

against lignite due to its sulphurous odour and high ash content. It must be remembered that at this period little coal cleaning had been attempted, and the methods of extraction were such that the mined lignite contained much dirt and foreign matter. Any original enthusiasm on the part of the exploiters soon evaporated, and at the commencement of 1943, these small mines were only holding out in the hopes of new markets being created, especially by the Army.

Nevertheless, when the mines were first opened up, the majority of owners appeared to be only interested in profit with little outlay. Few owners gave much thought to the future of their properties, to the method of extraction, to the cleaning of their product, or to the suitability of their products for different markets. To them it was just coal.

The Société de Briquetage des Matières Combustibles was the only company who displayed any real enterprise, due no doubt to the fact that the invested capital was high, and the business was conducted on proper commercial lines.

—oOo—
—oOo—



Once Sand on the Beirut -
Damascus main Road.



A narrow strip on the road
between the Damascus and
Beirut.



In the of the mountains
between Jozaya and
Lamouine.



Along the Beirut - Damascus
Road. High mountains
between the Jozaya and
Lamouine.



Ones seen on the Sierrita -
Damasco main road.



A Sierrita seen on the road
between El Morado and
Salina.



On top of the mountains
between Joraya and
Yamavire.



Alongside the Sierrita - Damasco
road before descending into
Salina in the Joraya Valley.



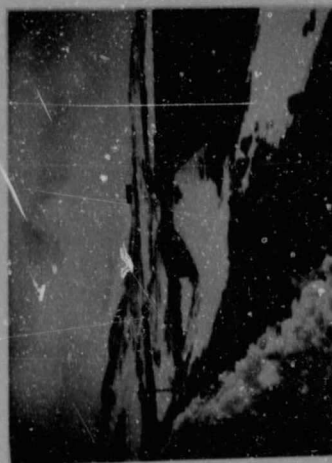
Snow Scans on the "Bicus" -
Romascus main Road.



A Road Spot on the road
between the Morada and
Salata.



On Top of the Mountains
between Yngaya and
Yannawine.



Alongside the Bicus, Romascus
Road before descending into
Salama in the fertile Elad
Valley.

SECTION VI.

THE MOUNTAIN AREA.

The details of the deposits and occurrences of the Mountain Area, will be described in detail in the following sections, namely:-

I. The Mountain Area:-

1. Bull Mountain Mine.
2. Mountain Mine.
3. Mountain Mine.
4. El Arbo Mine.
5. Mountain Mine.
6. Mountain Mine.

SECTION VII.

THE MOUNTAIN AREA:-

DETAILED ACCOUNTS OF DEPOSITS.

10. Mountain Mine.
11. Mountain Mine.
12. Mountain Mine.

III. The Mountain Area:-

13. Mountain Mine.

THE MOUNTAIN AREA.

There are various mines situated in the Mountain Area, at Bull Mountain, Mountain Mine, Mountain Mine, in the immediate proximity of the road. The Mountain Mine is about 1,500 feet above sea level. The Mountain Mine is a distance of 10 miles, and the Mountain Mine is 30 miles. As is the case with the other mines, these are difficult to reach, and they are far

DETAILED ACCOUNTS OF DEPOSITS.

THE NORTHERN LEBANON.

The details of the deposits and occurrences of the Northern Lebanon, will be sub-divided as before into three sections, namely:-

I. The Blaouza-Becharré Area:-

- A. 1. Beit Mender Mine.
- 2. Blaouza Mine.
- 3. Becharré Mine.
- B. 4. El Aarbe Mine.
- 5. Belahiss Mine.
- 6. Hadet Mine.
- 7. Mazraat Beni A'Saab.
- C. 8. Other Deposits.

II. The Kartaba Area:-

- 9. Kartaba Mine.
- 10. Aalmate Mine.
- 11. Bkarta Mine.
- 12. Tannourine.

III. The Meyrouba Area:-

- 13. Meyrouba Mine.

I. THE BLAOUZA - BECHARRÉ AREA.

There are various mines situated all round this circuit - at BEIT MENDER, BLAOUZA EL OUADI, BECHARRÉ, etc., in the immediate proximity of the road. The altitude ranges about 4,500 feet (1400 metres). From Becharré to Chekka is a distance of 25 miles, and from Blaouza to Chekka, 30 miles. As is the case with the mine at Meyrouba, these mines are difficult to exploit during winter. They are far

from the coast and at a high altitude, so that the transport is expensive. Nevertheless, these are the mines which have been the most exploited, for the use of the Société Ciments Libanaise, Chekka.

The BECHARRE MINE produced 2018 tons in 1941, while BLAOUZA MINE produced 2800 tons. These mines are consequently not virgin, and the methods by which they have been exploited have given rise to large falls of roof. In order to be able to continue exploiting them it would be necessary to increase the height of the roads and to take various precautionary measures.

A.1. BEIT MENDER MINE. (Fig. 9)

Location.

The village of Beit Mender lies about 22.5 miles (37 kms) from Tripoli, at an altitude of 3,900 feet, (1200 metres). The mine lies a little above the village and is reached by a track that turns off the main road where the Qanate road also turns off.

Nature of the Seam.

THE LOWER MINE.

(Map Reference 1675.2574.

Altitude 4,000 feet: 1320 metres).

The mine lies close to the vast masses of volcanic rocks which bound it in the west. The carbonaceous shales lie in the purple-red volcanics, between the Nubian Sandstone and the Jurassic Limestone, and form the usual lens-shaped deposit. The outcrop may be followed for 220 to 270 yards (200 to 250 metres). It runs from south-west to north-east, up a considerable slope.

The seam dips at a low angle to the north-west, and the entries, of which there are thirteen, are

FIG. 9.

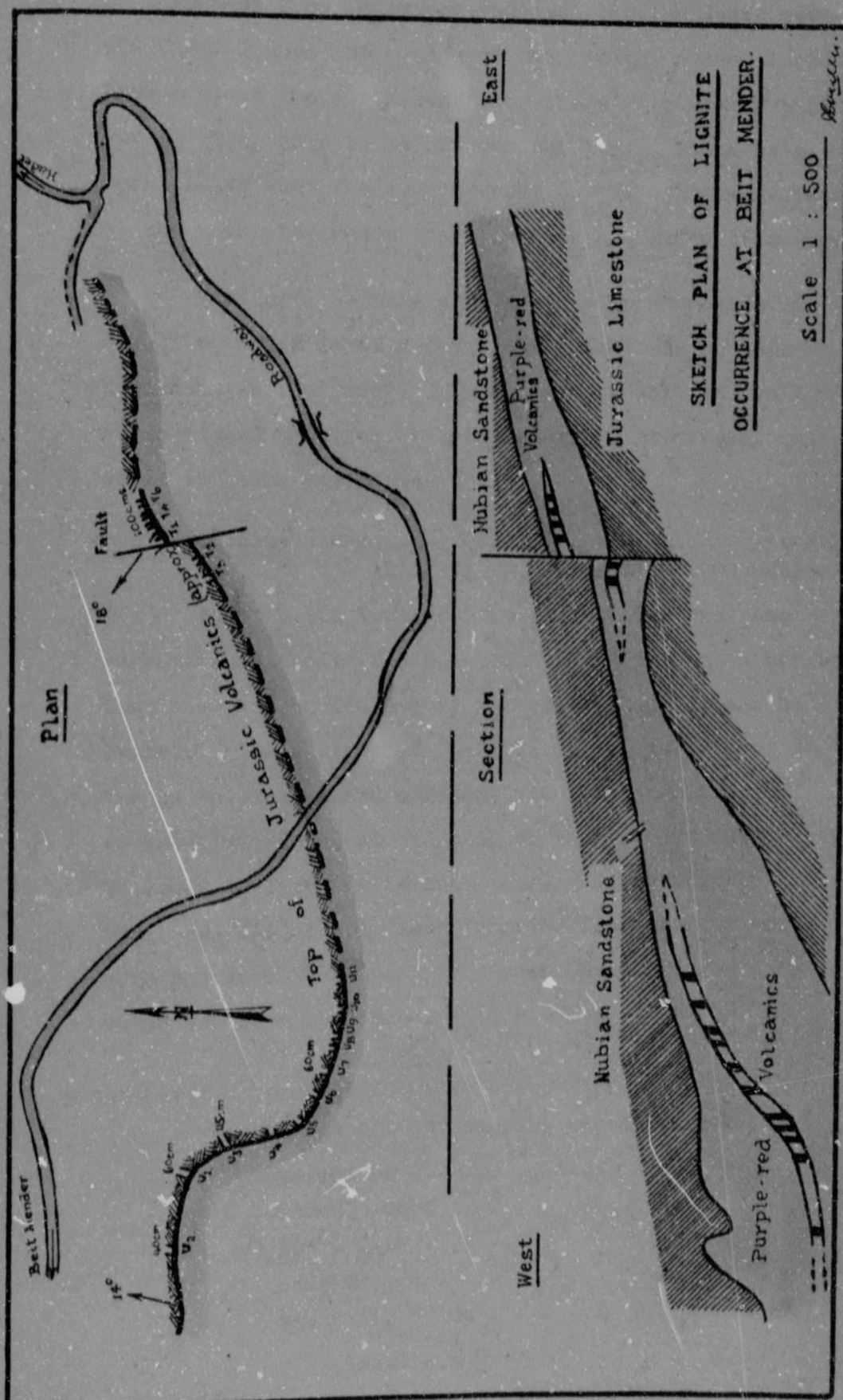
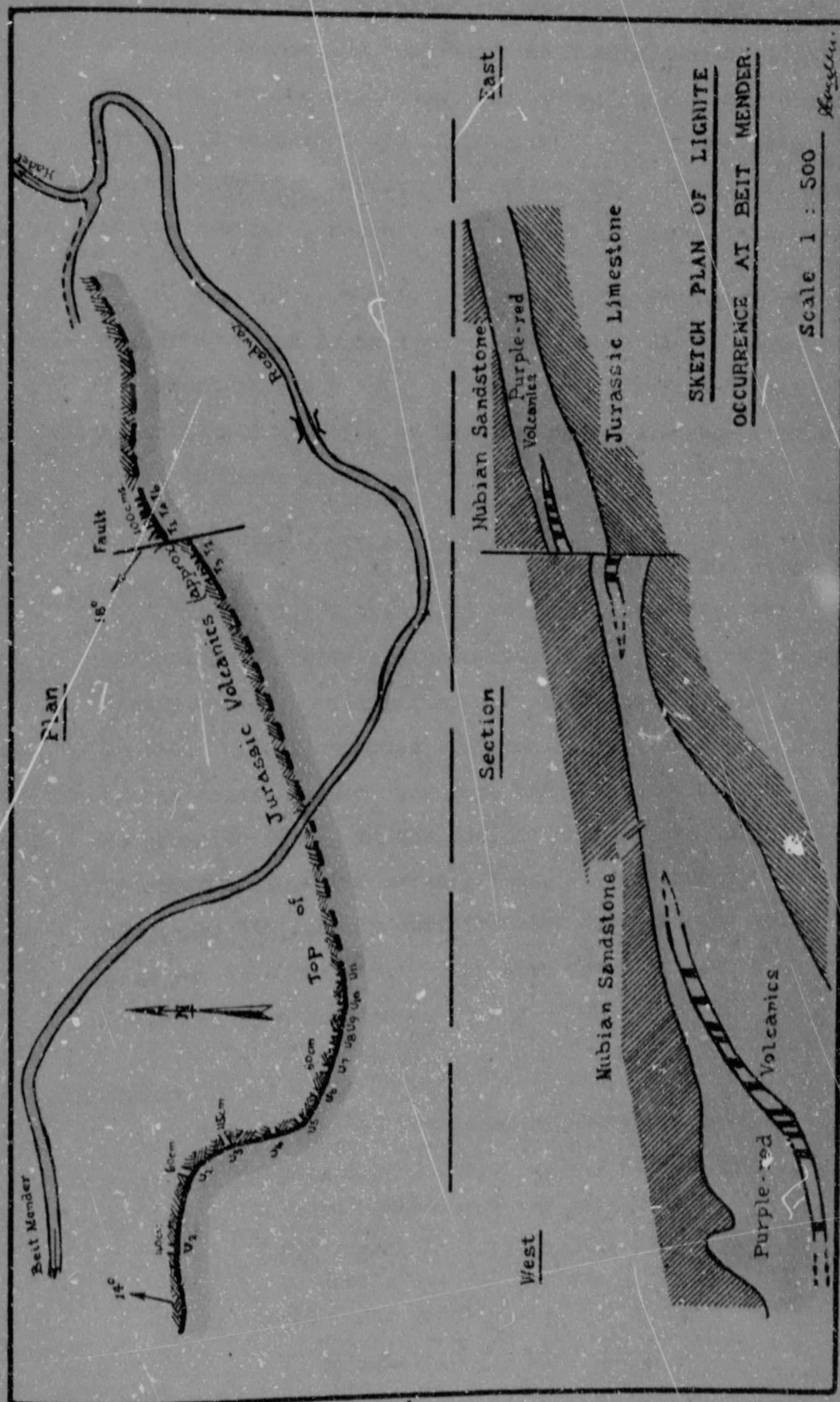


FIG. 9.



therefore flooded or have collapsed. The lignite varies in thickness from 24 inches (60 cms), at the south-west end to 32 inches (80 cms) near the middle, and 40 inches (100 cms) at the north-west end, where it suddenly pinches out. It appears to be of poor quality. There is a possibility that the seam extends to the north-west face of the mountain, where the volcanics are known to outcrop.

The tuffs at this mine contain an abundance of Hematite, which forms a terra cotta that can be used as a pigment in red paint. There is both soft and well consolidated material of this nature. At present only ochre is being extracted.

THE UPPER MINE.

(Map Reference 1675.2575

Altitude 4,160 feet : 1280 metres).

About 1,300 feet (400 metres) up the dip, the carbonaceous shales again outcrop in a lens which has been partly worked. Six adits, now all collapsed, can be traced. It is reported that the shales were about 24 inches thick at their outcrop, and thickened inwards to about 40 inches at the back of the longest adit, which is about 65 feet (20 metres) long. Unfortunately the rocks dip steeply away from the face and the adits were run down the dip. They soon became filled with water and were abandoned.

Analysis.

The average of four samples taken gave:-

Volatiles	26.5%
Fixed Carbon	32.2%
Ash	41.3%
Sulphur	2.4%
Calorific Value	8,280 (4,600).
B.T.U.s and Cals/kilo.	

A.2. BLAOUZA MINE. (Map Reference 1711.2580. Fig. 10)Location.

The Blaouza Mine workings are situated on a steeply inclined slope on the north side of Wadi Qadicha at Blaouza, at an altitude of 4,390 feet (1350 metres) and 30 miles (48 kms) by road from Chekka.

Nature of the Seam.

This seam, 28 inches (70 cms) thick, is also in Jurassic tuffs. It is wedge-shaped in outcrop, its eastern extremity being 9.75 feet in thickness, terminating against a vertical fault. In this region local volcanic effects have produced complications in the structures, and much faulting. The seam dips slightly to the south-west and the workings therefore drain by gravity. The lignite has a fairly good fuel value, but contains a large quantity of pyrite, and has an extremely strong sulphurous odour when fired.

Analysis.

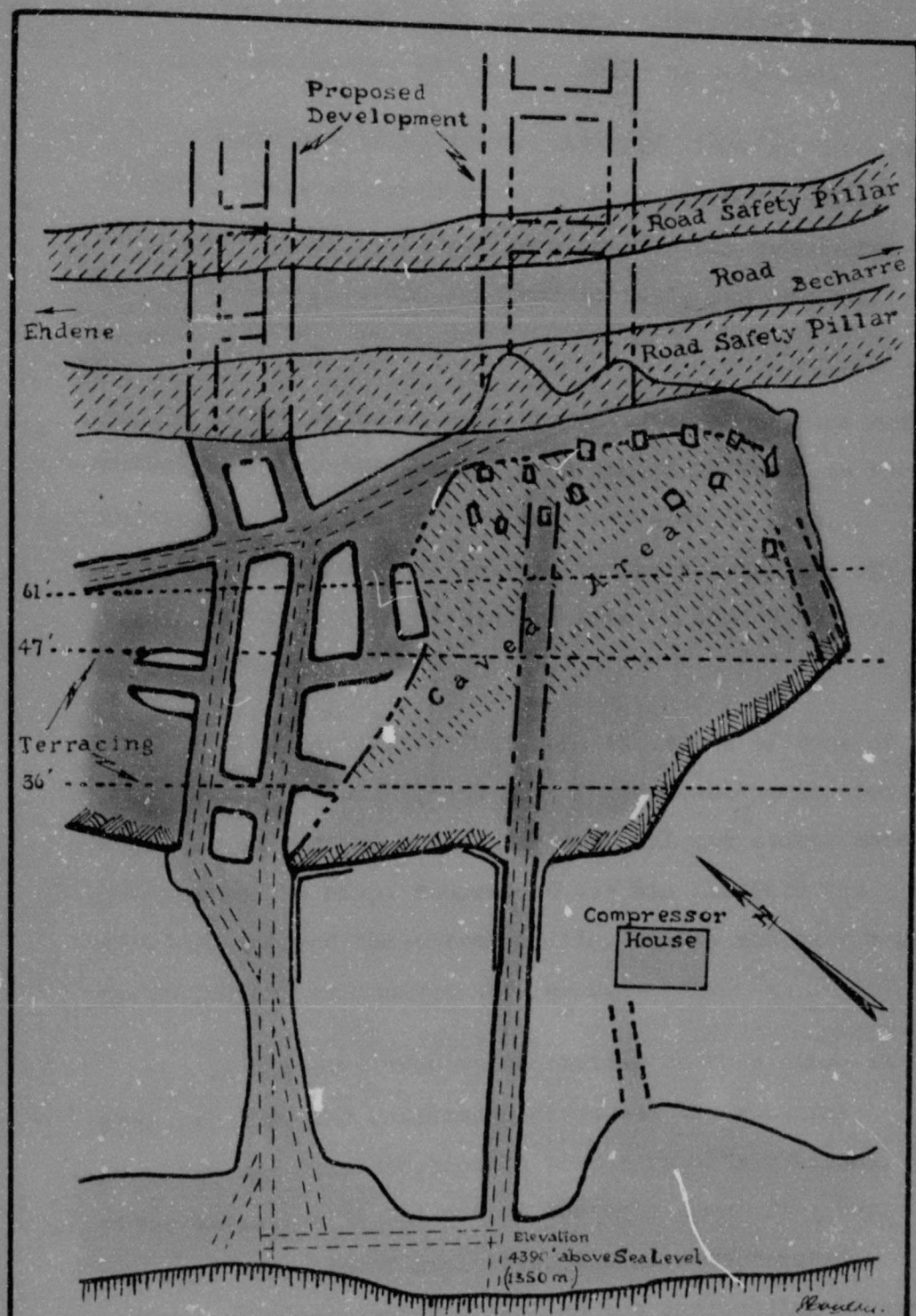
The average of a great number of samples taken by the Société Ciments Libanaise, who have bought 2,800 tons from the mine, gave a value as follows:-

Volatiles	29.2%
Fixed Carbon.	35.5%
Ash	35.3%
Sulphur..	5.2%
Calorific Value..	9,270 (5150).
B.T.U.s and Cals/kilo	

Comment.

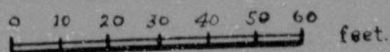
Blaouza was one of the mines taken over and worked by the military when it was decided that there was mineable lignite in sight. The mine had been stopped by order of the Section des Mines on account of the fact that the method of working as practised by the owners,

FIG. 10.



SKETCH PLAN OF BLAOUZA MINE WORKINGS

Scale 1 : 400



had rendered the mine unsafe. Such was the state when taken over and re-opened, that much time and material was necessary before any output could be obtained.

Roads had to be driven and well timbered through caved-in areas and much waste packing had to be done, the object being to render safe all the excavated area, by packing or allowing the roof to fall, and eventually to mine by longwall faces.

Having rendered safe the caved-in areas, the mining policy was to drive through under the main road, as shown in Fig 10, and open up workings on the other side. Nevertheless, doubt was felt as to the possibility of opening up a large coal-bearing area in this vicinity, owing to faulting.

It was estimated that some thousands of tons of lignite were in sight, and that a reasonable daily tonnage could be extracted. Military material and stores were brought to the mine, compressed air was led into the workings to feed three rock drills, tracks and cars were installed and explosives were used.

In a report made by the writer on this mine, it was stressed that the assistance given and the material supplied was disproportionate to the results obtained, as after three months the output was only about five tons per day. The use of explosives was also deprecated, owing to the shattering effect on the surrounding strata and the strata around Blaouza was already disturbed in its natural state.

After five months, during which continual falls were taking place, Blaouza Mine was eventually abandoned. This was mainly due to the failure to find coal of sufficient quantity on the north side of the road, and the exhaustion of the area on the south side.

A.3. BECHARRÉ MINE. (Map Reference 1766.2555. Fig. 11)Location.

The village of Becharré is situated about 25 miles, (39 kms), by road from Chekka, and lies at an altitude of 4450 feet (1400 metres). About 1.25 miles (2 kms) by road, across the Qadicha gorge lies the Becharre Mine, at much the same altitude as the village.

Nature of the Seam.

The seam at this mine also occurs in Jurassic tuffs, and is exposed over an outcrop length of about 165 yards (150 metres). The strike is north-west, and the dip between 5 and 10 degrees north-east, towards the valley. Drainage of the workings by gravity is therefore possible. The average width of the seam is 24 to 28 inches (60 - 70 cms). The lignite contains large blebs of pyrite, particularly near the bottom of the seam. Faulting and local disturbances are much in evidence.

Analysis.

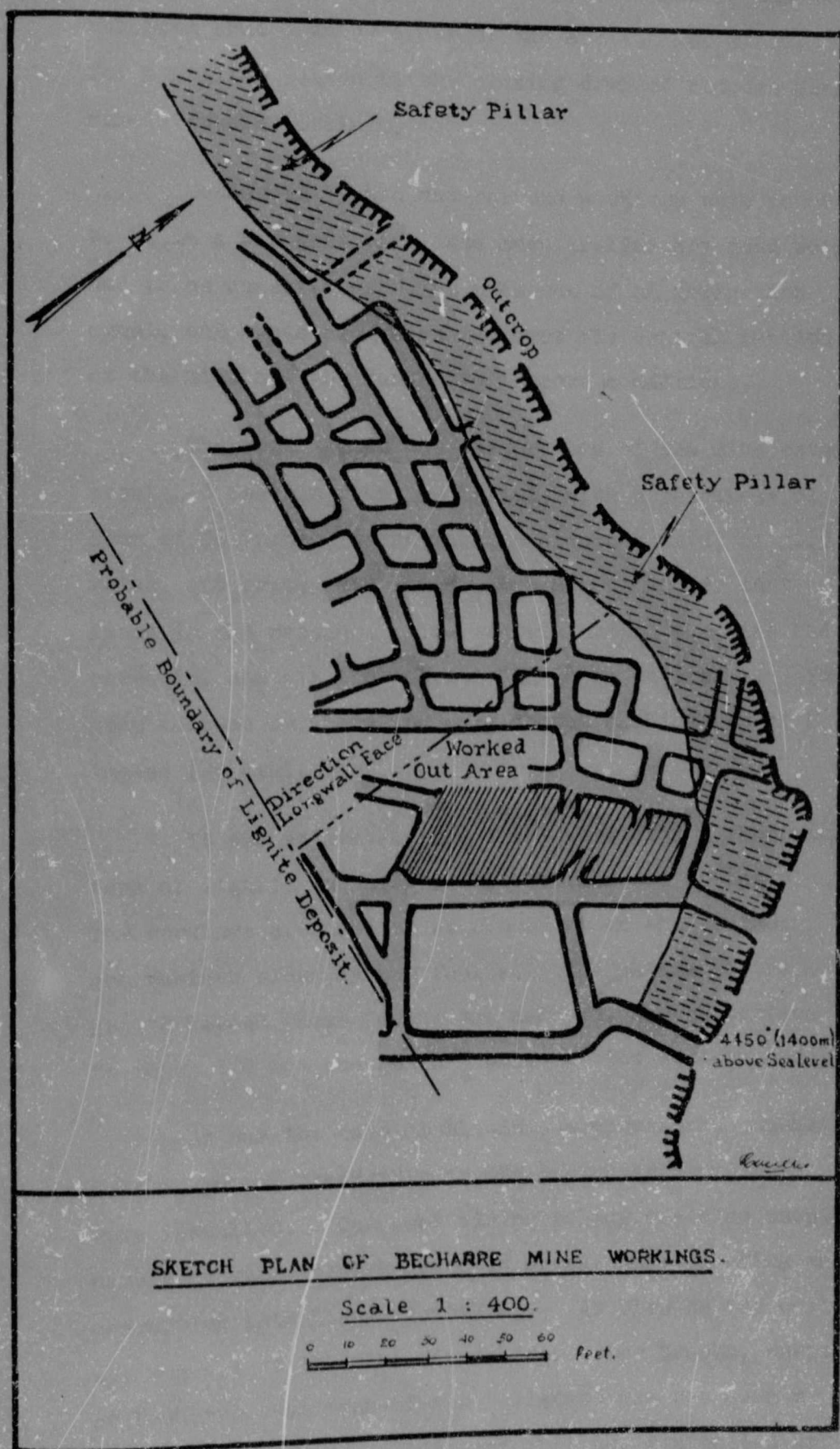
As in the case of Blaouza, the Société Ciments Libanaise had bought over 2,000 tons of Becharré lignite for lime-burning, and an average of 56 samples taken over a period of two years, yielded the following:-

Volatiles	30.3%
Fixed Carbon.	34.6%
Ash	35.1%
Sulphur..	13.0%
Calorific Value..	8,950. (4970).
B.T.U.s and Cals/kilo.	

Comment.

Becharré Mine was re-opened by the military authorities, in conjunction with Blaouza Mine, the whole of the output of the two mines going to the Société Ciments

FIG. 11.



Libanaise at Chekka. Prior to this re-opening, the mine had been shut down by order of the Section des Mines, for a similar reason to the closing down of Blaouza Mine, namely unsafe workings.

Consequently the underground workings were found to be in a bad condition, and much preliminary dead work had to be undertaken. The presence of an irrigation canal, which had been diverted over the central portion of the mine had not tended to improve conditions.

The workings at the eastern end of the mine extended about 120 feet in from the portal, with a thickness of seam of 26 inches. The lignite here was hard, of good value, and broke into lumps making about 20 per cent fines in the working. The western end of the mine had caved in, and all the entries had to be re-opened. The seam thinned out here and only showed a thickness of 8 inches (20 cms).

It was estimated that there were over a thousand tons of lignite in sight at the eastern end of the mine. The workings appeared to be closed in on the southern and western sides by two faults. The nature of the ground beyond these faults was unknown, though surface features did not show much promise at the western end.

As was the case at Blaouza, compressors, pneumatic drills, pumps, decauville tracks and underground cars were installed. The same mining policy was also adopted, namely driving through caved-in areas, waste packing and converting into Longwall working. At Blaouza the coal was run out of the mine direct into motor trucks, whereas at Becharré, the 'run-of-mine' lignite was run down a steep 200 yard long self-acting incline, controlled by a small hoist, direct into a storage bin alongside the main Becharré - Chekka - Tripoli road.

The military controlled exploitation of Blaouza and Becharré commenced in September 1942. By January 1943, it was decided to abandon Blaouza. In March 1943 the small military detachment working Becharré, using local labour, was recalled to its unit. The mine then remained idle for some months, after which operations were again commenced under the supervision of miners from Cyprus.

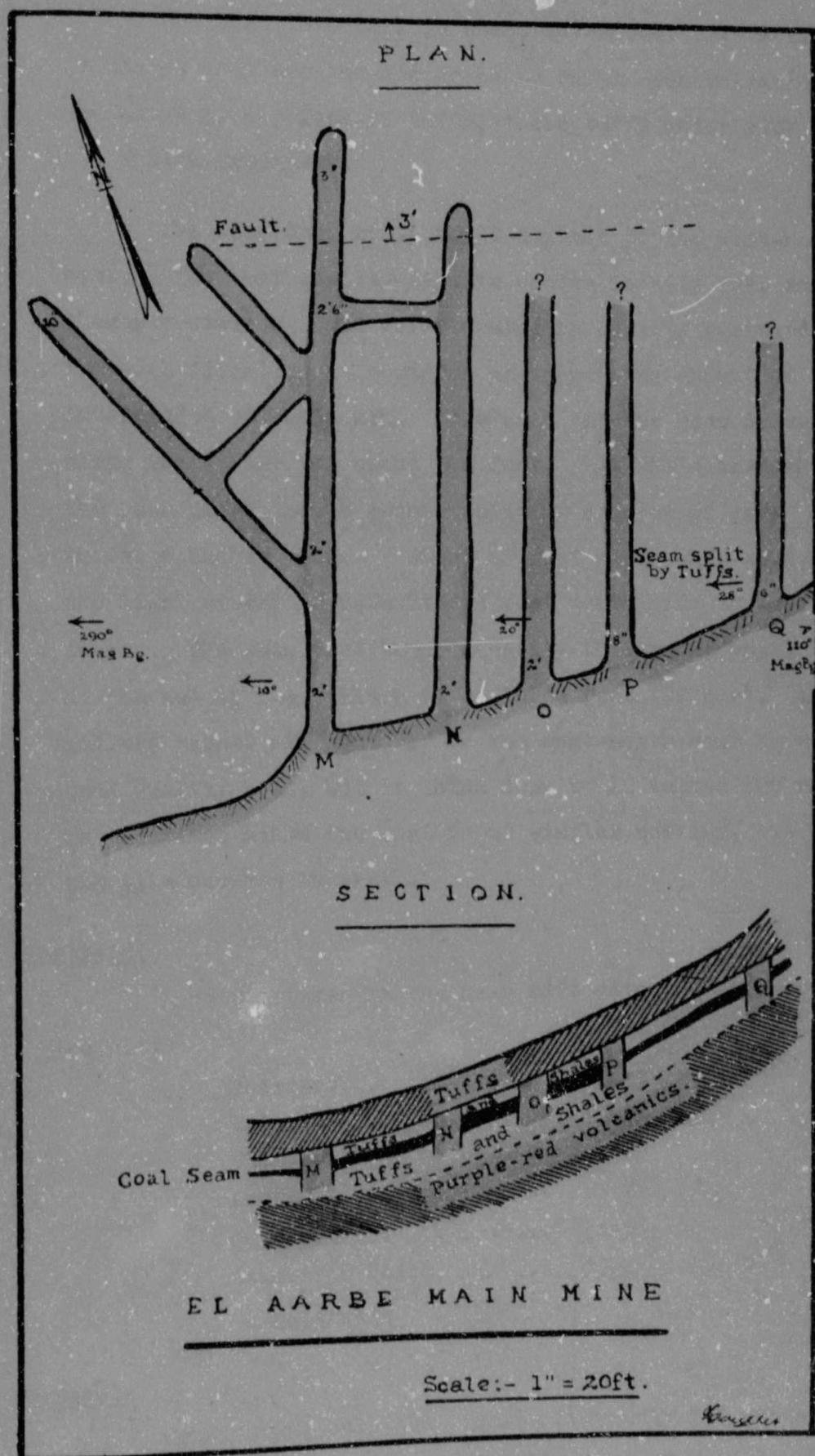
Altogether, the mining operations at these two mines were disappointing. At no time did the combined output of Blaouza and Becharré exceed 10 tons per day. Considering the assistance and materials supplied, this small output was deplorable. No final cost per ton was ever made available, but it can be assumed that such cost was high, as the detachment of military men numbered eighteen. Such assistance as rendered at these two mines could certainly have been better utilised in the Central Lebanon, where the deposits were nearer to the coast, at lower altitudes and workable all the year round. Had such assistance been made available for the working of Merjlaya and Abey Mines, the daily output would have exceeded 60 tons or 18,000 tons per annum.

B.4. EL AARBE MINE. (Map Reference 1697.2614. Fig. 12).

Location.

The village of El Aarbe is situated about 26 miles (42 kms) from Tripoli at an altitude of 3,740 feet (1150 metres). It is reached by a rough track down from Belahiss. About 650 yards (600 metres) down this track, some distance before reaching the village, a small mine is being worked.

FIG. 12.



Nature of the Seam.

The lignite occurs in about seven feet (2.5 metres) of shales that are bounded below by purple-red volcanics, and above by 6.5 feet of tuffs, these tuffs underlying the Nubian Sandstone.

The seam dips at 10 to 30 degrees to the west-north-west. The best quality lignite occurs in adit "M", and thence westwards. It deteriorates in quality eastwards, in which direction it contains an increasing amount of interbedded volcanic ash. The adit "M" has been driven along the strike for about 100 feet. At the entrance the seam is 24 inches thick, split by a layer of grey tuffs, 6 inches thick. About 65 feet along this adit, the lignite seam is upfaulted 3 feet northwards in two steps. The seam continues, steadily thickening until at the end of the gallery it is three feet (90 cms). A gallery turned off adit "M" to the west-north-west shows good quality coal, but it thins down to 10 inches (25 cms). In the other adits the coal is of similar quality, but the seam becomes thinner.

Analysis.

A sample taken in the main adit gave the following result:-

Moisture	3.0%
Volatiles... ..	35.1%
Fixed Carbon	33.2%
Ash.	31.7%
Sulphur.	14.5%
Calorific Value.	9,520. (5290)
B.T.U.s and Cals/kilo	

Comment.

Considering only the lignite from adit "O" westwards, it is possible to say that 550 tons of good

quality coal 24 to 32 inches, (60 - 80 cms) thick, are in sight, and there is a prospect that considerably more will be revealed by development. The coal-bearing and surrounding strata are firm and require little timbering.

About 650 feet (200 metres) down the outcrop of tuffs, towards El Aarbe, 5 adits extending over 80 feet (25 metres) have been driven in distances of 25 feet, tracing a seam of lignite 4 to 8 inches (10 - 20 cms) thick. A sample of this seam gave:-

Moisture	3.0%	
Volatiles... ..	28.0%	
Fixed Carbon	33.5%	
Ash.	38.5%	
Sulphur.	18.4%	
Calorific Value.	<u>8,170.</u>	(4540)
B.T.U.s and Cals/kilo.		

B.5. BELAHISS MINE. (Map Reference 1706.2612)

Location.

Belahiss village lies on a rough road passable to motor transport, that branches southwards off the Ehdene-Tripoli road (Fig. 4). A few hundred yards south-east of the village, at an altitude of 4390 feet (1350 metres) there exists a carbonaceous outcrop.

Nature of the Seam.

The coal appears as fragments in a carbonaceous mudstone or tuff, which has no sign of bedding planes beyond an orientation of the carbonaceous fragments, which contain evidences of wood. The matrix weathers grey, leaving the coal fragments as blotches or speckles of black.

The carbonaceous, which is at least 36 inches thick, lies below some 30 feet of tuffs, and outcrops for 230 feet (70 metres) along the road side. The beds strike north-north-east - south-south-west, and dip approximately 10 degrees to the west-north-west.

The bed has been worked, apparently by quarrying rather than by mining.

Analysis.

The following results were obtained from a sample:-

Moisture	3.0%
Volatiles... ..	30.7%
Fixed Carbon	12.9%
Ash.	56.4%
Sulphur.	2.3%
Calorific Value.	4,910. (2730)
B.T.U.s and Cals/kilo.	

B.6. HADET MINE. (Map Reference 1686.2535 and 1686.2542: Fig. 13).

Location.

This area, which will be dealt with in two portions, (a) Upper and (b) Lower, lies about 2.25 miles (3.5 kms) south of Hadet village, at altitudes of 5525 to 5850 feet (1700 - 1800 metres). Hadet is situated 25 miles (40 kms) from Tripoli, on the Tripoli - Becharré road. The area is reached by taking the rough road towards El Mrouj for 1.25 miles (2kms) and then the footpath running south up the mountain side to the lignite workings.

Nature of the Seam.

The coal lies in shales at the top of the purple-red volcanics, and below the Nubian Sandstone, in a place where these outcrop at the termination of an arch whose axis slopes steeply from east to west. The steep

FIG. 13.

SKETCH PLAN OF LIGNITE

OCCURRENCE AT HADET.

Scale 1 : 500

Plan



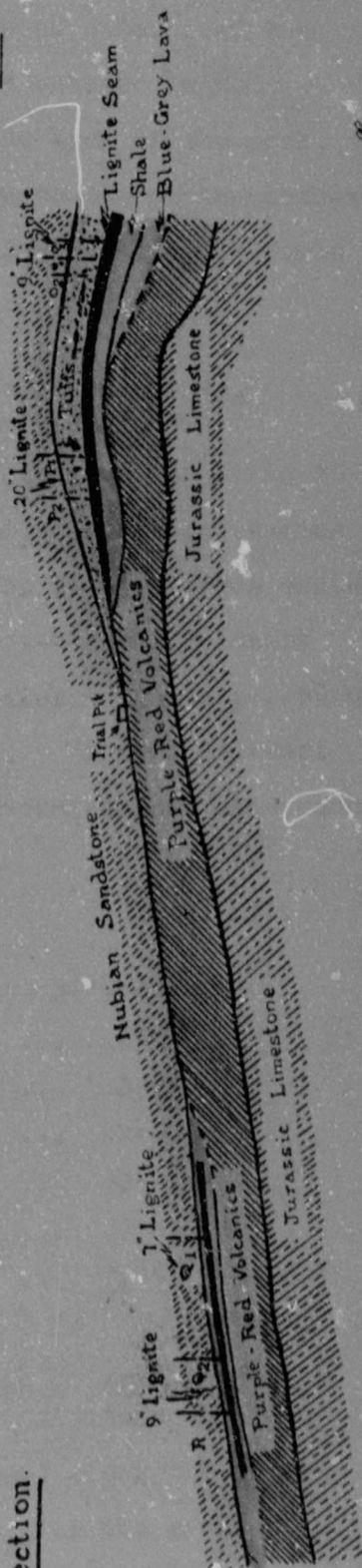
Lower Workings

Upper Workings

NNW.

SSE.

Section.



Longue

Author Coulter J

Name of thesis The occurrence and exploitation of lignite in the Lebanon 1944

PUBLISHER:

University of the Witwatersrand, Johannesburg

©2013

LEGAL NOTICES:

Copyright Notice: All materials on the University of the Witwatersrand, Johannesburg Library website are protected by South African copyright law and may not be distributed, transmitted, displayed, or otherwise published in any format, without the prior written permission of the copyright owner.

Disclaimer and Terms of Use: Provided that you maintain all copyright and other notices contained therein, you may download material (one machine readable copy and one print copy per page) for your personal and/or educational non-commercial use only.

The University of the Witwatersrand, Johannesburg, is not responsible for any errors or omissions and excludes any and all liability for any errors in or omissions from the information on the Library website.