.10-29.00	13.10	24.35	11.25	22.69	4.39	95.80	23.69	-

TABLE 7 (Cont.)

CATION EXCHANGE CAPACITY (C.E.C)

DETERMINE, DATA

LOCATION..SIAM CEMENT (PAKGER)..

No.	LAB. NO.	DEPTH	READING	(T) TITRATE	(B) BLANK	B-T	C.E.C/MS. PER100gm.	MOISTURE PERCENT W%	MOISTURE PERCENT DRYSOIL	C.E.C/DS	REMARK
1	S1	4.50-5.25	12.30- 0.25	12.05	24.35	12.30	24.80	3.97	96.18	25.78	-
2	S2	6.00-6.75	25.50-12.30	13.20	24.35	11.15	22.49	4.56	95.64	23.52	-
3	S3	7.00-7.75	23.60-11.50	12.10	24.35	12.25	24.70	5.33	94.94	26.02	-
4	S4	2.00-2.75	37.90-25.50	12.40	24.35	11.95	24.10	4.50	95.69	25.19	-

TABLE 7 (Cont.)

CATION EXCHANGE CAPACITY (C.E.C)

DETERMING, DATA

LOCATION. BANK OF THAILAND (BANG KUMPUMN)

No.	LAB. No.	DEPTH	READING	(T) TITRATE	(B) BLANK	B-T	C.E.C/MS PER100gm.	MOISTURE W%	PERCENT DRYSOIL	C.E.C/DS.	REMARK
1	B1	3.00- 3.50	13.20- 0.50	12.70	24.35	11.65	23.49	4.34	96.84	24.51	-
2	B2	8.00-8.50	45.00-31.85	13.15	24.35	11.20	22.59	5.42	94.86	23.81	-
3	B3	10.50-11.00	11.50- 0.50	11.00	24.35	13.35	26.92	4.68	95.53	28.18	-

TABLE 7 (Cont.)

CATION EXCHANGE CAPACITY (C.E.C)

DETERMINE, DATA

LOCATION..BANGNA(BANGNA TRAD K.M.4)....

No.	LAB. NO.	DEPTH	READING	(T) TITRAT	(B) BLANK	B-T	C.E.C/MS PER100gm.	MOISTURE w%	PERCENT DRYSOIL	C.E.C/DS	REMARK
1	BA1	1.50- 2.10	21.60-12.45	9.15	24.00	14.85	29.57	4.67	95.57	30.94	-
2	BA2	4.50- 5.10	26.20-14.05	12.15	24.00	11.85	23.59	4.04	96.12	24.54	-
3	BA 3	6.00-6.50	12.20- 0.20	12.00	24.00	12.00	23.89	4.41	95.78	24.94	-
4	BA4	9.00- 9.50	25.90-12.20	13.70	24.00	10.30	20.51	4.92	95.31	21.52	-
5	BA5	13.50-14.00	41.00-25.90	15.10	24.00	8.90	17.72	4.79	95.43	18.57	-
6	BA6	16.50-17.00	38.70-33.55	5.15	24.00	18.85	37.53	3.85	96.29	38.98	-

TABLE 7 (Cont.)

CATION EXCHANGE CAPACITY (C.E.C)

DETERMINE, DATA

LOCATION.. KLONG SRAN (NISHIMATSU STATION)..

No.	LAB. No.	DEPTH	READING	(T) TITRATE	(B) BLANK	B-T	C.E.C/MS PER100gm.	MOISTURE W%	RERCENT DRYSOIL	C.E.C/DS.	REMARK
1	NI1	1.50- 2.10	31.25-18.50	12.75	24.00	11.25	22.40	3.91	96.24	23.28	-
2	NI2	4.50- 5.10	33.55-21.60	11.95	24.00	12.05	23.99	3.16	96.94	24.75	-
3	NI3	6.00- 6.60	14.05- 0.15	13.90	24.00	10.10	20.11	2.62	97.45	20.64	-
4	NI4	7.50- 8.10	48.80-31.25	17.55	24.00	6.45	12.84	1.76	98.27	13.07	-
5	NI5	9.00- 9.60	18.50- 0.10	18.40	24.00	5.60	11.15	1.54	98.48	11.32	-
6	NI6	12.00-12.60	12.45- 0.20	12.25	24.00	11.75	23.39	3.15	96.95	24.13	-

4.4 Chemical Composition of Bangkok

From the chemical analysis, the percentage of SiO_2, Al_2O_3, Fe_2O_3, CaO, MgO, MnO, SO_3 and Na_2O + K_2O of Bangkok clay samples are summarized in the Table 8.

It can be noticed from Table 8 that SiO_2, CaO, MgO, MnO, SO_3 and K_2O + Na_2O in Bangkok soil not very to different locations throughout Bangkok. Whilst, Al_2O_3 & Fe_2O_3 vary from one location to the other at some ratio which is indicating that where there is high percentage of Al_2O_3, low percentage of Fe_2O_3 is associated or vice versa. However, the sum of two percentage of Al_2O_3 + Fe_2O_3 varies from approximately 20% to 25%.

Also, fire loss percentage does not vary accordingly to locations except, at Nong Ngu Hao location where higher percentage is obtained. It is possible that the soil at Nong Ngu Hao may contain higher organic substances.

From Table 9, a rough calculation check of the Illite content presenting in the soil sample is shown. From the assumption, if K_2O is presenting approximately 6.5%, Illite would be presented 100% by assuming no other potassium containing in the sample. In this experiment K_2O alone, was not determined, but instead the combination of K_2O and Na_2O was determined. Therefore, maximum content of Illite in the soil samples was obtained by neglecting Na_2O.

TABLE 8

CHEMICAL ANALYSIS FOR CLAY FRACTION

Lab No.	A_I	A_{II}	B	C	D
Location	Lumpini	Lumpini	Nong Ngu Hao	Din Daeng	Petchaburi Road
Depth	-1.40 - -1.50	-3.50 - -5.90	-4.0. - -7.0	-2.55 - -11.00	-2.0 - -5.0
SiO_2	61%	62%	58%	65%	60%
Al_2O_3	21%	17%	17.8%	15%	19.4%
Fe_2O_3	3.8%	5.2%	5.2%	5.4%	4.8%
CaO	1.2%	2.5%	2.1%	2.5%	2.4%
MgO	1.0%	1.5%	1.2%	1.3%	1.6%
MnO	0.2%	0.2%	0.1%	0.1%	0.3%
SO_3	2.2%	2.3%	2.6%	2.5%	2.6%
K_2O+Na_2O	1.7%	1.5%	1.6%	1.4%	1.8%
Fire Loss	7.7%	7.5%	9.3%	6.2%	6.8%
SUM	99.80%	99.70%	97.90%	99.40%	99.70%

TABLE 9

Maximum illite content calculated base on 6.5% of K_2O

Lab No.	K_2O + Na_2O	K_2O	Illite
A_I	1.70	1.70	26.15
A_{II}	1.50	1.50	23.08
B	1.60	1.60	24.62
C	1.40	1.40	21.54
D	1.80	1.80	27.69

Note: Neglect content of Na_2O in the combination of