

Outline of the Geology of Syria and the Lebanon.

It is divided into three stages:- Autunien, Saxonian and Thuringian.

2. Secondary Era. (Encroachment of the Sea)

During the second and up to the end of the third epoch, the sea covered almost all the area of the present structure of the Lebanon. In this period, the atmosphere, containing less carbonic acid, produced a more widely varied vegetation, and ammonites, reptiles as well as mammals of the lower orders made their appearance. This period ^{followed} is by a great extension of the Jurassic, which forms the skeleton of the mountain masses; the Lebanon and the Anti-Lebanon.

The Cretaceous, at the close of which an immersion of the land took place, extended largely over the Lebanon. In the limestone of the region, remarkable fauna have been discovered, and fifty varieties of fossilised fish have been counted.

In Syria, the invasion of the Mediterranean during the second epoch, has resulted in a covering of ancient marine sediment, such as limestone, chalk, clay and sand. This epoch is also marked by the large extension of the Jurassic, which forms the framework of the mountain massifs of the coastal region, Djebels Akraa and Noucairie.

3. Tertiary Era.

Under an atmosphere comparable with that of present times and a climate warm and humid, vegetation developed, birds, mammals and molluscs multiplied.

Outline of the Geology of Syria and the Lebanon.

From the geographical point of view, the movement which formed the Mediterranean depression had consequences which led to two formations, the one the result of the other.

(a) Formation of Folds:

The fold formations of the third epoch first affected the northern region over the area of marine beds of which the deposits and sediments suffered an upward movement, giving rise to the mountain chains. These chains were formed on the edge of the former plateau. The mass of the plateau underwent a vertical movement accompanied by volcanic eruptions. A part of these chains in the north is connected with the Taurus and consequently with the mountain system which reaches to Central Asia from the Egee of Karakorum. The folding affected, in the second place, the platform itself. The folds, separated by depressions and cracks, formed the great mountain masses with their ledges and crests.

(b) Beds and Breaks.

The breaks took place after the folding and rising of the mountain massifs, resulting in volcanic phenomena with discharge of lava. The sinking of the depressions bordering the bed of the Red Sea resulted from the subsidence of the Earth's surface, which in addition, produced at this time the Dead Sea, which forms the deepest inland bed in the world (1,280 feet below the Mediterranean); the bed of the Jordan, which has its source in the Bekaa depression, the gulfs of Akaba (Ataka) and Suez to the north of the Red Sea, and finally Lake Tanganyka in Africa. This was the period during which the formation of the continent of Asia was commenced, but it did not take its final form until the fourth era. The movements affecting the shores of the Mediterranean were responsible for the formation in Europe of the Pyrenees, the Alps and Jura, and for the present

construction seen in Syria.

4. Quaternary Era.

This period effected the present formation of the Earth, and like the remainder of the continent of Asia, the Lebanon assumed its present form. During this era rains, rivers and disintegration helped to form the present contours of the country. The rivers brought down considerable quantities of alluvial matter which settled upon the shallow areas of the plains and gave them their fertility. The period is remarkable above all for the development of human life, and particularly by the evolution of man in the sphere of civilisation.

To-day the Lebanon has no glaciers, but R.P. Zuooffen in his "Geologie du Liban", states that in the fourth epoch, it seems "that glaciers formed in the higher reaches, and descended to a greater or less degree into the valleys". Moraines and glacial remains have been reported by the majority of explorers, notably Hooker, Fraas, Lartet, Thomson, Hull and Dienar. The writers are in agreement, in that they consider the embankments on which the forests of The Cedars are found, to be the frontal moraine of an old glacier.

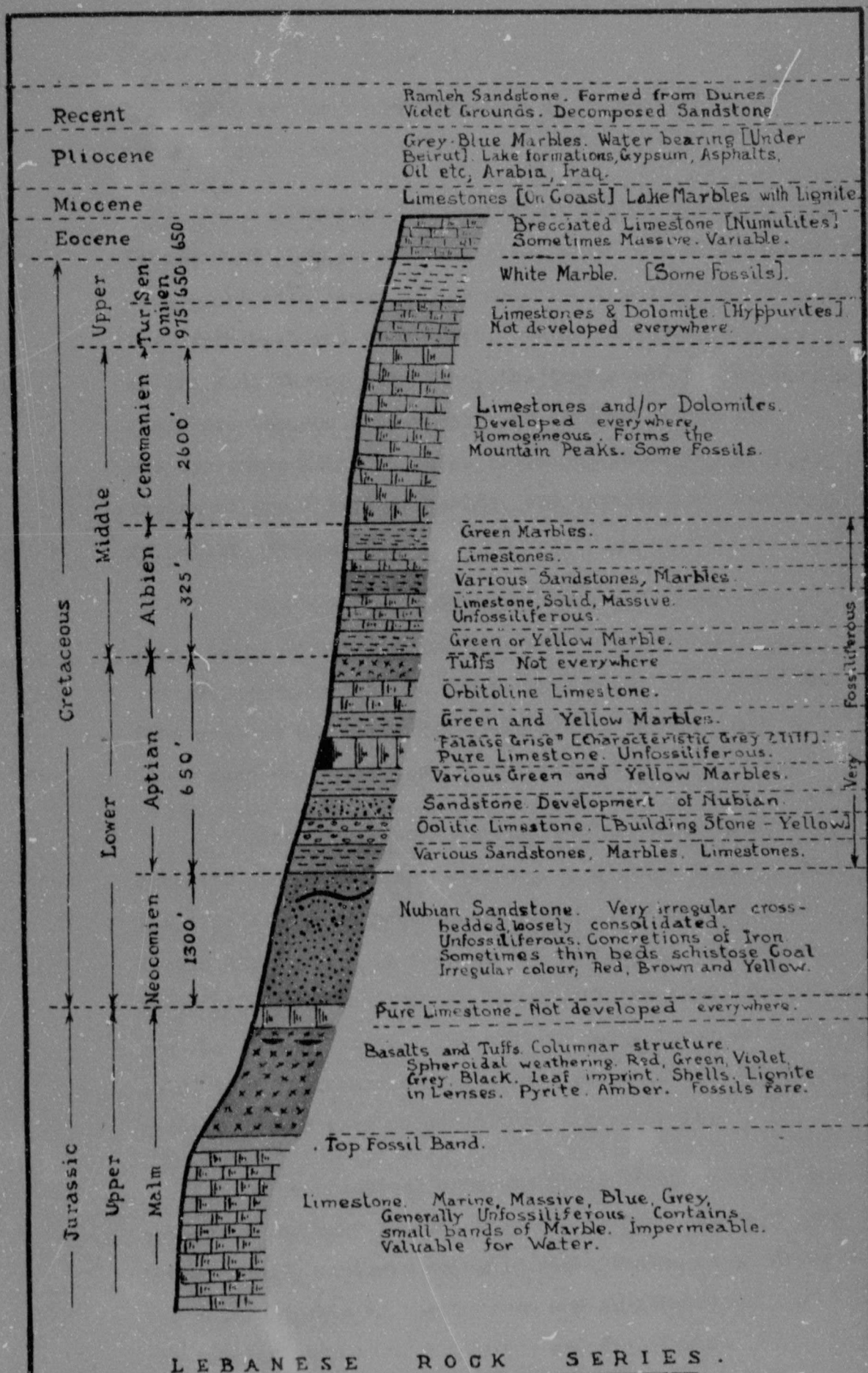
"The course of the Nahr Kadischa is in the shape of a horseshoe with the ends slightly opened. These large banks, the surface of which is slightly undulating and covered with a large number of hillocks irregularly distributed, were not formed by the erosive action of water. They are formed of sandstone and limestone blocks of all sizes, scattered in disorder; the sharpness of the angles and the ridges leads to the belief in the pursuance of a frontal moraine, although there is no evidence of glaciated rocks or striated stones. It is probable, though not

Outline of the Geology of Syria and the Lebanon.

certain, that the area of the Cedars was at the fourth era, occupied by a glacier. A large part of this moraine has been taken up by erosion, and carried by the Nahr Kadischa into the plain of the Akoura region, where it has formed a deep layer of shingle conglomerate, which covers the plain on each bank of the river."

The Rocks of Syria and their Nature.

The rocks and soils of this country are composed of different types, which vary according to their relief and their geological construction, and upon these are founded the great agricultural richness of the territory. Syria is marked by eruptive formations which cover an area of 12,740 square miles (33,000 sq. kms) approximately. Basalt makes its appearance to the south of Chamieh, where there exists vast regions of basaltic lava, and in the Homs - Tripoli gap. To the west of Djebel Druze, which is the principal massive of the area, can be seen the basaltic plateau of the Hauren and its surroundings. In addition, the Sedimentary rocks are distinguished for their variety. There also exist certain regions remarkable for their surface covering of muds, making possible the rich agricultural production which has attracted and held the attention of man. Alluvial soils, most of which are fertile, cover many plains which were formerly occupied by lakes.



Rougher.

Outline of the Geology of Syria and the Lebanon.

A brief resumé of an Extract by M. Louis Dubertret from *Revue de Geographic Physique et de Geologie Dynamique*, Paris, states inter alia -

A glance at the Geological Map of Syria and the Lebanon and of adjacent countries, shows the existence of a vast continental area of homogeneous structure, touching in the north-west and north-east, two mountainous zones of entirely different structure, the Taurus and the Kurdistan. Elsewhere the continental area is affected along the Mediterranean coast by large fractures belonging to the system of great African faults, and between them rise horsts or appear "trenches".

The tabular continental area is constituted principally of Upper Cretaceous and Tertiary sediments. Its average height is in the neighbourhood of 1,300 feet (400 mts) in the north and rises slowly to the south to 1,950 feet and 2,600 feet (600 - 800 metres).

The mountainous coastal region, with large Jurassic and Cenomanian outcrops, is divided into two by the line extending north up to Beirut, the Dead Sea and Jordan "trench". In the eastern part great horsts rise, the Kizil Dag, the Amanus, the Djebel Ansariye, the Lebanon and the Anti-Lebanon. The western part, lower and tabular, is divided by numerous fractures; the mountains of Judea, however, again seem to constitute a great unit.

The principal orogenic phase of the coastal region appears to be very recent, Pliocene or Quaternary. The Druze massif, entirely volcanic, is situated at an angle to the double system of the Lebanon and Anti-Lebanon, and the tabular regions of Palestine and Transjordan.

Outline of the Geology of Syria and Lebanon.

Its genesis is connected with the N.N.W. - S.S.E. fractures previous to the last great dislocations. The Palmyrian fold, developed on the edge of the Anti-Lebanon and pinched on the south by basaltic emplacements, only seems to have a restricted character.

The Mediterranean Coastal Zone.

The most northerly of the Syrian mountain masses is comprised of three principal ranges, Giaour Dagh, Amanus and Kizil Dagh; they are separated by the depressions of Bagtache and Beylan. These two passes are the only means of communication from one side of the mountain range to the other. To the north-west of this extend the plains of Cilicia and the flat gulf of Alexandretta. To the south-east is a deep marshy valley, containing Lake Amouh and Lake Antioche. This valley rises slowly from Souidie to Ishlahie where it attains a height of 1,625 feet (500 metres), afterwards sinking again towards Harach. Thus, surrounded by low zones, Kizil Dagh and Giaour Dagh appear as raised walls bounded by abrupt sides. All these masses are covered with dense and varied forest, but they are sparsely inhabited. The villages are situated at the foot of the two slopes and in the neighbourhood of Beylan and Bagtache.

To the east and south-east of the valley of Lake Antioche, extends a low mountain zone 12.5 to 32 miles (20 - 50 kms) long, much lower than the former, and of which certain portions resemble the mountain arc of which Amanus and Kizil Dagh form a part, whilst others present an arid landscape of calcareous and marlaceous sub-soil, so characteristic of Syria.

Kurd Dagh is a country of small hills, calcareous and marlaceous, circled by the Nahr Afrine (Nahr River). The calcareous plateau on the left bank of the Afrine rises and becomes more prominent towards the south; meridional faults divide it into zones of unequal height; then this landscape of marked features disappears suddenly on approaching the Oronte.

Beyond Oronte extends Kosier, a country in general marlaceous and rather arid; sometimes calcareous and of tabular structure. It abuts in the west against a very mountainous region, which begins at Antioche and develops towards the south-west constantly overhanging the valley of the Oronte, ending against a sharp calcareous mass situated opposite the bank, Djebel Akra. To the south of Djebel Akra reappears a dark country covered with forests, similar to that of Kizil Dagh. The country takes in Bau and Bassit and tapers to a point in the neighbourhood of Lattakia. It is bounded along the east by the Kosier, a country of marls, which occupy the valley of Nahr-el-Kebir.

A major mass, Djebel Ansariye, follows the coast in a north-south direction from Lattakia to Tripoli, 19 to 23 miles (30 - 35 kms) wide, it rises slowly from west to east, and culminates at 5,100 feet (1,568 metres) in a crest orientated meridionally, and then falls in abrupt slopes on to a very low country.

The northern part, 650 feet (200 metres) in height is the Ghab swamp, which drains the Oronte and which continues to the east up to the foot of the escarpments at the west end of Djebel Zaviye, 3,000 feet (930 metres), a gently arched and faulted table.

In the south part of Djebel Ansariye, the falling again towards the east is less important and less sudden. The peaks are only 3,575 to 4,550 feet (1,100 - 1,400 metres), whilst the plains are 1,575 feet (500 metres), and eastwards at Hama are about 975 feet (300 metres). Around the country at Homs there exists a collection of ashes and lavas. These same lavas soften at the south end of Djebel Ansariye, the limit of which is marked by the Homs - Tripoli gap.

The Lebanon and the Anti-Lebanon.

To the south of the Homs - Tripoli Pass, rises the Lebanon and the Anti-Lebanon, twin masses similar to Djebel Ansariye. They are separated by a slight valley, the Bekaa. This double mountain range, oriented N.N.E. - S.S.W. starts to rise from a line normal to this direction and disappears to the south along a meridinal line which prolongs the Jordan valley towards the north and passes through Beirut. The zone included between these two lines presents homogeneous and very characteristic features. Southern Lebanon, situated on the other side of the meridian, on the other hand, belongs to the orographical system of Palestine.

The portion of the Lebanon situated to the east of the meridian is formed principally by a high mass, laying in N.N.E. - S.S.W direction, 12.5 to 15 miles wide (20 - 26 kms) tabular, 3,250 to 4,875 feet (1000 to 1500 metres) mean height, and which is flanked on all sides by abrupt slopes. On this mass are found the remains of a vast upland; to the north, the Kornet-es-Saouda plateau - 10,040 feet (3089 metres) in the Central Lebanon, the Sannine - 8,540 feet (2628 metres)

This high mass is bounded to the west in its north portion, and to the east in its south portion, by the two ridges of Djebel Djedj and Djebel Barauk; to the north it ends in an ellipse; to the south it is cut by the Jordan meridian. Its west border is enveloped from the plains of Akkar to Jbail by a zone of small hills; from Jbail to Beirut it touches the sea.

To the east of the Lebanon massif the Bekaa starts, included between two zones of remnants rapidly diverging towards the north, so that it does not measure more than 3 miles (5 kms) in width at its southern extremity, whilst it attains 15.5 miles (25 kms) at Hermal. The Bekaa culminates at about 3,575 feet (1100 metres) to the north-west of Baalbek; it drops slightly on both sides; to the north it joins the Homs plain, 1,625 feet (500 metres), and forms towards the south, the rich basin of Bekaa - 2,600 feet (800 metres), which was a lake. At its southern extremity the Bekaa is enclosed by stony hills.

The Anti-Lebanon is, like the Lebanon, a very high and elongated mass, 105 miles (170 kms) long and 12.5 to 15 miles (20 to 26 kms) wide. It is orientated nearly north-east - south-west, thus making with the Lebanon an angle of approximately 7 degrees. It is divided into two halves approximately equal, by a line of fractures which cross it obliquely, nearly parallel to the Lebanon. The west half is formed principally by the Herman massif which rises from the Houle depression, plus 6.5 feet (2 metres), and forms an immense arch - 9,150 feet (2814 metres), fissured and faulted on its western slope. From this stony mass, two branches of similar characteristics are detached towards the north, being little more than 4,875 feet (1500 metres) in height.

This high mass is bounded to the west in its north portion, and to the east in its south portion, by the two ridges of Djebel Djedj and Djebel Barauk; to the north it ends in an ellipse; to the south it is cut by the Jordan meridian. Its west border is enveloped from the plains of Akkar to Jbail by a zone of small hills; from Jbail to Beirut it touches the sea.

To the east of the Lebanon massif the Bekaa starts, included between two zones of remnants rapidly diverging towards the north, so that it does not measure more than 3 miles (5 kms) in width at its southern extremity, whilst it attains 15.5 miles (25 kms) at Hermal. The Bekaa culminates at about 3,575 feet (1100 metres) to the north-west of Baalbek; it drops slightly on both sides; to the north it joins the Homs plain, 1,625 feet (500 metres), and forms towards the south, the rich basin of Bekaa - 2,600 feet (800 metres), which was a lake. At its southern extremity the Bekaa is enclosed by stony hills.

The Anti-Lebanon is, like the Lebanon, a very high and elongated mass, 105 miles (170 kms) long and 12.5 to 15 miles (20 to 26 kms) wide. It is orientated nearly north-east - south-west, thus making with the Lebanon an angle of approximately 7 degrees. It is divided into two halves approximately equal, by a line of fractures which cross it obliquely, nearly parallel to the Lebanon. The west half is formed principally by the Herman massif which rises from the Houle depression, plus 6.5 feet (2 metres), and forms an immense arch - 9,150 feet (2814 metres), fissured and faulted on its western slope. From this stony mass, two branches of similar characteristics are detached towards the north, being little more than 4,875 feet (1500 metres) in height.

The two halves of the Anti-Lebanon are encountered along a zone of broken ground formed by the Zebdani valley, which the Beirut - Damascus Railway follows along two straight ridges which dominate the vicinity. The part of the Anti-Lebanon situated to the east of the Zebdani zone is very slightly broken up, tabular, and about 6,500 feet (2000 metres) average height; it rises up to 8,450 feet (2600 metres) in some crests, then gently sinks and finally the mountain region ceases and gives way to alluvial plains.

Beyond where the double system of the Lebanon and the Anti-Lebanon disappears to the S.S.W., an altogether new country appears where the influence of the two massifs is not apparent. This country, broken by fractures and highly wooded, forms, on the whole, a plateau culminating in the south-east at 3,915 feet (1205 metres). Then it descends and ends in a complicated system of faults at Nazareth, beyond which extends the plains of Esdrelon.

Further south-east the country rises rapidly to form the Judea massif, comparable in size and shape to the Lebanon and Anti-Lebanon. Like the great north massifs, it is formed essentially by a high region, very elongated in comparison to its width, and almost flat. It is orientated N.N.E. - S.S.W. and is flanked by slopes, gentle in the west and steeper in the east. To the south it plunges precipitously under the alluvial plains.

The Judea massif differs essentially from the Lebanon and the Anti-Lebanon by its low altitude 1,950 to 2,275 feet (600 - 700 metres). However, its relief is mountainous due to the proximity of the Dead Sea valley, where the water level is -1280 feet (392 metres) and the bottom -2275 feet (-700 metres). This valley rises towards the north and attains a height of -675 feet (-208 metres) at Tiberias and plus 6.5 feet (2 metres) at Lake Houle.

Outline of the Geology of Syria and the Lebanon.

In Transjordan, a very high mountain region, over 3,250 feet (1000 metres), faces the Judea massif; this is Djebel Adjeloun about which little is known.

The Judea and Djebel Adjeloun brings to an end the orographical system of the Mediterranean coast in the south. This comprises the following great massifs sharing similar characteristics: Amanus Arc, Djebel Ansariye, Lebanon and Anti-Lebanon, Judea massif and the Adjeloun mountains. These massifs are almost always in juxtaposition to deep valleys or to mountain systems less important and of complex structure.

The Chamieh.

By the Chamieh is meant the plains and deserts included between the Mediterranean coastal mountains and the valley of the Euphrates. Their name comes from the capital, Damascus or "Ech Cham", situated on their eastern border.

The northern extremity of the Chamieh tapers to a point between Kurd Dagħ and the Euphrates where it touches a basaltic plateau, Sof Dagħ. This country is calcareous and flat, and its surface cut by wadis. At the latitude of Aleppo it attains 50 miles (80 kms) in width, then it follows a narrow bend along the hills up to the north edge of Djebel Zaviye.

To the south of this calcareous region stretches a chalky country, gently undulating, in the middle of which rises like great blemishes, the basaltic plateau of Djebel Haas and Djebel Chbeit. This vast country, in its western part, resolves into closed basins of which one, to the north of Djebel Haas, contains the salt lake of Djaboul.

Outline of the Geology of Syria and the Lebanon.

It enlarges towards the east and the relief dies out except along the Euphrates valley, where there exists a cliff, sometimes precipitous, approximately 260 to 325 feet (80 - 100 metres) high.

These plains of the Northern Chamieh strike two mountain ranges in the south, about 3,250 feet (1000 metres) high, the principal massifs of which are Djebel Chomariye, Djebel Bilas, Djebel Boueida and Djebel Eichri. To the south, these bulges fall on to vast plains, traversed only by a long ridge which is detached at an angle south-west from Djebel Boueida, passes Djebel Palmyre, and continues as Djebel Charki in the direction of Damascus. Djebel Charki is the south border of a country of linear ridges which extend to the west up to the Anti-Lebanon.

The most southern part of Syria is cut off sharply from all that has been described by its mountainous lavas and volcanoes. The volcanic country of Southern Syria, dark and rocky, covers approximately 12,740 square miles (33,000 sq. kms). In the north it runs along the point of Djebel Charki, the gardens of Damascus and the Herman; it extends to the west beyond the Jordan valley in Galilee, then its edge describes an arc enveloping Djebel Adjeloun.

The most important massif of this vast country, covered with extinct volcanoes, is Djebel Druze, situated near its centre and which culminates in a high plateau, about 5,850 feet (1800 metres) in height, crowned with volcanic cones of which Tel Guine is the highest. The slopes fall erratically on to the plains that they join about 3,250 feet (1,000 mts).

Ledja, the oldest of the Chaaba volcanoes, covers 386 square miles (1,000 sq. kms); a chaotic flow, in the middle of which exists an undisturbed islet. This chaos is brought about by the penetration of one flow under the already solid crust of a previous flow, and the carrying off of this crust.

The Khaa issued from two insignificant craters, against which is built the villages of Rdeme and Charkie. It does not cover more than 58 square miles (150 sq. kms), and its surface, though chaotic, is less so than Ledja.

The Djezireh.

Further east of the Chamieh there extend more plains and deserts, where the great geographical units are less clearly marked. Conforming to local customs as in the case of the Chamieh, the Djezireh is the land between the Euphrates and the Tigris rivers. It is an immense plain formed by steppes in the north and an arid desert in the south. It falls in very gentle slopes towards the south-east to less than 325 feet (100 metres).

In the portion north of Djebel Abdel Aziz, the rain fall is abundant, the country is fertile and the villages numerous. Towards the south it becomes poorer, desert-like and flat with gypsum sub-soil. In the south-east of the Djezireh, this gypsum is covered with alluvium and disappears altogether; the country becomes more and more uniform.

The habitation, which is very large in the Djezireh, and on its border, is fixed almost exclusively along the great rivers, Euphrates, Khabour and Tigris.

The Lebanon - Syrian Horsts.

The zone of the Lebanon-Syrian horsts differs from the vicinity of the Taurus by a greater homogeneity of the facies and by the absence of important tangential deformations. Several large deep fractures (African), divide it into great structural units, very elongated, between which exist important remnants.

The massifs have a Jurassic core covered in places by Lower and Middle Cretaceous; the Tertiary only exists as a thin covering in the high regions and in the depressions.

The North Djebel Ansariye is the most important of these horsts. Djebel Ansariye, which faces the horst of Ansariye, is the edge of a tabular region falling slowly to the east and joins the North Syrian plateau. The Ghab swamp, held between Djebel Ansariye and Djebel Zaviye, corresponds to a typical "trench". The Lebanon and the Anti-Lebanon, constituting the knot of the Levant massifs, are twin horsts of like proportions. The Bekaa depression which they contain, corresponds to a "trench".

The Lebanon horst has a high position marked on its east border by a Jurassic pad, Djebel Djedj, and a very low south portion, tailing to a point by the prolongation to the north of the Jordan line, and dominated by a Jurassic on its east border, Djebel Barouk. The contact of the two regions is revealed by an east-west fault at Beirut. The Lower and Middle Cretaceous mantle, enveloped by a Jurassic core, joins mainly with the low west regions by a zone of strong pendages. To the east, on the contrary, a large vertical fault, which prolongs the South Djebel Ansariye, establishes a clear discontinuity of beds.

The Anti-Lebanon is divided into two by the Zebdani fissure which crosses it obliquely. The lower east part is Cenomanian, except the line of contact with the west part, which describes a Jurassic crest over Sergaya. The west part of the Anti-Lebanon, mainly Jurassic, rises in the Herman in a strong fault which gives the impression of a fold in depth rather than a horst. To the east of the Anti-Lebanon a large fissure, similar to that of the east watershed of the Lebanon, does not exist. In places the Cretaceous joins with the low regions, and only in the Herman region do any important remnants exist. The Bekaa, contained between the great east fault of the Lebanon and the zone of strong pendages on the west edge of the Anti-Lebanon, is in fact a "trench", but at first gives the impression of a large synclinal depression.

—oOo—
oOo



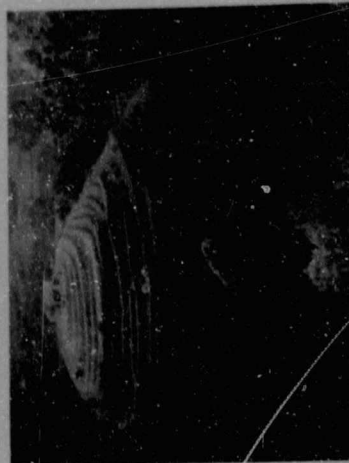
Blawya District.
Overlooking the Qadicha gorge.
Typical mountain scene. A Roman
Catholic church is built on an
apparently inaccessible spot.



Blawya District.
Near the top of the
Qadicha gorge between Blawya
and Achani.



Myrauba District.
Camels brought in from the
mountains being crushed, cones
and quarried in the main road
through Myrauba village.



Myrauba District.
On the road from Djamal to
Myrauba. Altitude 2000 ft. Type
of formation not unusual in the
Lebanon. "Ymacing" is also depicted.

SECTION III.

EARLY HISTORY OF LEBANESE LIGNITE.

III. EARLY HISTORY OF LEBANESE LIGNITE.

Lignite may be defined as an immature form of coal sometimes known as brown coal. Lignites are mostly light, friable and porous, showing their vegetable origin by the retention of the woody structure, or sometimes also of the shape of leaves, stems and pieces of bark. In burning they give out much smoke, comparatively little heat, and a somewhat unpleasant odour. Chemically they represent an intermediate stage between wood and coal.

Nearly all lignites are of recent geological age as compared with coals, though they may be converted into coal by the heat of igneous masses, or by pressure and earth movement.

Only small quantities occur in the British Isles, but it is an important fuel in many European countries, especially Germany, where it occurs in beds of considerable thickness. It is also found in Australia. Lignite contains about 45 per cent of volatile matter, and is mainly used as a fuel in the form of briquettes.

Referring to the statement that the lignites may be converted into coal by the heat of igneous masses or by pressure and earth movement, this would appear to be the case in many of the deposits in the Lebanon, as analysis will show. The term Lignite, therefore, as applied to this treatise, is not always strictly correct, as the lignite in the Lebanon often merges into sub-bituminous coal.

The occurrence of lignite in the Lebanon has been known for many years, but few records of any exploitation in those early times are available. Any technical publications dealing with this country are by French or German writers and the subject of Lignite is passed over in a few sentences. R.P. Zumoffen in his book, "Geologie du Liban", makes reference to lignite exploitation in the early part of the nineteenth century, and it was during this period that the first recorded exploitation was made. This, to a great extent, was due to the Industrial Revolution which made for an intensification of European trade with the Orient, and a vast rise in Western efficiency.

The first country to strive after Western efficiency was Egypt, under its great Viceroy, Mehmet Aly. The smelting of iron ore was carried out by the Egyptians as far back as 4000 B.C. During Mehmet Aly's regime, however, iron ore was in great demand for the manufacture of weapons for the Viceroy's armies, commanded by his son General d'Ibrahim Pasha. Mehmet Aly evolved ideas for erecting blast furnaces at Cairo, and proposed to use iron ore from Merdchibah in the Lebanon, and to smelt by using coal imported from England.

Mehmet Aly, then imported an Austrian engineer, one Russeger, to take control of the iron industry in his Empire. Russeger erected ovens for the purpose of smelting the ore, but the importation of coal from England was soon found to be too expensive, and it was decided to mine lignite in the Lebanon and to transport it to Cairo, for the supply of the blast furnaces.

Early History of Lebanese Lignite.

Exploitation was commenced in 1835 at Arsoun, Mar Hanna-el-Kniese, (Ras-el-Harf), and Bzebdine. An English engineer, Brattles, was imported to manage the exploitation. Some 40 to 50 workmen were employed and the daily output was about 10 tons. The mined lignite was transported to Beirut by donkey, and then shipped in sailing vessels to Egypt.

In 1838, Brattels was recalled to Cairo to take over the management of the iron smelting. In the meantime the mining of the lignite was under no supervision. Ibrahim Pasha ordered the Turkish District Officer to supervise the work, but the output dropped considerably. This officer, intimidated by threats from Ibrahim Pasha, decided to pay a personal visit into one of the mines. Inside the mine he found that supporting pillars had been left, and thinking that the labourers had overlooked these, he ordered their extraction. On this being done, the galleries soon collapsed and eventually spontaneous combustion took place. The mines were then abandoned.

Little further exploitation took place until the Great War of 1914 - 1918. During this period the Germans found themselves short of coal and commenced working the deposits for use on the railways. The most important deposits worked were at Abey, Aaramoun, Arsoun, Ras-el-Harf, Bzebdine and Djezzine, the total output being 100 tons per day. The labour for these mines was conscripted locally, and there are many tales of the cruelty and harsh treatment meted out to these labourers by the Turks and the Germans.

At the conclusion of the Great War the interest in lignite again dropped off, and the necessary amount of better quality coal was imported from Great Britain and India.

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.