

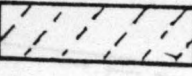
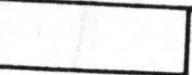
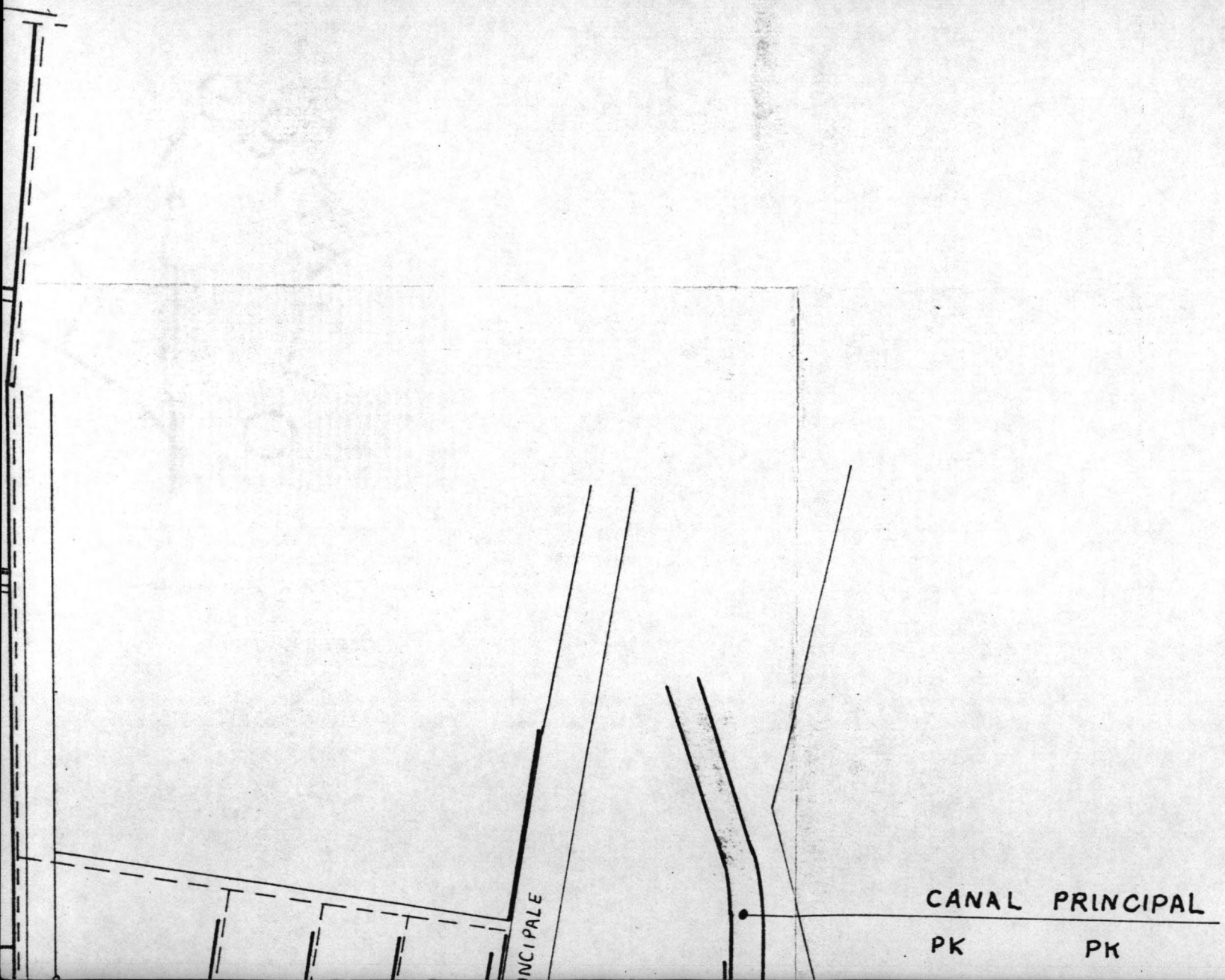





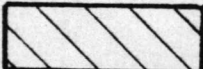
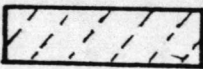

-  Bananes
-  Bananes + Agrumes
-  Cultures maraicheres
-  Agrumes

SECTEUR TEST DE ITANIEH / *Qasmieh* /

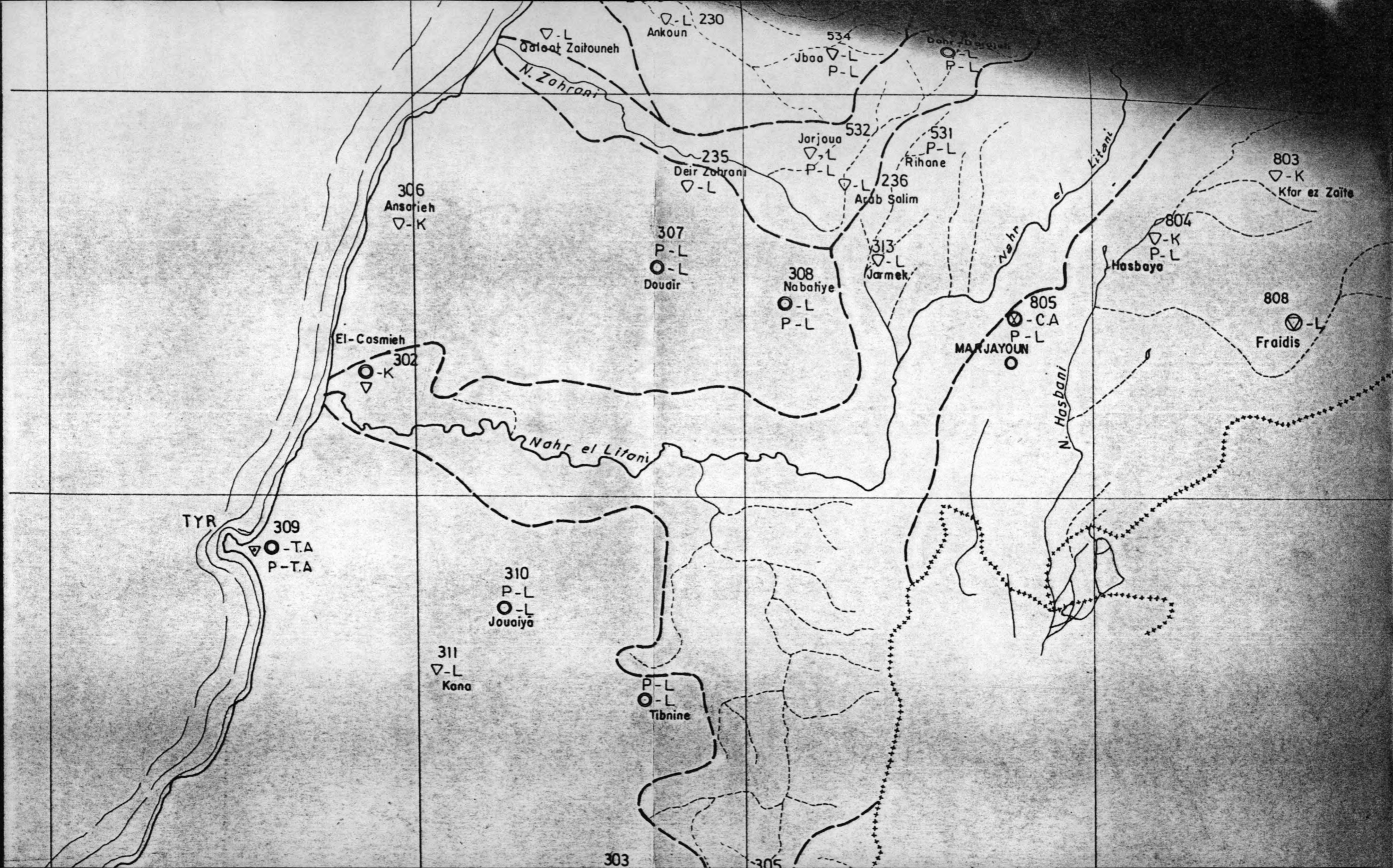
PLAN DU RESEAU D'IRRIGATION EXISTANT

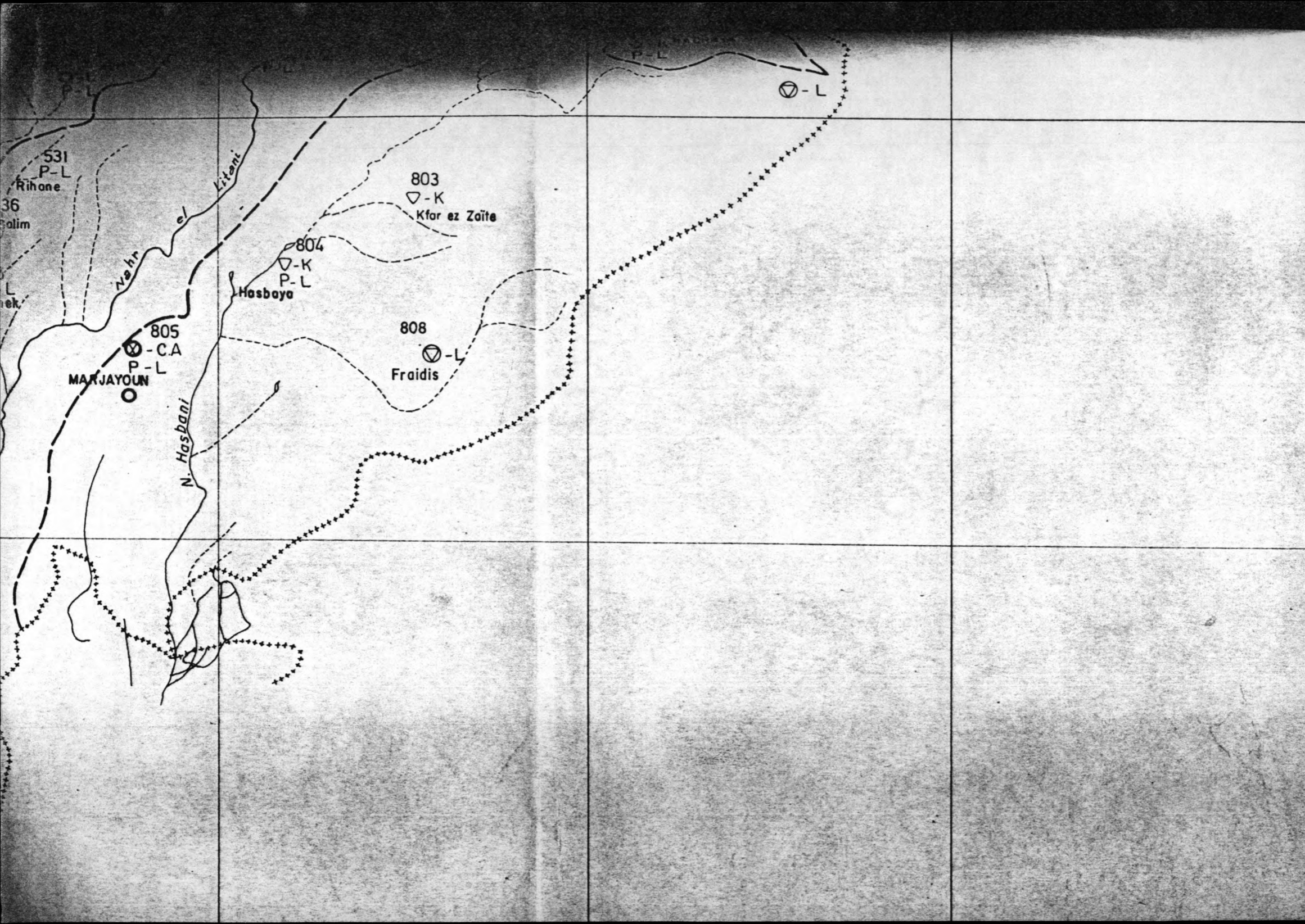


43 N° Cadastrale Parcelle

- Canal secondaire, tertiaire, etc...
- - - - - Drain
-  Bonanes
-  Bonanes + Agrumes
-  Cultures maraicheres
-  Agrumes

CANAL PRINCIPAL
PK PK





T.A : Station
 Pr. : Station
 A.U.B. : Station
 -----: Limite

BEYRO

1- A.U.

2- Ins

3- St.

4- No

5- Ae

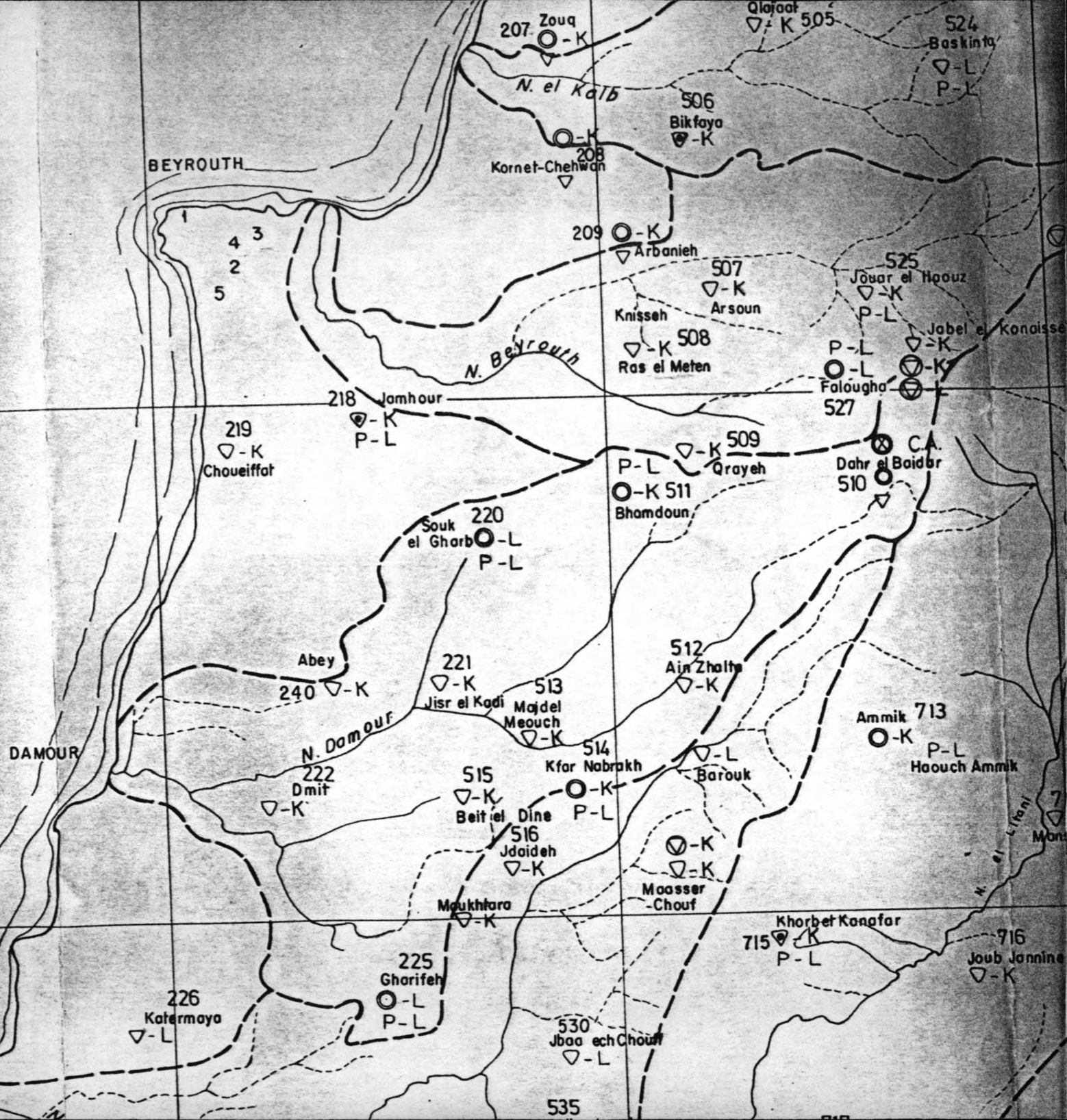
T.A Stations installées par l'Institut des Recherches Agronomiques à Tell-Amara
 Pr. : Stations privées
 A.U.B. : Stations installées par l'Université Americaine de Beyrouth
 ---: Limites des B.V.

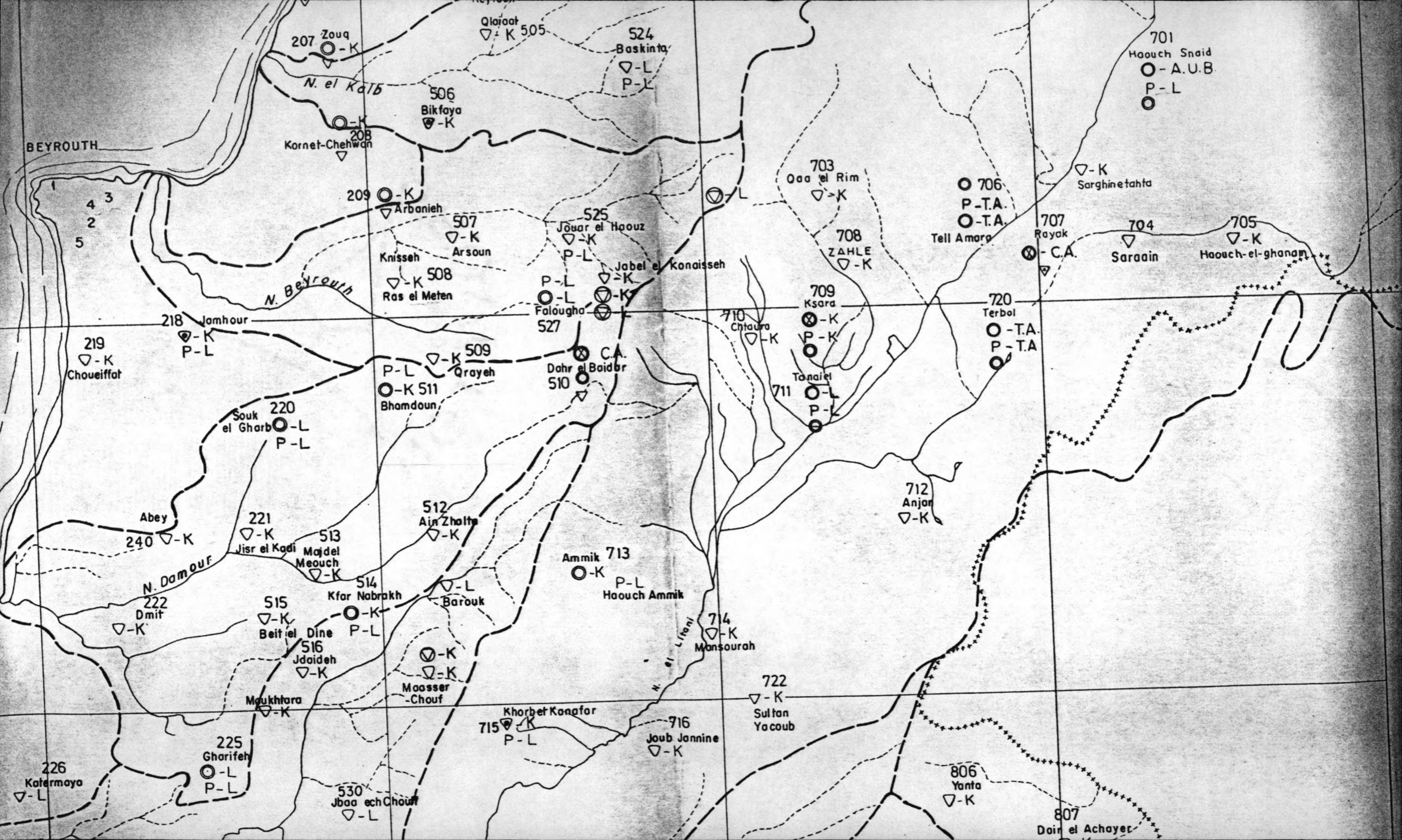
BEYROUTH

- 1 - A.U.B. : ○ - A.U.B. 211
- 2 - Institut de geographie P - Pr. ○ 238
- 3 - St. Joseph : P - Pr. 213
- 4 - Nazareth : ⊙ --K 214
- 5 - Aeroport ⊗ - C.A. 216

222 : Numero de la station

REPUBLIQUE LIBANAISE OFFICE NATIONAL DU LITANI	PROJET DE DEVELOPPEMENT HYDRO - AGRICOLE DU SUD DU LIBAN	P R O G R A M M E DES NATIONS - UNIES POUR LE DEVELOPPEMENT F A O
--	--	--





BEYROUTH

207 Zouq
○-K

Qlaraqat
▽-K 505

524 Baskinta
▽-L
P-K

701 Haouch Snaid
○-A.U.B.
P-L
○

N. el Kab
208 Kornet-Chehwan
▽-K

506 Bikfaya
▽-K

703 Oaa el Rim
▽-K

706 Tell Amara
○-T.A.
○-T.A.

▽-K Sarghinetakta

209 Arbanieh
▽-K

507 Knisseh
▽-K

525 Jouar el Haouz
▽-K
P-L

708 ZAHLE
▽-K

707 Rayak
○-C.A.

704 Saraain
▽-K

705 Haouch-el-ghanam
▽-K

508 Ras el Meten
▽-K

Jabel el Konaisseh
▽-K

709 Ksara
○-K
P-K

720 Terbol
○-T.A.
P-T.A.

218 Jamhour
▽-K
P-L

527 Falougha
○-L
○-K

710 Chtaura
▽-K

219 Choueiffat
▽-K

509 Qrayeh
▽-K
○-K 511 Bhamdoun

510 Dahr el Baidar
○-K
C.A.

711 Tanaiel
○-L
P-K

220 Souk el Gharb
○-L
P-L

512 Ain Zhalta
▽-K

713 Ammik
○-K
P-L
Haouch Ammik

712 Anjar
▽-K

240 Abey
▽-K

221 Jisr el Kadi
▽-K

513 Majdel Meouch
▽-K

514 Kfar Nabrakh
○-K
P-L

Barouk
▽-L

N. Damour

222 Dmit
▽-K

515 Beit el Dine
▽-K

516 Jdaideh
▽-K

Maasser-Chouf
▽-K
▽-K

714 Mansourah
▽-K

Moukhtara
▽-K

715 Khorbet Kaqfor
▽-K
P-L

722 Sultan Yaoub
▽-K

226 Kafermaya
▽-L

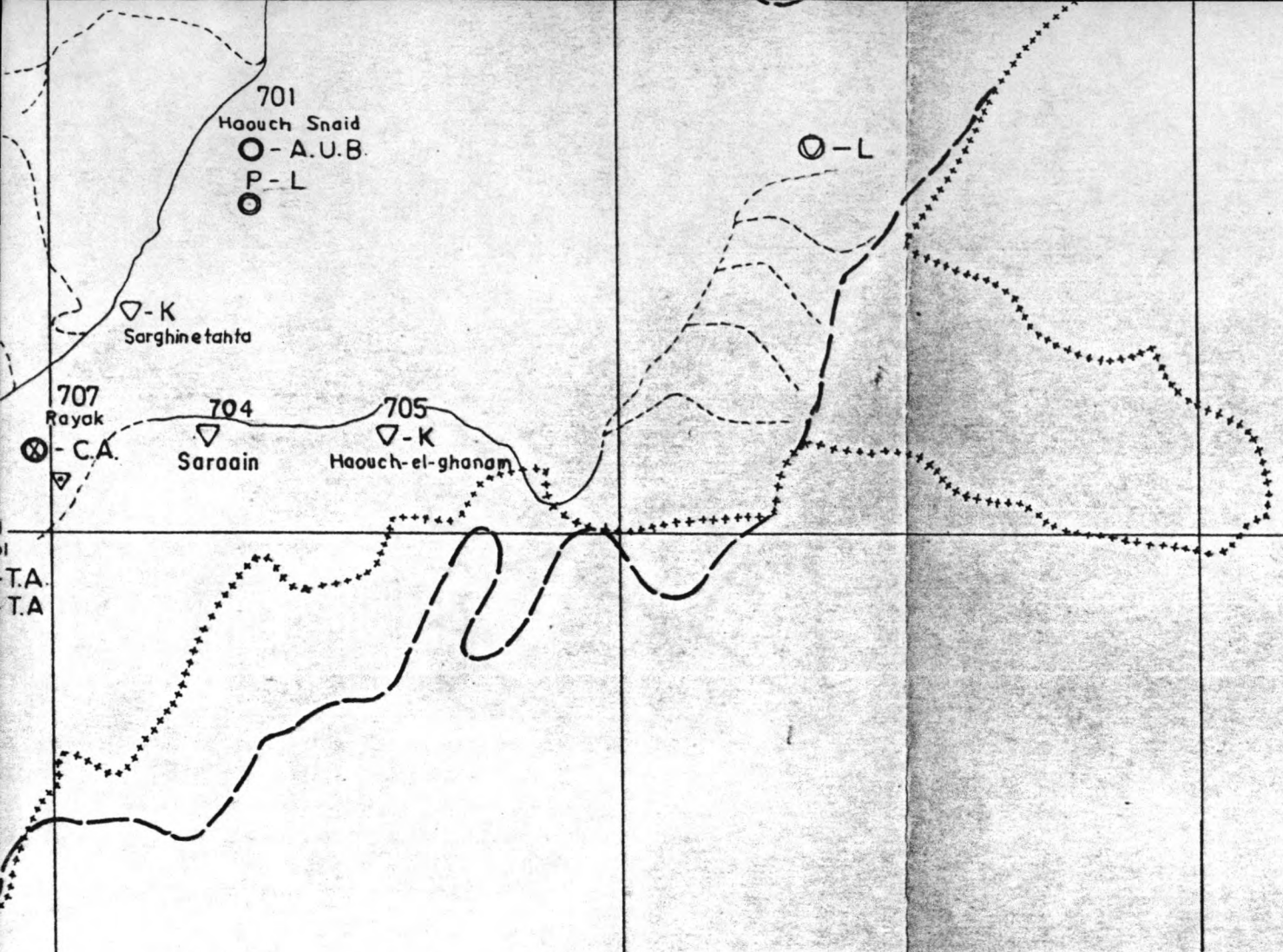
225 Gharifeh
○-L
P-L

530 Jbaa ech Chouf
▽-L

716 Joub Jannine
▽-K

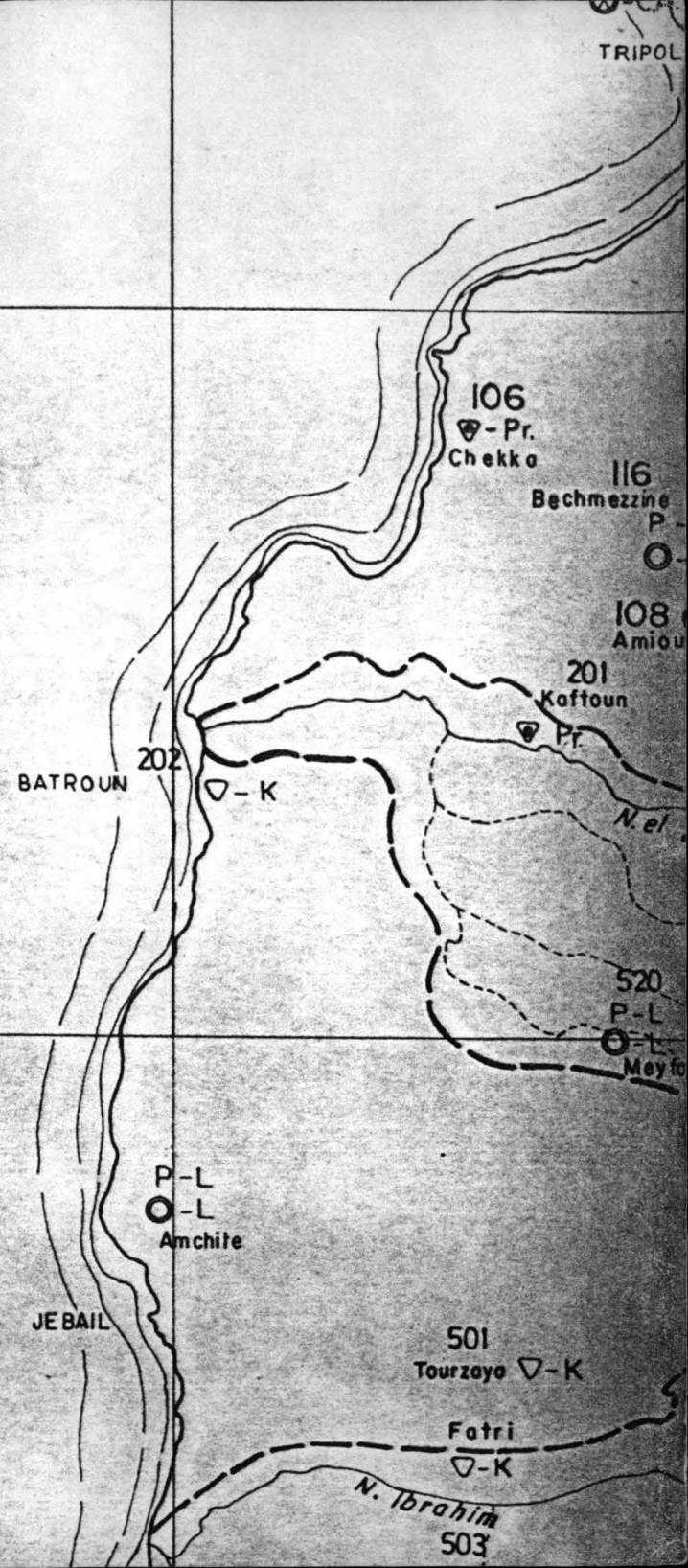
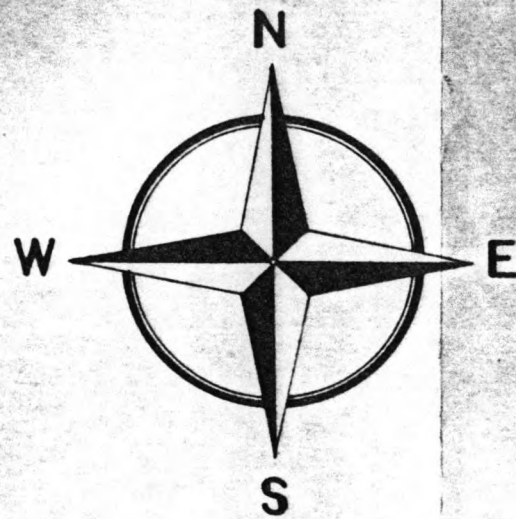
806 Yanta
▽-K

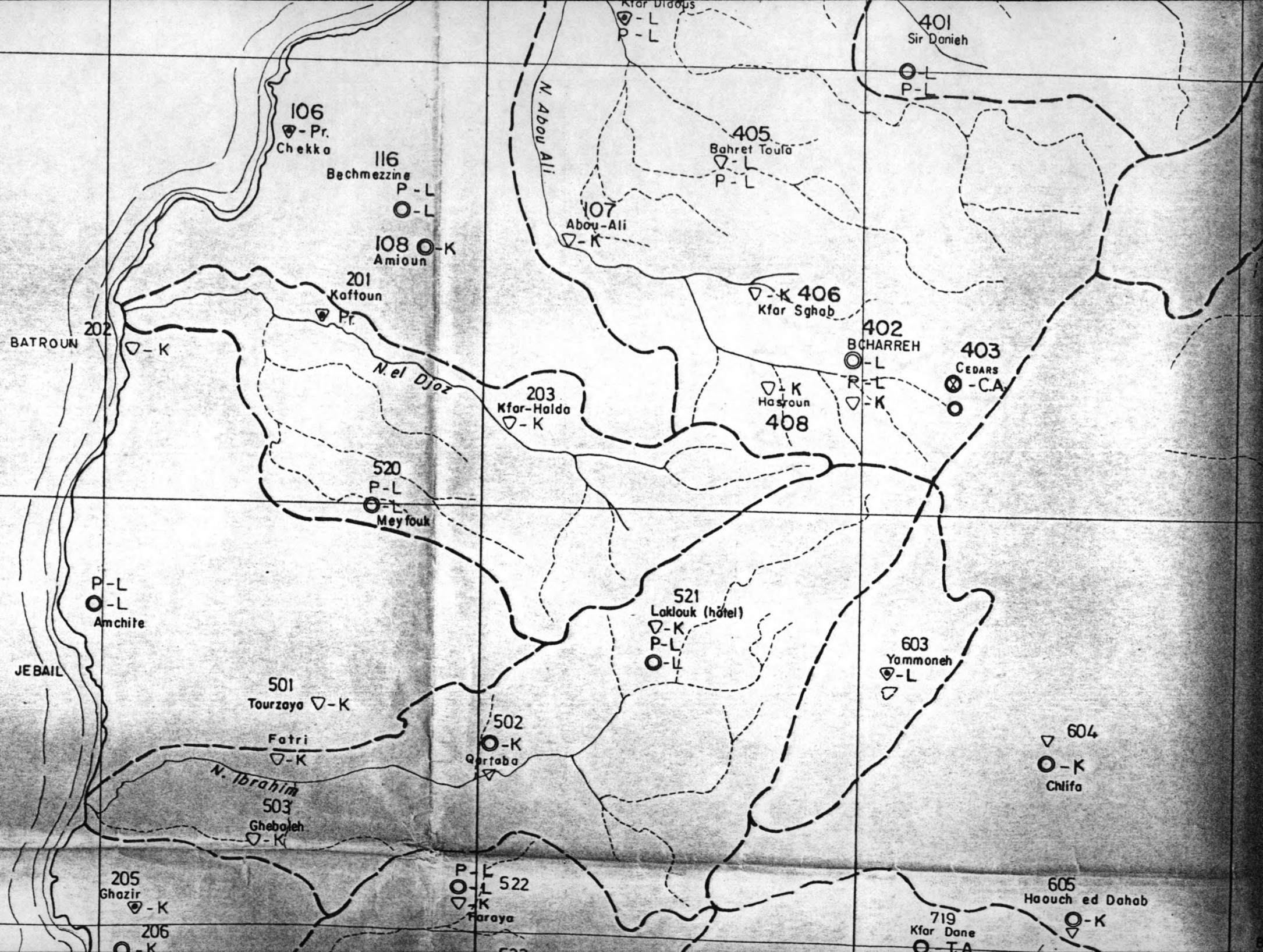
807 Dair el Achayer

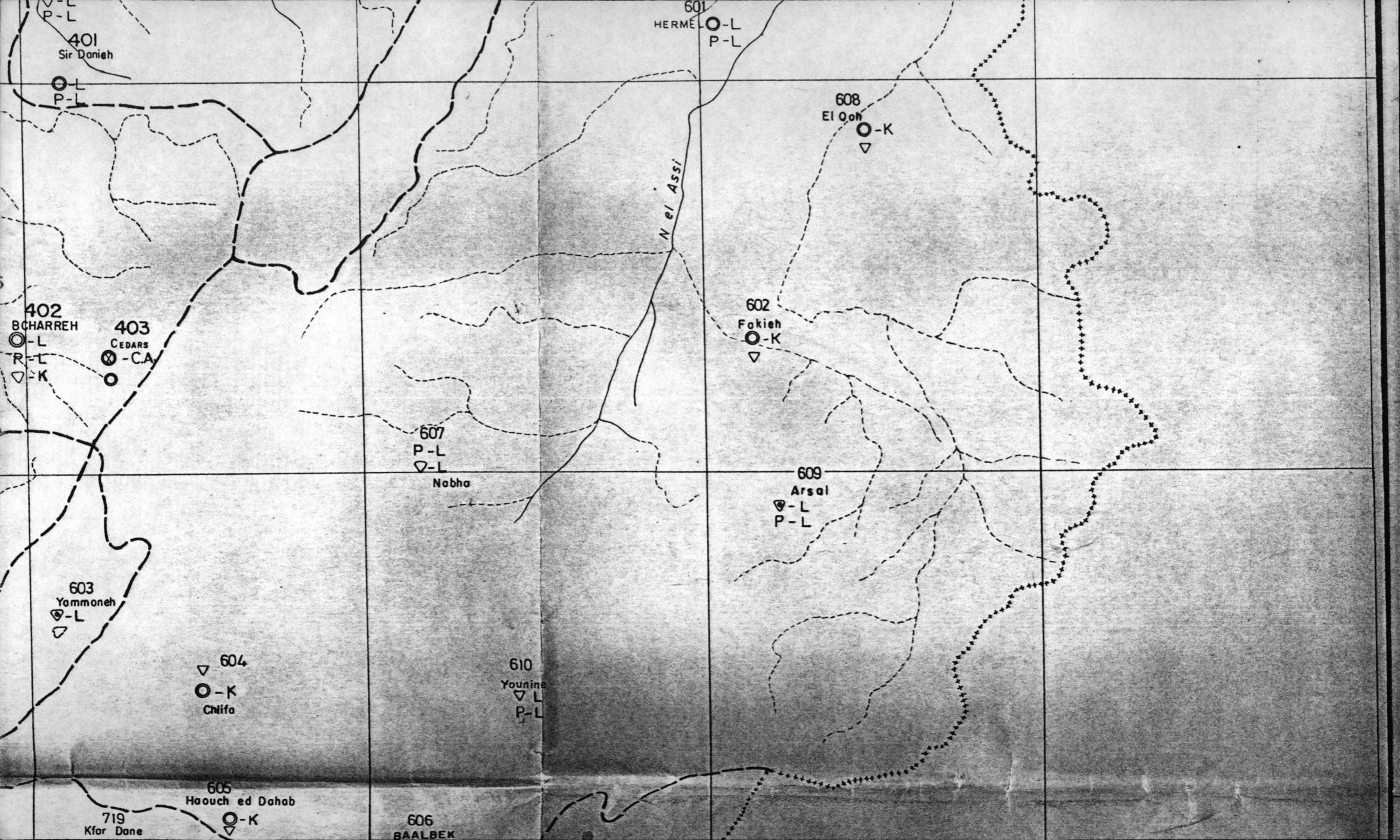


LEGEND

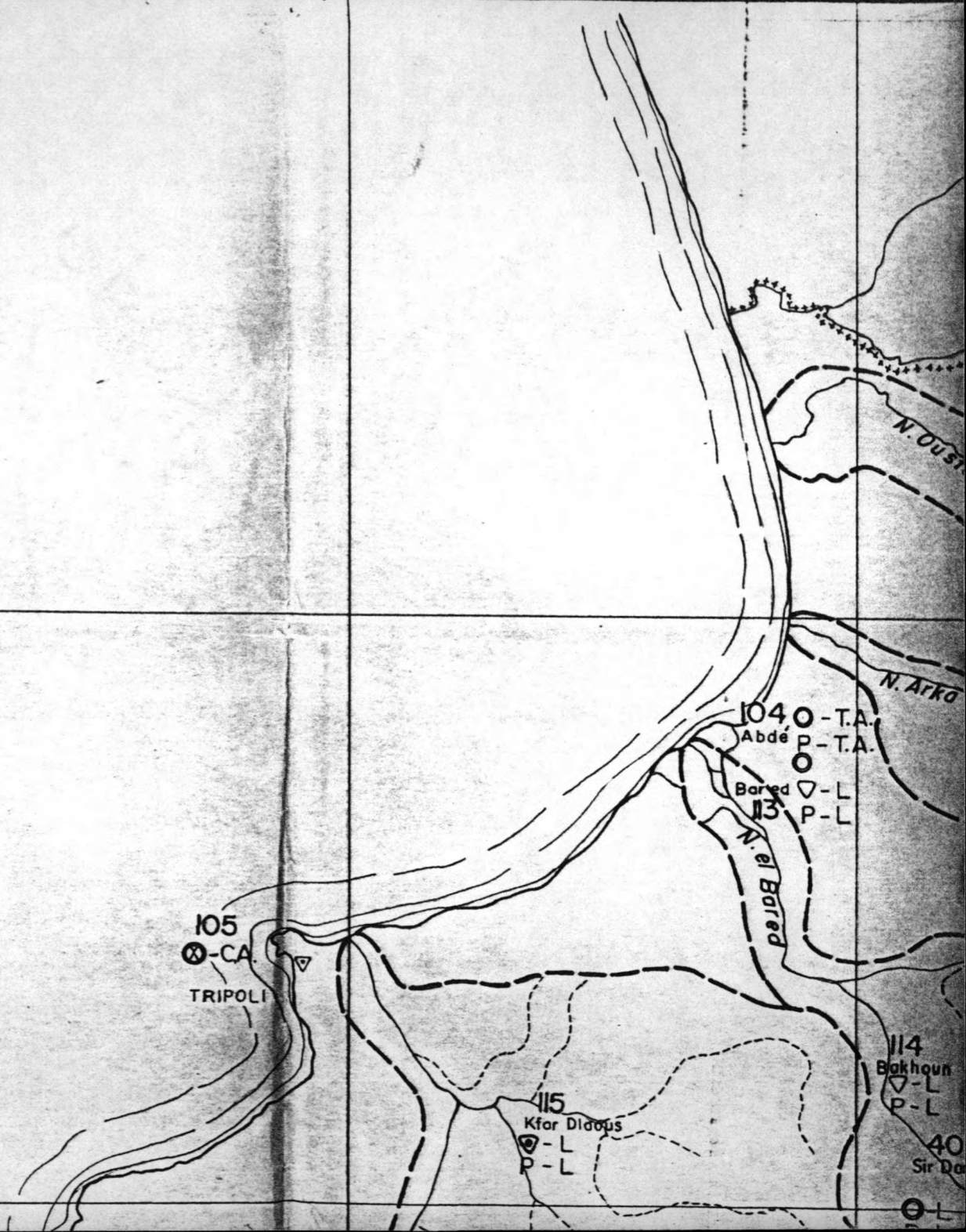
- ⊗ : Totalisateur
- ⊗ : Station synoptique
- : Station agro-météorologique
- : Station climatologique
- ▽ : Station pluviométrique
- ▽ : Station pluviométrique
- : Pluviographe

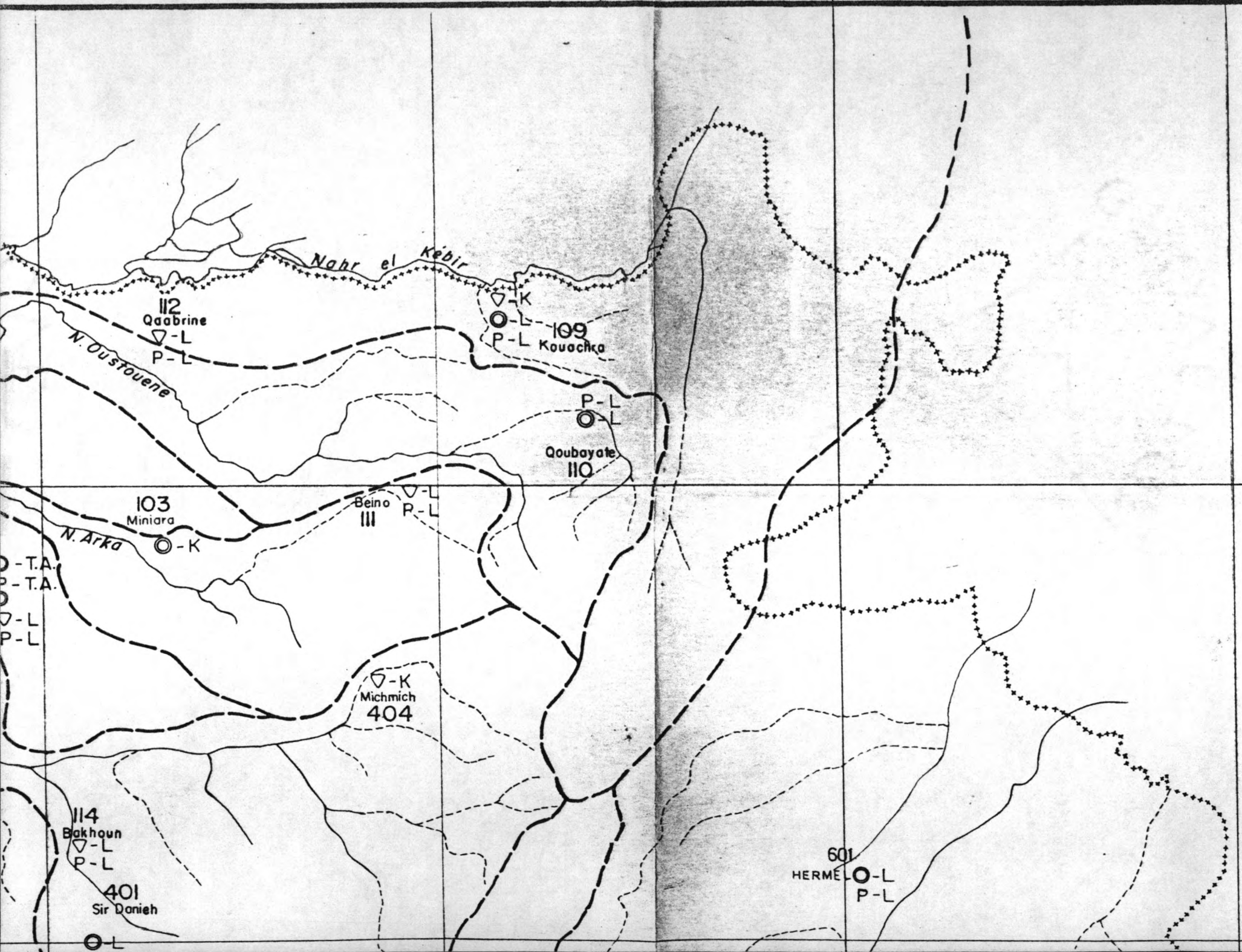






105
④-CA
TRIPOLI





Nahr el Kebir

112
Qaabrine
▽-L
P-L

▽-K
○-L
P-L 109
Kouachra

P-L
○-L
Qoubayate
110

103
Miniara
○-K

Beino
▽-L
P-L
111

▽-K
Michmich
404

114
Bakhoun
▽-L
P-L

401
Sir Danieh
○-L

601
HERMÉ
○-L
P-L

○-T.A.
○-T.A.
▽-L
P-L

825 : Average Annual Precipitation in mm.

REPUBLIC OF LEBANON

LITANI RIVER AUTHORITY

HYDRO - AGRICULTURAL
DEVELOPEMENT PROJECT
FOR SOUTH LEBANON

UNITED NATIONS DEVELOPEMENT

PROGRAM

FAO

PLUVIOMETRIC MAP OF LEBANON

FOR AN AVERAGE YEAR

(PERIOD : 1939 - 1970)

1

AE - 106

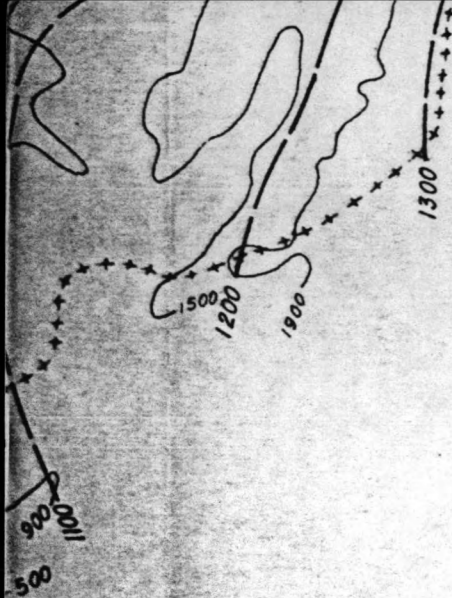
Drawn by:

Date June 1973

Scale 1 : 200 . 000

Class N° : ae 120

Checked by:



S

825 : Average Annual Precipitation in m

REPUBLIC OF LEBANON
LITANI RIVER AUTHORITY

HYDRO - AGRICULTURAL
DEVELOPEMENT PROJECT
FOR SOUTH LEBANON

PLUVIOMETRIC MAP OF L

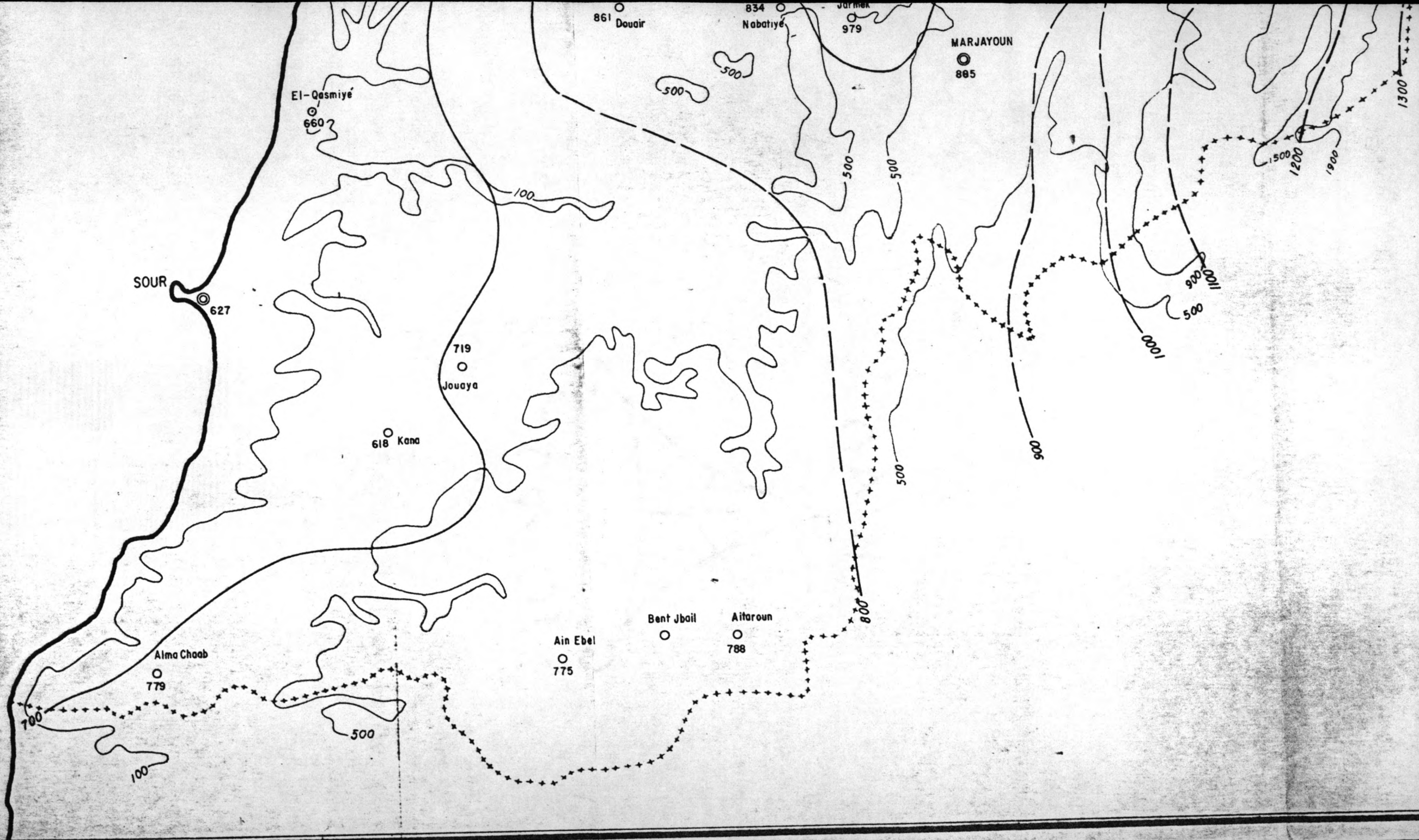
FOR AN AVERAGE YEAR

(PERIOD : 1939 - 1970

Date **June** 1973

Scale . 1 : 200 . 000

Clas



- 3 - St. Joseph : P - Pr. 213
- 4 - Nazareth : © - K 214
- 5 - Aeroport : ⊗ - C.A. 216

222 : Numero de la station

REPUBLIQUE LIBANAISE
OFFICE NATIONAL
DU LITANI

PROJET DE
DEVELOPPEMENT HYDRO - AGRICOLE
DU SUD DU LIBAN

P R O G R A M M E
DES NATIONS - UNIES
POUR LE DEVELOPPEMENT
F A O

SITUATION DES STATIONS METEOROLOGIQUES DU LIBAN



AE - 103

Dess.

Date

Echelle : 1 / 200.000

N° de class. : 110

Verif.

808

Fraidis

3 - St. Joseph : P - Pr.

4 - Nazareth : ☉ -- K

5 - Aeroport : ⊗ - C.A.

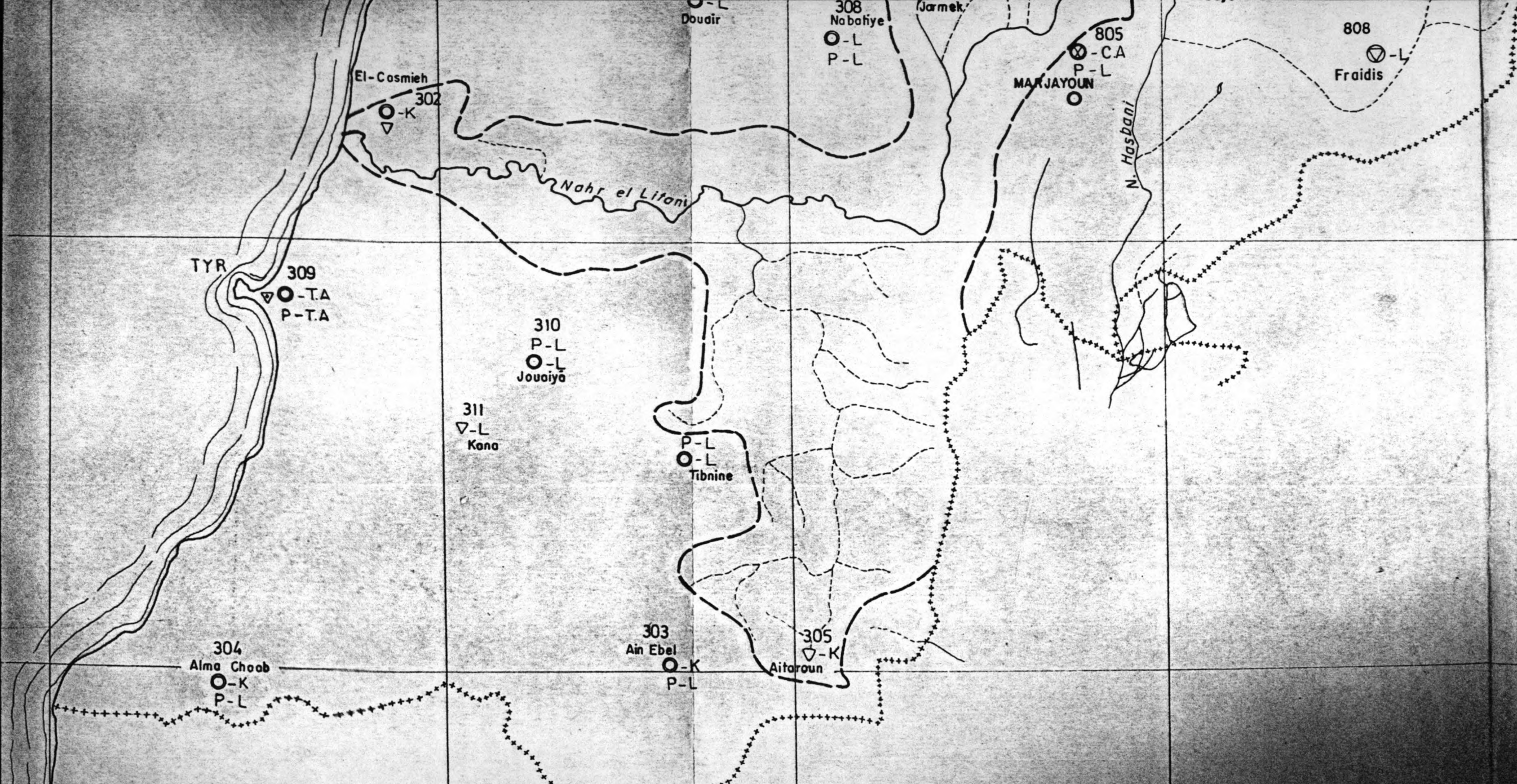
222 : Numero de la station

REPUBLIQUE LIBANAISE
OFFICE NATIONAL
DU LITANI

SITUATION METEOROLO

Date

Echelle



D'apres une carte établie par l'Office National du Lifani

1100
1200
1300

S

Y

825 : Average Annual Precipitation in mm.

REPUBLIC OF LEBANON
LITANI RIVER AUTHORITY

HYDRO - AGRICULTURAL
DEVELOPEMENT PROJECT
FOR SOUTH LEBANON

UNITED NATIONS DEVELOPEMENT
PROGRAM
FAO

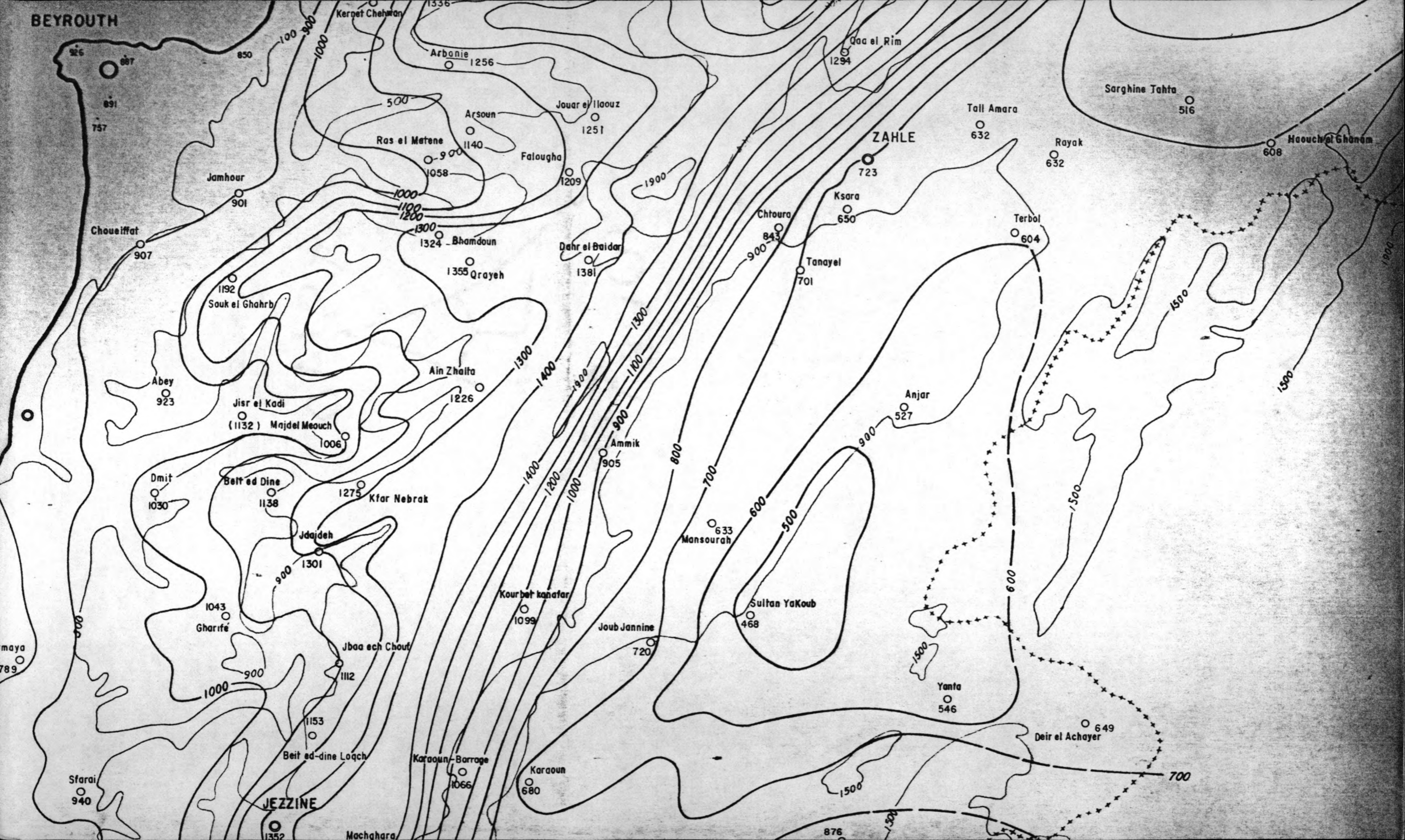
PLUVIOMETRIC MAP OF LEBANON

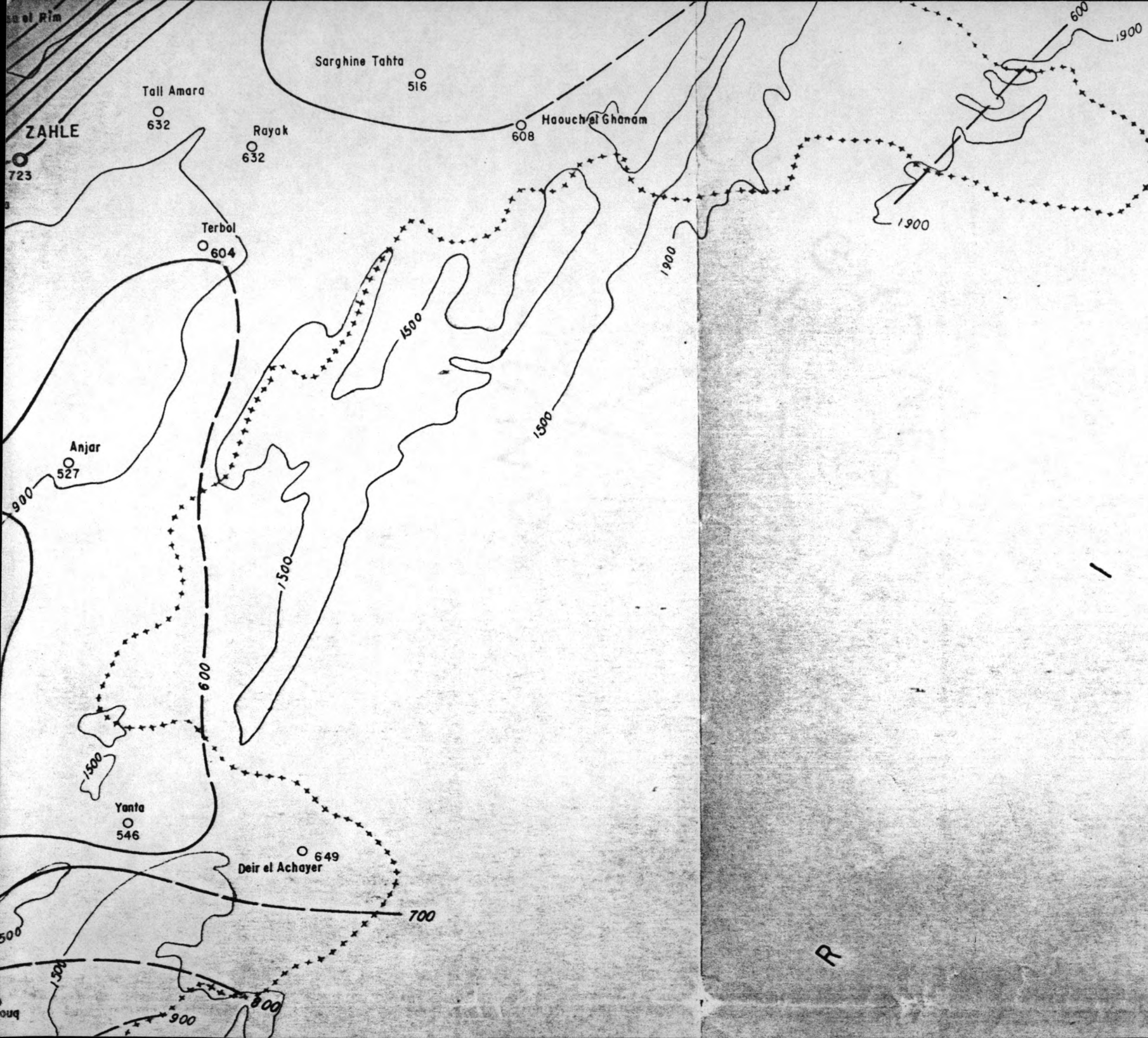
FOR AN AVERAGE YEAR

M e d i t



BEYROUTH

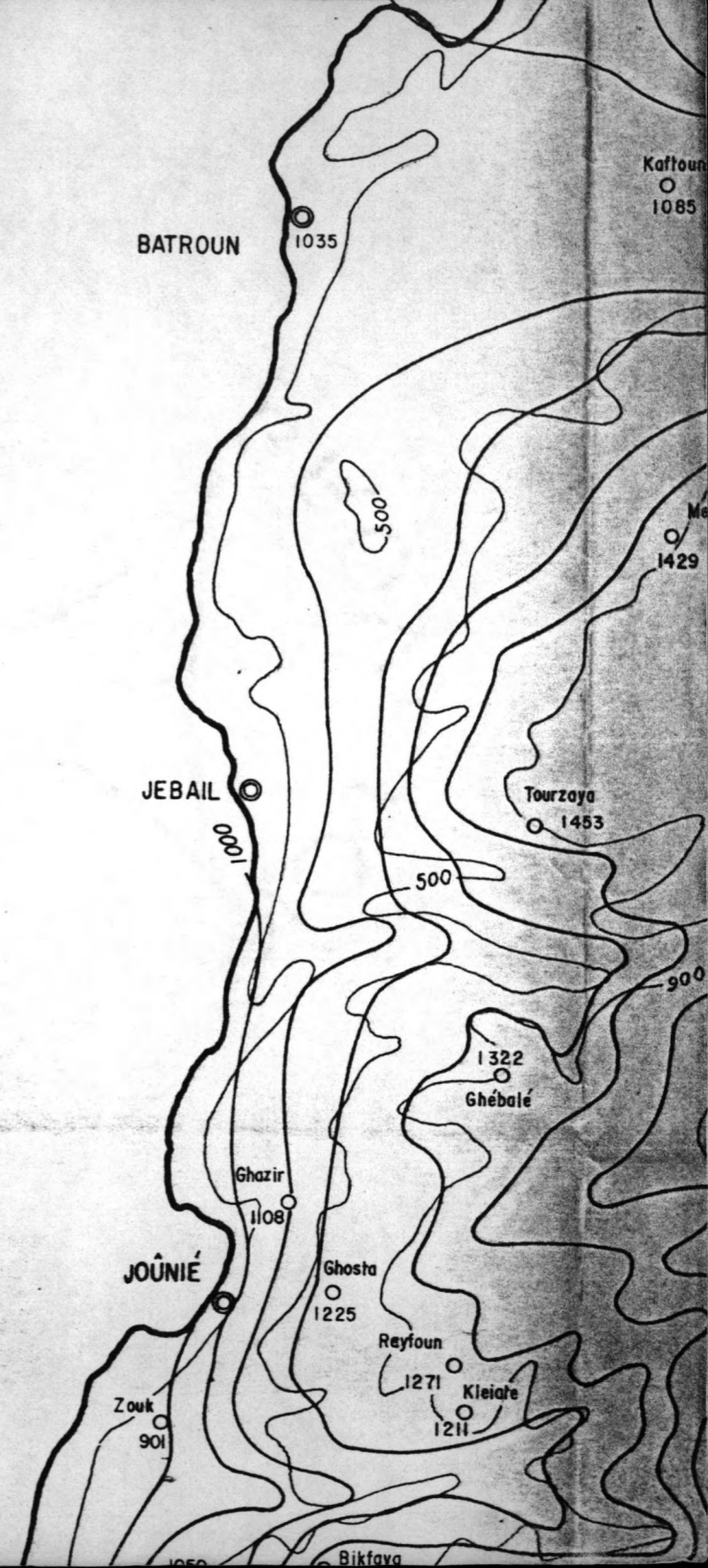




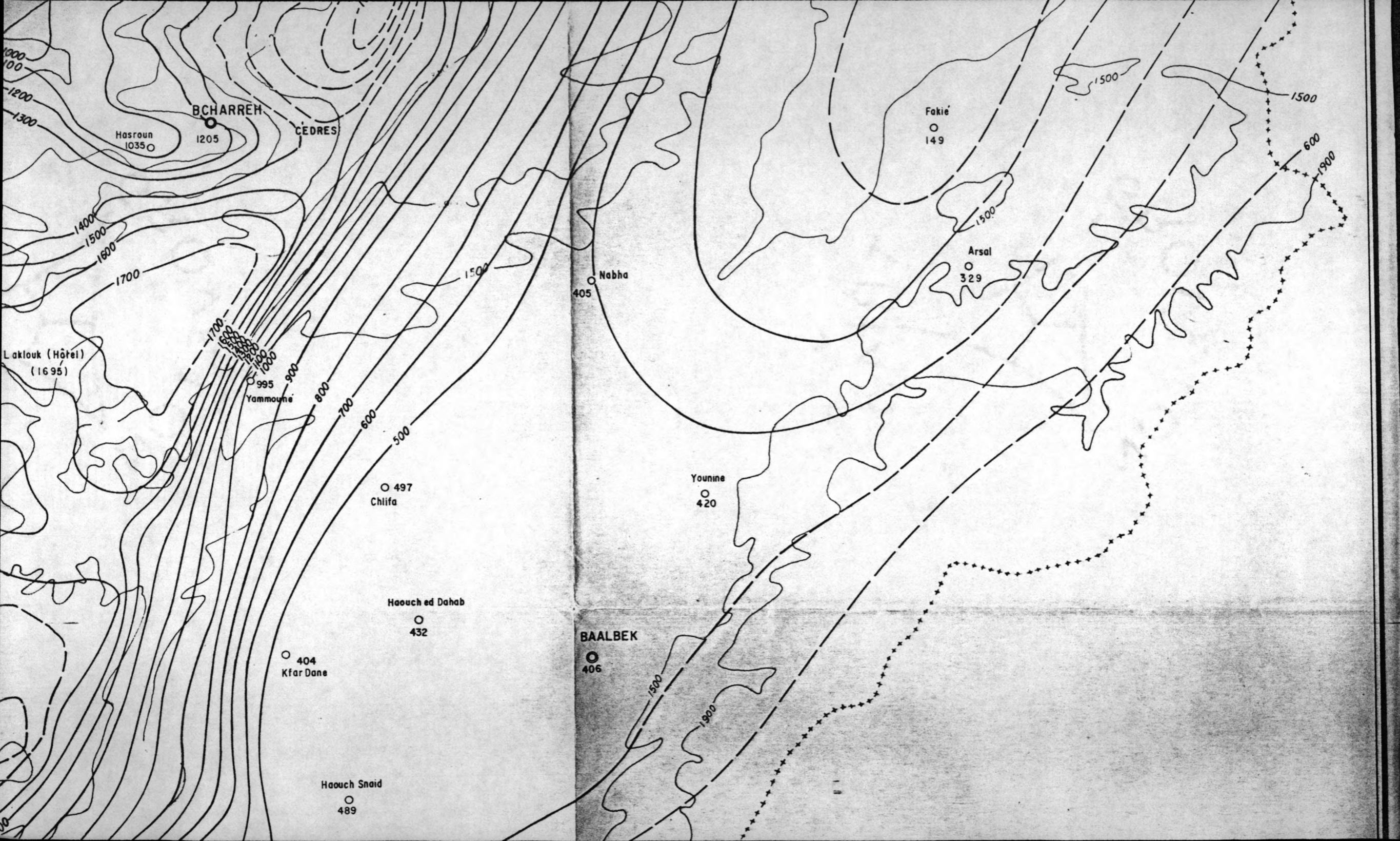
E

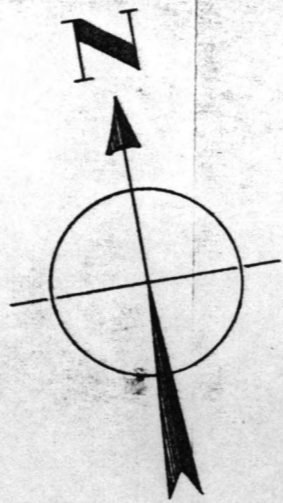
R

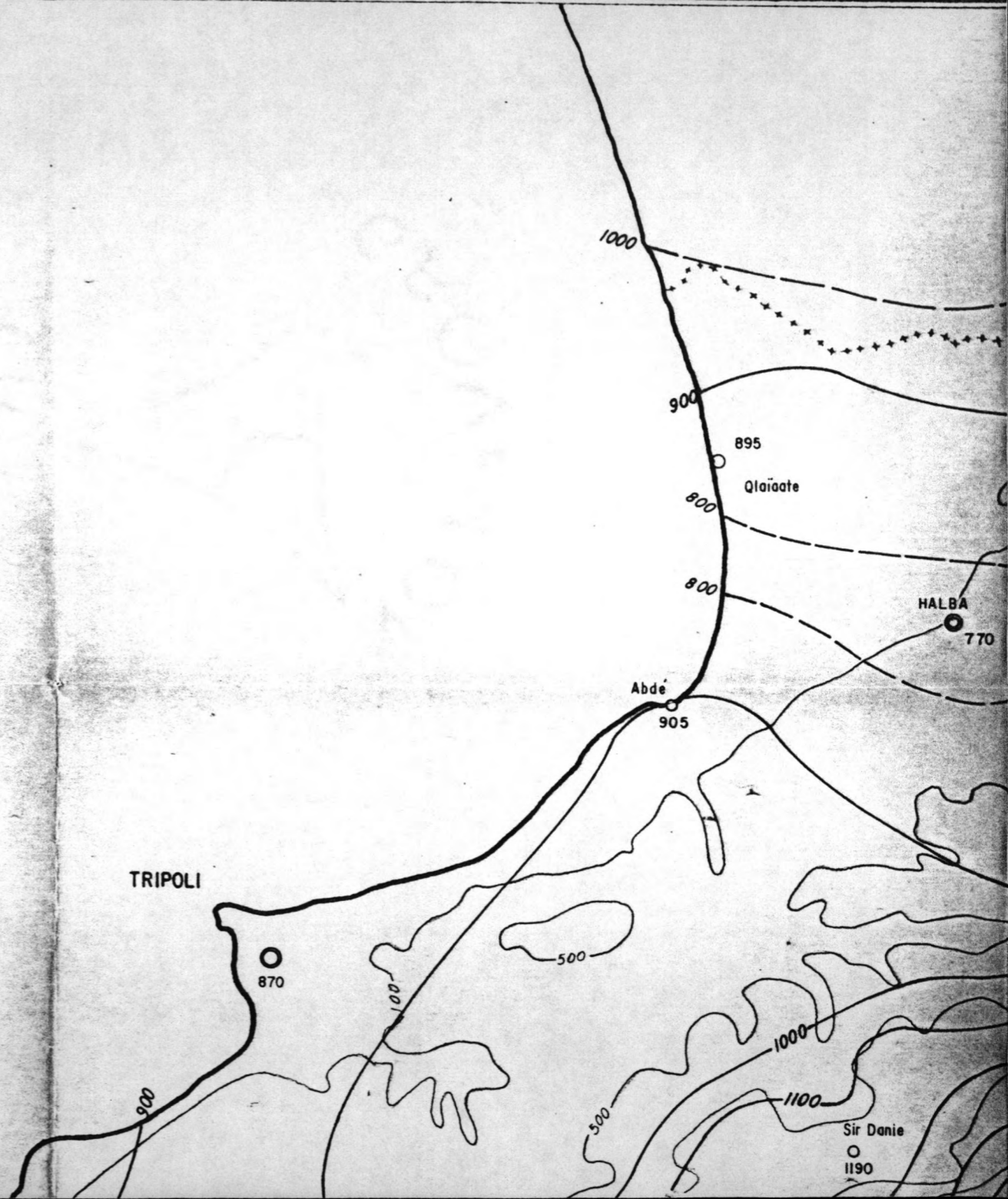
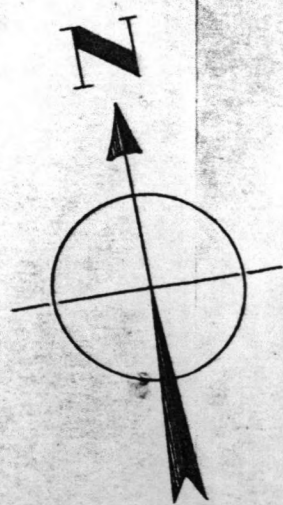
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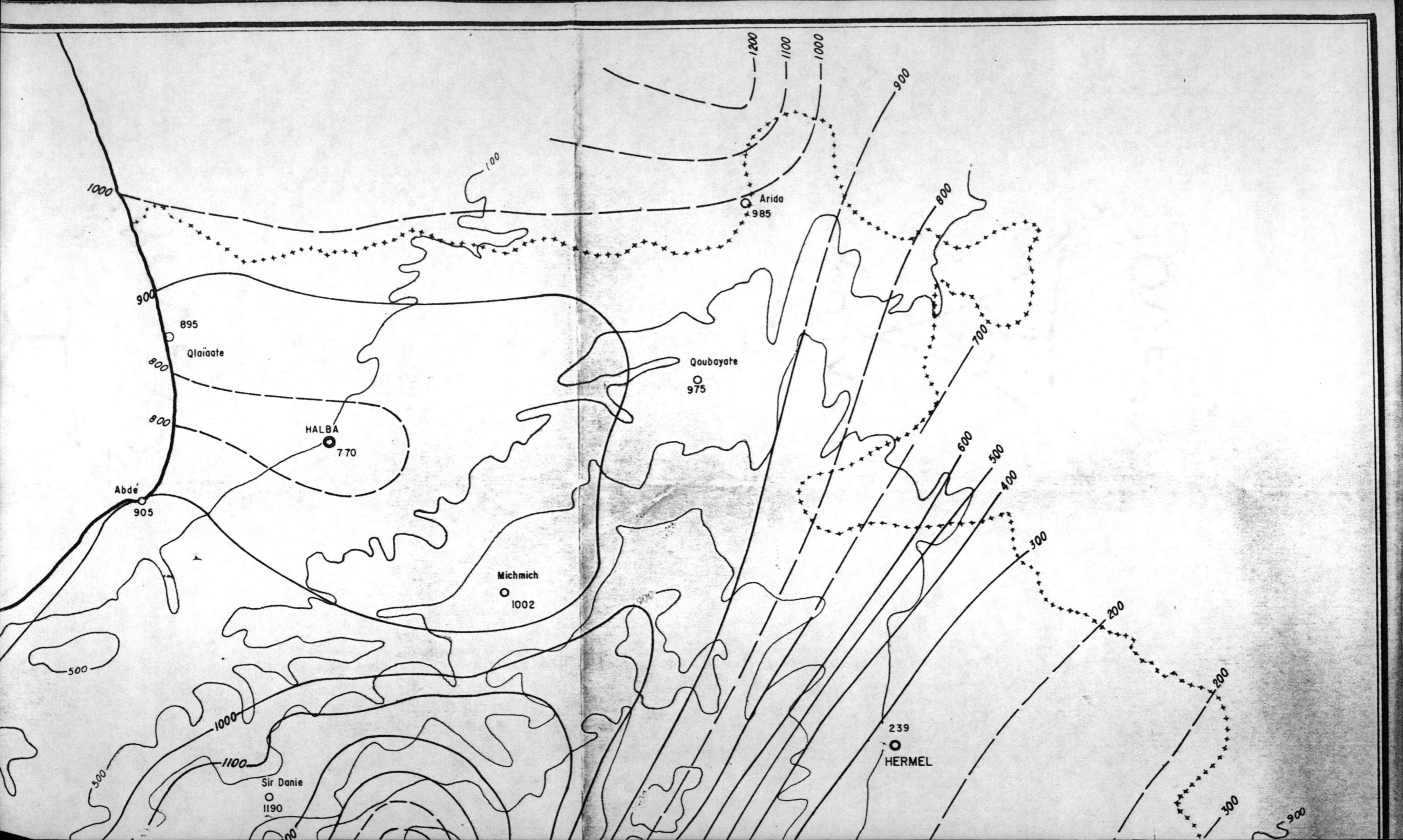


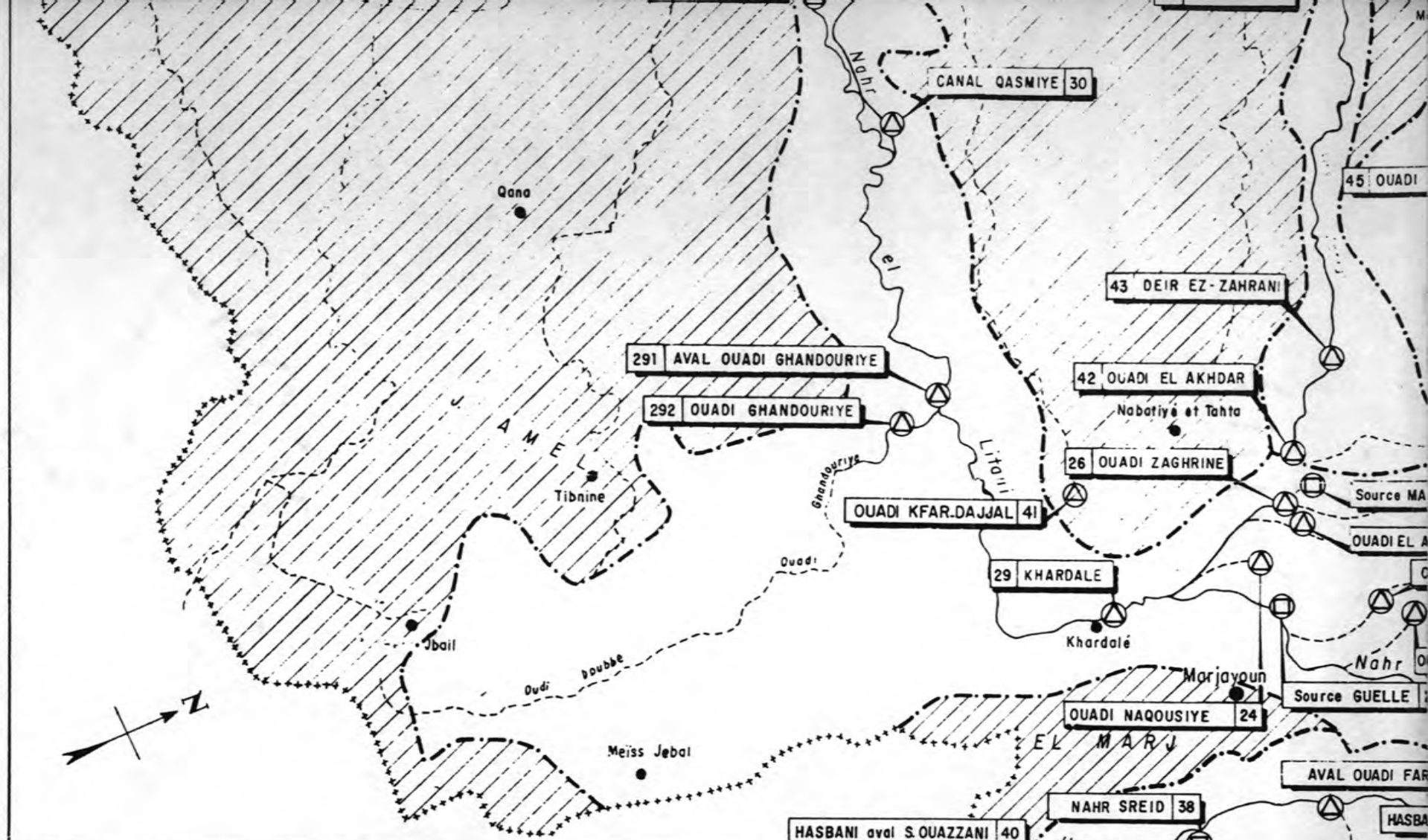






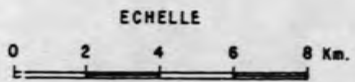


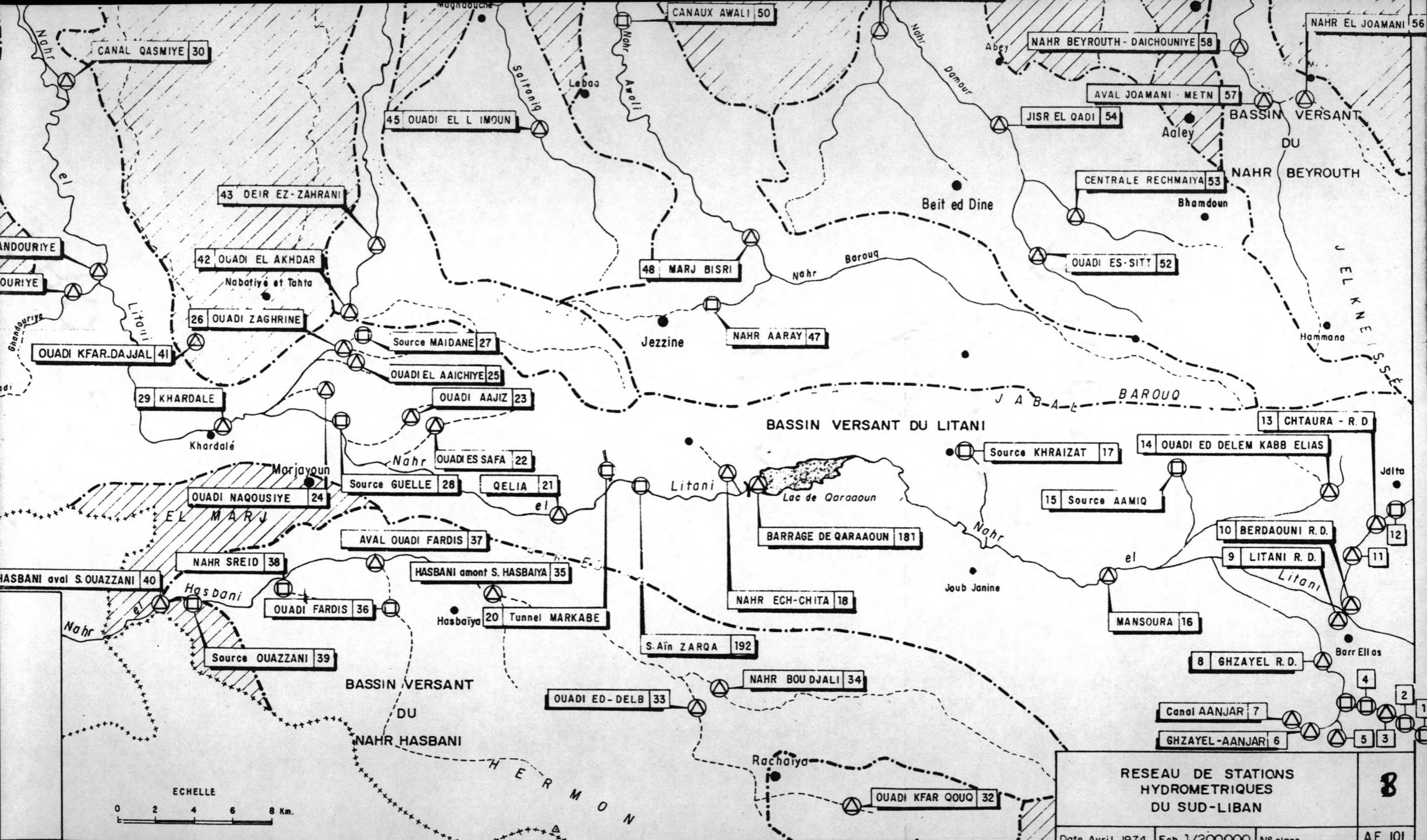




Legende

- Limite de Bassin Versant
- Stations hydrométriques {
 - ⊙ Station limnigraphique
 - ◻ Station de jaugeage
- ▨ Secteur non jaugeé du Sud-Liban
- 26 Numéro station hydrométrique

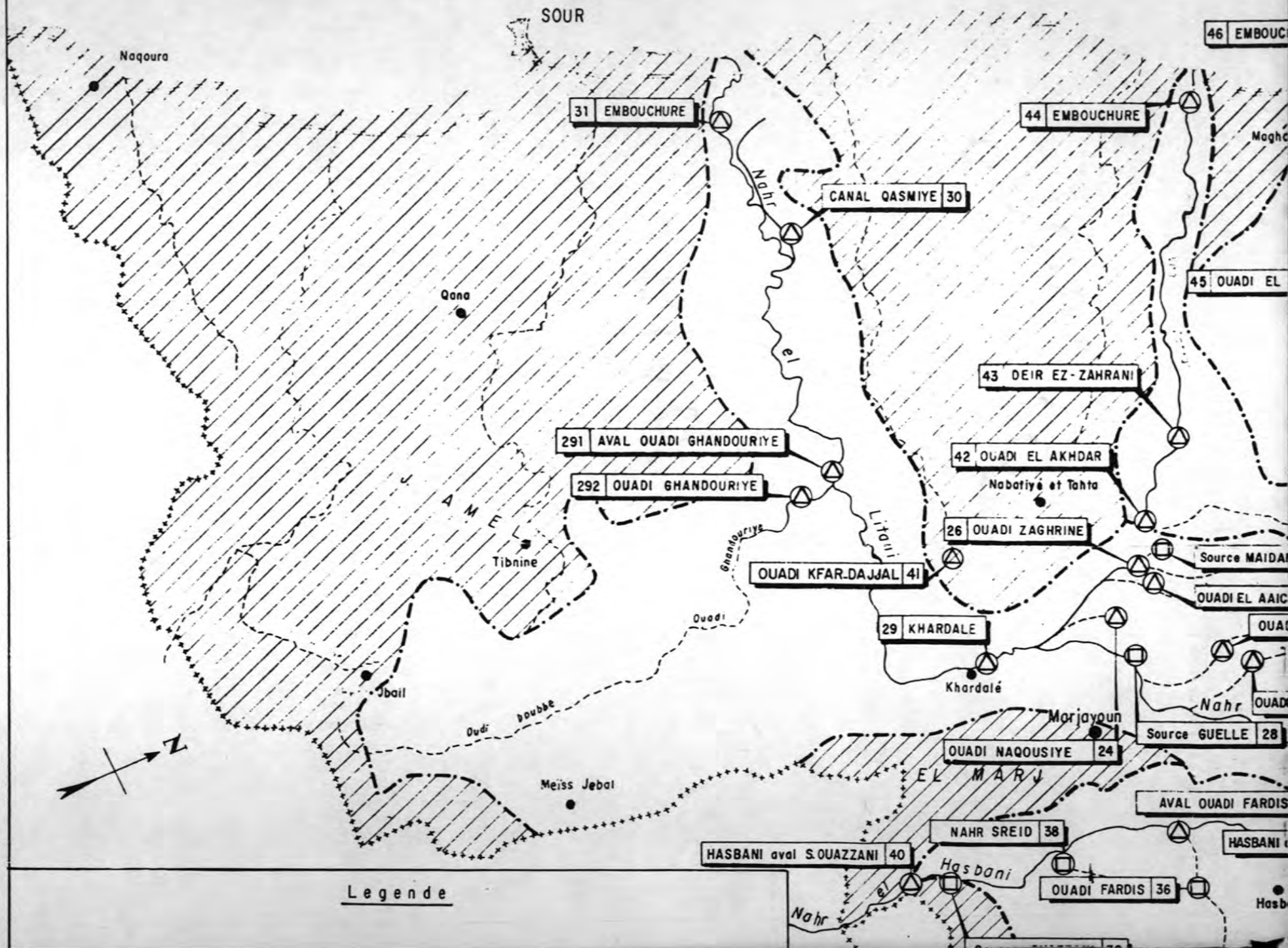




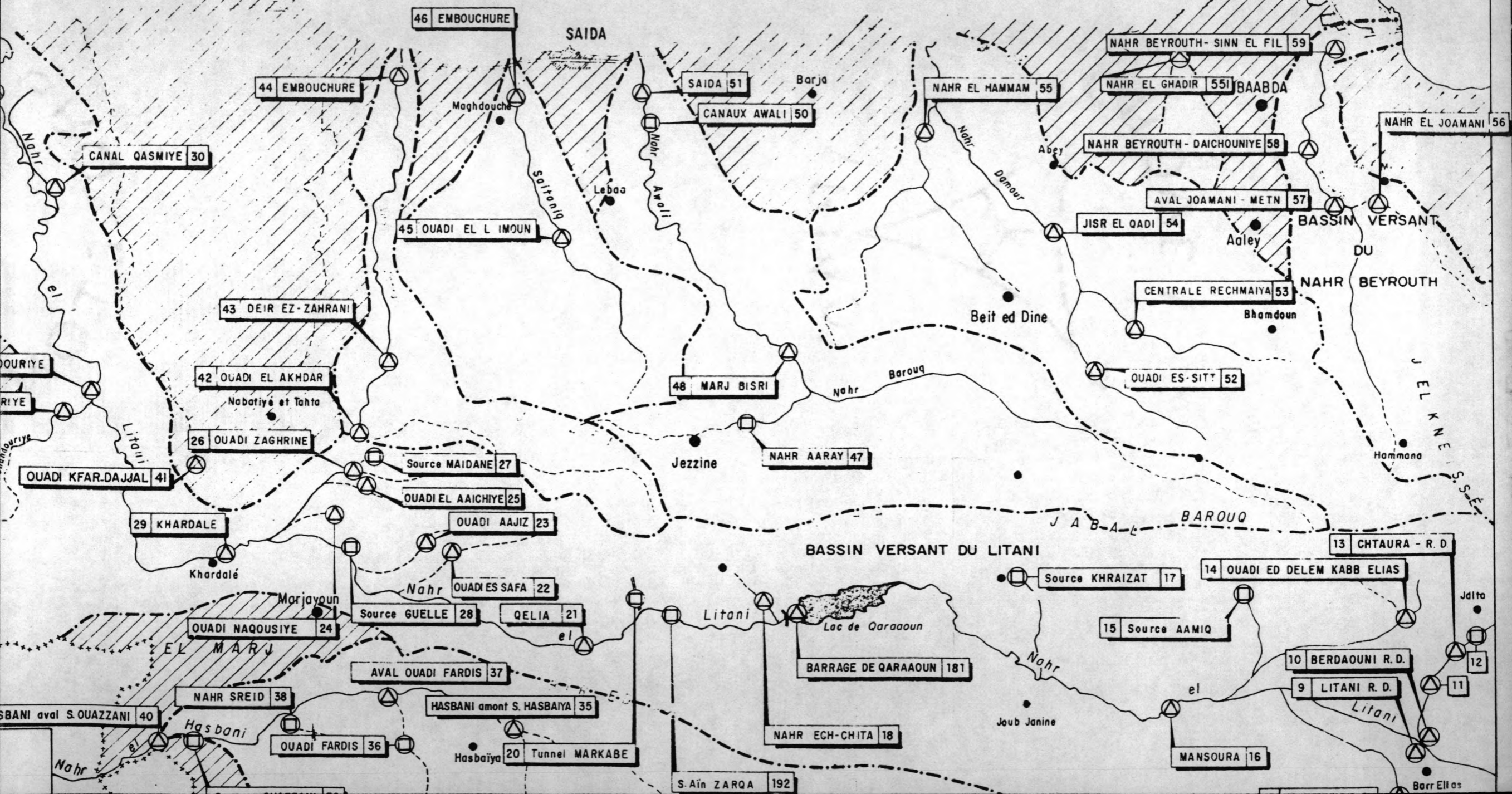
RESEAU DE STATIONS HYDROMETRIQUES DU SUD-LIBAN			8
Date Avril 1974	Ech. 1/200.000	N° class	
			AE 101

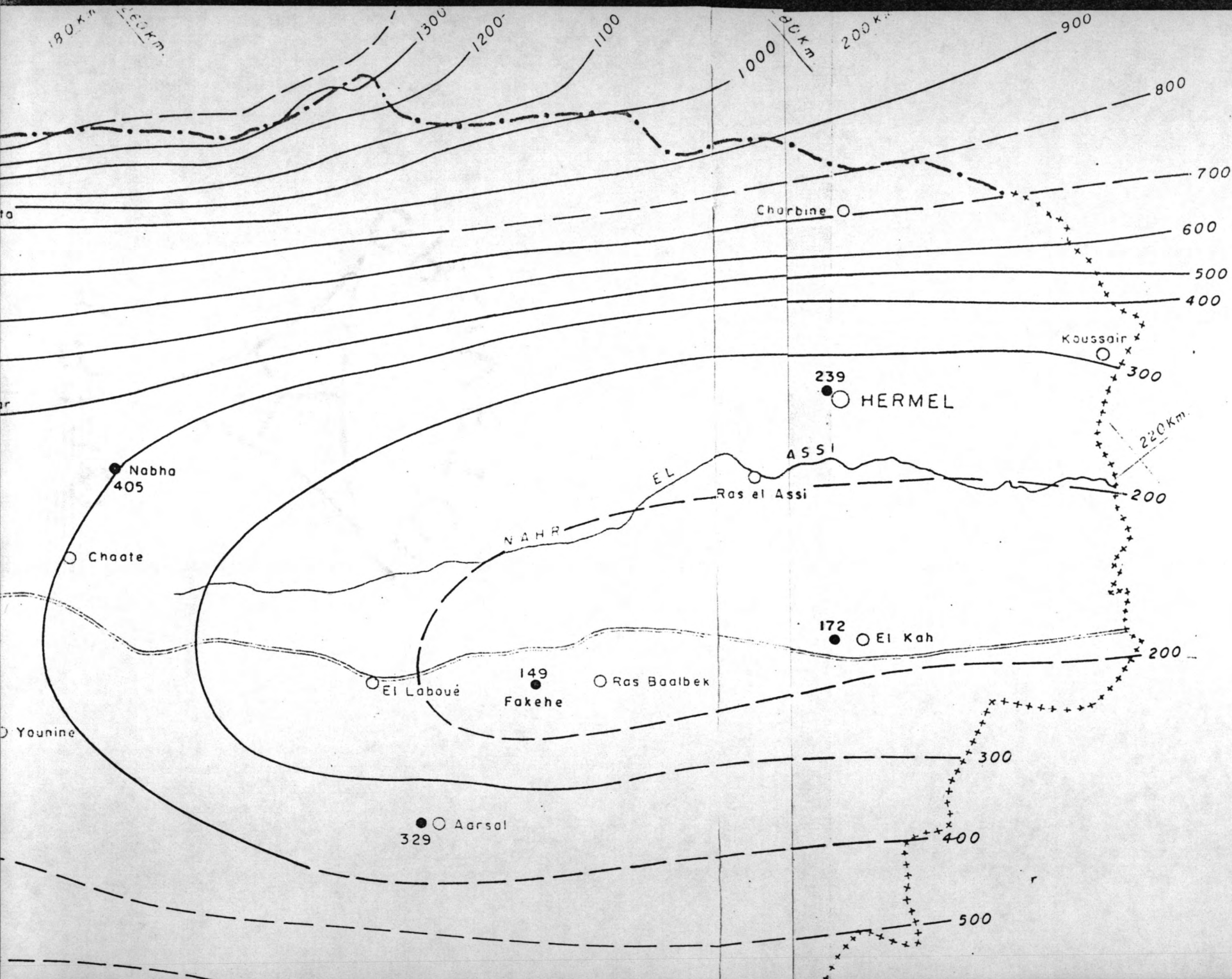
May 8

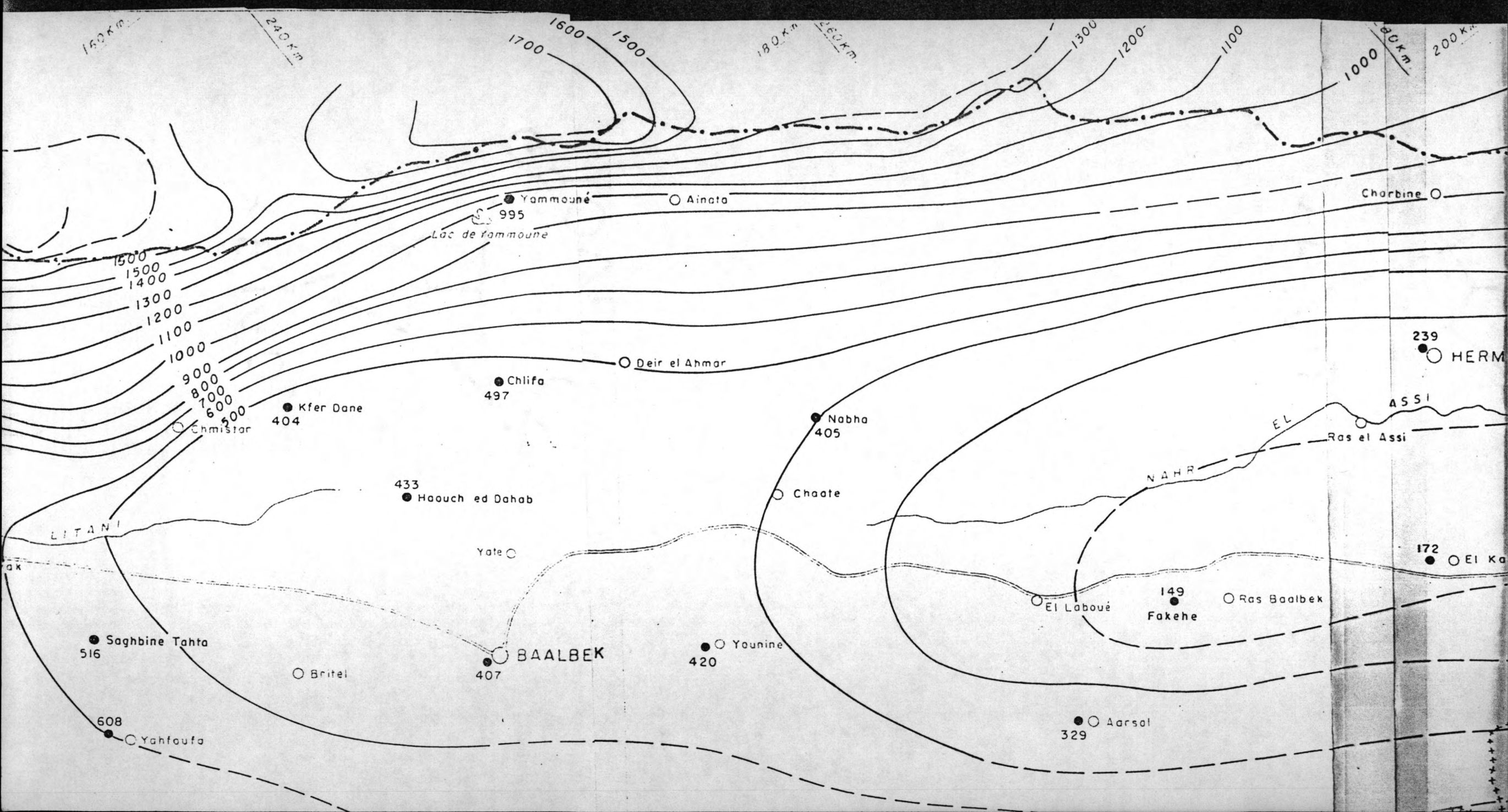
M e r M é d i

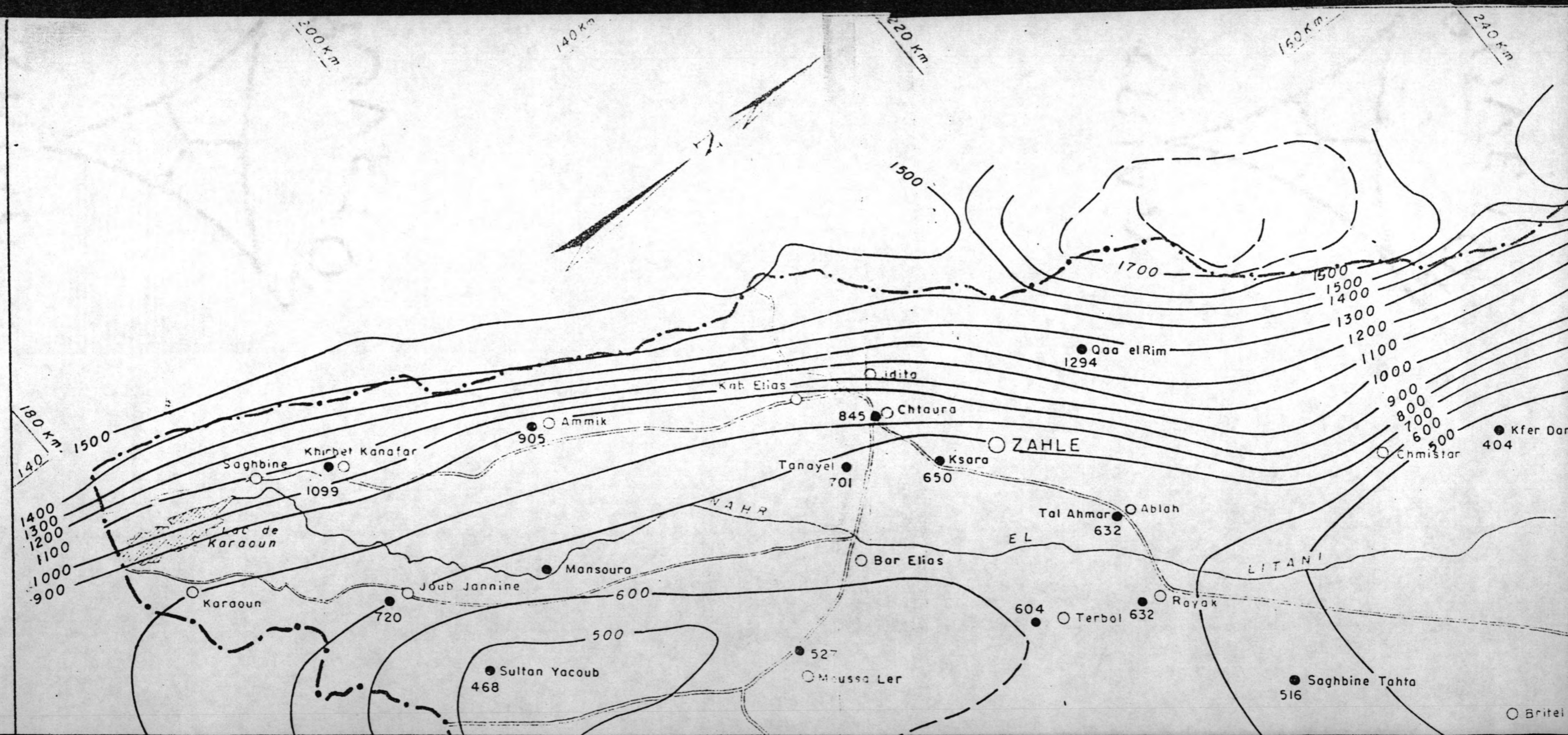


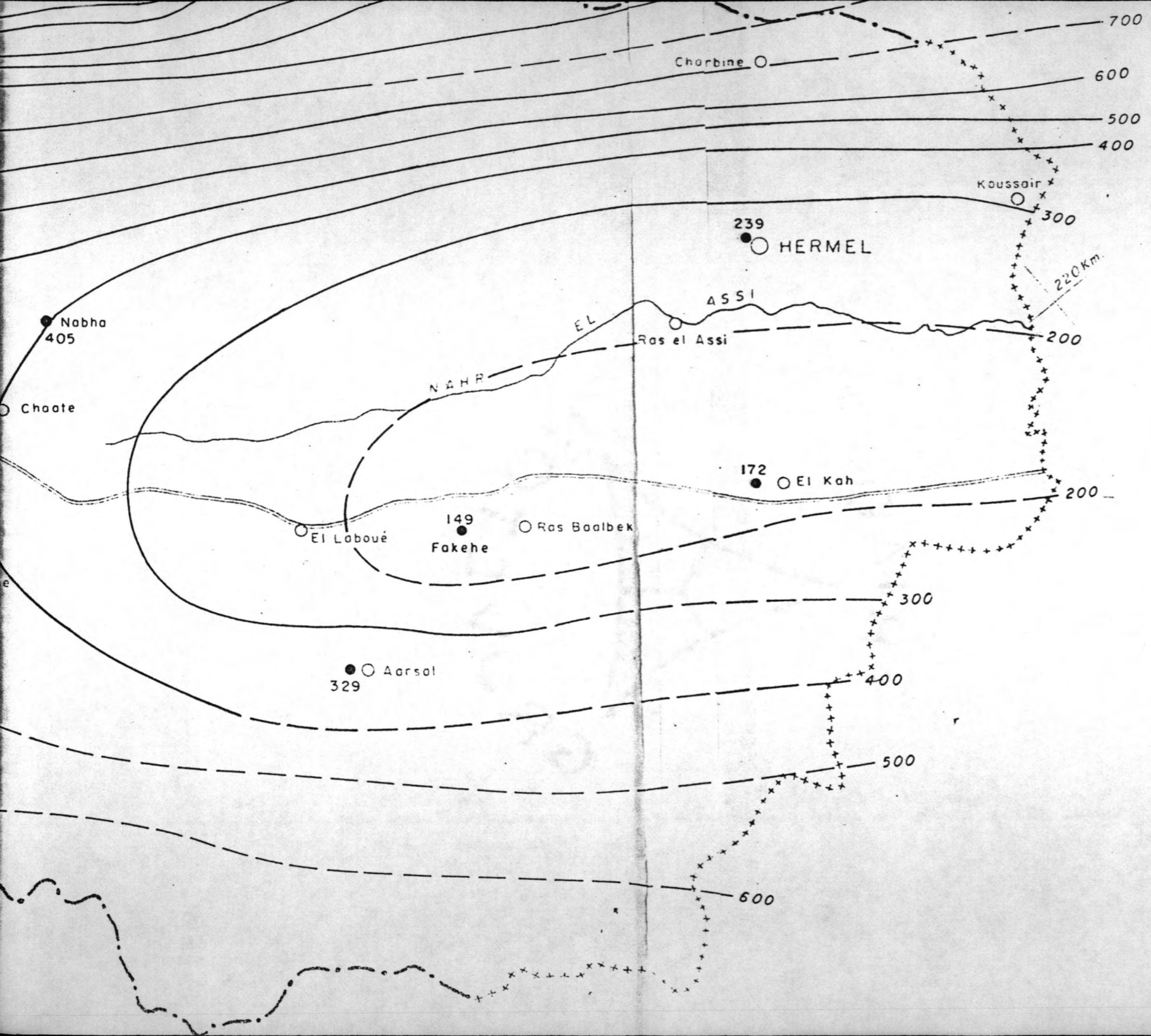
Legende

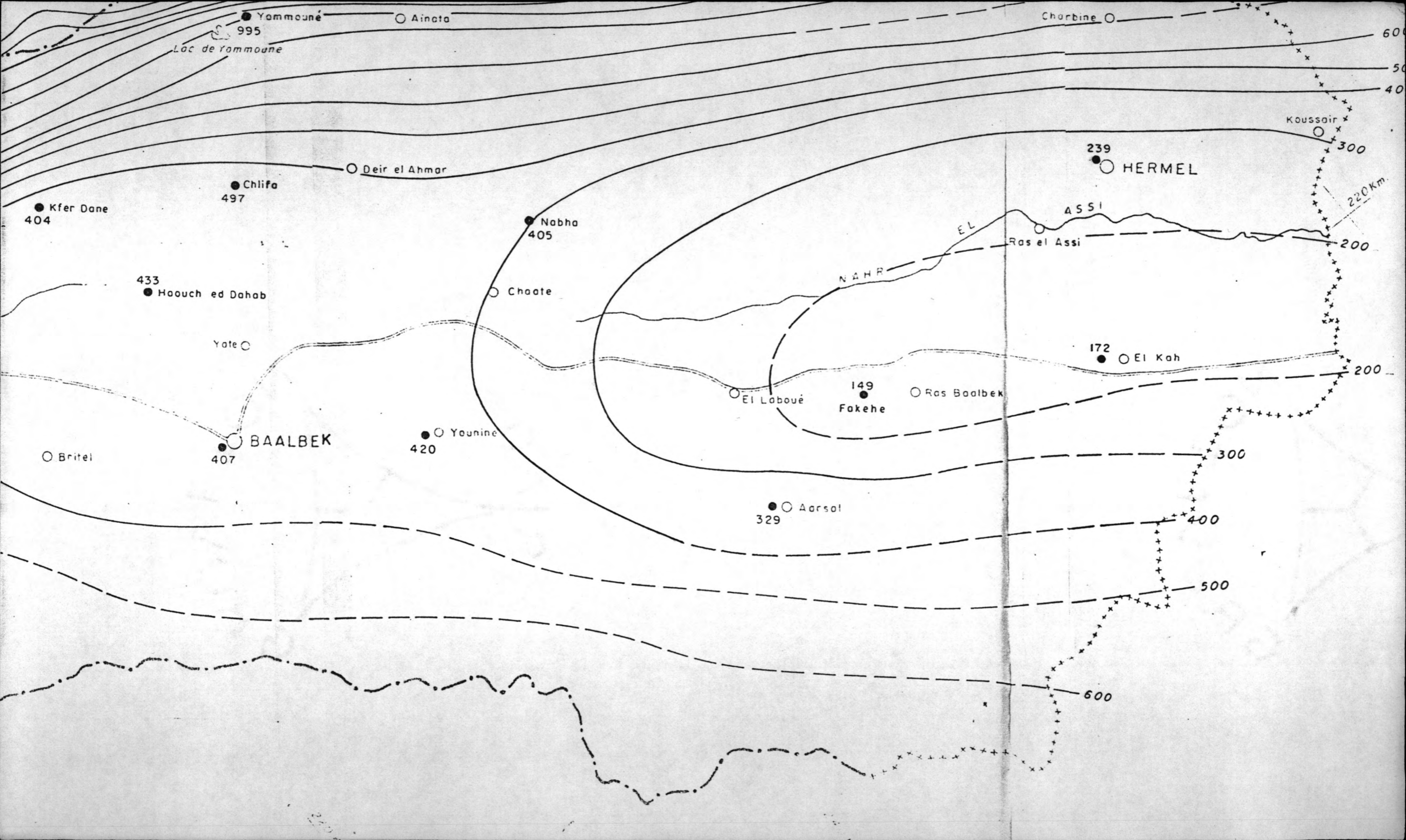


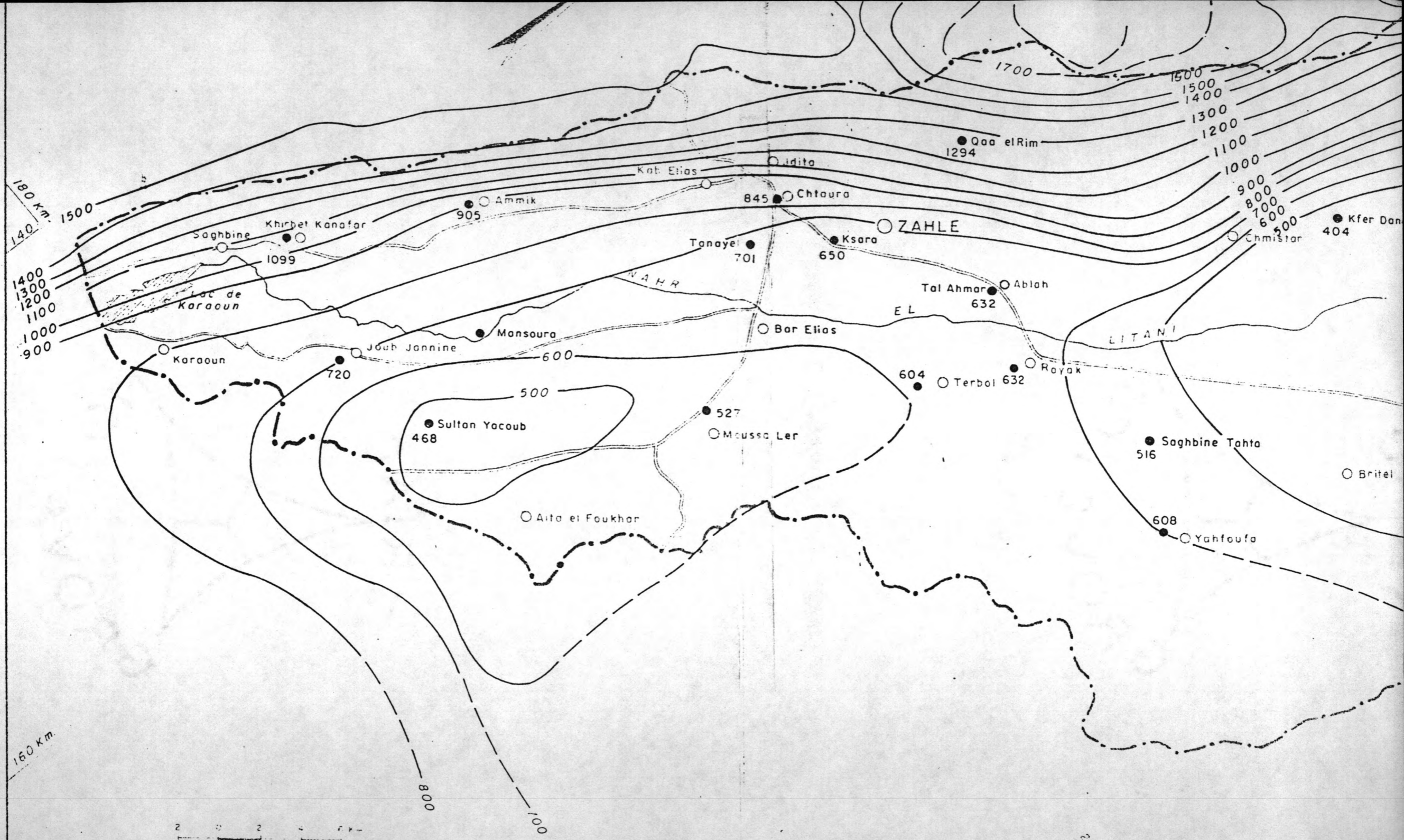




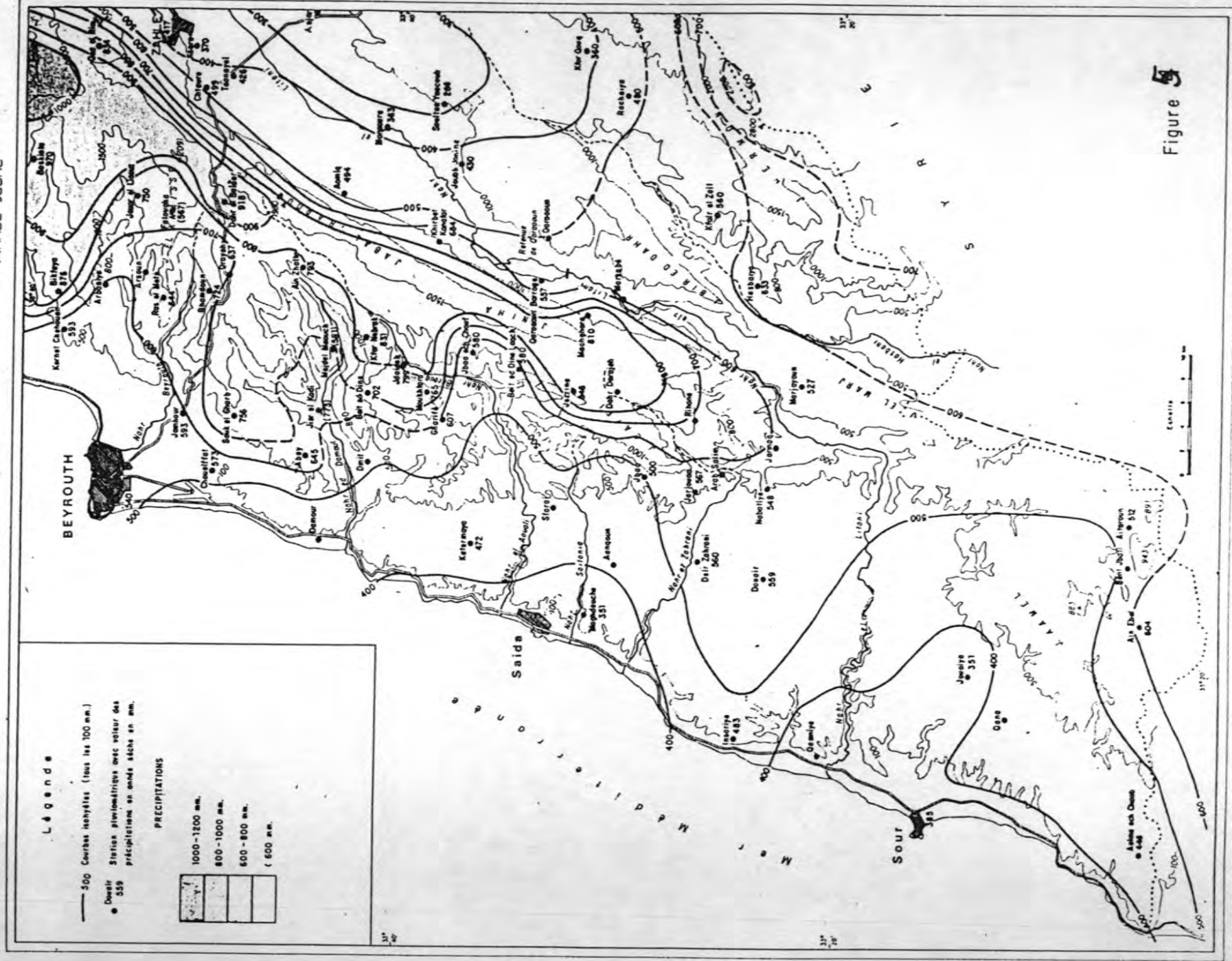




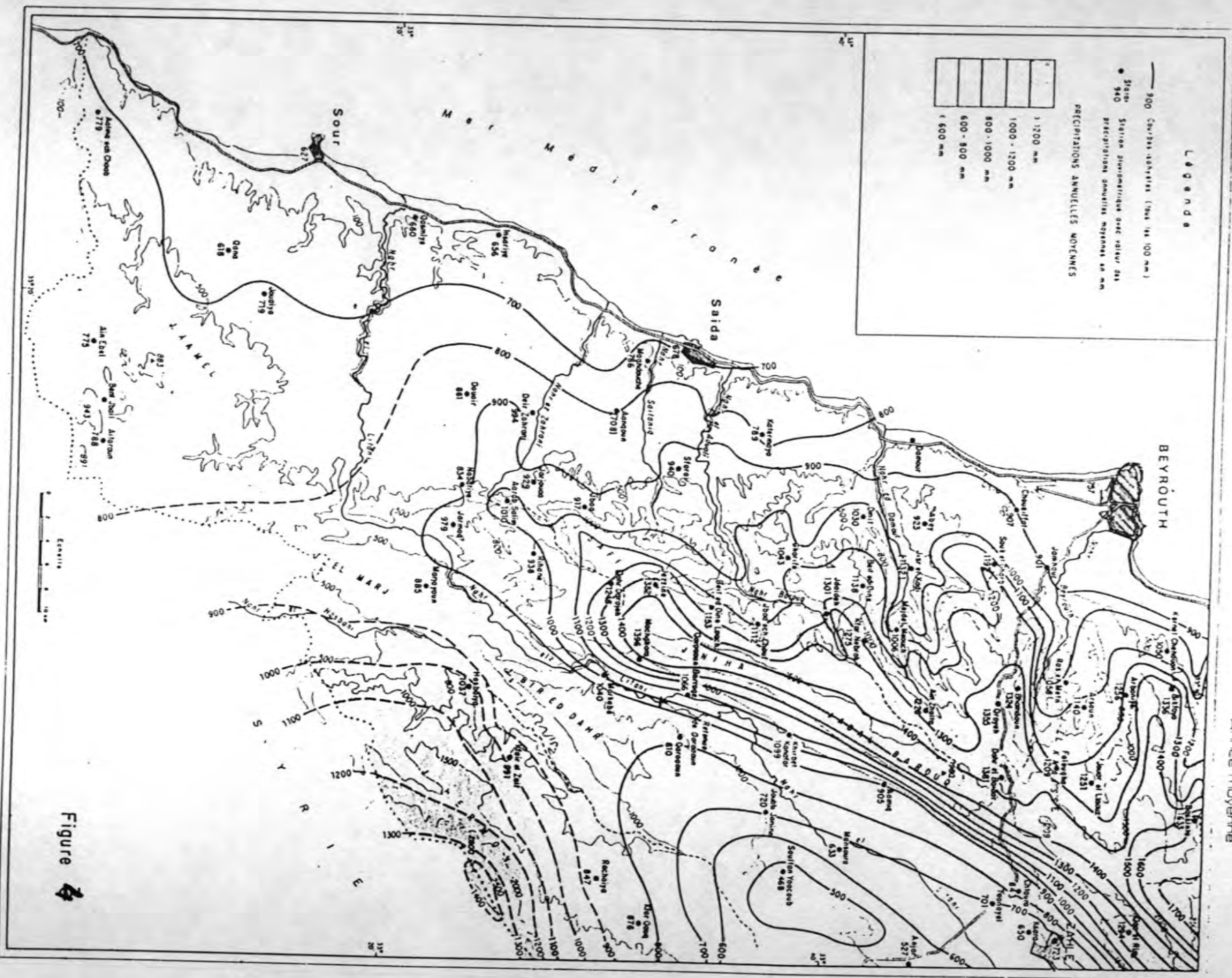




2 0 2 4 6 Km



PLUVIOMETRIE
Année moyenne



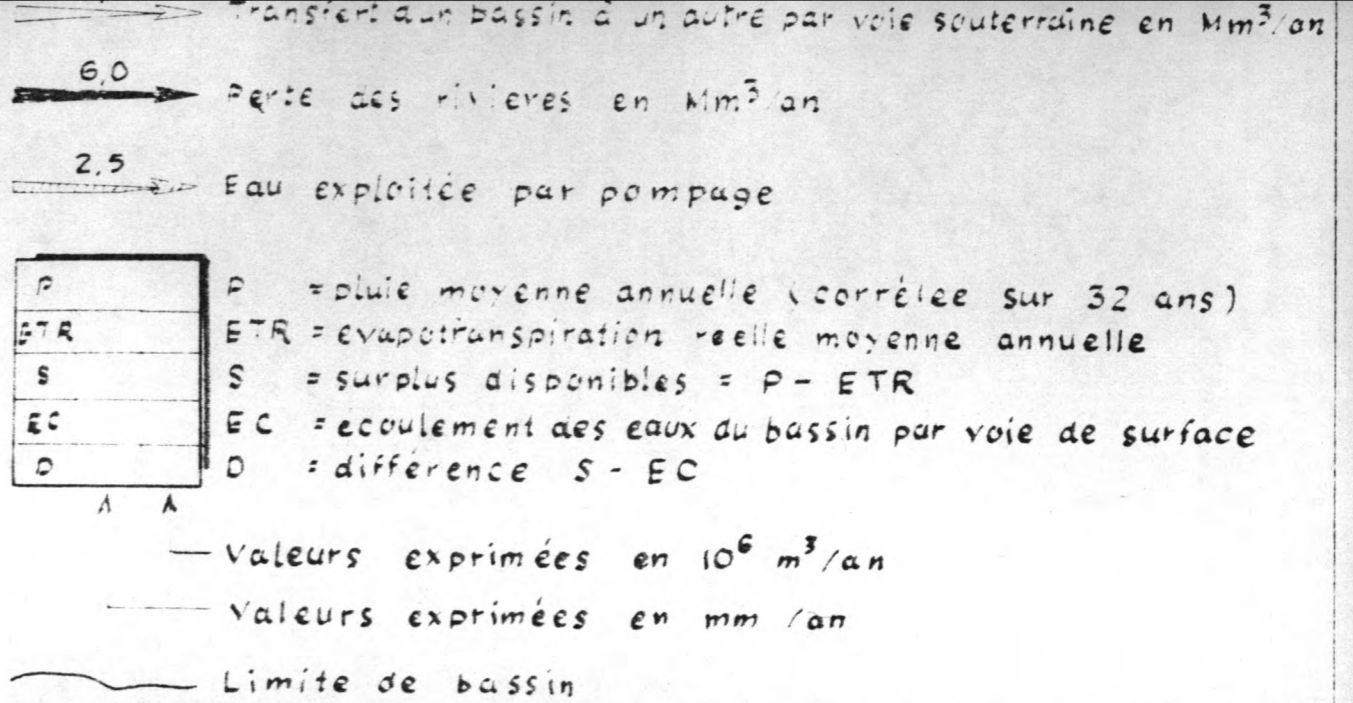
P	748	138.4
ETR	475	67.9
S	273	50.5
EC	32	6.0
D	241	44.5

OUADI GHANDOURIYE
(185 km²)

Bent Jbail

9.3

4.5



BILAN DES EAUX SOUTERRAINES PAR BASSINS HYDROLOGIQUES

6

P	719	190.5
ETR	492	130.1
S	227	60.6
EC	149	39.7
D	78	20.7

Jouaïya

SOUR - JOUAÏYA
(265 km²)

P	748	138
ETR	475	67
S	273	50
EC	32	6
D	241	44

OUADI GHANDOU

(185 km²)

P	779	787
ETR	466	47.1
S	313	31.6
EC	84	6.4
D	249	25.2

NAQOURA

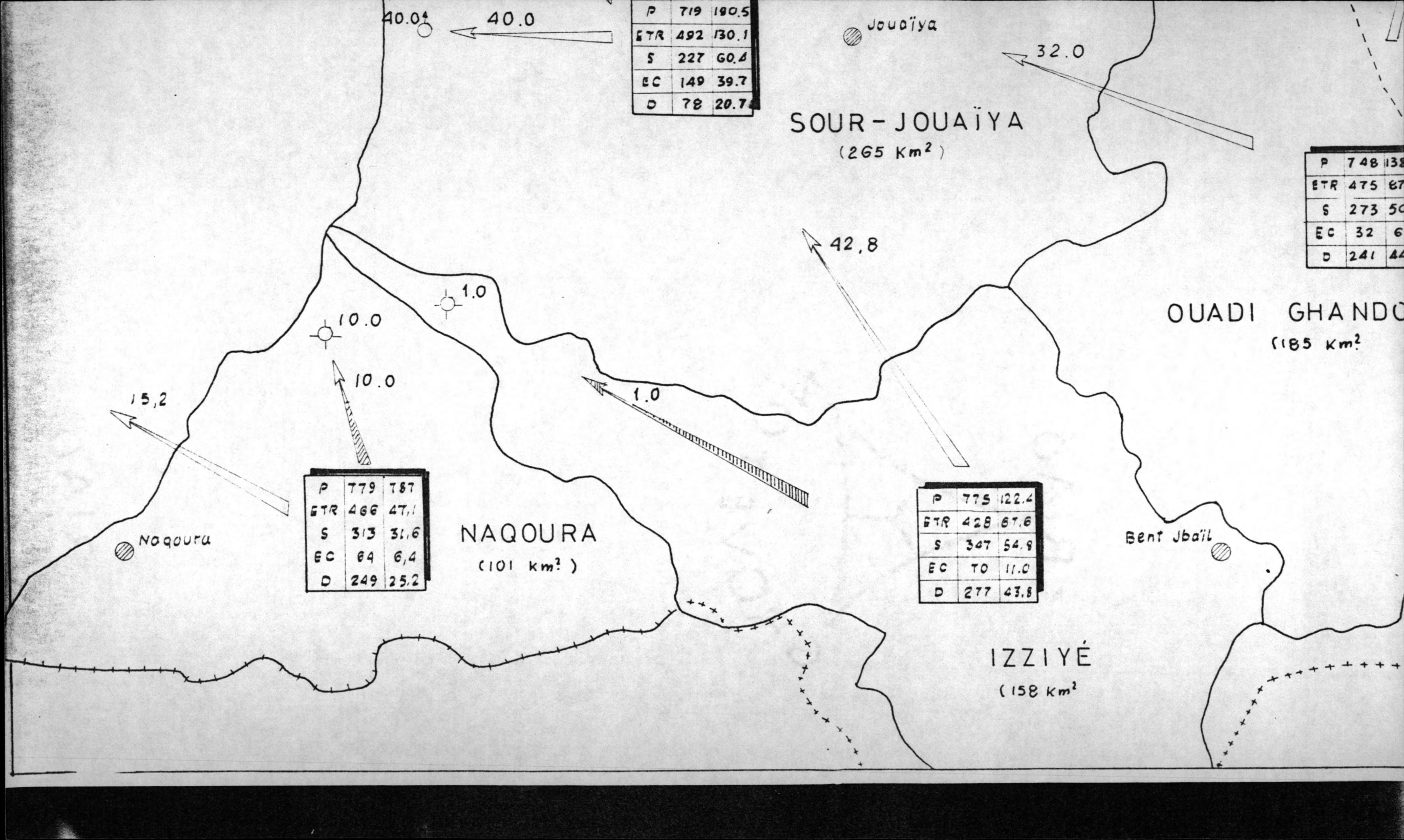
(101 km²)

P	775	122.4
ETR	428	67.6
S	347	54.9
EC	70	11.0
D	277	43.8

Bent Jbaïl

IZZIYÉ

(158 km²)



SOUR

LITANI AVAL INF.
(97 km²)

SOUR-JOUAÏYA
(265 km²)

Jouaïya

P	719	69.7
ETR	308	49.3
S	211	20.4
EC	205	19.9
D	6	0.5

P	719	190.5
ETR	492	130.1
S	227	60.4
EC	149	39.7
D	78	20.7

24.0

26.0

26.0

40.0

40.0

29.5

32.0

42.8

1.0

10.0

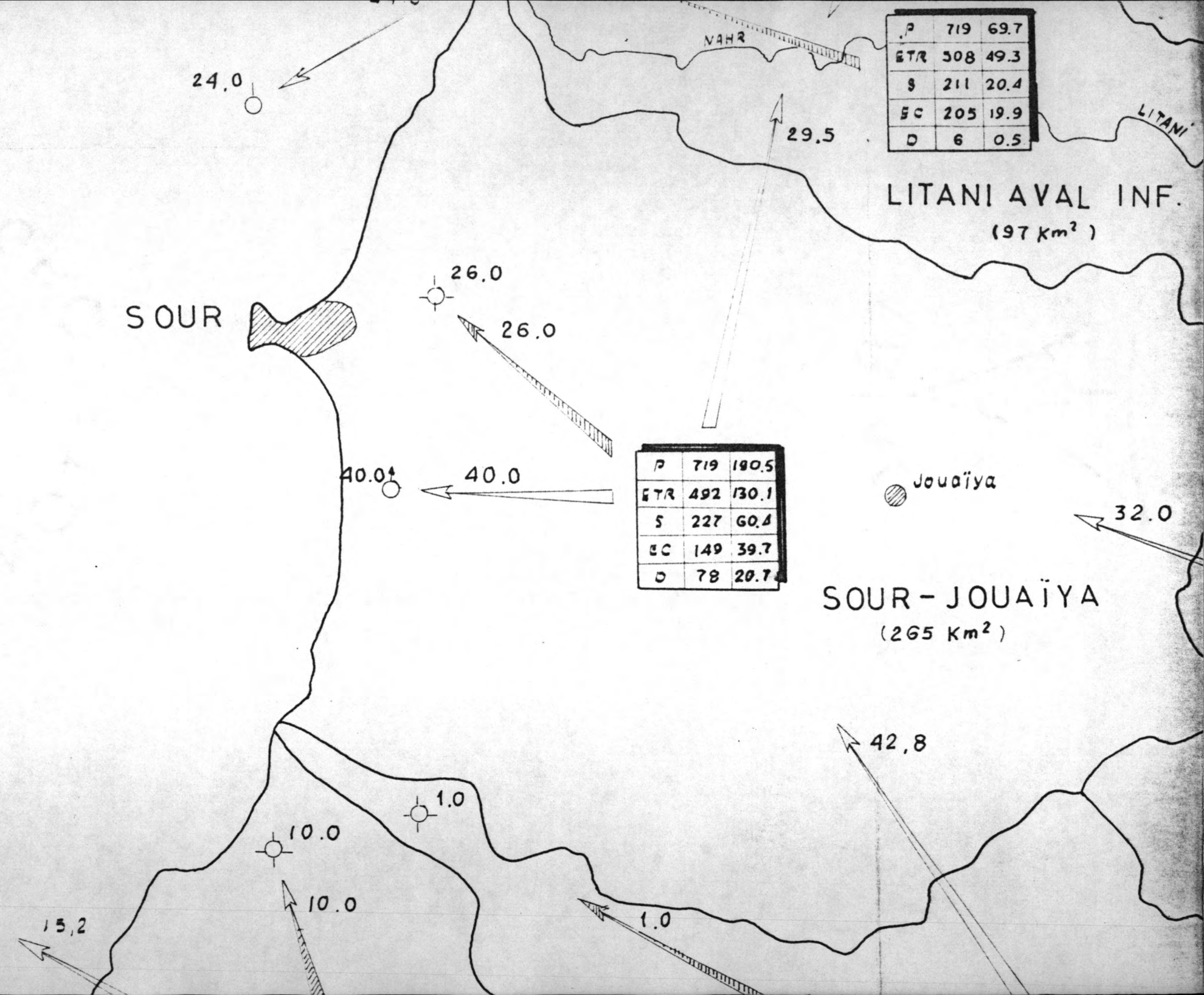
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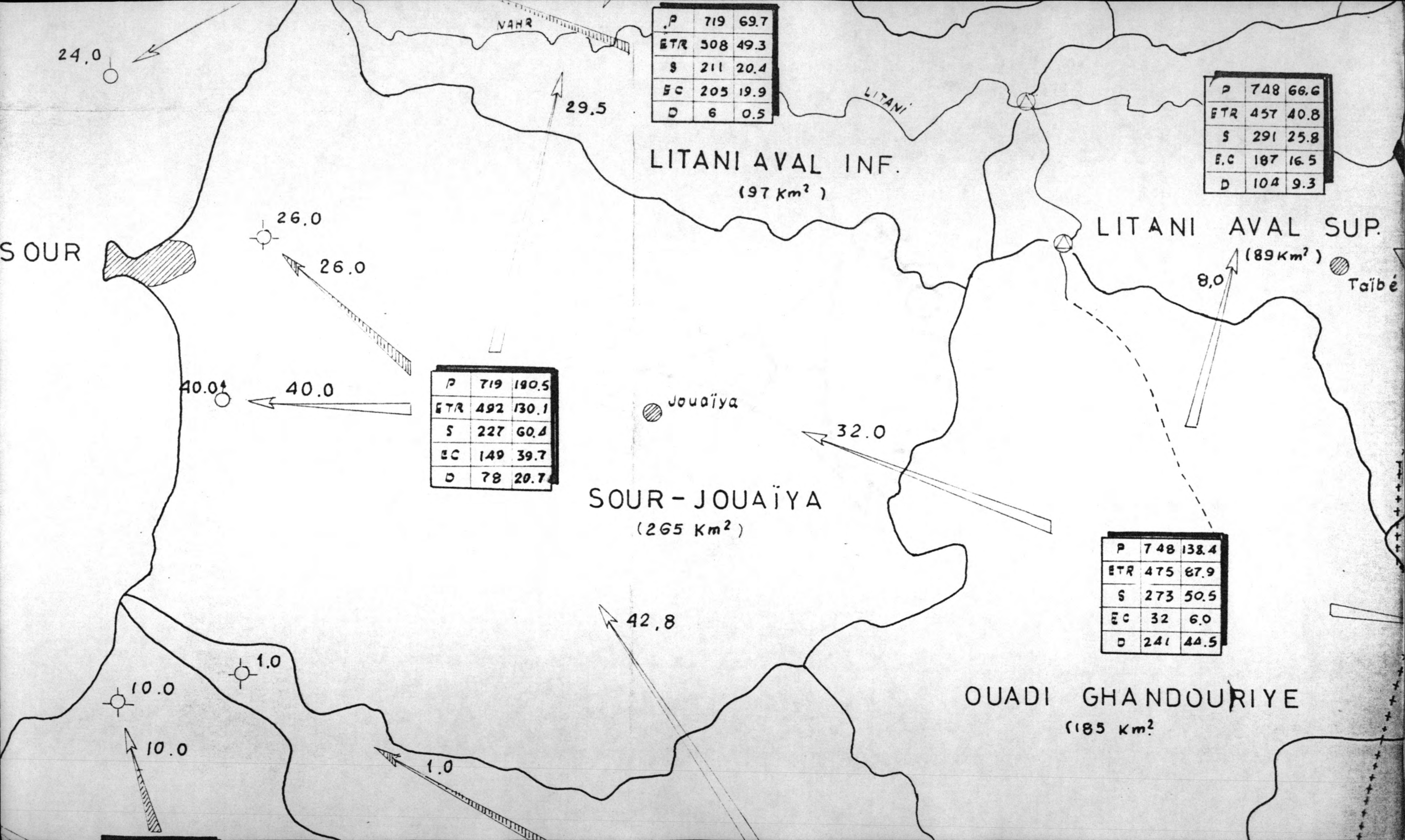
15.2

1.0

NAHR

LITANI





P	719	69.7
ETR	508	49.3
S	211	20.4
EC	205	19.9
D	6	0.5

P	748	66.6
ETR	457	40.8
S	291	25.8
E.C	187	16.5
D	104	9.3

P	719	190.5
ETR	492	130.1
S	227	60.4
EC	149	39.7
D	78	20.7

P	748	138.4
ETR	475	67.9
S	273	50.5
EC	32	6.0
D	241	44.5

LITANI AVAL INF.
(197 km²)

LITANI AVAL SUP.
(89 km²)

SOUR - JOUAÏYA
(265 km²)

OUADI GHANDOURIYE
(185 km²)

24.0

29.5

26.0

26.0

40.0

40.0

Jouaïya

32.0

8.0

42.8

1.0

10.0

10.0

1.0

Taibé

SOUR

NAHR

LITANI

P	748	66.6
ETR	457	40.8
S	291	25.8
EC	187	16.5
D	104	9.3

LITANI AVAL SUP.

(89 km²)

Taïbé

8,0

7,1

5,0

9,3



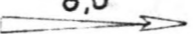
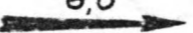
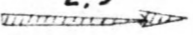
4,5

P	748	138.4
ETR	475	87.9
S	273	50.5
EC	32	6.0
D	241	44.5

OUADI GHANDOURIYE

(185 km²)

LEGENDE

-  40,0 Sources principales et débit en Mm³/an
-  13,5 Exploitation des eaux souterraines du bassin par pompage en Mm³/an (valeur de 1972)
-  8,0 Transfert d'un bassin à un autre par voie souterraine en Mm³/an
-  6,0 Perte des rivières en Mm³/an
-  2,5 Eau exploitée par pompage

P		
ETR		
S		
EC		
D		

- P = pluie moyenne annuelle (corrélée sur 32 ans)
- ETR = évapotranspiration réelle moyenne annuelle
- S = surplus disponibles = P - ETR
- EC = écoulement des eaux du bassin par voie de surface
- D = différence S - EC

Valeurs exprimées en 10⁶ m³/an

Valeurs exprimées en mm/an

Limite de bassin

Meer
M e d i t e r

SAÏDA

P	787	22.8
ETR	529	15.3
S	258	7.5
EC	258	7.5
D	0	0

SAÏDA
(23 km²)

NAHR SAÏTANIQ
1.0 2.5

2.5
2.5

P	805	43.5
GTR	512	27.7
S	293	15.8
EC	170	9.2
D	123	6.6

ROUMINE
(54 km²)

2.5 NAHR
2.5

ZAHRANI AVAL
(82 km²)

ZAHRANI

13.5
13.5

4.1

8.1

8.0 Adloun
8.0

P	751	220.8
ETR	509	149.6
S	242	71.2
EC	86	25.4
D	156	45.8

ADLOUN
(204 km²)

S	409	32.7
EC	403	32.2
D	6	0.5

SAÏDA
(23 km²)

P	856	91.6
ETR	508	54.4
S	348	37.2
EC	178	19.0
D	177	18.2

SAITANIQ
(107 km²)

P	1248	58.6
ETR	446	20.9
S	802	37.7
EC	802	37.7
D	0	0

ZAHRANI AMONT
(47 km²)

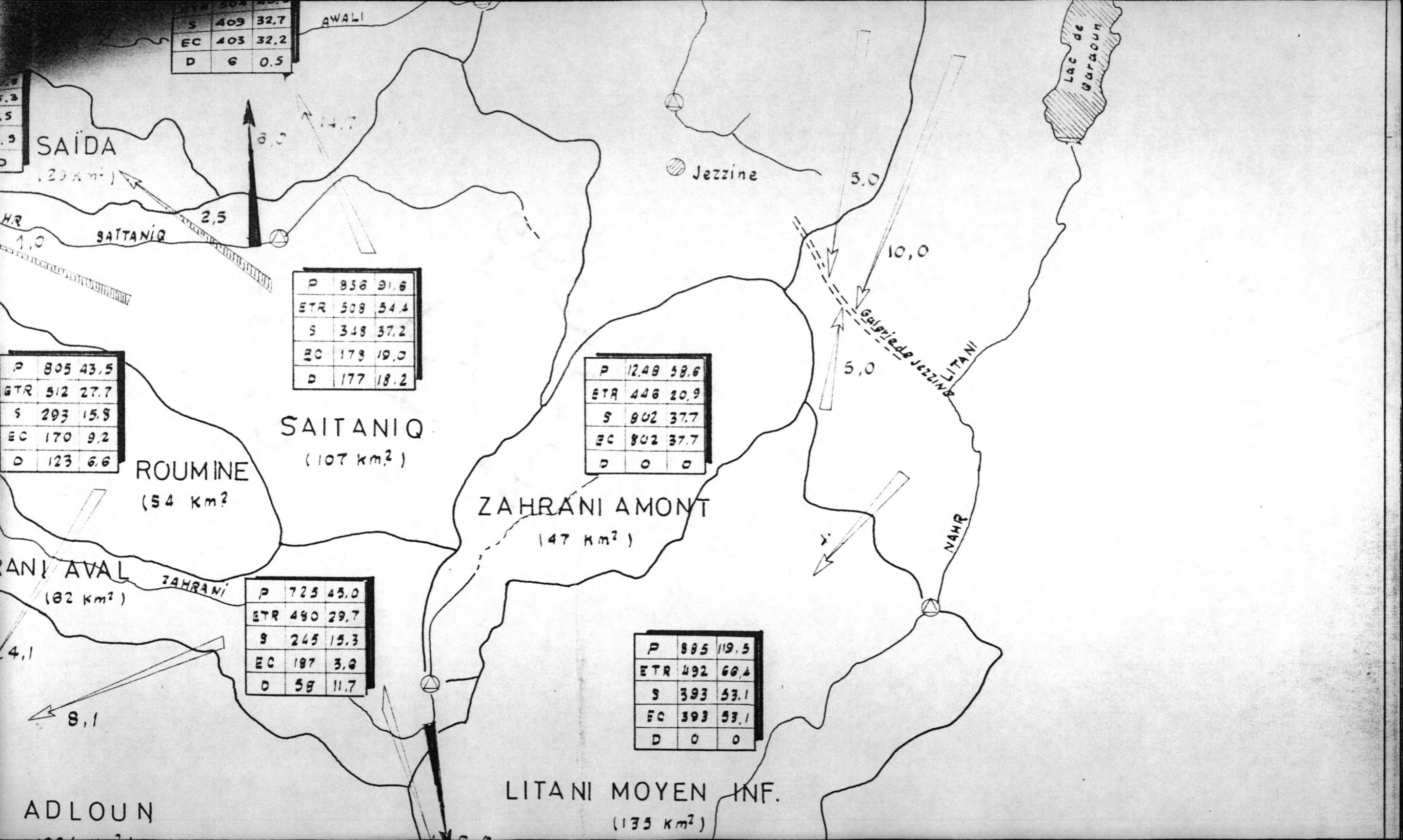
P	725	45.0
ETR	490	29.7
S	245	15.3
EC	187	3.8
D	58	11.7

ZAHRANI AVAL
(82 km²)

P	885	119.5
ETR	492	60.4
S	393	53.1
EC	393	53.1
D	0	0

LITANI MOYEN INF.
(135 km²)

ADLOUN





n n e e

Damour

YAWR

D
DA

4.0

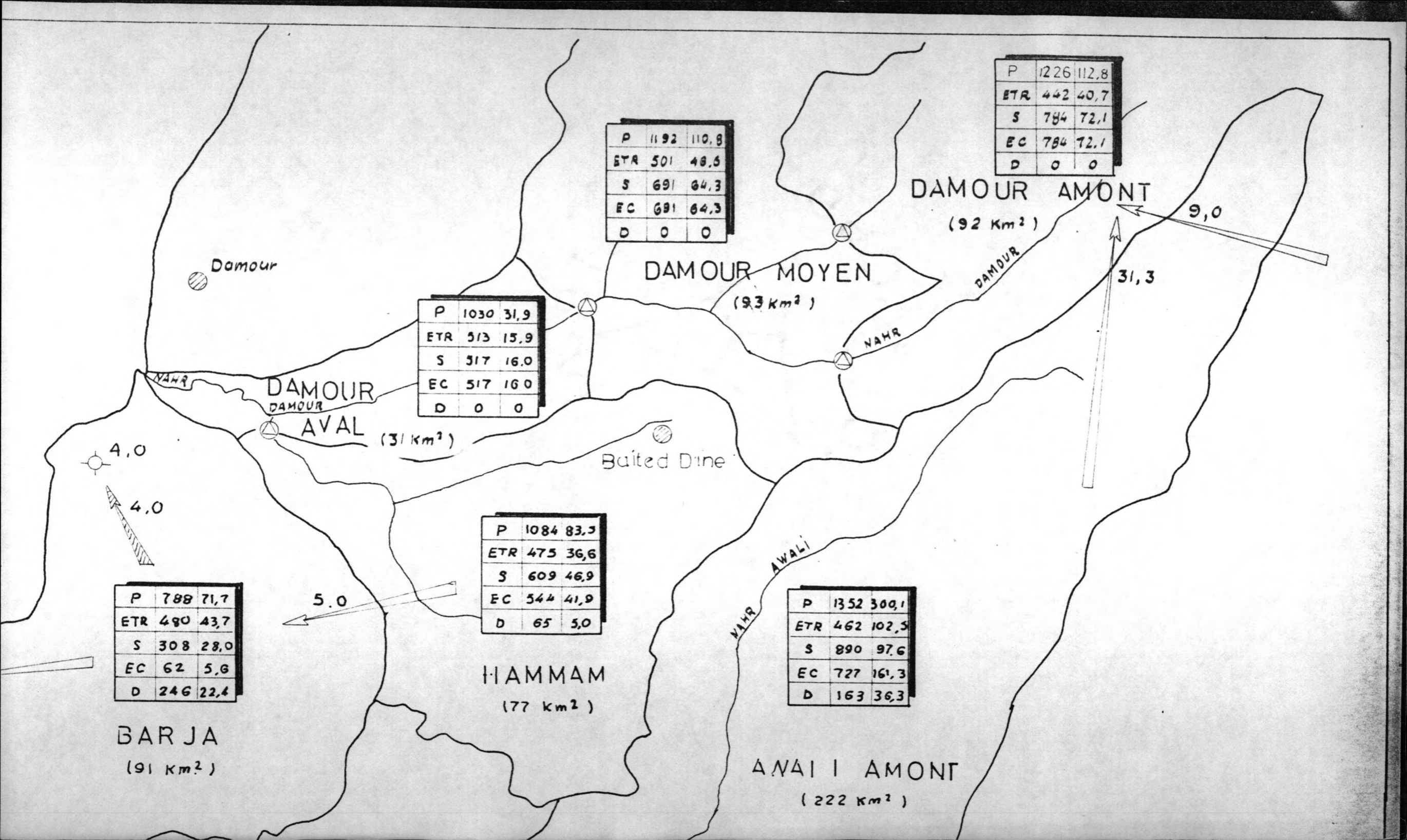


P	788	71,7
ETR	480	43,7
S	308	28,0
EC	62	5,6
D	246	22,4

23,4



BARJA
(91 km²)



P	1226	112,8
ETR	442	40,7
S	784	72,1
EC	784	72,1
D	0	0

P	1192	110,8
ETR	501	48,5
S	691	64,3
EC	691	64,3
D	0	0

P	1030	31,9
ETR	513	15,9
S	517	16,0
EC	517	16,0
D	0	0

P	1084	83,5
ETR	475	36,6
S	609	46,9
EC	544	41,9
D	65	5,0

P	1352	300,1
ETR	462	102,5
S	890	97,6
EC	727	161,3
D	163	36,3

P	788	71,7
ETR	480	43,7
S	308	28,0
EC	62	5,6
D	246	22,4

Damour

DAMOUR
DAMOUR

AVAL (31 km²)

DAMOUR MOYEN

(93 km²)

DAMOUR AMONT

(92 km²)

Baited Dine

HAMMAM

(77 km²)

ANAI I AMONT

(222 km²)

BARJA

(91 km²)

4,0

4,0

5,0

31,3

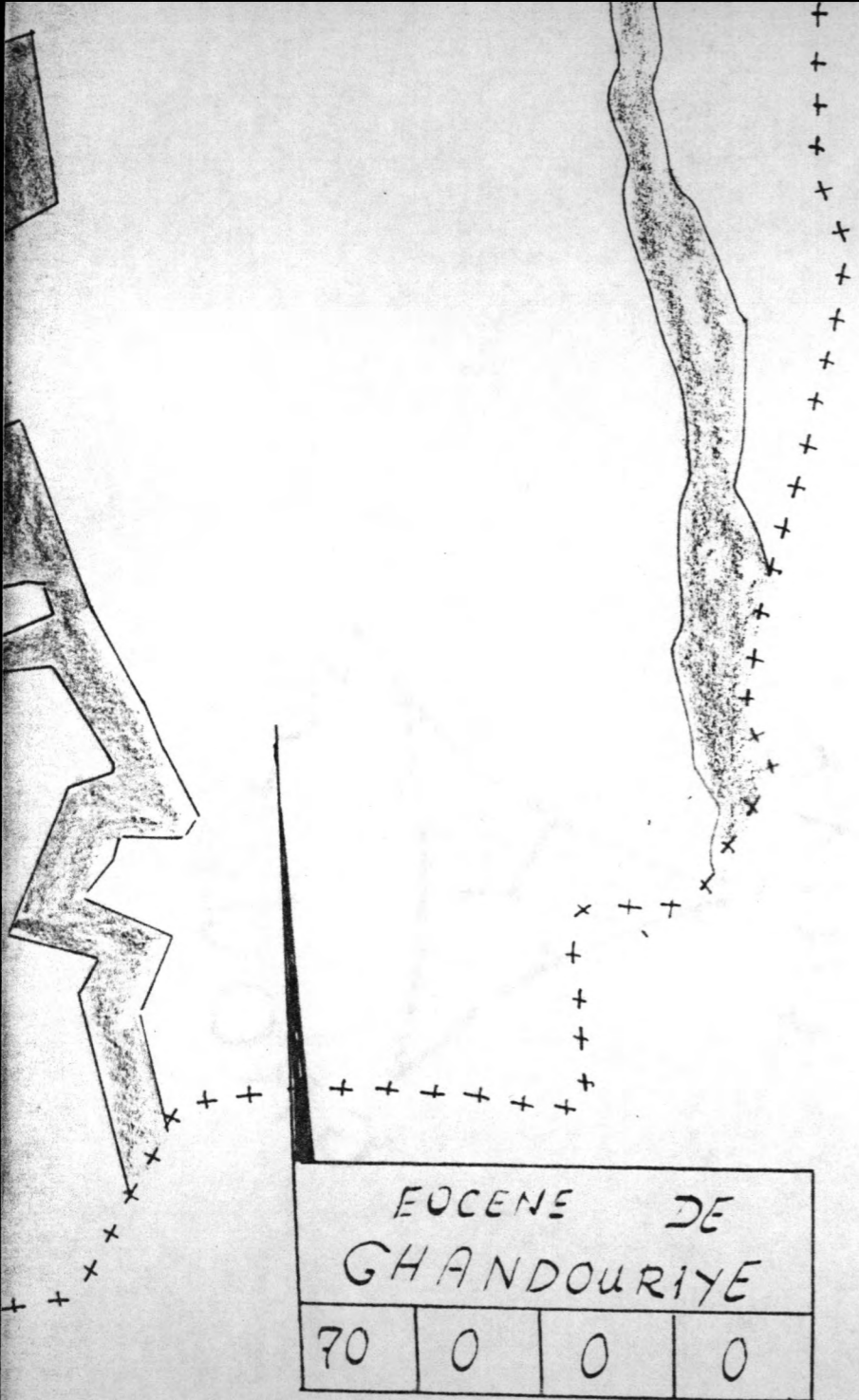
9,0

NAHR




NAHR



NAHR
AWALI

DAMOUR



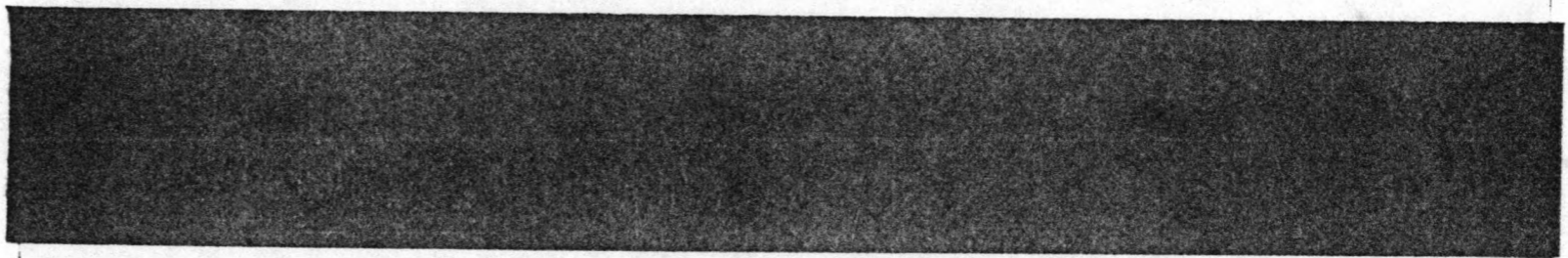
FAÏLLE PRINCIPALE

-  POMPAGE DANS LE CRETACE MOYEN
-  POMPAGE DANS L'EOCENE
-  POMPAGE DANS LE QUATERNAIRE

-  POMPAGE POSSIBLE DE 5 M³/AN
-  POMPAGE POSSIBLE DE 1 M³/AN

AQUIFERE Localisation			
A	B	C	D

- A- RECHARGE ANNUELLE MOYENNE EN M³/AN
- B- EXPLOITATION ANNUELLE ACTUELLE (1972) EN M³/AN
- C- EXPLOITATION SUPPLEMENTAIRE POSSIBLE EN M³/AN
- D- RESSOURCE EXPLOITABLE TOTALE PAR POMPAGE EN M³/AN



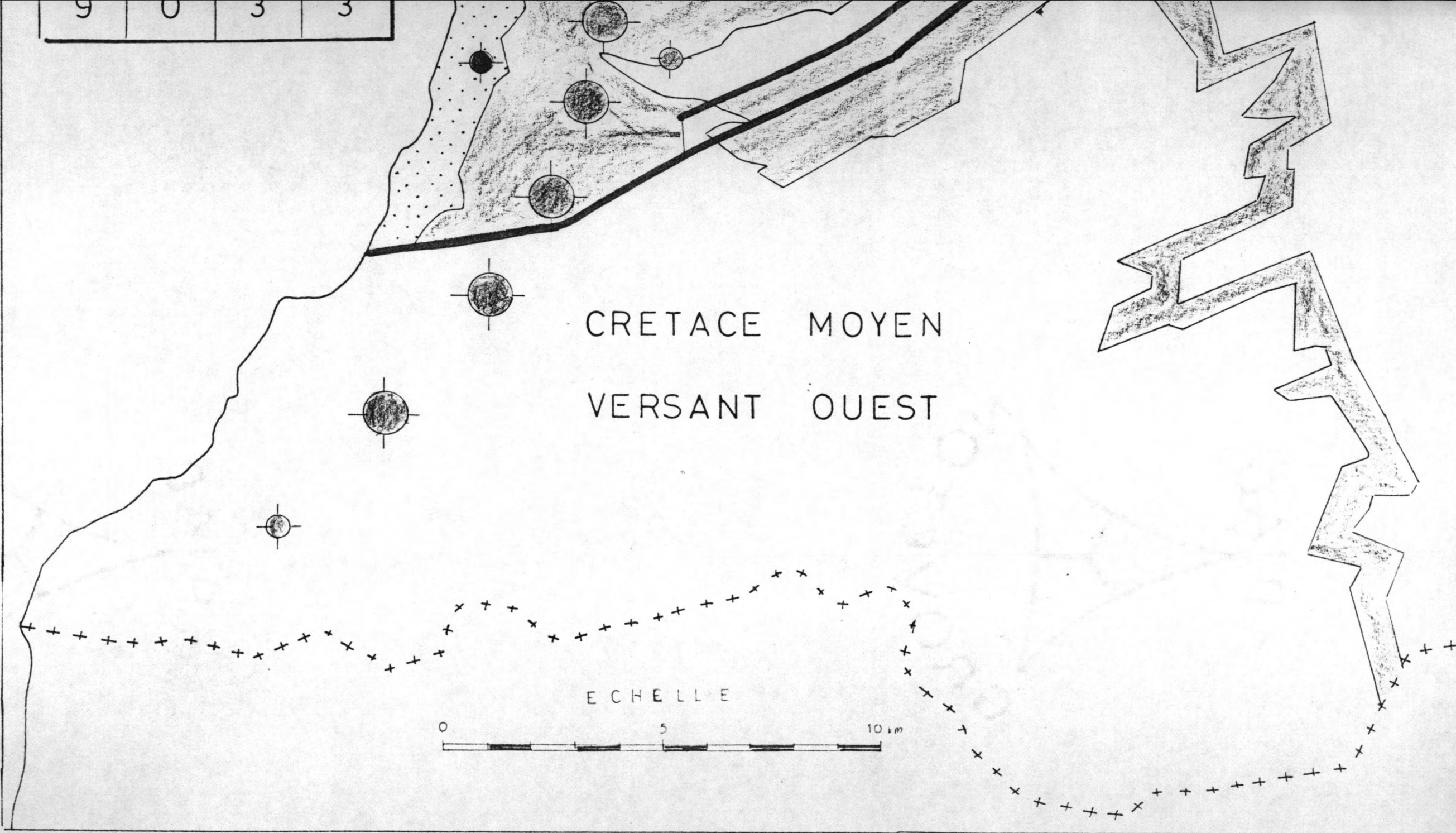
EOCENE DE GHANDOURIYE			
A	B	C	D
70	0	0	0

Les ressources en eau souterraine exploitables par pompage

7

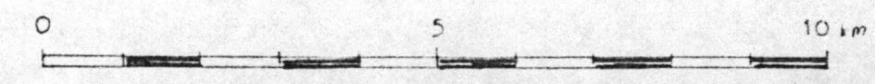
E. Jpouh

9 0 3 3



CRETACE MOYEN
VERSANT OUEST

ECHELLE



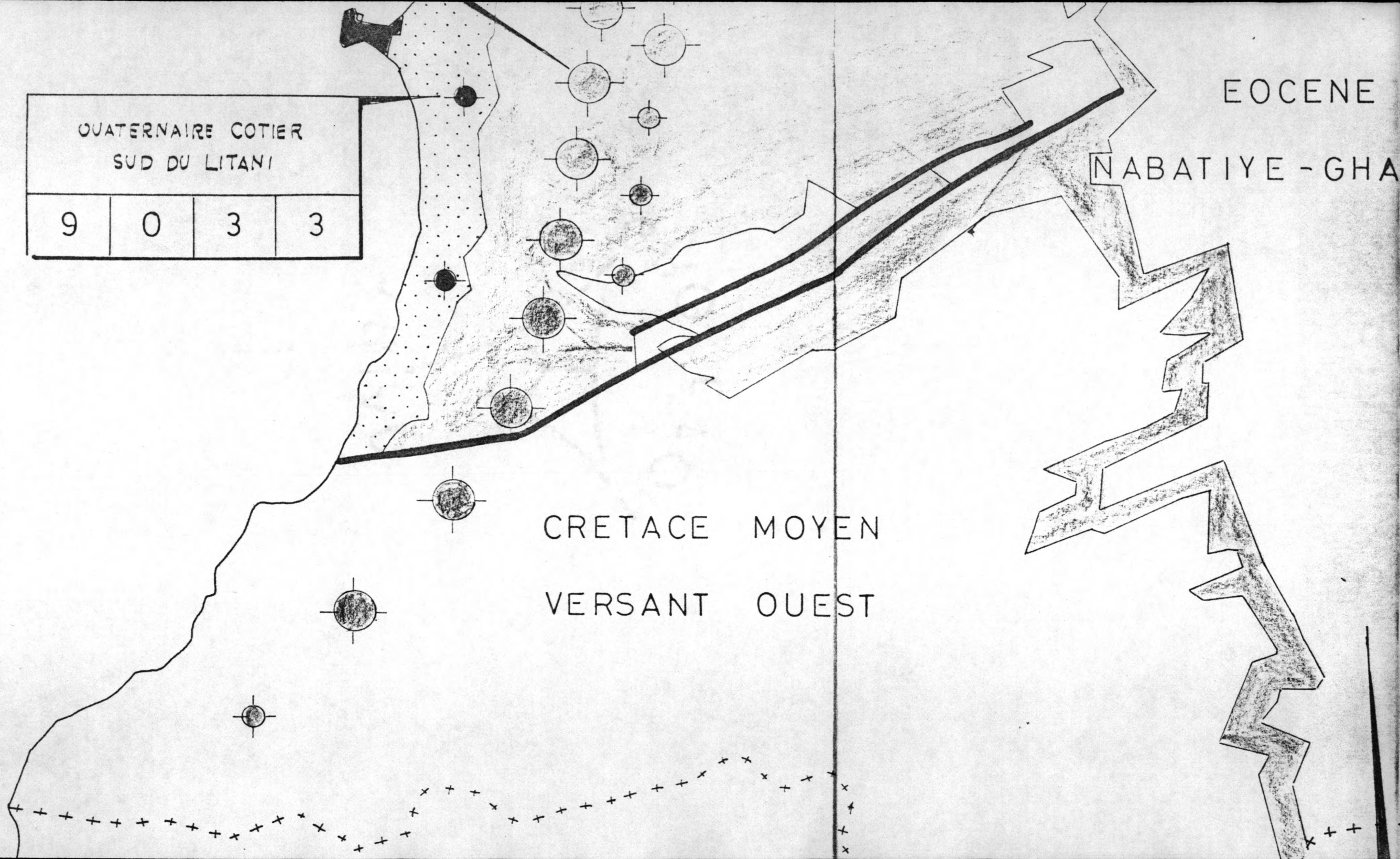
QUATERNAIRE COTIER
SUD DU LITANI

9	0	3	3
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CRETACE MOYEN
VERSANT OUEST

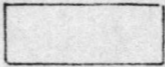
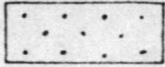
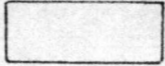

EOCENE




NABATIYE - GHA

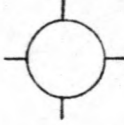



EOCENE DE
BATIYE - GHANDOURIYE

LEGENDE

-  AQUIFERE DE TYPE KARSTIQUE
-  AQUIFERE DE MILIEU POREUX (QUATERNAIRE)
-  AQUICLUDE IMPERMEABLE OU SEMI-PERMEABLE
-  FAÏLLE PRINCIPALE

-  POMPAGE DANS LE CRETACE MOYEN
-  POMPAGE DANS L'EOCENE
-  POMPAGE DANS LE QUATERNAIRE

-  POMPAGE POSSIBLE DE 5 Mm³/AN
-  POMPAGE POSSIBLE DE 1 Mm³/AN

AQUIFERE Localisation			
A	B	C	D

- A- RECHARGE ANNUELLE MOYENNE EN Mm³/AN
- B- EXPLOITATION ANNUELLE ACTUELLE (1972) EN Mm³/AN
- C- EXPLOITATION SUPPLEMENTAIRE POSSIBLE EN Mm³/AN
- D- RESSOURCE EXPLOITABLE TOTALE PAR POMPAGE EN Mm³/AN

Les ressources en eau souterraine

exploitables par pompage

CRETACE MOYEN
VERSANT OUEST
SUD DU LITANI

187	37	27	64
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SOUR

QUATERNAIRE COTIER
SUD DU LITANI

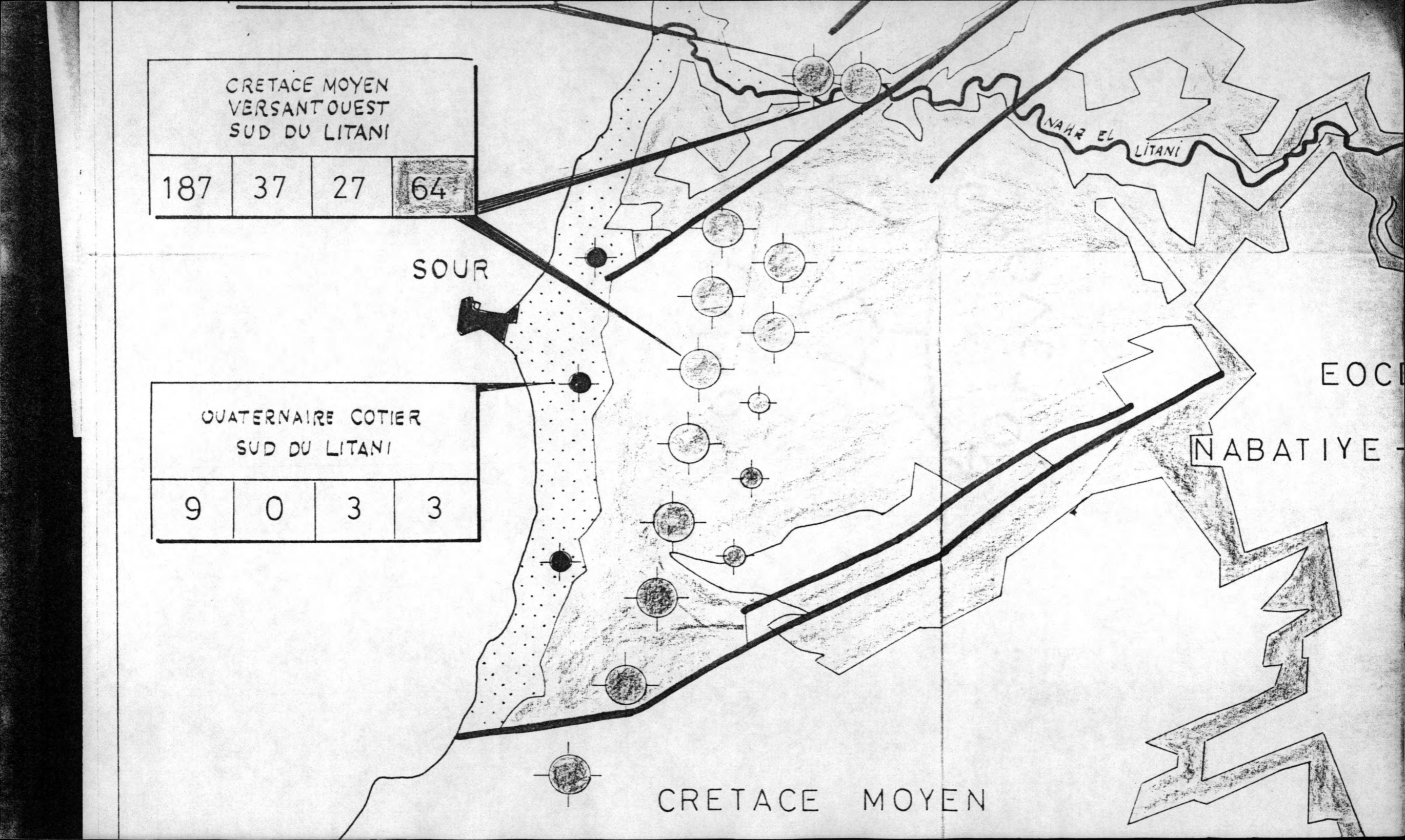
9	0	3	3
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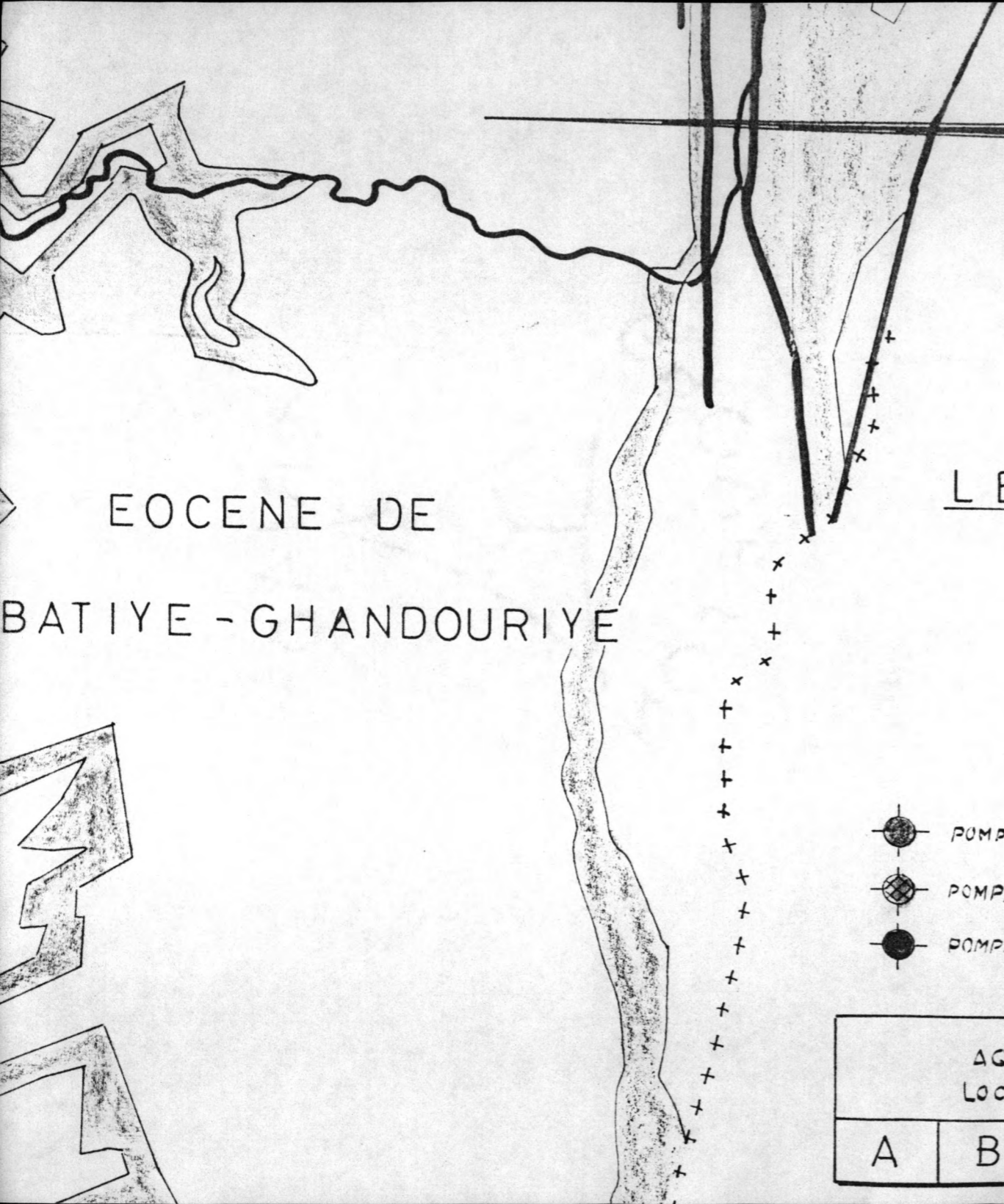
NAHR EL
LITANI

EOC

NABATIYE

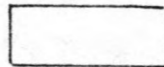
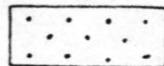
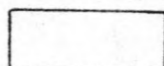

CRETACE MOYEN










EOCENE DE NABATIYE			
25	0	0	0

LEGENDE

-  AQUIFERE DE TYPE KARSTIQUE
-  AQUIFERE DE MILIEU POREUX (QUATERNAIRE)
-  AQUICLUDE IMPERMEABLE OU SEMI-PERMEABLE
-  FAÏLLE PRINCIPALE

-  POMPAGE DANS LE CRETACE MOYEN
-  POMPAGE DANS L'EOCENE
-  POMPAGE DANS LE QUATERNAIRE
-  POMPAGE POSSIBLE DE 5 Mm³/AN
-  POMPAGE POSSIBLE DE 1 Mm³/AN

AQUIFERE Localisation			
A	B	C	D

- A- RECHARGE ANNUELLE MOYENNE EN Mm³/AN
- B- EXPLOITATION ANNUELLE ACTUELLE (1972) EN Mm³/AN
- C- EXPLOITATION SUPPLEMENTAIRE POSSIBLE EN Mm³/AN
- D- RESSOURCE EXPLOITABLE TOTALE PAR POMPAGE EN Mm³/AN

EOCENE COTIER
ENTRE AOUALI ET ZAHRANI

Am	9	2,5	2,5	5
A.5	2			

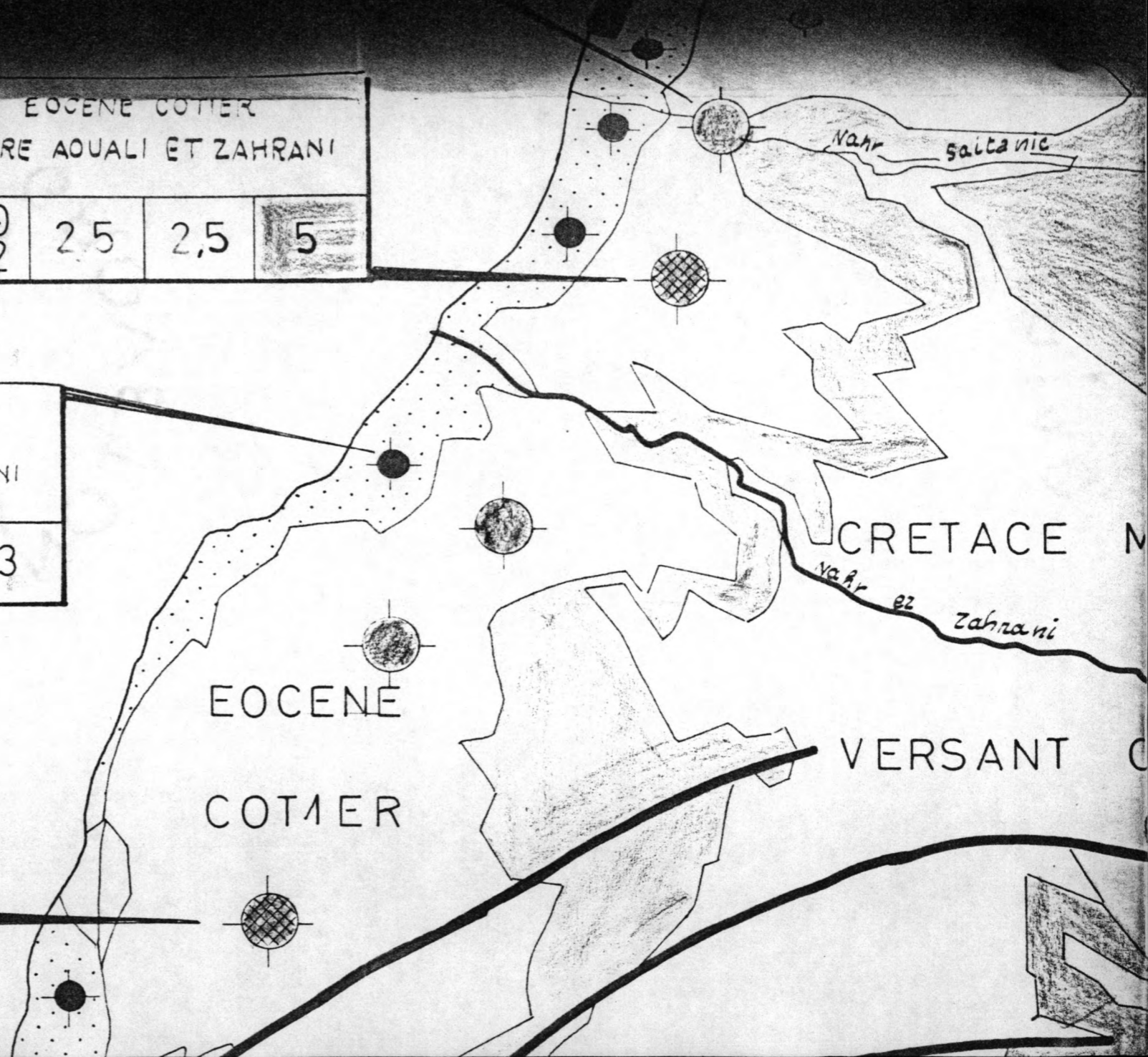
QUATERNAIRE COTIER
ENTRE AOUALI ET LITANI

Am	45				
10	2				
10	0				
20	2	20	0,5	2,2	3

EOCENE COTIER
ENTRE ZAHRANI ET LITANI

12	3	2	5
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Am 45
10 2
10 0
20 2



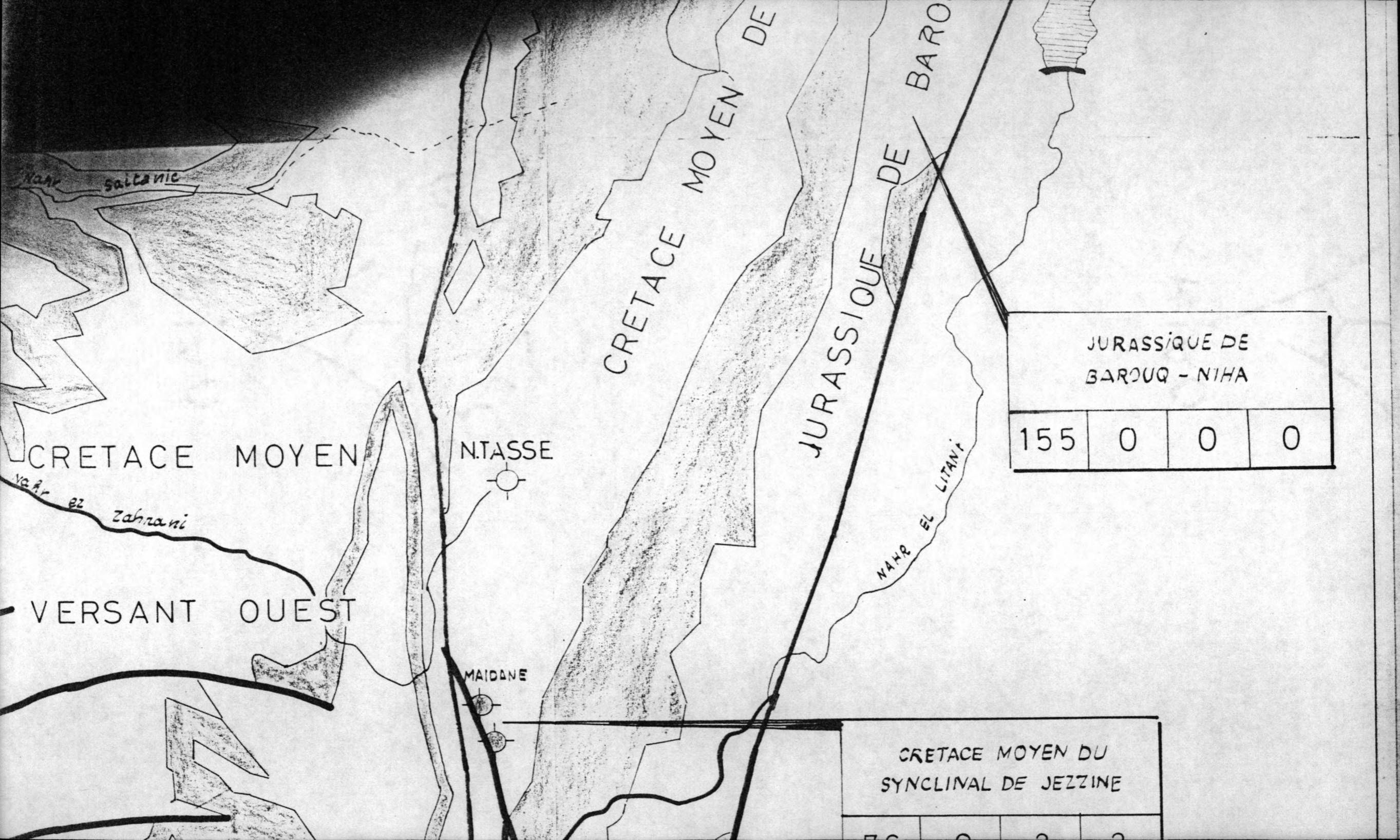
Nahr Saltanie

CRETACE M

Nahr ez Zahrani

EOCENE
COTIER

VERSANT C



JURASSIQUE DE BAROUQ - NIHA			
155	0	0	0

CRETACE MOYEN DU SYNCLINAL DE JEZZINE			
76	0	0	0

CRETACE MOYEN
VERSANT OUEST
ENTRE DAMOUR ET AOUALI

77

4

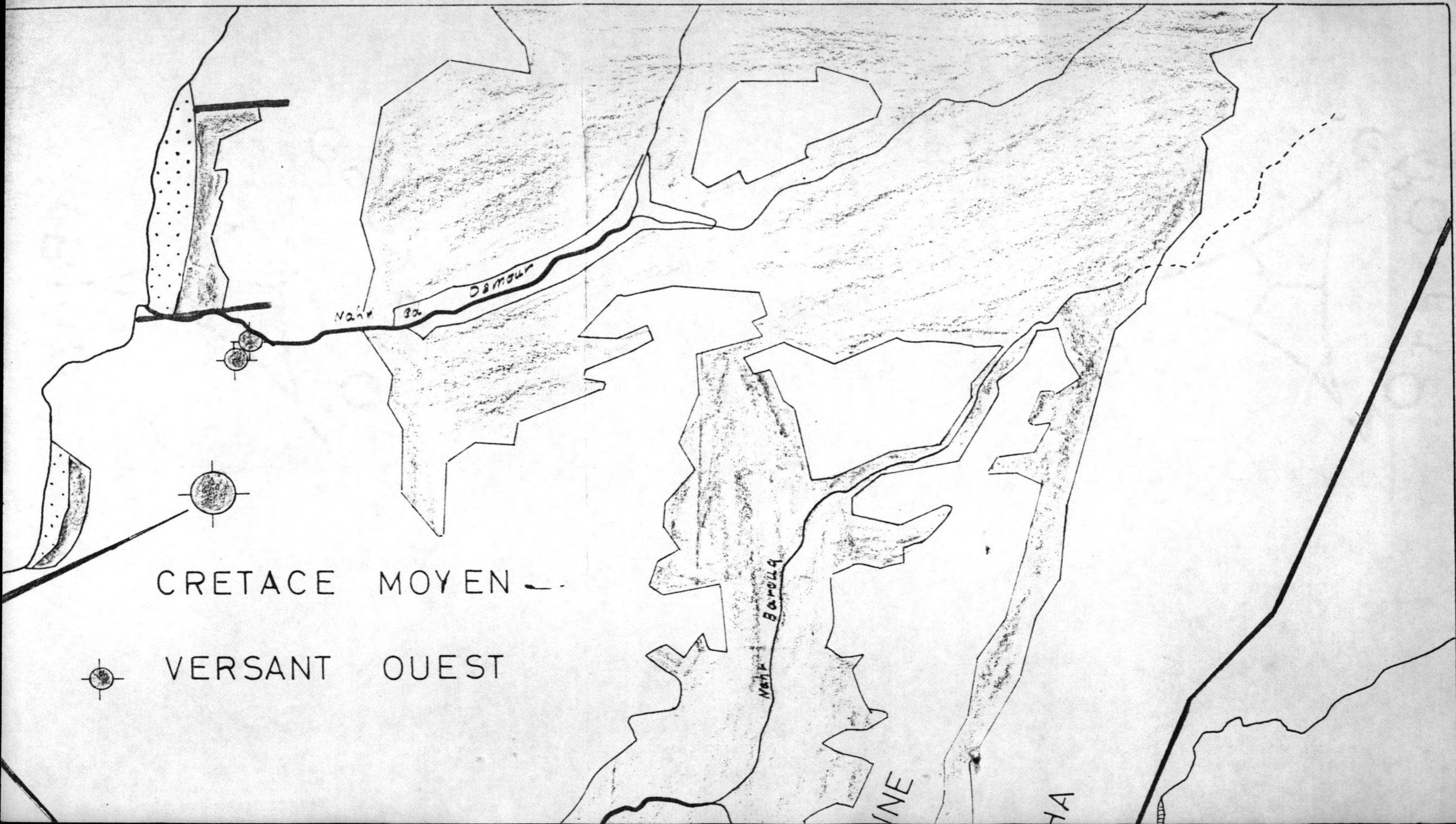
9

13

CRETACE MOYEN
VERSANT OUEST
ENTRE AOUALI ET ZAHRANI

CRETACE

VERSANT



DAMOUR

BARDOLLA

CRETACE MOYEN

VERSANT OUEST

INE

TA