

Hewing is done, as usual, with hand-picks, bars and hammers. The average rate of advance of a gallery is 2 feet per day. The method employed is to cut away the waste rock, leaving the rough coal seam as a ledge at the roof or floor. The waste rock is all transported out of the mine by small boys with wheelbarrows. The coal ledge is then broken in large lumps and transported separately out of the mine, where it is sorted if necessary, bagged into 165 lbs. lots, and transported by mule to a storage dump on the road. A mule carrying two of these lots, i.e. 330 lbs per load, transports, for uphill distances of half a mile, one ton per day.

By this method of mining, in the case of a seam 10 inches thick, two men working in a gallery-end, with one wheelbarrow boy, can produce about 550 lbs (250 kgs) per day. Where the seam is thicker, the production per man is correspondingly greater, and the average production near Aitouli village appears to be about one ton per day of sorted coal delivered at the road depot for every 9 employees and one mule.

Most of the lignite from the producing mines during the early part of 1943 was utilised to fulfill a 2,000 ton contract in Beirut, this contract having to be completed within six months. The contract, however, was cancelled after some hundreds of tons had been delivered owing to the quality of the lignite being below specifications. This was due entirely to bad organisation and inexperience of those working the deposits, as well as the failure on the part of those receiving the lignite, to exercise a closer supervision on the quality delivered. Representative samples taken during this period gave fair values.

DESCRIPTION OF PROPERTIES.

A. In February 1943, there were four properties in this area producing lignite:-

1. Aitouli Nord Mine.
2. Aitouli Sud Mine.
3. Grand Mreh (Present Workings).
4. Zehalta Mine.

1. AITOULI NORD MINE.

(Map Reference 1328.1785. Fig. 24)

Location.

The mine is situated in a ravine, 325 feet (100 metres) below and immediately north of Aitouli at an altitude of 2,600 feet (800 metres). It is 878 yards (0.8 kms) from a road depot at the village; owing to a steep gradient, the mules use a longer route via Quobbeh village.

Nature of the Seam.

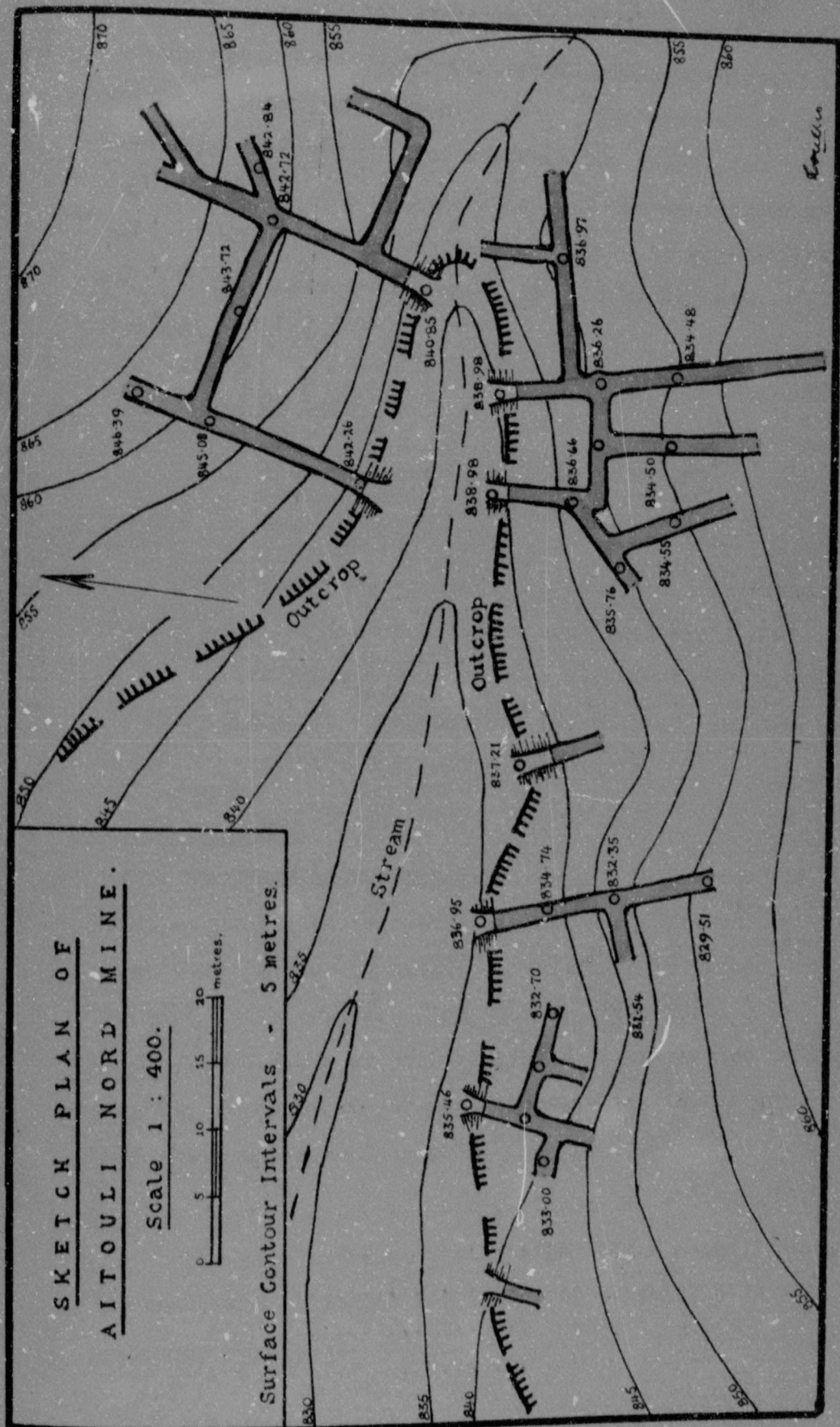
The seam is fairly extensive with a width of about 10 inches (25 cms), and the lignite is of good quality; it breaks into lumps and requires little sorting.

Analysis.

A sample taken from a 10 inch width of seam in the mine gave the following results:-

Volatiles	27.9%
Fixed Carbon.	46.0%
Ash..	26.1%
Sulphur..	14.4%
Calorific Value..	10,280 (5710)
B.T.U.s and Cals/kilo.	

FIG. 24.



Comment.

The property is still in the early stages of development, the output being about 3 tons of sorted lignite per day, employing 30 men. The present galleries have only explored an area representing some 1,000 tons of coal, but there are no indications of the seam terminating, and accordingly no estimate of available tonnage can be made. The exploration permit is held by M. Bاده Thomas.

2. AITOULI SUD MINE.

(Map Reference 1329.1778. Fig 25)

Location.

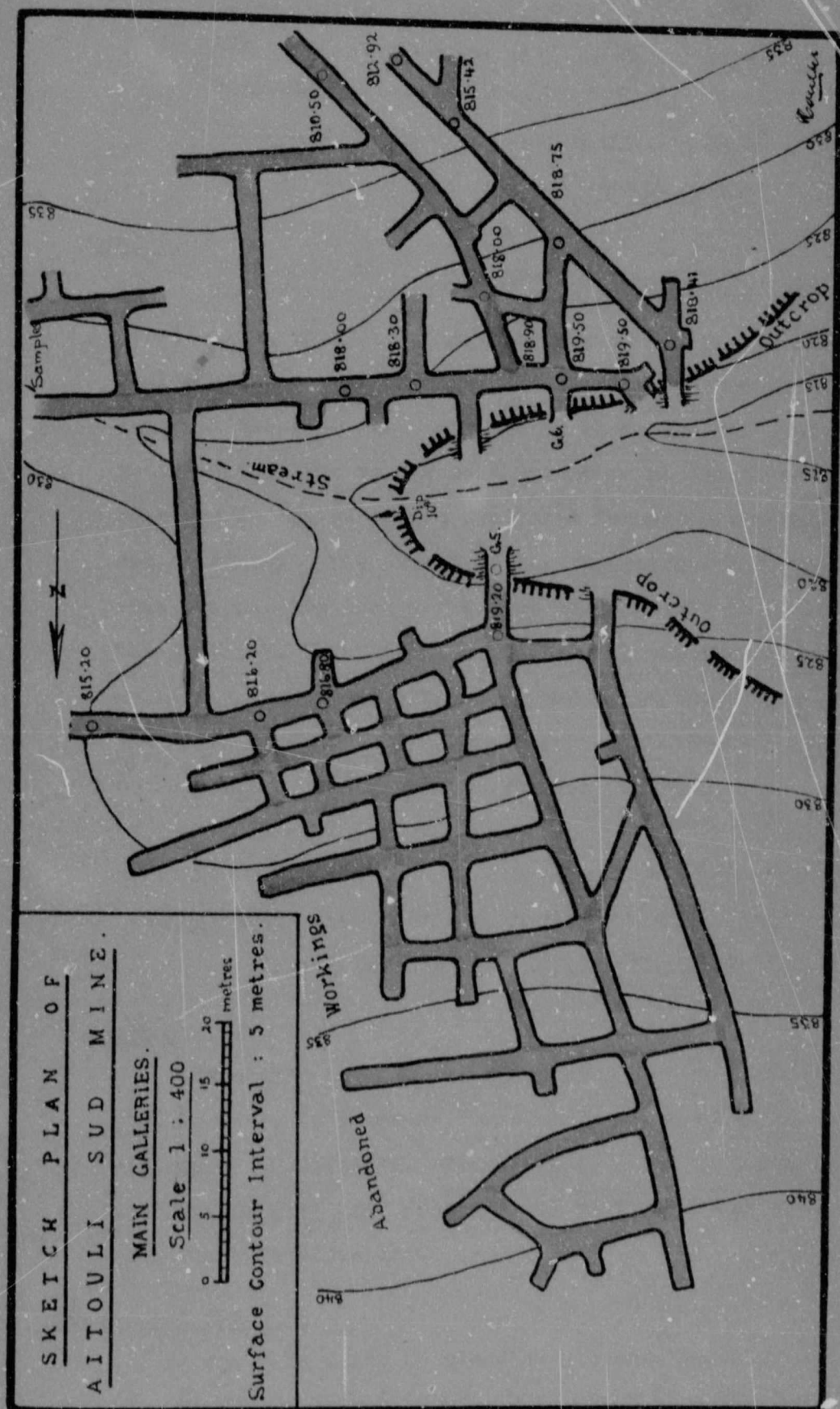
Here again the workings are situated in a ravine, about 260 feet (80 metres) below and immediately south of Aitouli village. The workings are about 550 yards, (0.5 kms) from the road depot at the village, and lie at an altitude of 2,260 feet (820 metres).

Nature of the Seam.

The seam is fairly extensive and is composed of bands of good lignite with shale and marl streamers, which necessitates sorting. It averages 15 inches (40 cms) in thickness. The quality after sorting is about 9900 B.T.U.s or 5500 cals/kilo. Extraction on this property produces 20 per cent fines, which is higher than the average in this area.

Analysis.

Two samples taken in the mine from a seam 12 inches (30 cms), and 18 inches (45 cms) respectively, gave the following results:-



	I.	II.
Volatiles	31.6%	33.5%
Fixed Carbon.	35.2%	32.1%
Ash	33.2%	34.4%
Sulphur	5.5%	5.4%
Calorific Value..	9,000	8,820
B.T.U.s and Cals/kilo	(5,000)	(4,900)

Comment.

The development in this mine has explored an area representing about 1,800 tons of lignite. The present daily output is 6 tons sorted lignite, the labour strength being 40 men. At the northern end the seam deteriorates, but to the east and south no limits to the seam are indicated and no available tonnage estimate can be given. The nature of the lignite seam here makes this proposition less attractive than Aitouli Nord, but the owner, M. Thoumas, is concentrating his operations on this property owing to the lower mining costs due to the width of seam and the proximity to the road. The present mining costs about £.Stg.3.5 per ton.

3. GRAND MRAH (Present Workings).

(Map Reference 1327.1771. Fig 26.)

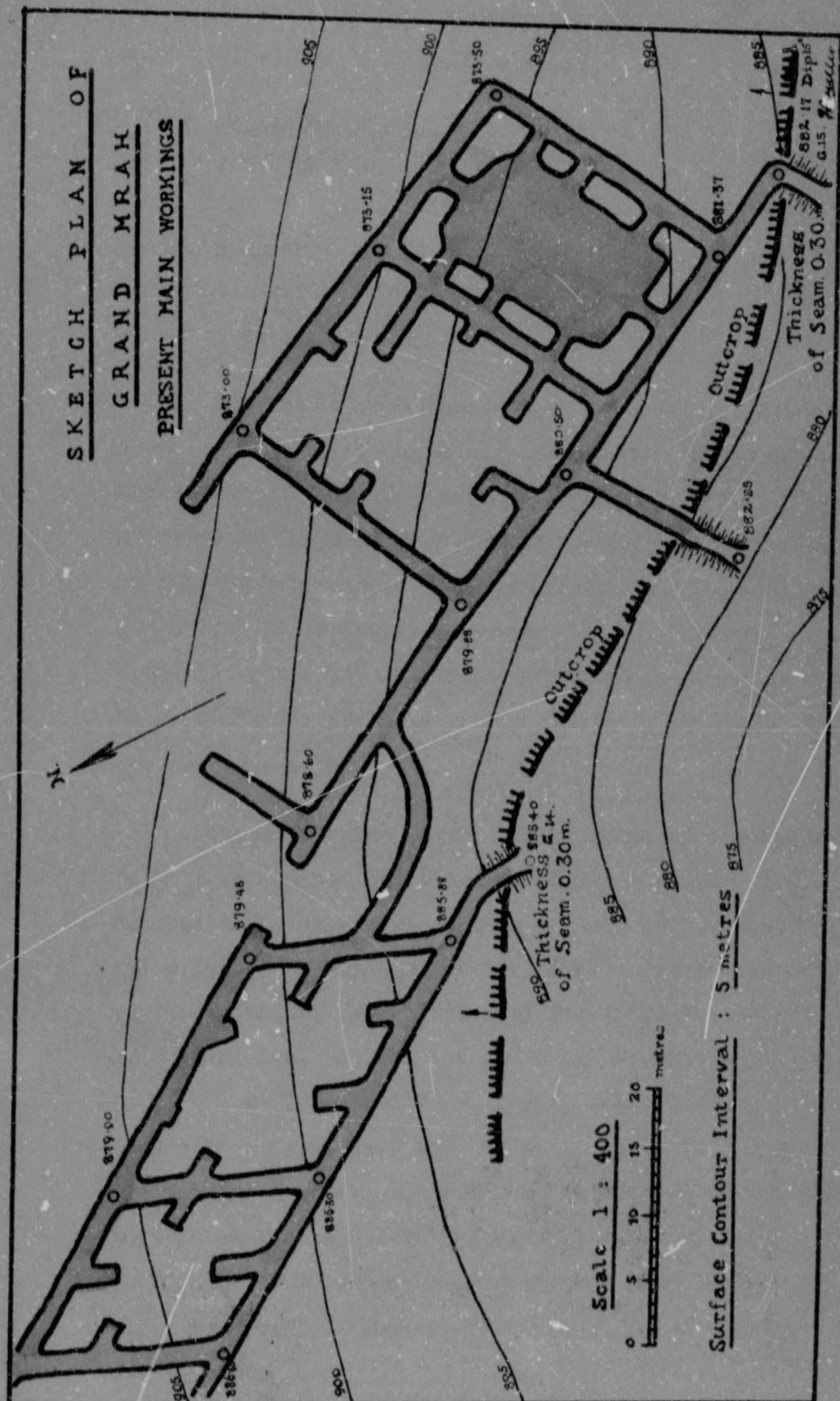
Location.

The mine is situated at an altitude of 2,900 feet, (900 metres), in a ravine immediately south of the village of MAKNOUNIYE, (Grand Mrah). The workings are 1,600 yards (1.5 kms) from Aitouli village, which is at much the same elevation.

Nature of the Seam.

The main seam, as mined at present, is split up into two bands each 6 inches thick, by a 12 inch parting, thus necessitating sorting. The lignite is of good quality and breaks into lumps.

FIG. 26.



Analysis.

A Grab Sample of roughly sorted lignite at the mine yielded the following results:-

Volatiles	25.9%
Fixed Carbon.	45.0%
Ash	29.1%
Sulphur..	9.1%
Calorific Value.. ...	<u>10,260</u>
B.T.U.s and Cals/kilo	(5,700)

The present development has explored an area of about 1,500 tons of lignite. Some 30 men are employed for an output of 3 tons sorted lignite per day. No evidence of the seam terminating has been found, which renders an estimate of the tonnage reserves impossible. The holder of the exploration permit, M. Thoumas, estimates the cost of lignite delivered at the road depot to be £.Stg.4.5 per ton. This figure is at least 25 per cent too high.

There are also several other seams at intervals up to 98 feet (30 metres) above and below the main seam. Several of these are also being explored by prospect galleries. A sample taken from one of the lowest seams, 15 inches thick, gave a value of 8,570 B.T.U.s or 4760 cals/kilo, with an ash and sulphur content of 35.2% and 4.7% respectively. This seam, incidently, occurs in a large lava body which is prominent in the vicinity. Another sample from a narrow bed of 6 inches, just below the main workings, gave a value of 8,320 B.T.U.s or 4620 cals/kilo, the ash and sulphur content being 36.2% and 7.3% respectively.

4. ZEHALTA MINE.

(Map Reference 1319.1749. Fig 27)

Location.

The workings of this mine are situated in a ravine some 650 feet (200 metres) below and south-west of the village of Zehalta, and are at an altitude of 2,860 feet, (880 metres). They are about half a mile from the road depot at the village.

Nature of the Seam.

The seam is extensive with a consistent width of 15 inches (40 cms). It is of good quality and breaks into large lumps requiring little sorting.

Analysis.

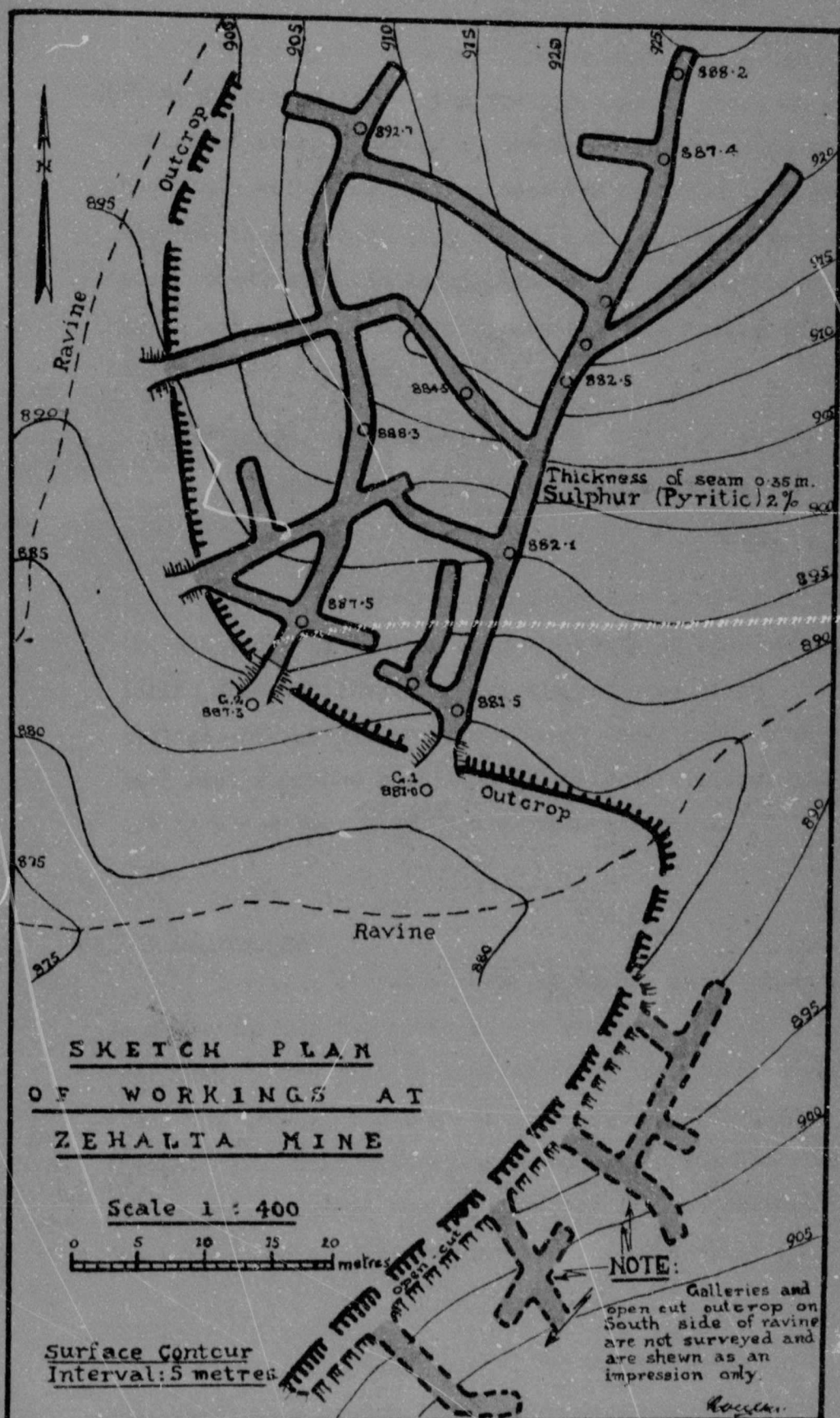
Two samples taken in the workings from widths of 8 inches and 15 inches respectively, gave the following results:-

	I.	II.
Volatiles	32.6%	50.9%
Fixed Carbon.	52.1%	42.8%
Ash	15.3%	6.3%
Sulphur	8.4%	1.1%
Calorific Value..	11,300	11,340
B.T.U.s and Cals/kilo	(6,280)	(6,300)

Comment.

From the galleries examined in this mine, it would appear that the development has explored an area of some 1,500 tons of lignite. The seams also show no signs of petering out, and accordingly, an estimate of available tonnage is difficult. At present Zehalta is being worked for the Fighting French Army, who take the whole of the daily output of 3 tons.

FIG. 27.



B. OTHER PROPERTIES.

The properties already described are the main mines in production at the present time. There are a number of other workings in the area, which in the past have been either actively prospected or mined, but which are not in operation at present. These properties were not examined in detail, and the following brief notes are added here to complete the description of the Southern Lebanon.

1. GRAND MRAH. (Old Workings)

(Map Reference 1327.1771. Fig. 28)

Location.

These old workings are located in a ravine up the slope of the hill immediately north of Maknouniye, (Grand Mrah), village. They are situated at an altitude of 2,930 feet (900 metres) about 1600 yards (1.5 kms) from the road depot at Aitouli village, and are in close proximity to the present workings at Grand Mrah.

Nature of the Seam.

The seam averages about 14 inches in thickness, and splits into two bands at the upper end of the workings. The quality appears to be good, but samples were not taken. The lignite is tough and obviously breaks into lumps with a low percentage of fines. The shale and sandstone forming the roof of the workings is stratified and breaks away in large slabs.

Comment.

During the early stages of this war, the property was operated by a French Company, but at present no work is being done. On account of the nature

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FIG. 28.

SKETCH PLAN OF
GRAND MRAH
OLD WORKINGS.

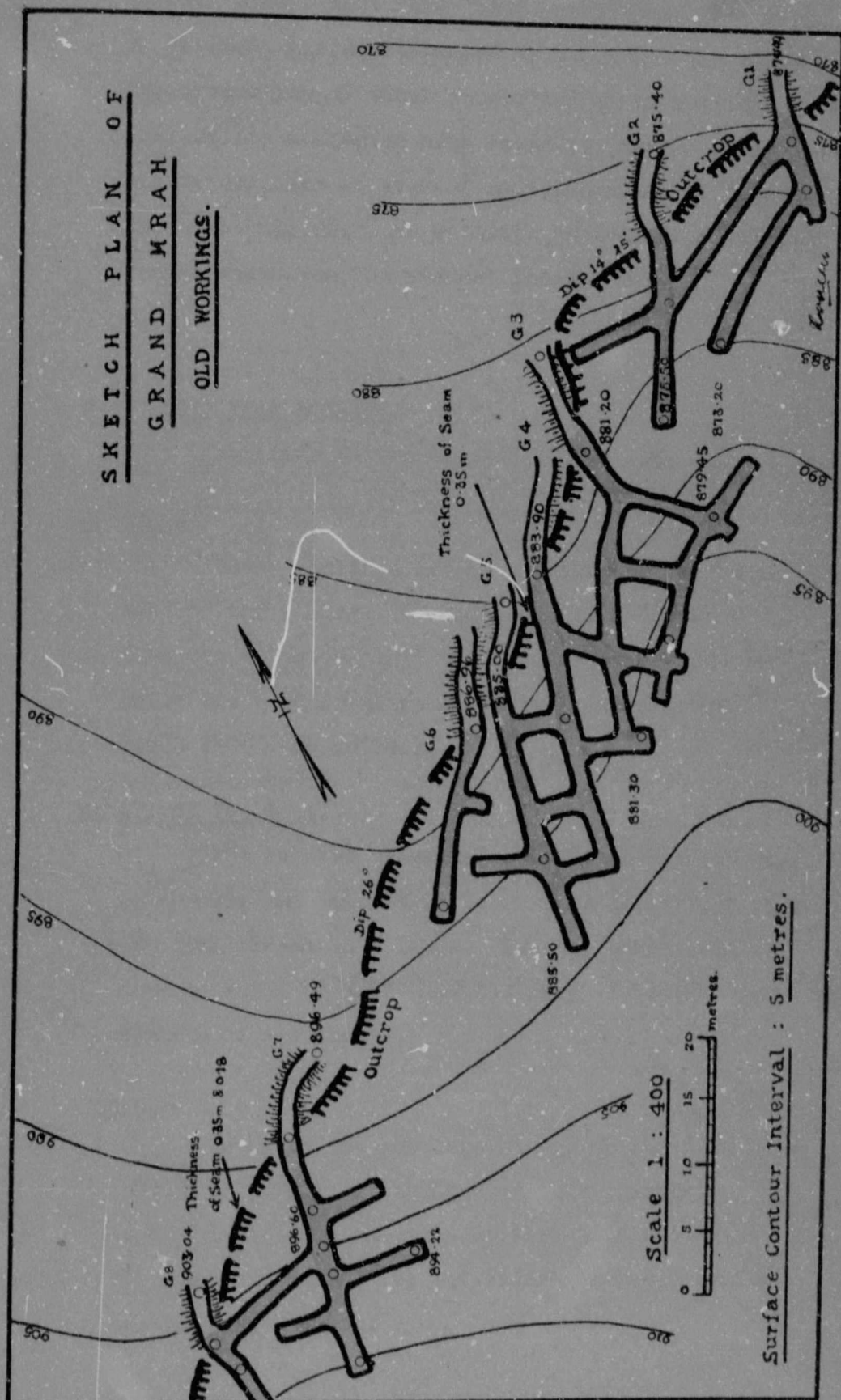
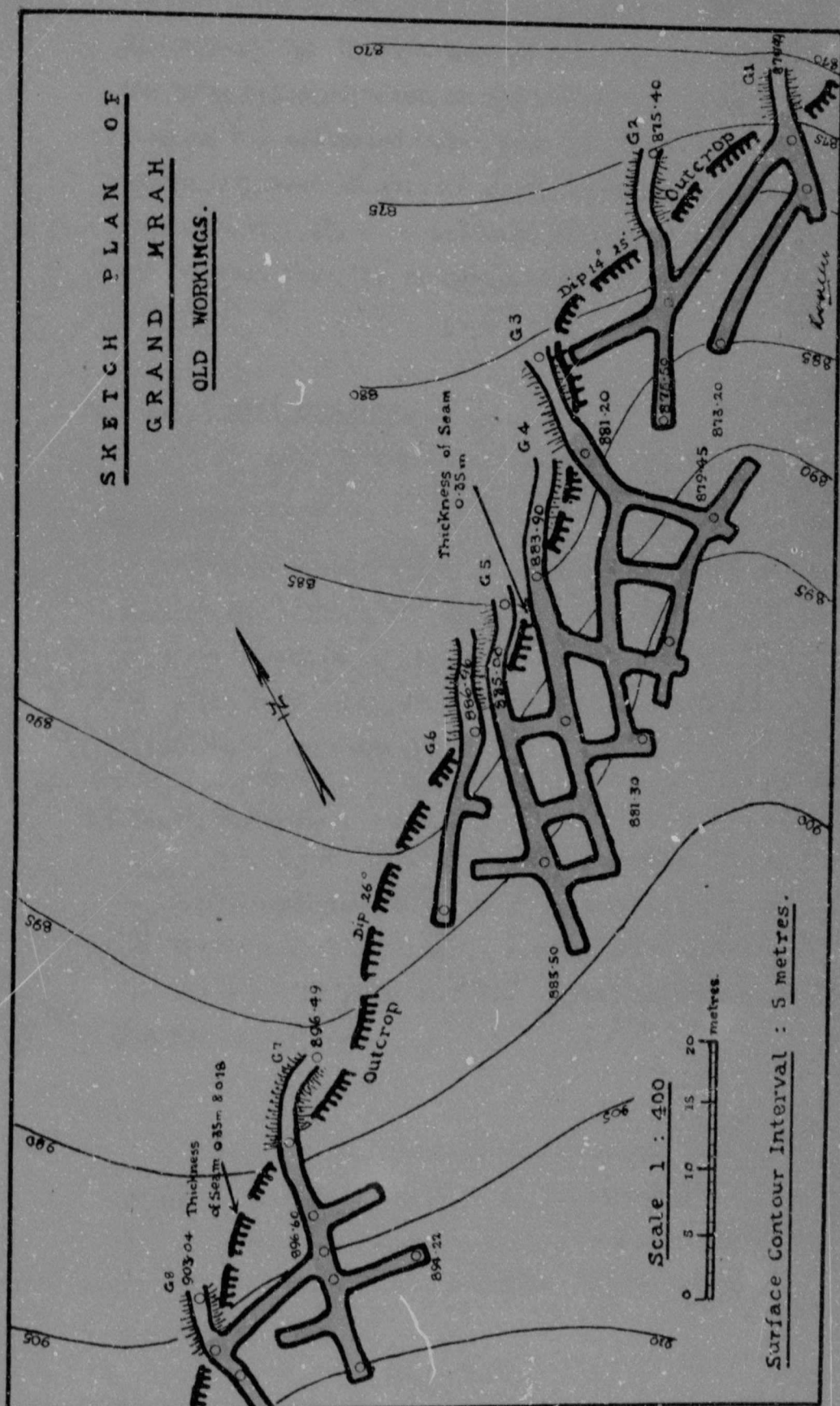


FIG. 28.



of the roof, timbering is necessary. For this reason as well as the fact that labour is scarce, the owner, M. Thoumas, has concentrated on his other properties, the production of which is sufficient to meet the demand. Many of the galleries have caved in, these galleries having explored an area of some thousands of tons as shown in Fig. 28. No estimate of available tonnage can be made from the present information.

2. PETIT MRAH WORKINGS.

(Map Reference 1328.1776. Fig 7.)

Location.

These workings are in a ravine below and north-west of the village of HAMI ABOU JDID (Petit Mrah). They are situated about 0.5 mile from and 1000 feet below the road depot at Aitouli, at an altitude of 2,670 feet (820 metres).

Nature of the Seam.

The lignite averages about 10 inches (25 cms) in thickness, and appears to be of good quality, tough, and would break into lumps. Samples taken gave an average value of 9,980 B.T.U.s or 5545 Cals/kilo, over a width of six inches.

Comment.

Owing to the shortage of labour and lack of a market no work is being done at this prospect. The work done to date consists of five prospect adits about 50 feet in length. No indication of the extent of the seam is present.

5. DJESSINE - SAIDA WORKINGS.

(Map Reference 1328.1796)

Location and Nature of the Seam.

This seam, composed of lignite and vitreous stringers of coal, occurs at a cutting on the Djessine-Saida main road, half a mile west of the turn-off to Aitouli village. The outcrop as exposed by the road cutting is about 100 yards.

The occurrence is of little economic value, the lignite being of inferior quality. It is reported that the best sample only recorded a value of 4,860 B.T.U.s or 2700 cals/kilo.

SAIDA	10	2700	32.5	32.1	32.1	32.1
SAIDA	20	—	—	—	—	—
SAIDA	30	2700	32.5	32.1	32.1	32.1
SAIDA	40	2700	32.5	32.1	32.1	32.1
SAIDA	50	2700	32.5	32.1	32.1	32.1
SAIDA	60	2700	32.5	32.1	32.1	32.1
SAIDA	70	2700	32.5	32.1	32.1	32.1
SAIDA	80	2700	32.5	32.1	32.1	32.1
SAIDA	90	2700	32.5	32.1	32.1	32.1
SAIDA	100	2700	32.5	32.1	32.1	32.1
SAIDA	110	2700	32.5	32.1	32.1	32.1
SAIDA	120	2700	32.5	32.1	32.1	32.1
SAIDA	130	2700	32.5	32.1	32.1	32.1
SAIDA	140	2700	32.5	32.1	32.1	32.1
SAIDA	150	2700	32.5	32.1	32.1	32.1
SAIDA	160	2700	32.5	32.1	32.1	32.1
SAIDA	170	2700	32.5	32.1	32.1	32.1
SAIDA	180	2700	32.5	32.1	32.1	32.1
SAIDA	190	2700	32.5	32.1	32.1	32.1
SAIDA	200	2700	32.5	32.1	32.1	32.1
SAIDA	210	2700	32.5	32.1	32.1	32.1
SAIDA	220	2700	32.5	32.1	32.1	32.1
SAIDA	230	2700	32.5	32.1	32.1	32.1
SAIDA	240	2700	32.5	32.1	32.1	32.1
SAIDA	250	2700	32.5	32.1	32.1	32.1
SAIDA	260	2700	32.5	32.1	32.1	32.1
SAIDA	270	2700	32.5	32.1	32.1	32.1
SAIDA	280	2700	32.5	32.1	32.1	32.1
SAIDA	290	2700	32.5	32.1	32.1	32.1
SAIDA	300	2700	32.5	32.1	32.1	32.1

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Location and Nature of the Seam.

This seam, composed of lignite and vitrious stringers of coal, occurs at a cutting on the Djezzine-Saida main road, half a mile west of the turn-off to Aitouli village. The outcrop as exposed by the road cutting is about 100 yards.

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Sample No. 1	31	—	26.7	21.3	21.3	21.3
Sample No. 2	28	31.3	21.3	21.3	21.3	21.3
Sample No. 3	20	31.3	21.3	21.3	21.3	21.3
Sample No. 4	—	27.3	21.3	21.3	21.3	21.3
Sample No. 5	—	31.3	21.3	21.3	21.3	21.3
Sample No. 6	25	32.7	21.3	21.3	21.3	21.3
Sample No. 7	10	31.3	21.3	21.3	21.3	21.3
Sample No. 8	20	31.3	21.3	21.3	21.3	21.3
Sample No. 9	29	31.3	21.3	21.3	21.3	21.3
Sample No. 10	30	31.3	21.3	21.3	21.3	21.3
Sample No. 11	30	31.3	21.3	21.3	21.3	21.3
Sample No. 12	30	31.3	21.3	21.3	21.3	21.3
Sample No. 13	30	31.3	21.3	21.3	21.3	21.3
Sample No. 14	30	31.3	21.3	21.3	21.3	21.3
Sample No. 15	30	31.3	21.3	21.3	21.3	21.3
Sample No. 16	30	31.3	21.3	21.3	21.3	21.3
Sample No. 17	30	31.3	21.3	21.3	21.3	21.3
Sample No. 18	30	31.3	21.3	21.3	21.3	21.3
Sample No. 19	30	31.3	21.3	21.3	21.3	21.3
Sample No. 20	30	31.3	21.3	21.3	21.3	21.3
Sample No. 21	30	31.3	21.3	21.3	21.3	21.3
Sample No. 22	30	31.3	21.3	21.3	21.3	21.3
Sample No. 23	30	31.3	21.3	21.3	21.3	21.3
Sample No. 24	30	31.3	21.3	21.3	21.3	21.3
Sample No. 25	30	31.3	21.3	21.3	21.3	21.3
Sample No. 26	30	31.3	21.3	21.3	21.3	21.3
Sample No. 27	30	31.3	21.3	21.3	21.3	21.3
Sample No. 28	30	31.3	21.3	21.3	21.3	21.3
Sample No. 29	30	31.3	21.3	21.3	21.3	21.3
Sample No. 30	30	31.3	21.3	21.3	21.3	21.3

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Sample No. 1	1	10.0	10.0	10.0	10.0	10.0
Sample No. 2	2	10.0	10.0	10.0	10.0	10.0
Sample No. 3	3	10.0	10.0	10.0	10.0	10.0
Sample No. 4	4	10.0	10.0	10.0	10.0	10.0
Sample No. 5	5	10.0	10.0	10.0	10.0	10.0
Sample No. 6	6	10.0	10.0	10.0	10.0	10.0
Sample No. 7	7	10.0	10.0	10.0	10.0	10.0
Sample No. 8	8	10.0	10.0	10.0	10.0	10.0
Sample No. 9	9	10.0	10.0	10.0	10.0	10.0
Sample No. 10	10	10.0	10.0	10.0	10.0	10.0
Sample No. 11	11	10.0	10.0	10.0	10.0	10.0
Sample No. 12	12	10.0	10.0	10.0	10.0	10.0
Sample No. 13	13	10.0	10.0	10.0	10.0	10.0
Sample No. 14	14	10.0	10.0	10.0	10.0	10.0
Sample No. 15	15	10.0	10.0	10.0	10.0	10.0
Sample No. 16	16	10.0	10.0	10.0	10.0	10.0
Sample No. 17	17	10.0	10.0	10.0	10.0	10.0
Sample No. 18	18	10.0	10.0	10.0	10.0	10.0
Sample No. 19	19	10.0	10.0	10.0	10.0	10.0
Sample No. 20	20	10.0	10.0	10.0	10.0	10.0
Sample No. 21	21	10.0	10.0	10.0	10.0	10.0
Sample No. 22	22	10.0	10.0	10.0	10.0	10.0
Sample No. 23	23	10.0	10.0	10.0	10.0	10.0
Sample No. 24	24	10.0	10.0	10.0	10.0	10.0
Sample No. 25	25	10.0	10.0	10.0	10.0	10.0
Sample No. 26	26	10.0	10.0	10.0	10.0	10.0
Sample No. 27	27	10.0	10.0	10.0	10.0	10.0
Sample No. 28	28	10.0	10.0	10.0	10.0	10.0
Sample No. 29	29	10.0	10.0	10.0	10.0	10.0
Sample No. 30	30	10.0	10.0	10.0	10.0	10.0
Sample No. 31	31	10.0	10.0	10.0	10.0	10.0
Sample No. 32	32	10.0	10.0	10.0	10.0	10.0
Sample No. 33	33	10.0	10.0	10.0	10.0	10.0
Sample No. 34	34	10.0	10.0	10.0	10.0	10.0
Sample No. 35	35	10.0	10.0	10.0	10.0	10.0
Sample No. 36	36	10.0	10.0	10.0	10.0	10.0
Sample No. 37	37	10.0	10.0	10.0	10.0	10.0
Sample No. 38	38	10.0	10.0	10.0	10.0	10.0
Sample No. 39	39	10.0	10.0	10.0	10.0	10.0
Sample No. 40	40	10.0	10.0	10.0	10.0	10.0
Sample No. 41	41	10.0	10.0	10.0	10.0	10.0
Sample No. 42	42	10.0	10.0	10.0	10.0	10.0
Sample No. 43	43	10.0	10.0	10.0	10.0	10.0
Sample No. 44	44	10.0	10.0	10.0	10.0	10.0
Sample No. 45	45	10.0	10.0	10.0	10.0	10.0
Sample No. 46	46	10.0	10.0	10.0	10.0	10.0
Sample No. 47	47	10.0	10.0	10.0	10.0	10.0
Sample No. 48	48	10.0	10.0	10.0	10.0	10.0
Sample No. 49	49	10.0	10.0	10.0	10.0	10.0
Sample No. 50	50	10.0	10.0	10.0	10.0	10.0

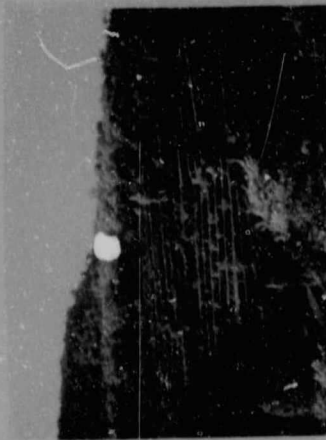
SUMMARY OF CALORIFIC VALUES AND PROXIMATE
ANALYSES OF PRINCIPAL LIGNITE OCCURRENCES.

<u>OCCURRENCE.</u>	<u>Width of Seam. Ins.</u>	<u>Vola- tiles %</u>	<u>Fixed Carbon %</u>	<u>Ash %</u>	<u>Sul- phur %</u>	<u>Calori- fic Value B.T.U.s</u>
BEIT MENDER	12	26.5	32.2	41.3	2.4	8280
BLAOUZA	28	29.2	35.3	35.3	5.2	9270
BECHARRE	26	30.3	34.6	35.1	13.0	8950
EL AARBE	24	35.1	33.2	31.7	14.5	9520
EL AARBE PROSPECT	6	28.0	33.5	38.5	18.4	8170
HADET UPPER	9	35.0	22.8	42.2	7.8	7560
HADET LOWER	7	32.5	28.9	38.6	10.3	8350
MAZRAAT BENI A'SAAB	18	37.4	30.1	32.5	2.9	8530
DOUAIR	6	33.4	21.4	45.2	4.9	7960
KARTABA No.1 ADIT	22	37.2	26.5	36.3	9.3	9360
KARTABA No.2 ADIT	21	31.9	26.9	41.2	6.4	8230
AALMATE No.1 SEAM	14	34.3	23.4	42.3	11.2	7520
AALMATE No.2 SEAM	20	31.3	23.8	44.9	7.2	7530
AALMATE No.3 SEAM	-	25.3	11.9	62.8	8.1	4700
BKARTA. SELECTED	-	33.3	29.4	37.3	12.3	8600
BKARTA. MIXED	26	32.7	23.7	43.6	9.2	7690
TANNOUINE	10	34.8	20.8	44.4	7.3	6660
MEYROUBA	20	51.6	22.9	25.5	5.3	11000
MEAJLAYA	29	30.6	28.8	40.6	7.4	8030
ARSOON. SELECTED	30	41.0	39.4	19.6	8.4	11700
ARSOON. MIXED	34	37.9	32.5	29.6	6.1	10300
ABEY	9	27.7	40.0	32.3	9.2	8640
AIN TRAZ	14	35.6	35.0	29.4	8.7	9000
AITOULI NORD	10	27.9	45.0	26.1	14.4	10280
AITOULI SUD	12	31.6	35.2	33.2	5.5	9000
GRAND MRAH. (GRAB)	-	25.9	45.0	29.1	9.1	10260
ZEHALTA	8	32.6	52.1	15.3	8.4	11300

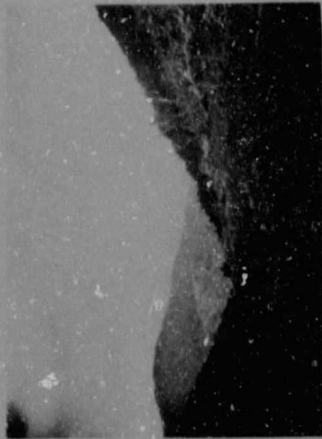
NOTE:- Unless where otherwise stated the above samples were taken at the coal faces with no sorting.



Horlaba District.
A scene taken in
the Hurabac formations on
the Horlaba - Calmala Road.



Bay District.
A typical example
of "terracing" common through-
out the Khamon to prevent
soil erosion. Years of labour
are spent on this work.



Bay District.
Searching for a
suitable road route near
the village of Sauradach.



Hadut District.
Antidinal Spelling
as exposed on the Tripoli-
Hadut Road.



Kartabo District.

A scene taken in
the Jurassic formations on
the Kartabo - Natunale Road.



Avey District.

Searching for a
suitable road route near
the Village of Baouardere.



Avey District.

A typical example
of "terracing" common through-
out the Lebanon to prevent
soil erosion. Years of labour
are spent on this work.



Hadut District.

Antidiagonal Folding
as exposed on the Tripoli-
Hadut Road.

SECTION VIII.

PREPARATION OF THE MINED PRODUCT FOR THE MARKET.

(2) The first step in the preparation of the mined product for the market is the selection of the material to be marketed. This selection is based on the quality of the material, the quantity available, and the market conditions.

The second step is the preparation of the material for the market. This involves the removal of impurities and the grading of the material. The material is then packed in suitable containers for shipment to the market.

The third step is the marketing of the material. This involves the selection of a suitable market and the negotiation of a sale. The material is then shipped to the market and sold to the buyer.

VIII. PREPARATION OF THE MINED PRODUCT FOR THE MARKET.

COAL CLEANING.

As has already been indicated in Section VI. little attempt was made on the part of the exploiters to improve the quality of the mined product by removing, where possible, any impurities in the "run-of-mine" lignite.

The impurities in lignite or coal are of two kinds:-

(1) Those that are so intimately mixed with the lignite that they form part of its composition and cannot be economically separated from it. Such impurities include the portion of the ash coming from the organic matter from which the lignite is formed, all, or nearly all, of the phosphorus, and that part of the sulphur which comes from the same source as the ash.

(2) Impurities not forming part of the lignite, but more or less intimately mixed with it, such as shale, slate, fireclay, and iron and sulphur in the form of iron pyrites.

The presence of the impurities coming under (2) in coal used for steam and household purposes increases the amount of ash, reducing the heat value of the coal, and obstructs the grate bars by causing the coal to clinker.

The lignite comes out of the mines in a very unclean condition. The greater part of the associated sandstone or volcanic rocks is removed separately at the coal face, but the lignite itself contains other extractable impurities, the chief of which is iron pyrites.

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