Al-Ouat 'Ouate

NUMBER 15 NEW SERIES

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العدد 15 السلسلة الجديدة

SPELEO CLUB DU LIBAN

2009

Revue Libanaise de Spéléologie et de Karstologie

The Lebanese Review on Speleology and Karst

المجلة اللبنانية لدراسة المغاور وعلم الكارست

EXPEDITION JI.ITA

MZ&PARTNERS
ARCHITECTURAL & ENGINEERING CONSULTANCY

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في ١٩٥١ تأسس النادي اللبناني للتنقيب في المغاور على يد ليونال غرّه. البير أنافي. ريمون خوام وسامي كركبي و هو أقدم نادي للمستغورين في الشرق الاوسط. يضم اكثر من ٢٠٠ عضو موزعين في جميع انحاء العالم. يهتم النادي في الشؤون المتعلقة بالمغاور و علم الكارسة. في ١٩٦٣ استحق لقب جمعية ذات منفعة عامة (المرسوم رقم ١٤٢٦٢ تاريخ ١٩٦٣/١١/٢٨) و في ١٩٦٩ نال وسام الارز الوطني برتبة ضابط (رقم ٥١٢ تاريخ ١٩٦٩/٢/٢٤) على اعماله في مغارة جعيتا كما أنه نال وسام الارز الوطني برتبة فارس (رقم ١٥٤٠٠٠ تاريخ ٢٠٠٥/١/١.).

The Spéléo Club du Liban was founded in 1951 by Lionel Gorra, Albert Anavy, Raymond Khawam and Sami Karkabi. It is the oldest caving club in the Middle East. It has over 200 members all over the world. The club specializes in speleology and karst. The club was awarded the 'A Club that is a Benefit to the Public' Order by the Lebanese government in 1963. 'The National Order of the Cedars', from the Lebanese government was awarded for their work in Jiita Cave, rank Officer, in 1969. In 2005 a second Order of the Cedars was awarded to the club, rank Knight.

Le Spéléo Club du Liban fut fondé en 1951 par Lionel Gorra, Albert Anavy, Raymon Khawam et Sami Karkabi. Il s'agit du plus ancien club de spéléologie au Moyen-Orient et comprend plus de 200 membres au monde entier. Le club est spécialisé en spéléologie et karstologie. En 1963, il fut décrété d'utilité publique (décret N°14262 du 28/11/1963). En 1969, il reçu l'Ordre National du Cèdre du grade Officier (N°512 du 24/02/1969) pour les travaux effectués dans la grotte de Jiita et reçu en 2005, un second Ordre National du Cèdre du grade Chevalier (N°154000 du 10/10/2005).

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المجلة اللبنانية لدراسة المغاور وعلم الكارست

Editors
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Johnny Tawk

Layout and collages
Rena Karanouh

In collaboration with
The Lebanese National Council for Scientific Research
CNRS

"Learn to see" as physician William Osler said in the 19th century.

What helped scientists like Charles Darwin, Alfred Russel, Franklen Evans, Edouard Dupont and others to understand is that they not only possessed the ability to look but also to see. This is the major foundation for their amazing discoveries.

Learning to 'look and see' is what SCL is trying to do.

Lebanon, the land of karst in the Middle East, has a special ecosystem being a melting point between Africa, Asia and Europe. It has striking caves and karst elements that not only need to be looked at, but also to be seen.

In Lebanon we are starting to uncover the amazing karst environment that we live in, including our remarkable caves, speleothems and fauna present in them. All this and much more are to be looked at and seen in such a fragile environment. Caves are truly the last frontiers on earth and in Lebanon and they still hold places that have never been seen before.

Let us keep our eyes open and watch out for the amazing environment that we live in.

We should also thank and pay tribute to our fathers, who got us were we are now, and in their honour let us teach and help the new generation to follow the path that we have learnt.

Issam Bou Jaoude
Editor

We would like to thank Shk. Khalid Bin Thani A. Al Thani from First International Investment Group, Mr. Abdulla Bin Nasser Al Misnad from Gulf Cement Company and Mr. Marwan Zgheib from MZ & Partners for their moral and financial support to ensure a consistent release of our publication.

We would also like to thank Dr. Dia Karanouh and Mrs. Nidal Nseir and Ms. Hala Bou Jaoude for their valuable revision of the English articles, Stephanie Mailhac for her French translation and Maya Sarrouf for her help.

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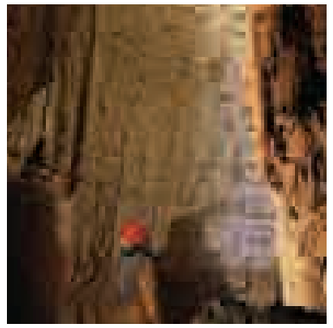
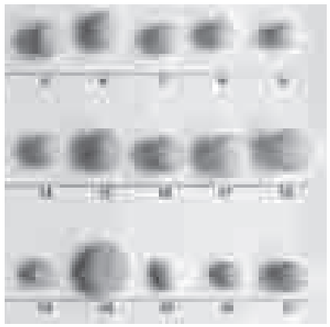
A canyon passage in Rahoue cave
(Photo by Johnny Tawk)



> Mgharet el Rahoue

Thanks to our generous sponsors Shk. Khalid Bin Thani A. Al Thani, Mr. Abdulla Bin Nasser Al Misnad and Mr. Marwan Zgheib, the coming issue of Al-Ouat'Ouate Magazine, issue 16, is already in the works. Several articles are already being researched. Here are some of the new discoveries, scientific reasearch and many varied cave related issues that will appear in our next issue:



> The Pearls of Kanaan.

> The detailed survey of Chaos, Jiita.

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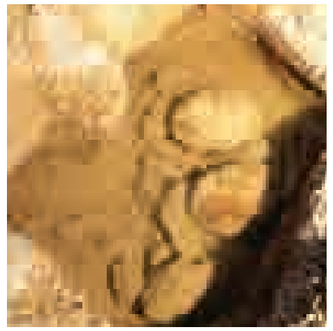

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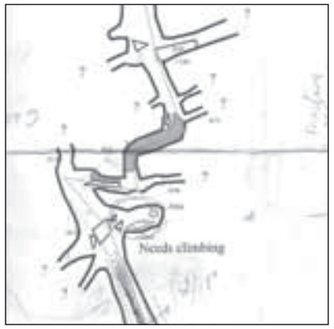

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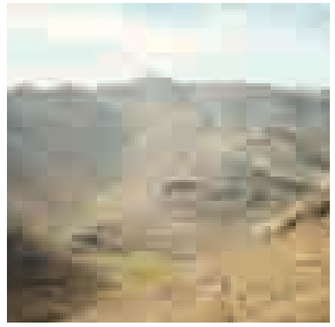
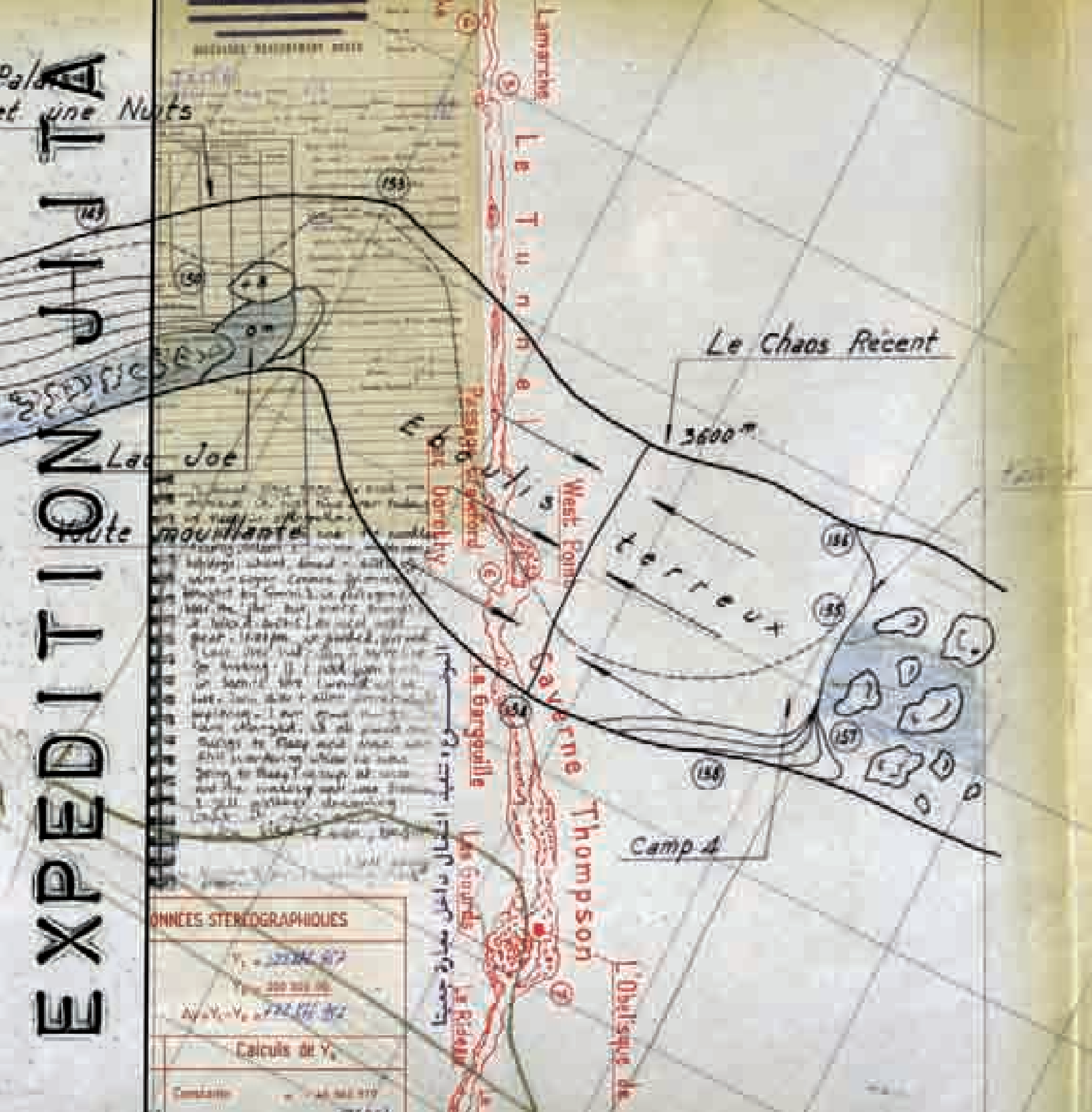


> Karst plateau

> Colouration.

> The karst of Lebanon



لهذه المغارة طابع غريب.

هي تريد ان تكون في طليعة المغاور في لبنان من حيث الحجم "حجم الممرات والتشكلات" والطول والارتفاع وجمال التشكلات.

تاريخ الأستغوار في لبنان مسطر داخل هذه المغارة. واهم هذه الاكتشافات جائة على يد اللبنانيين بقيادة أحد اعمدة الاستغوار في لبنان واحد مؤسسي النادي البناني للتنقيب في المغاور السيد سامي كركبي.

بعد خمسين سنة على اكتشاف الطابق العلوي وهو الان موقع سياحي جدير بالاحترام في عالمنا العربي. هذه المغارة ما تزال تحتفظ باسرار وتعتمد على الافصاح عنها دورياً ولكن بشكل بطيق وليس مل.

نلقي الضوء في هذا العدد من مجلة الوطواط على جمل هذه المغارة من خلال الافصاح عن معالمها من تشكلات متعددة الأوان ومغامرات مشوقة رافقة الأكتشافات داخلها.

يجب ان نتأقلم مع هذا الطابع الغريب لمغارة جعيتا والمحافظة عليه لانه ملك الاجيال القادمة.

Have you ever met Jiita?

It can never bore you.

You can never but enjoy every moment you spend in her realms. It amazes you when you go in but will beat you every time on your way out.

But it is surely a cave with an attitude.

Jiita cave wants to be the Giant of all caves in Lebanon. It desires to be the longest, the largest, the most beautiful and the one that holds the most cave secrets.

It is the mother of our founding fathers. It witnessed the birth of our club in 1951. It triggered a swirl of caving adventures in Lebanon. Caving history was written in it.

Fifty years since the discovery of its Upper Gallery, Jiita is now the most visited tourist attraction in Lebanon, its beauty rivaling many international show caves.

This cave still holds on to many of its secrets. But it is slowly showing them to us bit by bit. The process is so slow it hurts, but still, anything worthwhile is worth waiting for, right?

We pay tribute in this issue of the Al-Ouat'Ouate magazine to this amazing cave by showing you some of its new secrets: big columns; amazing stalagmites; stories from one of its great discoverers Mr. Sami Karkabi; its white and red galleries; and its climatic imprints...all this and more.

We keep on watching for what she decides to unveil next.

Connaissez-vous Jiita?

Vous ne pourriez que prendre plaisir de chaque moment passé dans ses bras. Jiita vous surprendra et vous marquera de manière inoubliable au cours de votre visite et bien après. Cette grotte a sûrement un caractère, un charme, la plus longue des grottes libanaises, la plus jolie et surtout, la plus secrète. Elle est la mère de nos pères fondateurs et témoin de la naissance de notre club en 1951 où le berceau et l'histoire des aventures spéléologiques libanaises furent écrits.

50 ans après la découverte des Galeries Supérieures, Jiita est la plus grande attraction touristique du pays et sa beauté rivalise celle des grottes internationales aménagées.

Conservant minutieusement ses secrets, Jiita les dévoile peu à peu. Le progrès est lent et douloureux, mais les résultats prouvent le mérite des efforts.

Dans cette édition du magazine Al Ouat'Ouate, nous rendons hommage à cette grotte en vous dévoilant, autant que possible, sa splendeur, ses colonnes, ses stalagmites, les histoires de son plus grand explorateur M. Sami Karkabi, ses galeries rouges et blanches, ses empreintes climatiques… tout cela et encore plus.

Prenez plaisir dans l'attente de ses prochains dévoilements.

Sami Karkabi | *kraks@cyberia.net.lb*

LES PREMIERS **TRAÇAGES À L'URANINE** AU LIBAN

Résumé

Le désaccord qui opposait la Compagnie des Eaux de Beyrouth à la Société des Eaux du Kesrouan remonte à 1911. Il concernait le captage des eaux de Nabaa el Laban à des fins d'irrigation. La Compagnie assurait qu'elle était lésée par ce captage, soupçonnant que les eaux qui s'écoulaient librement auparavant dans le lit du Nahr es Salib alimentaient aux travers de fissures la rivière souterraine de Jiita, ce cours d'eau souterrain ravitaillant à son tour la rivière souterraine. Trois traçages à la fluorescéine destinés à vérifier les faits furent entrepris en 1913 dans des conditions précaires, rendant les résultats peu fiables.

Afin de mettre fin à ce litige, le Général Weygand, Haut Commissaire de la République Française en Syrie et au Liban, institue par décision N°1998, le 26 juillet 1923, une ''Commission'' destinée à chercher l'origine de l'alimentation en eaux de la source principale du Nahr el Kelb.

C'est à la suite de recherches effectuées dans les archives diplomatiques de Nantes (Mandat Syrie-Liban) et dans la revue Al Kulliyah de l'Université Américaine de Beyrouth qu'un certain nombre d'éléments relatifs à cette affaire ont été reconstitués.

Il nous est apparu indispensable, vu la complexité de cette histoire, de retracer brièvement les différentes phases de son évolution.

يتطرق هذا المقال الى المراحل والظروف المحيطة بالجدل الذي حصل على حرم نبع اللبن بين شركة مياه بيروت وجمعية مياه كسروان في عام 1911. الشركة تقول ان المياه المتدفقة من نبع اللبن تغور في الشقوق في منطقة الصليب لتغذي المجرى الجوفي لنبع جعيتا. عمليات التلوين التي حصلت سنة 1914 للتأكد من هذه النظرية لم تجدي نفعا. لذالك قام المفوض السامي للبنان وسوريا انذاك الجنرال وينغارد بأصدار قرار رقم 1998 في تموز 1923 بتعين لجنة للنظر في هذا الأشكال. يستعين ألباحث بارشيف الجامعة الأمركية والارشيف الدبلوماسي في نانت.

The disagreement on the catchment area of Nabaa el Laban between the Beirut Water Company and the Society of Waters of Kesrouan goes back to 1911. The Company argued that the water passing freely in the bed of Nahr el Salib fed the underground river of Jiita through fissures and fractures. Three tracing tests using fluorescéine were undertaken in 1913 to prove this theory, proved inconclusive. To put an end to this debate, the General Weygand, high commissioner of the French République in Syria and in Lebanon, formulates a decision N°1998, on July 26th, 1923. The decision stipulates a «Commission» intended to search for the main source of Nahr el Kelb. This paper shortly illustrates the history and the stages regarding the issue at hand with the aid of information gathered from the archives of 'Archives Diplomatiques de Nantes' (Mandate Syria – Lebanon) and the Al Kulliyah bulletin from the American University of Beirut.

Il nous est apparu indispensable, vu la complexité de cette histoire, de retracer brièvement les différentes phases de son évolution.

L'alimentation en eau de Beyrouth en 1870

La capitale libanaise est ravitaillée dès 1870 par les eaux issues de la résurgence des grottes de Jiita, source principale du Nahr el Kelb. La concession de cette opération appelée ''Entreprise des Eaux de Beyrouth'' (devenue Compagnie des Eaux de Beyrouth) est accordée le 22 juillet 1870 par firman du Gouvernement Impérial Ottoman à M. Thevenin, ingénieur français, aux conditions suivantes : les eaux nécessaires seront empruntées au Nahr el Kelb en un point voisin de son embouchure dans la Méditerranée et seront conduites par un canal d'amenée à l'usine de Dbayeh. Une partie de ces eaux servira de force motrice aux turbines qui la refouleront à Beyrouth, l'autre sera préalablement filtrée puis élevée au moyen d'une usine hydraulique qui s'établira et fonctionnera de façon à ne gêner ni les irrigations ni les moulins desservis par le cours d'eau. La quantité d'eau amenée à Beyrouth est fixée au minimum à 4000 m^3 par 24 heures. L'eau utilisée pour refouler à la vapeur 1 m^3, exigerait l'emploi de dix autres mètres cubes environ par les installations hydrauliques.

Le 6 novembre 1897 cette concession, à courir de la date du firman impérial, a été prolongée de 40 ans par une convention additionnelle.

L'alimentation en eau du Kesrouan

Le 3 avril 1893, un permis d'exploitation à but d'irrigation, du Nahr es Salib est accordé par la cour administrative du Liban au Cheikh Sejaan Maroun el Khazen. La Compagnie ne s'en inquiéta pas estimant que le Cheikh n'avait apparemment pas les moyens financiers d'aboutir mais soupçonnant toutefois, quoique n'en ayant aucune preuve, que les eaux issues de la résurgence de Jiita étaient directement alimentées par les eaux d'infiltration provenant du Nahr es Salib.

En 1905, les droits du Cheikh Sejaan, étaient transférés au Cheikh Mansour el Bittar.

Au mois de Juin 1907, Sélim Bey Chaker, sujet ottoman, natif du village libanais de Deir el Harf, représentant un syndicat de financiers d'Egypte, demande à la cour administrative de transférer encore une fois ces droits à son propre nom. Craignant que cette fois ne soit réalisé le projet, la Compagnie s'en alarme et proteste de façon formelle auprès de Youssef Pacha, Gouverneur du Liban. Cette crainte découle du fait, que si la quantité d'eau fournie pendant les mois d'hiver suffisait à tous les besoins, il n'en serait pas de même à l'étiage (de juin à novembre) pour refouler 640.000 m^3 d'eau à la vapeur. A ceci, s'ajouterait l'obligation de modifier les installations hydrauliques afin de les adapter à un débit plus réduit que celui pour lequel elles avaient été calculées, d'où préjudice et énorme dommage.

Ne tenant aucun compte de cette protestation ainsi que celle de la demande de Sélim Bey Chaker,

Youssef Pacha, accorde une nouvelle autorisation à Michel Bey Tueni. La Compagnie protesta alors auprès de la Sublime Porte, par l'intermédiaire du Wali de Beyrouth. Le Gouverneur du Liban fut invité à fournir des explications et le Gouvernement Impérial envoya de Constantinople un haut fonctionnaire des Travaux Publics mandaté pour effectuer une étude scientifique et géologique de concert avec les ingénieurs du Wilayet et du Liban. Toutefois, la Compagnie n'ayant qu'une confiance limitée dans les connaissances scientifiques de ces fonctionnaires, demanda au Wali de Beyrouth de leur adjoindre **M. Elie Day**, professeur de géologie au Collège Américain. La Compagnie profita d'une absence du dit professeur, pour se rendre dans le Kesrouan et faire seule son enquête. Le rapport fut présenté le **21 octobre 1908**. Il contenait de nombreuses erreurs et lacunes. Le professeur Day se rend alors dans les vallées du Nahr es Salib et du Nahr el Kelb. Son étude conclut à la probabilité d'une communication souterraine entre le haut Nahr es Salib et les grottes de Jiita. Une série d'observations confirmèrent cette opinion. Dès lors, Michel Bey Tueni, renonça à continuer ses démarches.

Extrait de l'étude du Pr. A. E. Day publié en 1912:

… The river bed at Meiruba and the Jaita cave are both in the lower (Jurassic) limestone of Lebanon, and it is probable that the whole of the subterranean channel is excavated in this formation. Caves are common in limestone countries, being formed by the solvent action of the water of the rains and the snows as it percolates through the rock. While it has been stated as probable that the water which flows out of the Dog River cave, it must be remembered that this not been proved. If a large amount of solution of some harmless coloring matter were turning into stream near Meiruba at the time of low water in the latter part of the summer, while competent persons made careful observations at the Dog River cave, it might thereby be ascertained whether or not the water of Meiruba forms a part of the subterranean river. This would entail considerable expense and careful attention from skilled observers. A demonstration of another character seems likely to be made in the near future. A company has been formed to divert the water of Neb'-ul-Asal by an aqueduct, which shall take it to the region of Reifun, Ajaltun, and Ashkut. Preliminary surveys were made recently and it may be that the plan will be carried out. It is to be hoped that if is results in a diminution of the output of water from the Dog River cave, the amount remaining may prove to be sufficient for the wants of Beirut. The Beirut Water Company contested the right of the new Company to divert the head waters of the Dog River systems, but the litigation resulted unfavorably to the Beirut Company.

(réf. Al-Kulliyah,Alfred Ely Day, Professor of geology - A.U.B. - Vol. III N°3, p.72 – January 1912).

Sélim Bey Chaker revint à la charge en **1911**. Malgré les protestations de la Compagnie, la concession lui fut finalement accordée par «mazbata» sanctionné le **7 juillet 1911** par Youssef Pacha, Gouverneur du Liban. Ce dernier accorde à M. Sélim Bey Chaker le droit de la fourniture, d'alimentation et d'irrigation à divers villages du Kesrouan. Le transfert de cette concession prend nom de ''Société des Eaux du Liban''. Elle sera reportée quatre mois plus tard par son bénéficiaire à une société constituée par un groupement anglais. Le gouvernement de Constantinople ne parait pas être intervenu dans l'affaire.

Sur quoi la Compagnie adressa le 1er novembre 1911 au Ministère des Travaux Publics une dépêche le rendant responsable des dommages que l'octroi de cette concession entraînerait. Suite à cette dépêche, le Ministre des Travaux Publics nomma une commission d'experts et adressa au Wali de Beyrouth, en date du **17 novembre 1911**, l'ordre de faire rechercher par cette commission, soit par matières colorantes, soit par examen microscopique, si oui ou non, il y avait communication entre les eaux du Nahr es Salib et les grottes de Jiita et, en attendant les résultats, de suspendre les travaux. Puis le temps passa et rien ne fut exécuté.

La Compagnie protesta à nouveau, mais cette fois par acte notarié du **31 janvier 1912**. Cette démarche n'ayant pas plus de succès que les autres et la Commission Officielle n'ayant aucune velléité de remplir sa mission, le Consul Général de France intervint en raison des intérêts français considérables représentés dans la Compagnie, et, sur son désir, celle-ci lui adressa le **14 février 1913** un rapport complet réclamant de surcroît son intervention personnelle.

Cette fois, après un nouvel ordre du Ministère des Travaux Publics en date du **2 avril 1913**, le Gouvernement du Liban s'exécuta et ainsi que le Wilayet le faisait de son côté, désigna en Août une Commission d'experts, composée de membres du Conseil Administratif du Liban et du Wilayet afin de réexaminer la situation.

Les premières colorations

Les colorations de la Société des Eaux du Kesrouan et de la Compagnie des Eaux de Beyrouth (septembre et novembre 1913).

1 - la Compagnie fit faire par son personnel un essai privé de coloration qui, exécuté le plus discrètement possible (sans témoins accrédités) et sans attirer l'attention, donnait des résultats prouvant l'existence d'une communication souterraine entre le Nahr es Salib et le Nahr el Kelb. Ces résultats sont consignés dans un procès-verbal d'analyse établi le **6 septembre 1913** par le Docteur GUIGES, professeur à la Faculté Française de Médecine. Ce document n'a pas été trouvé dans les archives diplomatiques de Nantes.

2 – la seconde coloration (20kg d'uranine versés à Nahr es Salib) réalisée le **30 septembre 1913** en privé par la ''Concession'' n'a donné aucun résultat positif. Il reste que ces deux expériences restent entachées du même vice, celui d'une trop courte attente à la sortie des eaux de la résurgence de Jiita et ne peuvent servir de témoignage.

3 - La troisième expérience (30kg d'uranine), officielle cette fois-ci, a été exécutée le **6 novembre 1913** par une commission déléguée par la Compagnie. Elle fut entourée d'une publicité inévitable. Malheureusement la Commission eut le tort d'attendre trop peu de temps à la grotte de Jiita, et de faire ses prélèvements d'eau avant l'arrivée de la grande masse de colorant, qui ne survint, prétend-elle, qu'après son départ et dont les habitants de Beyrouth ont gardé le souvenir car ils le burent deux jours durant. Mais cette présence de colorant n'avait pas été constatée officiellement à la grotte même, et les échantillons prélevés prématurément par la Commission n'ayant donné de traces qu'au fluoroscope, sans coloration visible à l'œil, la majorité de la Commission déclara l'expérience insuffisante.

DOCUMENT N° 9 – Rapport du chimiste James A. Patch, chargé par la Compagnie des Eaux de Beyrouth de prélever et d'analyser les échantillons d'eau à la grotte de Jiita. Ce rapport est daté du 8 novembre 1913, c'est-à-dire au surlendemain de la coloration effectuée avec 30kg de fluorescéine au niveau de Nabaa el Mghara dans la région de Meiruba. Comme signalé plus haut, l'attente fut trop courte et seul le témoignage tardif de M J. Patch (voir plus loin, "The Dog river dyed green" confirme par la suite la réussite de l'expérience.

Dear Sir,
    At your request on Nov 6, I took in collecting and examining samples of water from the Nahr el Kelb as issues from the cave of Jiita. The object of the test was to determine if the water contained any trace of the special dye called ''uranine'' which had been added to the extent of 30 kilos in the Nahr Salib before it disappears in the ground.
    I took the first sample at 10.50 A.M. Thursday, Nov.6th. It consisted of an 'elfeeyah' (approximately 3 liters) and being perfectly clear, was reserved for comparison. At 11.15 A.M. we began to take regular samples of 250 cc. each every 15 minutes, and continued the sampling without a break until 8 A.M. Friday morning, the samples sent to Beirut for further analysis. Here each was treated and traces which might not be evident in the tube comparisons. Colorimetric comparisons of the samples which in 1-10,000,000 solution of uranine showed them free from color. As a result of the examination of original samples and later the collective samples, I am able to state that between the hours of 11,15 A.M. on Thursday and 8 A.M. on Friday, Nov. 6-7, no trace of uranine could be found in water.
    Trusting that report will serve you need, I remain,

Yours very sincerely,
(Sgd) James A. Patch

THE DOG RIVER DYED GREEN
Al-Kullyah, Vol. N°3 - January 1914

In Al-Kulliyah for January 1912 appeared an interesting article giving a description of the Dog River Cave and of the experiences of various exploring parties who have made excursions into the cave. Towards, Professor Day, discusses the possibility of the water flowing from the cave being the same as that which sinks into the river bed of Nahr us-Salib near Meiruba. Professor Day suggests, as a method of proving this connection, that there be emptied into the Nahr-us-Salib near Meiruba a large quantity of some harmless dye which, if there is a connection between the streams, would appear later in the water at the Dog River Cave.
    Considerable importance has recently become attached to the proving or disproving of this connection between the two rivers. The water supply of the City of Beirut is mainly drawn from the stream issuing from the Dog River Cave. Another water company is now engaged in reconstructing tunnels and aqueducts preparatory to diverting the water of Nar-ul-Assal, which at present flows into the Nahr-us-Salib, and so, perhaps eventually, into the Dog River, to supply the needs of the towns of Reifun, Ajaltun and Ashkut. If, as many believe, the Neb-ul-Assal water furnishes one-fifth of the Dog River supply, then the leading away of this amount would appreciably decrease the Beirut supply, especially at the end of the dry season.
    The writer was recently called to assist in making such a color test as Professor Day has suggested. By previous arrangement with both the Beirut and the Reifun water companies a large quantity of a special dye, called ''uranine'', was dissolved in water and turned into the Nahr-us-Salib near Meiruba at seven o'clock on the morning of Nov. 6th, last. Uranine when in dilute solutions, imparts to water a beautiful green fluorescence, greater dilution can still observed by looking through a considerable length of solution in a colorimetric tube. On the occasion here described sufficient uranine (30 kilograms) was poured into Nahr-us-Salib to give a strong color to all the water that then flowing from the Dog River Cave in twenty-for hours (about 130.000 cubic meters). The color was dissolved and mixed with the stream by representatives of the Beirut Water Company. Soon after the experiment was made, tests were begun on the water flowing from the Dog River Cave. Samples were collected and tested every fifteen minutes until eight o'clock the following morning, that is, until twenty-five hours elapsed after the color was added to the Nahr-us-Salib at

Meiruba. From the length of time it took the color to travel a given distance in the stream above, it had been calculated that the color ought to appear at the cave in about nine hours. Sixteen additional hours were considered a very safe margin to wait for appearance of the uranine. However, during all this time not the slightest indication of coloration appeared.

It was a great disappointment to many of the watchers of this interesting experiment to realize that their belief in a close connection between the two streams must be altered.

All the small samples of water collected during the test were mixed in two-hour samples in large bottles and brought to the College for further testing, but with the same negative results. The most careful examination failed to show any signs of coloration and a report was made out to that effect.

On the morning of November 12th, six days later, a messenger from the water company at Dubeiyeh appeared at the College to say that at six o'clock that morning the water of the Dog River began to run green. Mr McCann, representing the writer, went out on the next train and hastened to the cave to make note of the facts. He reported on his return the green appearance of the water and brought with him a sample of the colored water to be tested. Uranine was present but in a very minute quantity. The following morning the writer tested the city supply in the laboratory and in his house and found it also green but much less colored than the cave water. For more than a day the city of Beirut drank green water without knowing it. Those who looked at the sample in the writer's laboratory can testify to the fact that it was really green.

The experience of the previous week had altered our belief in regard to the origin of the Dog River water. Now this new incident again upset out conclusions. Surely the green in the water must have come from Meiruba, but where had it been all this time? How could it have been concealed for six days within a distance of thirteen kilometers? At a previous test one month before a similar tardy appearance of the color was reported to have occurred.

After all, then, Professor Day's conjecture is perhaps correct. Until some new data is presented it is natural to assume that the water, which is sinking into the stony river bed of the Nahr-us-Salib, appears again at the Dog River Cave. Not many months hence a more certain proof of the truth or falsity of the assumption will be furnished by the actual diverting of the Neb-ul-Assal waters.

James A. Patch

Malgré l'apparition du colorant à Dbaiyeh et dans les robinets de Beyrouth, la Commission n'osa conclure l'exactitude des résultats obtenus. La Commission de 1913 se proposait de renouveler ses expériences à la fin de l'été de 1914, mais survient la guerre, et la question des Eaux du Nabeh el Assal tombe dans un sommeil de sept ans. Quand la Société des Eaux du Kesrouan manifeste l'intention de les reprendre, la Compagnie des Eaux de Beyrouth proteste de nouveau et obtient le **5 octobre 1922** du gouverneur du Grand Liban la nomination d'une commission nouvelle chargée de réaliser le programme interrompu par les hostilités.

Mais cette commission présidée par le Directeur des Travaux Publics du Haut-Commissariat, posa dans les deux séances qu'elle tint, les 12 et 14 du même mois, la question préjudiciable suivante : nommée par le Gouvernement du Grand Liban, héritier de l'ancienne Administration du Liban, avait-elle le droit, le cas échéant, de conclure à la responsabilité pécuniaire de ce Gouvernement ? A la majorité, elle estima que non, et conclut à son incompétence.

Devant cette fin de non-recevoir, la Compagnie des Eaux de Beyrouth se retourna vers le Haut-Commissariat. Elle lui demanda de constituer une commission définitive indépendante du Grand Liban et susceptible de mener à bien les expériences ajournées depuis neuf ans. La saison était trop tardive pour y procéder en 1922.

Afin de mettre fin à ce litige, le **Général Weygand, Haut-Commissaire de la République Française en Syrie et au Liban, institue par décision N°1998, le 26 juillet 1923**, une 'Commission' destinée à chercher l'origine de l'alimentation en eaux de la source principale du Nahr el Kelb.

Cette «Commission» comprenait deux représentants du Haut-Commissariat, deux représentants de l'Administration du Grand Liban, un représentant de la Compagnie des Eaux de Beyrouth, le concessionnaire des Eaux du Nabeh el Assal, plus un représentant de la Société rétrocessionnaire, ainsi que deux experts indépendants de l'Administration et des parties en cause. Le point essentiel qui nous intéresse ici est la procédure à suivre pour des expériences de coloration des eaux du Nahr es Salib au moyen d'uranine fournie par la Compagnie des Eaux de Beyrouth. Pour réaliser ce projet, une commission parallèle est créée, composée d'un ingénieur chimiste, d'un géologue, d'observateurs en amont lors de l'injection du colorant et d'observateurs en aval à la résurgence pour certifier l'arrivée du colorant. En outre, et afin d'assurer le bon déroulement de l'opération et éviter toute équivoque, une dizaine de gendarmes sont affectés à l'entrée de la grotte de Jiita.

Les opérations préparatoires comprenaient une reconnaissance des lieux permettant une étude géologique, la localisation des pertes supposées, une mission de jaugeage et bien entendu le programme concernant l'opération de coloration elle-même.

A – Considérations géologiques

(Larges extraits du rapport géologique (Septembre 1923) de M. Odinot professeur de Géologie à l'école Française d'Ingénieurs de Beyrouth (Fig. 1). Note : lire en place de Ouadi bou Roqaa, Nahr es Salib tel qu'indiqué sur les cartes en 1923.

Nous avons remonté le Nahr es Salib un kilomètre environ en amont de Nabaa el Mghâra sur les premières pentes du Sannine. L'endroit où est établi notre campement est assez caractéristique ; en aval les couches sont calcaires, plongent 25 degrés environ O.E. en direction N.S. et se rétablissent horizontalement à hauteur de Maïroûba où les parois de la rivière, deviennent très abruptes jusqu'au moment où nous avons suivi le lit de la rivière, c'est-à-dire jusqu'au droit de Reyfoun. En amont les couches calcaires plongent sous une puissante venue de basalte qui les a métamorphosés. L'arête rocheuse aussi bien côté Maïroûba que côté Mazraat Kfar Debian, est recouverte dans ses parties horizontales par les grés rouges. On peut donc se situer logiquement dans la partie où ont eu lieu les essais, l'on se trouve dans les calcaires les plus anciens de la montagne du Liban, c'est-à-dire vraisemblablement dans le Jurassique supérieur et sous le dernier étage le plus ancien du crétacé, le grès du néocomien qu'on retrouve dans la vallée du Nahr el Kelb, en aval de la grotte de Jiita, mais ici les couches sont presque verticales.

Ces considérations permettant ainsi de présumer que le fond de la vallée n'est pas imperméable mais que les apports de la rivière ont constitué une sorte de colmatage jusqu'à présent perméable de la partie inférieure de la vallée en la nivelant à peu près. Ceci laisse supposer et permet de considérer qu'il y a un lit souterrain inférieur au niveau actuel du lit aérien avec lequel il y aura communication tant que le colmatage ne sera pas complet. Mais nous devons dire aussi que par suite du cours naturel des choses, l'effet de colmatage sera certainement d'amener un jour le lit souterrain à être aérien sur tout son parcours. L'inclinaison des couches dans la partie amont du Platane semblerait indiquer que les eaux qui se perdent dans cette partie de la rivière peuvent être captées et dirigées vers et sous la circonscription du

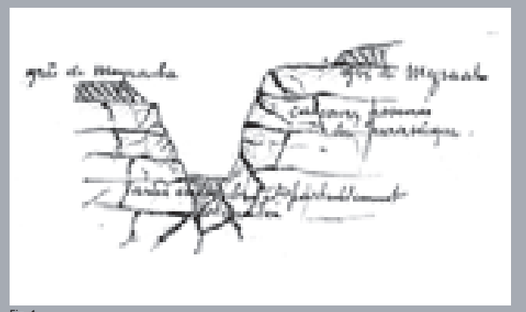


Fig. 1

Sannine, puisque ces couches plongent à l'Est. Les eaux qui s'infiltrent dans les lits de stratification sont vraisemblablement dirigées de ce côté. Un réseau souterrain de fissures doit certainement exister dans toute la région commandée par le Sannine pouvant modifier assez considérablement le système d'écoulement des eaux superficielles et il est très probable qu'il doit y avoir d'assez grandes différences entre les lignes de séparation des eaux à la surface (eaux pluviales) ou bassin topographique et la ligne de séparation des eaux souterraines (eaux d'infiltration) ou bassin d'alimentation proprement dit.

Pour parler en complète connaissance de cause il faudrait faire l'étude du bassin hydrographique complet du Nahr el Kelb. Mais ceci demande du temps. Ce qu'il y a de certain, c'et que la nature du terrain qui est fissuré en grand dans un seul étage géologique rend probable au plus haut degré la communication entre le bas et le haut, entre le Nahr el Kelb et le Nahr es Salib.

Il sera beaucoup plus délicat de déterminer dans quelles proportions, si même cela est possible, car dans des expériences sincères et exemptes de toute critique au point de vue qui nous occupe, il faudrait faire surveiller tous les points d'où peut sortir l'eau. L'évaluation de la relation quantitative entre les grottes de Jiita et le Nahr es Salib peut se faire en serrant de très près la vérité, à l'aide d'un colorant sensible dans le genre de l'uranine. Les conditions géologiques sont donc au plus haut degré favorables à ce que les eaux qui sortent aux grottes de Jiita constituent une résurgence partielle des eaux perdues aux environ de Maïroûba. Concernant ce dernier point, des jaugeages dans les bassins supérieurs et inférieurs renseigneront utilement sur la perméabilité des lits et les quantités disponibles utilisées et perdues de l'eau en question.

Beyrouth, le 28 septembre 1923.
Odinot

B – Localisation des pertes

Six pertes ont été repérées avant de subir les injections d'uranine (Fig. 2). Deux sur la rive gauche : gouffres du Platane et de AÏn Ouarka, deux sur la rive droite : gouffres de Zeiat et du moulin, ainsi que deux pertes dans le lit filtrant à l'amont et l'aval du barrage initial dit aussi barrage de la Cie des Eaux du Liban.

Fig. 2

BASSIN SUPÉRIEUR							
		lit/sec	*m³/24 h*			*lit/sec*	*m³/24h.*
Nabaa el Assal	canal supérieur de Mazraat	50	4320	**Nabaa el Assal**	200mètres aval confluent	449	38800
À la source	lit torrentiel	585	50544				
	Total à la source	635	54864				
Nabaa el Laban	canal de Mazraat	40	3456	**Nahr el Salib**			
	lit torrentiel	14	1200	sous Harajel	barrage maçonné	504	43545
	total de la source	54	4656	sous Maïroûba	aval Chébli	250	21600
Nabaa el Mghara	à la perte	59	510	**Nabaa el Qana**		37	320 0
a la résurgence		281	24260				
BASSIN INFÉRIEUR							
Nahr el Kelb	résurgence Jiita	17	1000				

Soit un total de 191.435 m3/jour du bassin supérieur pour 171.000 m3/jour à la résurgence du Nahr el Kelb.

Fig. 3

C – Les sources principales se déversant dans le Nahr es Salib (Fig. 3)

Par ordre d'importance: Nabaa el Laban, Nabaa el Assal, Nabaa el Mghara, Nabaa el Qana, Nabaa el Hadid.

D – Les Jaugeages

Vingt trois jaugeages ont été effectués dans les bassins supérieurs et inférieurs des pertes présumées du Nahr es Salib. Nous n'en retiendrons que sept, résumant l'ensemble de ces mesures empruntées aux résultats de la mission Odinot/Troccaz (Fig. 4).

Il nous semble intéressant par ailleurs de relever une observation concernant les eaux de Nabaa el Laban faite lors de la reconnaissance des lieux. (Extrait du compte-rendu de monsieur Patras, gardien du barrage de la Cie des Eaux de Beyrouth).

Nabaa el Laban offre la particularité d'être la source la plus importante de cette région pendant la saison des pluies à partir de Janvier et jusque vers le 15 août. A cette dernière date, la quantité d'eau diminue brusquement. Il paraît que cette baisse (observée à la source en 1923) de 1.5m au moins en une nuit) serait très régulièrement observée dans une période de 3 jours autour du 15 août et même, tomberait invariablement le 15, 16 et 17 de ce mois; Le fait est assez curieux et mérite d'être étudié. Il peut s'expliquer facilement par l'existence d'un siphon ou d'un système de plusieurs siphons dont l'un se désamorcerait à cette époque de l'année. Ceci implique soit une très grande régularité annuelle dans le régime de précipitations atmosphériques soit l'existence d'une masse d'eau dont le niveau descendrait mathématiquement à la même cote au même moment de l'année.

Hypothèse

La seconde supposition se rapporte aux résultats d'une plongée et d'une topographie exécutée par C. Locatelli et J-J Bolanz (voir aussi Al Ouat'Ouate N°7-8/1992-1993, pp.18-20).

Deux plongées ont eu lieu dans la source de Nabaa el Laban. La première le 11/08/1992 et la seconde le lendemain 12. La visibilité était meilleure que la veille. Au regard du plan et de la coupe présentée en trois dimensions la présence de galeries latérales décrites par J-J Bolanz (pré-rapport d'expédition - Fédération Française de Spéléologie – Mission Liban 92) nous incite à croire à la présence de siphons latéraux désamorcés pour l'instant à savoir (Fig. 5) :

… je tire 42 mètres dans la galerie ovale aperçue hier. Au début elle est ovale, 2m par 1, mais rapidement elle diminue de taille pour atteindre 1m par 0,80. Le passage est loin d'être aisé, car le rocher est hérissé d'aspérités qui vous accrochent partout. De plus, le faible courant n'est pas suffisant pour évacuer la touille provoquée par les bulles …(Intéressante observation de ce réseau à faible courant alors que J-J Bolanz indiquait plus haut …). *C'est bien 18h00 quand nous arrivons à la source. La visibilité n'est que de trois mètres et le courant aussi fort que la veille …*

E – La coloration

Il serait fastidieux de décrire les différentes étapes qui ont marqué la coloration. Le rapport manuscrit de 13 pages en écriture serrée de Mr. Claris, professeur de chimie à l'Ecole Française d'Ingénieurs de Beyrouth et chargé de l'opération ‘'coloration'' en décrit minutieusement les infimes détails, y compris celle de l'analyse de 221 échantillons d'eau prélevés à la grotte de Jiita. Sachons toutefois que de nombreux observateurs témoins de la démarche étaient présents sur les lieux. Ils étaient partagés en deux équipes comprenant une commission d'amont et une d'aval. La commission d'amont supervisait l'injection d'uranine, celle d'aval étant chargée de vérifier l'arrivée du colorant et du prélèvement des échantillons.

Le tableau ci-joint résume les horaires des opérations d'injection faites entre le barrage de la Compagnie et le gouffre de Aïn Ourka, distant d'environ 300 mètres (Fig.4).

Réapparition de la coloration à la résurgence de la grotte de Jiita

Les eaux de Jiita sont apparues colorées à l'œil nu, à partir du lundi 10 septembre à 2 heures du matin. La coloration a été très caractéristique, les lundi 10 septembre, mardi 11 septembre, mercredi 12 septembre pour diminuer progressivement et ne plus être visible le mercredi 19 septembre (Fig. 6).

L'existence de la communication entre les eaux du Nahr es Salib et la grotte de Jiita est ainsi irréfutablement prouvée.

Il y aurait lieu suite à cette expérience de chercher à déterminer le volume des eaux du Nahr es Salib arrivant

Dates	heures	heures	durée de	quantité d'uranine	endroit du lancement	
3 au 7	lancé	arrêt	l'essai			
septembre	17 h.	19 h.	2 h.	2kg. 000	amont barrage	lundi soir
	8 h. 15	10 h. 30	2 h. 15	17kg 000	amont barrage	mardi matin
	17 h. 45	18 h. 45	1 h.	7kg. 000	Zeur	mardi soir
	8 h.	10 h.	2 h.	7kg. 000	aval moulin	mercredi matin
	17 h. 10	18 h.20	1 h. 10	7kg. 000	Plateau	mercredi soir
	8 h. 45	10 h.	1 h. 15	3kg. 600	Aïn Ourka	jeudi matin
				Total		43kg. 600

Fig. 4

Fig. 5

à Jiita. La quantité totale d'uranine versée dans le Nahr es Salib de 43kg600 est-elle réapparue en totalité à la grotte? Les responsables avancent le chiffre de 75%. Et pourtant s'il faut recouper les témoignages de l'époque, il y aurait eu des pertes relativement importantes de colorant. A savoir :

1 – Que l'uranine employée était de même provenance, mais une partie avait été importée antérieurement à la guerre de 1914-18 et l'autre dernièrement. 24kg datant du stock de 1913 se présentaient compact et difficiles à dissoudre. Il est permis de croire que l'uranine pouvait ne pas être homogène et qu'une partie n'aurait pas été dissoute, mais probablement précipitée. La partie nouvellement importée était enveloppée dans des boîtes en fer blanc, hermétiquement clauses, chaque boîte contenant 0,200 gr. Lors des colorations il a été constaté que l'uranine nouvelle était facilement dissoute dans l'eau et qu'il n'en était pas de même de l'ancienne que, retirée en blocs, il fallait réduire en poudre.

2 - Une boîte de 200 grs renversée a été perdue au gouffre du Moulin, à laquelle il faut ajouter ce qui est resté en particulier dans les boîtes en carton où l'uranine n'était pas en poudre et qu'il a été impossible d'extraire entièrement. Il y a eu certainement des pertes d'uranine provenant de ces diverses manipulation. L'uranine nouvelle moussait facilement, l'uranine ancienne presque pas. Lors des colorations quelle que soit l'uranine, il semblait que la coloration était identique, mais comme la concentration était très chargée, il était difficile d'apprécier à l'œil une différence.

Fig. 6

3 – Ne peut-on craindre vu les faits exposés que les résultats trouvés ne fussent légèrement affaiblis par la supposition que l'uranine ancienne avait les mêmes propriétés que celle contenue dans les boîtes nouvelles ?

4 – Les canaux d'irrigations situés entre Zeiat et le canal de Reyfoun sont restés ouverts pendant la durée des opérations (canal du Moulin, canal amont du Platane, canal Chébli). L'eau qui s'est répandue dans ces terrains qui est restée stagnante et colorée jusqu'au 22 septembre, laisserait croire que la matière colorante est descendue très lentement à travers les terrains. Une partie s'est évaporée et d'autres a été dissoute ou fixée par les plantes et les racines. Ici se trouve donc une perte impossible à évaluer. Ce qui est à retenir, car étant donné l'abaissement progressif de l'uranine au débit (voir diagramme de restitution, Fig. 6), la courbe aurait dû atteindre l'axe X plus tard que le point fixé. Autre argument concernait le débit du Nahr es Salib. La Compagnie arguait que les 4, 5, 6 septembre 1923, un Shlouk (vent chaud) d'une rare intensité sévissait au Liban. Il aurait augmenté considérablement l'évaporation, concentrant le colorant dans certaines parties où les eaux étaient stagnantes, faussant le calcul des pertes.

Messieurs Odinot et Troccaz, ont effectué des mesures exactes du débit des eaux en octobre. Ils ont trouvé en amont du barrage 43545m^3 par jour, or un mois plus tôt, c'est-à-dire vers le 4 septembre celui-ci devait être selon appréciation de 15% environ supérieur, soit 50000 m^3 de débit d'eau par jour.

5 - Les barrages amont et aval péchaient par leur étanchéité. Il était nécessaire de réévaluer les pertes d'eau par infiltration et par conséquent du colorant perdu.

Quelques observations

– La coloration met environ une DIZAINE D'HEURES pour franchir les 3 km qui existent entre le barrage de la Compagnie des Eaux du Liban et le point où les eaux disparaissent totalement dans le lit de la rivière (Fig. 7). La côte approximative de ces points est respectivement 1180 et 1160 mètres environ, soit une différence d'altitude de 20 mètres.

– D'autre part, la coloration met CENT TRENTE HEURES environ pour franchir le trajet souterrain estimé à seize kilomètres entre le point de coloration (1180m) et où elles surgissent à Jiita (60m).

Conclusion

En guise de conclusion, ce texte manuscrit de M. Claris (1923), (Fig. 8).

Annexe

Cet encadré paru dans le quotidien libanais L'Orient-Le Jour du 30 juillet 2008 (signé Victor Fleury) nous informe qu'un vaste programme d'étude a été lancé en collaboration des organisations italiennes dans le but de préserver les eaux du Nahr el Kelb.

En voici de larges extraits :

"Un projet d'étude sur la qualité de l'eau du Nahr el Kelb a été présenté dernièrement lors d'un séminaire à l'Université Notre-Dame de Zouk Mosbeh. Les représentants des principaux partenaires de cette initiative, le ministre de l'Energie et de l'Eau, le Centre de recherche de l'eau, de l'environnement et de l'énergie de l'Université Notre-Dame (WEERC-NDU), la fondation AVSI et l'Institut italien pour la coopération universitaire (ICU), étaient présents lors de cette conférence. Cette recherche pourrait permettre à l'avenir la mise en place d'une politique de préservation efficace des réserves d'eau dans cette région".

Et plus loin : A terme, les objectifs principaux de cette recherche sont multiples. Les scientifiques souhaitent constituer une base de données sur le versant de Nahr el-Kalb, pour pouvoir développer ultérieurement des projets d'infrastructure, visant à améliorer la gestion de l'eau.

Il est regrettable que le Spéléo-Club du Liban n'ait point été présent à ce séminaire. Il aurait indiqué aux organisateurs de nombreux éléments concrets.

A titre de rappel:

a - Il avait été démontré dès 1923 qu'une partie des eaux du bassin versant du Kesrouan alimentait directement la rivière souterraine de Jiita, source principale du Nahr el Kelb (voir l'article intitulé 'Les premiers traçage à l'uranine au Liban').

b - La revue libanaise de spéléologie et de karstologie du Spéléo-Club du Liban (Al Ouat'Ouate- Nouvelle série - N°3 - 1988 - pp. 3 à 17- B. Hakim, J. Loiselet - G. Srouji - S. Karkabi) décrit précisément

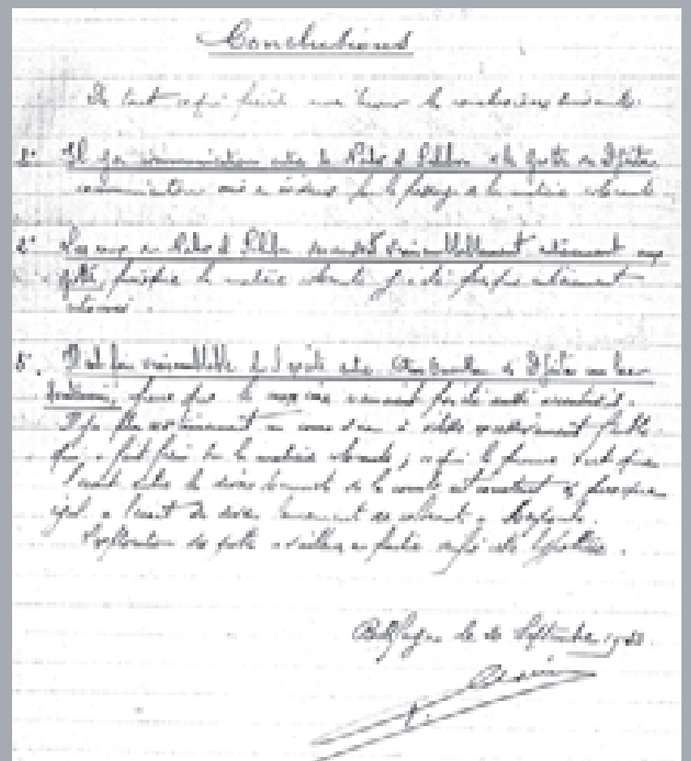

Conclusion

Fig. 8

l'aspect spéléologique du cours d'eau souterrain, les traçages réalisés en amont et une carte hydrogéologique du bassin versant du Nahr el-Kalb établie par le Dr Bahzad Hakim.

c - La revue Al Ouat'Ouate N°4 - 1989, pp. 6 à 16 fournie une étude faite sur 150 échantillons d'eau prélevés de 25 sources du Kesrouan sur une période de 9 mois. Ces échantillons furent soumis à des tests bactériologiques et physiques par le Professeur Joseph Hatem et M. Fady Chbatt M.S. Le nombre de sources contaminées s'est élevé à 84 %.

d -A signaler aussi, qu'une reconnaissance nous a amené en 2007 sur les lieux de la coloration effectuée en 1923 sur les ordres du Général Weygand. Nous avons pu localiser l'emplacement des pertes du Ouadi Bou Roqaa grâce au croquis N°1 établi par M. Odinot (géologue) et membre de la commission de la Cie des Eaux de Beyrouth. Le paysage est aujourd'hui entièrement bouleversé. De nombreux terrains des rives gauches et droites ont gagné sur le lit de la rivière.Terrains agricoles, maisons individuelles et immeubles ont été construits le long des berges. Nous avons pu toutefois repérer l'emplacement des gouffres du Moulin et celui du Platane. Ce dernier a été partiellement exploré et non topographié.

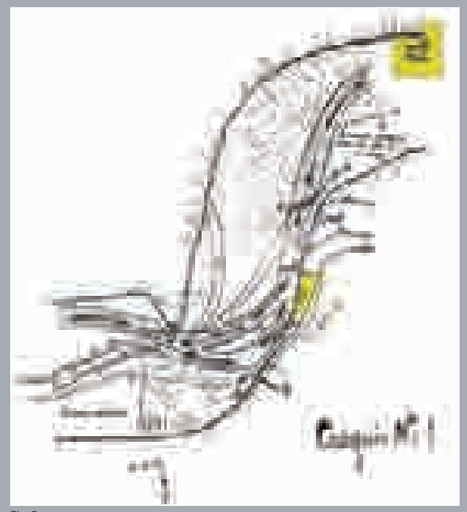


Fig. 7
En jaune sur le croquis, l'emplacement des pertes des gouffres du Moulin et du Platane.

Photo 1
Terrain agricole amputant le cours d'eau.

Des eaux usées se déversent à l'heure actuelle dans le cours principale de la rivière. Ces eaux se perdent en des fissures en aval du gouffre du Platane. Les marres résiduelles, la puanteur et les moustiques y habitent de concert. Les documents photographiques ci-joints illustrent cette catastrophe écologique.

En conclusion : de graves problèmes de pollution apparaissent sur le bassin versant du Nahr el Kalb.

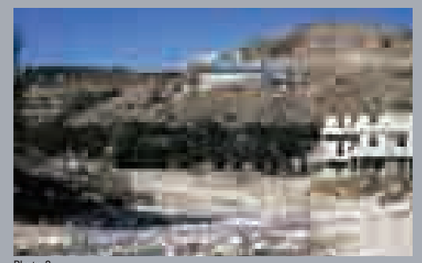


Photo 2
Constructions en bordure du cours d'eau. Les eaux usées coulent à leurs pieds.

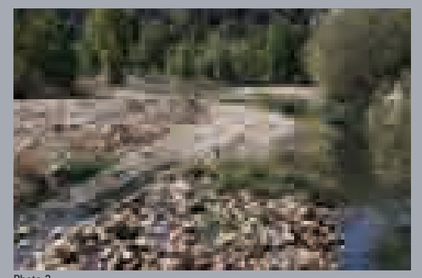


Photo 3
Marre stagnante et eaux usées dans le cours du Ouadi Bou Roqaa.

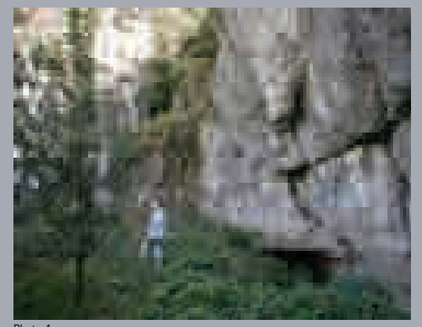


Photo 4
Le gouffre du Platane.

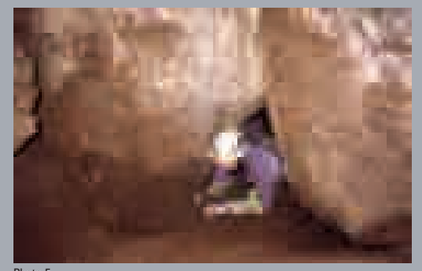


Photo 5
L'entrée du gouffre.

CAVE SURVEY | Maïa Sarrouf | maiasarrouf@gmail.com

هذا المقال يطلعنا على التشكلات في المنطقة المسمات الممر الأحمر في مغارة جعيتا. عمدت المؤلفة على تصنيف هذه التشكلات إلى صنفان معتمدة على فارق اللون بينهما, الأبيض والأحمر.

This article presents a general description of the Galeries Rouges's concretions in Jiita cave, visited during the Spéléo Club du Liban expeditions in 2007. The concretions are described according to the author's vision who divided them into two categories, based on the striking contrast of white and red color found in the gallery.

ROUGE SUR BLANC

Une description des Galeries Rouges de Jiita

Fig. 1
Topographie des Galeries Rouges de Jiita.

Fig. 2
Gours inondés dans la partie amont des Galeries.
(Photo by Johnny Tawk)

INTRODUCTION

Cet article présente une description générale des concrétions dans les Galeries Rouges de Jiita visitées en 2007, à l'occasion des expéditions organisées par le Spéléo Club du Liban.

LOCALISATION ET DESCRIPTION DES GALERIES ROUGES

Les Galeries Rouges se trouvent sur la rive gauche de la rivière souterraine, à environ 200 mètres en aval du siphon terminal. On y accède par un porche de moyenne dimension menant à une large salle d'effondrement. L'appellation des Galeries Rouges (1954) revient à la présence de concrétions particulièrement rougeâtres formées de dépôts d'argile et d'autres minéraux fortement calcifiés ornant l'ensemble des réseaux. Ces galeries se développent sur 140 mètres de long et se partage en deux sections ne se connectant pas (Fig. 1). La première est de direction E-O de 60 mètres de longueur, la seconde est de 80 mètres et son entrée se caractérise par une grande coulée de calcite révélant des concrétions riches et variées. Elle se termine par un large gour inondé. Sa topographie rejoint la tendance directionnelle du cours d'eau, NE-SO.

A l'entrée des « Galeries Rouges », les spéléologues se déchaussent avant toute progression par souci de protection des fragiles formations calcaires.

Les Galeries comprennent une variété de concrétions de calcite (stalagmites, stalactites, colonnes, draperies et coulées) ainsi que différents types de concrétions émanant de l'écoulement de l'eau sur le plancher (gours et micro-gours). Le contraste qui existe entre ces deux types de concrétions blanchâtres et rougeâtres caractérise au mieux le charme de cet espace et a inspiré le titre de l'article (rouge sur blanc), dont la suite propose une description des différents spéléothèmes observés.

CONCRETIONS DES GALERIES ROUGES

Concrétions rougeâtres

Le rouge caractérise par les gours qui ornent le plancher des couloirs. En amont, ces bassins naturels sont espacés (Fig. 2) et atteignent des profondeurs de 20 à 30 cm, tandis qu'en aval, ils montrent un festonnage plus régulier, concentré et moins profond (Fig. 3).

Les plus grands gours (dont le gour terminal) comprennent des plans d'eau calme permettant le développement de calcite flottante (Fig. 4). Cette pellicule, rarement observée au Liban, est fragile et se précipite au fond de la vasque à la moindre secousse ou vibration. Les gours moins profonds sont généralement secs à l'étiage. Ils présentent de nombreux cristaux de calcite dans leurs parois internes ainsi que des formations nodulaires sous forme de billes d'argile. Les bords externes de ces gours sont pour la plupart festonnés de micro gours (Fig. 4 et 5).

Concrétions blanchâtres

Les concrétions de calcite blanches des

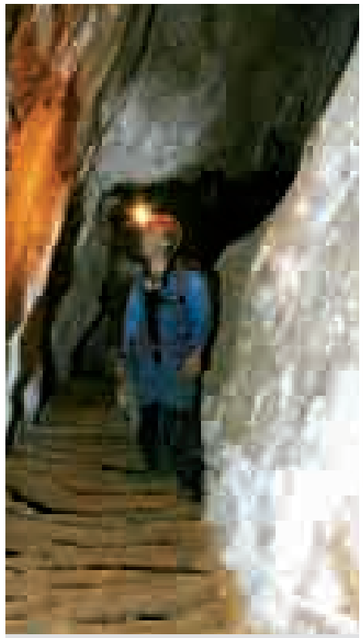


Fig. 3
Gours dans la partie aval des Galeries.
(Photo by Johnny Tawk)

Fig. 4
Calcite flottante et micro-gours sur le bord externe des gours.
(Photo by Johnny Tawk)

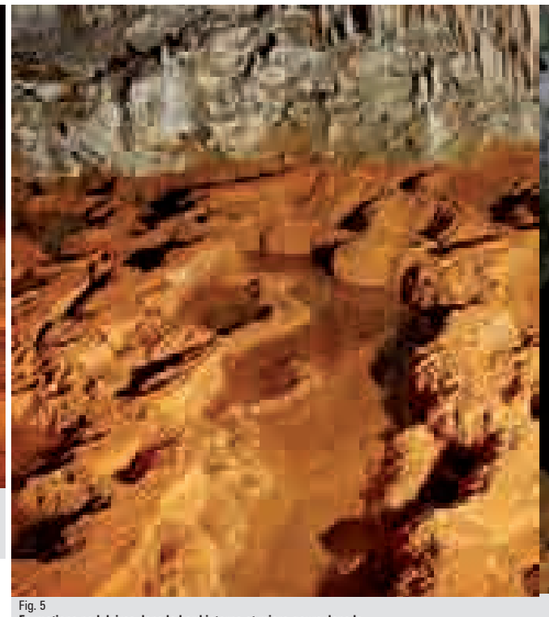


Fig. 5
Formations nodulaires dans le bord interne et micro-gours dans le bord externe des gours.
(Photo by Johnny Tawk)

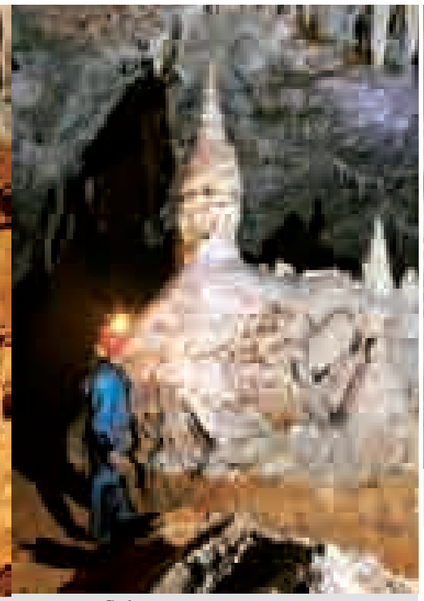


Fig. 9
Massif stalagmite montrant à sa base le contraste blanc sur rouge marqué par le niveau de l'eau.
(Photo by Johnny Tawk)

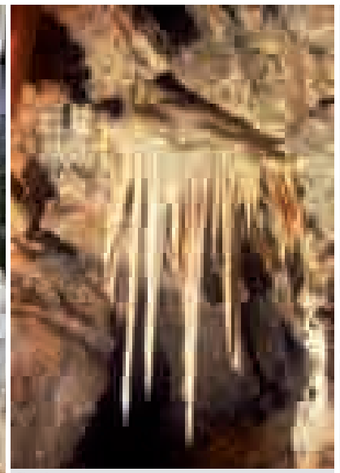


Fig. 10
Stalactite au sein des Galeries.
(Photo by Johnny Tawk)

Fig. 11
Remarquable contraste formé par une colonne et des gours.
(Photo by Johnny Tawk)

Galeries tranchent avec les gours et le plancher stalagmitique de couleur rouge.
Les draperies (Fig. 6) se développent sur les plafonds ou les paroisses inclinées et possèdent des dimensions variables de quelques mètres, atteignant 5 à 6 mètres de longueur.

Les coulées sont assez répandues au sein des Galeries. La forme la plus commune est celle des cascades (Fig. 7) retombant sur les gours gorgés d'eau et formant un clair contraste blanc sur rouge. Elles possèdent des tailles variant de 2 et 5 mètres de long.

Le mondmilch (formations blanchâtres) (Fig. 8), a été repéré sur la majorité des parois des Galeries surtout dans les branches comprenant les gours. Etant humides, ces formations étaient douces et plastiques lors de leur identification.

Les stalagmites, stalactites et colonnes (Fig. 9, 10 & 11) sont de loin les plus communément observées et ornent le plafond et le plancher des Galeries. Certaines stalagmites et colonnes sont légèrement teintées aux couleurs de l'argile ou d'autres minéraux et pigments inorganiques.

Des stalactites tubulaires sont de même observées. La Photo 12 illustre une stalactite tubulaire qui s'est jointe au micro gour du plancher formant une petite colonne d'environ 20 cm de longueur. Notons de plus, l'observation de stalactites dont la face externe est couverte de pointes cristallines, facilement assimilables à de minuscules excentriques et ne dépassant pas 2 cm de long.

Un type particulier de stalagmite est de même noté, celui des stalagmites d'argile (Fig. 13). Leurs dépôts sont associés aux changements dans la composition de l'eau d'écoulement.
Leur morphologie est caractérisée par leur forme conique et par l'existence d'un cratère ou trou central. Au sein des Galeries, elles ne furent observées que dans les gours et ne possèdent pas plus de 30 à 40 cm de haut, ne dépassant pas la hauteur des ces bassins étagés.

Fig. 6
Draperie au sein des Galeries.
(Photo by Johnny Tawk)

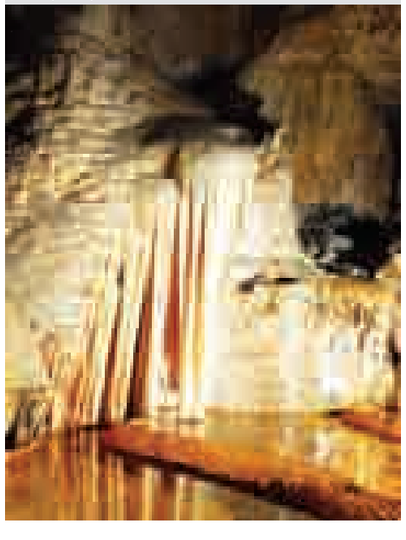


Fig. 7
Calcite blanchâtre délicatement « coulée » sur les gours rougeâtres.
(Photo by Johnny Tawk)

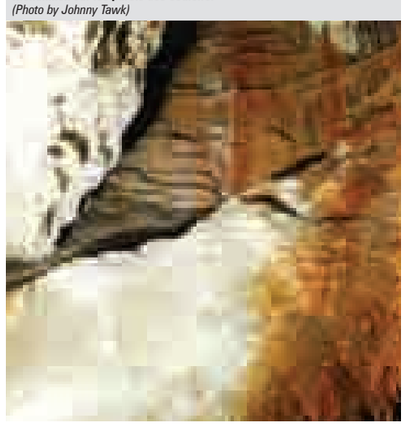


Fig. 8
Mondmilch sur les parois des couloirs.
(Photo by Johnny Tawk)

CONCLUSION

Un diagnostic aussi préliminaire des concrétions des Galeries Rouges permet de conclure que cette partie de la grotte mérite une attention particulière, formant une combinaison de tonalité et de richesse rare à observer. Des études plus approfondies sont recommandées pour tenter de comprendre la présence et la séquence de formation des concrétions.

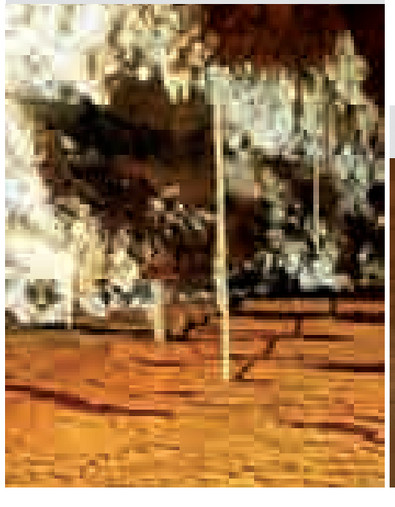


Fig. 12
Petite colonne formée par la jointure d'une stalactite tubulaire aux micro-gours du plancher.
(Photo by Johnny Tawk)

Fig. 13
Stalagmite d'argile à cratère central observé au sein des gours.
(Photo by Johnny Tawk)

RÉFÉRENCE

Auteurs ayant travaillés sur des articles similaires:

Bou Jaoude, I., Karanouh, R., 2002. Identification of Calcite Speleothems in Mgharet Nabaa el Shatawie. *Al-Ouate'Ouate*, 12 , 48-57.

Bou Jawdeh, I., Karanouh, R., 2005. Photographic Documentation of Some Special Speleothems from Lebanon, *Al-Ouate'Ouate*, 13, 62-71.

RECONNAISSANCE

L'auteur remercie les contributions techniques, les commentaires et les avis de Sami Karkabi et de Issam Bou Jaoude.

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FINAL NOTES ON SALLE BEAYNO

Fig. 1
'The Ballerina' in Salle Beayno.
(Photo by Issam bou Jaoude)

هذا الجزء من مغارة جعيتا رافق النادي اللبناني للتنقيب في المغاور بعدد كبير من الرحلات في العام المنصرم. ولكن العمل انتهى بعد ان تمّ اعادة اكتشاف ما يزيد عن 850 م من الممرات وهذا الرقم يضاف الى الطول الاجمالي لمغارة جعيتا. وبذالك يكون النادي وضع مصور دقيق لهذا الجزء من المغارة. رافقت هذه الاشغال مغامرات واحداث مشوقة يتطرق اليها الكاتب في هذا المقال.

Après sa première visite, la salle Beayno a été réexplorée et retravaillée. Même si elle ne figurera plus dans nos prochaines sorties, elle laissera toujours dans notre mémoire tous les souvenirs d'une belle salle, là-haut, en passant par le boulevard SCL de Jiita.

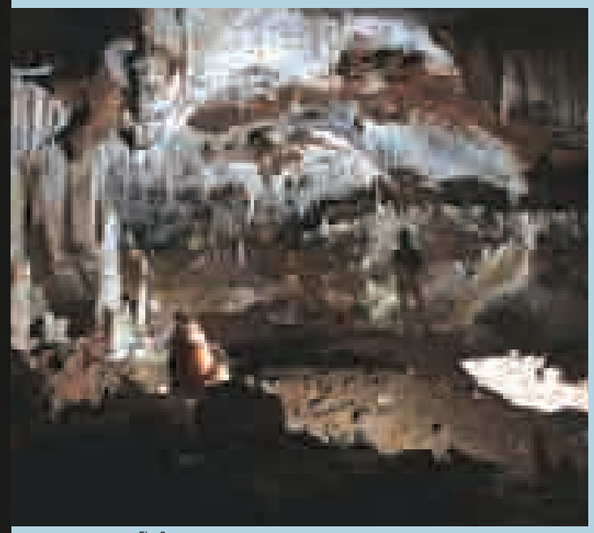

Fig. 2
The large tunnel in Salle Beayno.
(Photo by Issam Bou Joude)

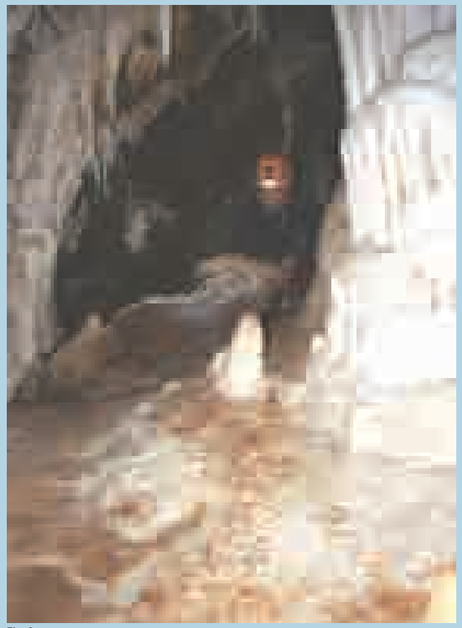

Fig. 3
Mud stains on crystal white calcite a result of careless explorers.
(Photo by Rena Karanouh)

Salle Beayno…

For the last year this name accompanied us in each and every Jiita trip, but now it's over (Fig. 1, 2 and 3).

The result: eight hundred and fifty-five meters of extra cave development to be added to the total development of Jiita cave with a fourth connection to the main Jiita axis; a new and more accurate survey is now finally completed (Fig. 4 and 5); and above all, lots and lots of adventures, stories and memories…

We're definitely going to miss the delightful climb up left after the SCL camp site, the opposition climb following that and finally the caving ladder, leading to a traverse line which leads in turn to a crawl, then a big chamber and a crawl and a… the point is that we spent memorable moments in gallery Beayno's tunnels and chambers.

Come to think of it, it was not long ago that we first decided to re-explore this section of our beloved mother of all caves, Jiita. The first trip to Salle Beayno took place in June of last year.

During that outing, a small group of SCL cavers pointed out the discrepancies between the published map and the actual structure of the cave (Labaki and Harb, 2008).

Salle Beayno had – again – its fair share of allotted time during the infamous three-day expedition trip in October 2007. The team spent a whole day exploring and surveying the galleries, except for the sinkholes which required dedicated equipment. These drops were later fully explored and drawn during a third trip.

Two question marks remained on the survey map. Now, is it just me or are they really provoking…. those small question marks left behind, here and there on cave surveys?

So we packed our bits and pieces in June 2008 and journeyed in once again. The remaining two sinkholes were finally explored; they turned out to lead into a common chamber and from that chamber a second sinkhole had to be rigged. The rigging was fast, the array of stalagmites, stalactites, columns and other formations made our rigging rather easy. The natural choice was to rig around these.

To rig 'naturally' whenever possible, as much as possible, saves the burden of using nuts and bolts on the delicate cave environment, an environment that already bore a lot of scars from previous expeditions. An environment, that in some places, used to be as white as snow, as beautiful as heaven, and now most of its beauty is covered by mud (Fig. 3). Ethics in speleology should be reminded, taught and stressed again and again.

That second sinkhole guided us to the top of the giant 'coulee' between the camp of SCL and the climb that leads to Salle Beayno. The view from up there was impressive, just like sitting on a balcony on top of a valley of wonders, with roaring water and twinkling stars; steep, intimidating edges framing the spectacle from the ceiling to the floor... then, back to caving reality… we were getting cold and had to leave.

One last passage was left unexplored though. It was one of those tight tunnels that only Rena K. can do, or so we decided… she loves them really!

She did enter and Hadi K. followed.

She found herself in a new, virgin tunnel but then she let go and suggested we leave it for future generations and we all agreed. We will certainly not tell them that it's filled with that sticky thick heavy mud. Good luck to them.

Leaving Salle Beayno that day, we knew, deep inside, that the work was over for now and we will probably never see this place again (Fig. 6 and 7). But at least the next time we pass by the SCL camp in Jiita, when someone points to a climb or an opening on top of a massive 'coulee'… we know what's up there…

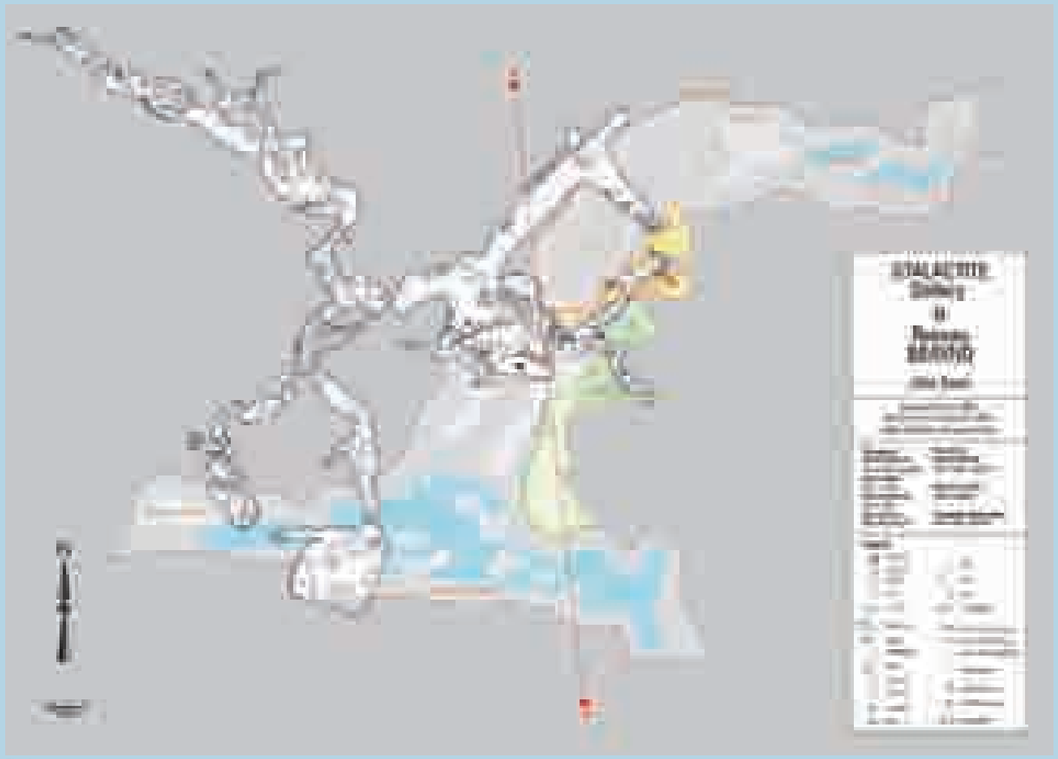

Fig. 4
The survey of Salle Beayno showing the last section that was discovered which is the fourth link between the gallery and the main Jiita cave axis.

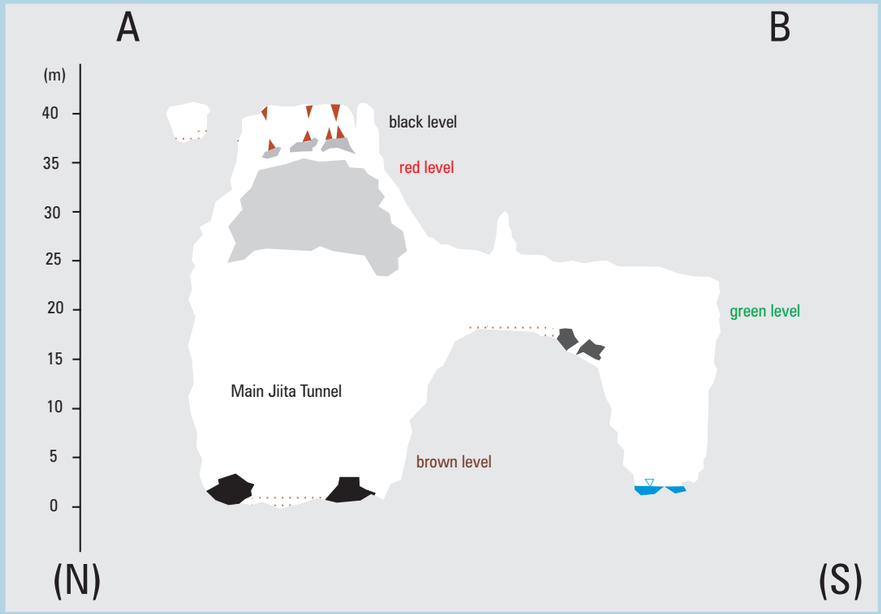

Fig. 5
Cross section of Salle Beayno.

Fig. 6
A general view of Salle Beayno. *(Photo by Rena Karanouh)*

Fig. 7
The general view of a tunnel in the Big Room of Salle Beayno. *(Photo by Rena Karanouh)*

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بعد 45 سنة من تاريخ اكتشافها قام عدد من المستغورين في النادي البناني للتنقيب في المغاور في سنة 2005 باعادة اكتشاف وتصوير وتخطيط منطقة في وسط مغارة جعيتا تسمى القاعة البيضاء تيمنا لبياضها الناصع. هذه المقالة تتطرق لتاريخ اكتشاف هذه المنطقة سنة 1960 الى سنة 2005 لحين اعادة اكتشافها وتفصل جميع المحاولات ما بين هذين التاريخين.

45 ans après sa découverte, la Salle Blanche a été de nouveau accédée par des spéléologues en 2005 . Cette galerie d'un blanc pur extraordinaire, avec son grand nombre de formations exceptionnelles, de larges cônes de tailles différentes (qui n'ont pas été documentés auparavant au Liban) a été revisitée, topographiée et photographiée. Cet article reflètera l'histoire de la Salle Blanche depuis sa découverte en 1960 jusqu'à sa redécouverte en l'an 2005; incluant les tentatives intermédiaires infructueuses.

THE SALLE BLANCHE EXPEDITION

The Salle Blanche (White Gallery) was a legend of Lebanese speleology until its rediscovery in 2005.

It was discovered in the early 60's during the Jiita cave expeditions conducted by SCL. Ever since then attempts to access the gallery were unsuccessful due to a treacherous climb in its approach.

The archives of the Speleo Club du Liban had no survey of this gallery and the final Jiita cave survey only showed the location of its entrance. There were also a few tantalizing photographs taken by Mr. Sami Karkabi in the 60's.

After 45 years an expedition in the summer of 2005 made the breakthrough and Salle Blanche was once again accessed by cavers. This amazingly pure white gallery with its large number of special speleothems, mainly large cave cones of various sizes (that have not been documented in Lebanon before) was revisited, mapped and photographed (Fig. 1).

This article will glance into the history of Salle Blanche, from its discovery in the 1960 until its rediscovery in the year 2005; including the unsuccessful attempts inbetween.

ATTEMPTS TO REACH SALLE BLANCHE

The Salle Blanche was discovered by Mr. Sami Karkabi and his mapping crew in early 1962 as they were surveying the main axis passage of Jiita cave using the theodolite.

When they got to the Chaos Gallery they wanted to measure the height of the ceiling, which appeared very high to them. So they assembled a long stick with a kerosene lamp and raised it to light the roof. This is how they came to define the 80 m height of the ceiling.

During this endeavor and at the height of approximately 70m, they noticed an opening on the right side close to the beginning of the Chaos Gallery. This opening was the entrance of the gallery to be named Salle Blanche (Personal Communication with Sami Karkabi). During that trip they did not have time to climb and explore the cavity so they left it for another expedition.

Fig. 1
The White Gallery showing cave domes, columns and speleothems.
(Photo by Issam Bou Jaoude)

On September 12, 1963 Sami Karkabi accompanied by Raymond Khawam, Robert Kasparian and Emile Ghanem free climbed the 70 m with very limited equipment, discovered the gallery and named it the Salle Blanche due to its marvelous and pure white surfaces (Personal Communication with Sami Karkabi).

Sami Karkabi took a dozen of pictures, two of which are present in the Al-Ouat'Oaute magazine issue number one published year 1986. A number of other pictures are also present in the archives of Sami Karkabi (Fig. 2 and 4).

Even though the location of the Salle Blanche is clearly shown on the Jiita cave map drawn in the year 1962 (Fig. 5), it was not mapped for 45 years and attempts to reach it failed until 2005.

After the Lebanese civil war ended in 1990 SCL members were reminded by Sami Karkabi of the presence of the gallery, however no attempts were made to access it during that period until 2003 when an attempt was made to reach the gallery. It was unfortunately unsuccessful due to shortage of equipment.

That attempt saw seven members of SCL access Jiita cave from its lower entrance. This meant working their way against the water current for 3 km where the Salle Blanche was located. The trip upstream was difficult as the water current was strong. One of the dinghies got a puncture and after about 4 hours the team finally reached the Salle du Domes. They ascended a 45 degrees slope and rigged a rope at about 60m up on a large white concretion.

At this level the mud traverse was found but it was dangerous to continue without any aid. However, one of the team members made his way across and climbed up 10m and reached the entrance. Obviously the location of the Salle Blanche and its possible course were located on this trip but it was a risky situation and the exploration and mapping of this gallery was left for another trip.

2005 SALLE BLANCHE EXPEDITION

The trip was scheduled to start on the 5th of August. The plan was to enter the cave by descending into the Daraya tunnel at 7:00 am. Delays in caving trips are always expected and after approximately 2 hours we started our descent into the tunnel at 9:15am.

Daraya's tunnel is a man made tunnel measuring approximately 600m, descending at a slope of 45 degrees from the northern side of the valley of Nahr el Kalib to the terminal siphon of the cave. The tunnel can be accessed through a meandering road that descends from the Ballouneh village on top of the mountain to nearly the river level. The tunnel was a government project made primarily for the exploitation of the underground water that emerges form that terminal siphon.

Fig. 2
The cavers who first entered the Salle Blanche.
(Photo by Sami Karkabi)

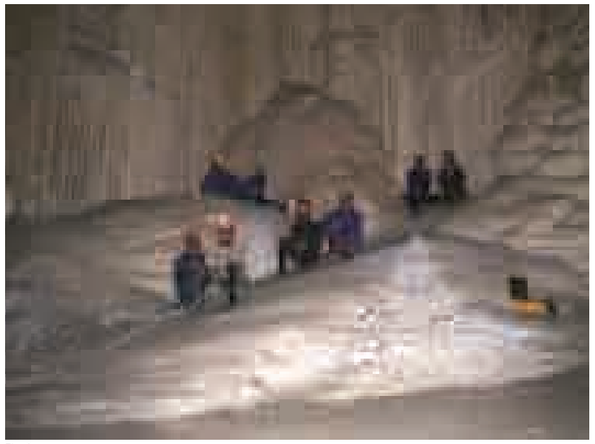

Fig. 3
The cavers of the 2005 Salle Blanche Expedition.
(Photo by Issam Bou Jaoude)

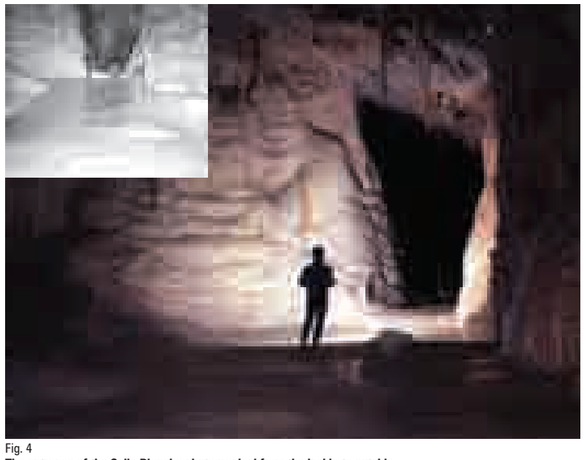

Fig. 4
The entrance of the Salle Blanche photographed from the inside to outside. Inset is the same location from the first exploration in the 60's.
(Photo by Issam Bou Jaoude)

Fig. 5
The survey of Salle Blanche.

EXTRACT FROM TRIP REPORT BY ISSAM BOU JAOUDE:

At the terminal siphon we wore our wet suits and began the 6 hour trek to reach the 1951 camp site.

A small incident delayed us further during the first 100 m of the wet section. One of the group members blew his inner tube and according to him managed to dislocate his shoulder. However, after a break of few minutes all was back to normal and we were on our way again. Stress builds up at the early stages of the expedition and one must be careful.

This section of the cave before the allocated camp site is mostly a wet section interrupted by short dry walk-able portages, mostly walking on rocks in the shallow depth of the water ways.

Two short rope sections were required before reaching the camp site at 5:30pm the same day. The first rope is located before passage Zoughbi and the other close to Palais des Milles et une Nuit.

Located almost in the center of the cave, the camp site was chosen in a dry spot at the end of the huge gallery called the Chaos Gallery. Its name is quite indicative for it is large and one can easily get lost there. In the middle of Salle du Domes, 20 minutes before reaching the camp site, a muddy slippery 30m-decent was encountered. At this location and after 8 hours of nonstop activities, exhaust and fatigue can easily promote

Fig. 6
Map showing the location of the Salle Blanche on the Jiita Cave map.

lack of concentration while descending this particular slope.

At the camp site tasks that were assigned previously were carried out, with some members collecting water and purifying it and others cooking dinner.

The next day we woke up at 7:00 am; five of us were assigned the task of trying to reach the Salle Blanche while the other two volunteered to remain at the camp site. The cliff where the Salle Blanche is located (70m above the level of the river) is fifteen minutes from the camp site towards the west.

The climb has already started. A rope was rigged at a muddy steep slope from a previous expedition. At an elevation of 60 meters the tricky 30m horizontal slippery traverse had to be rigged. Rena belayed me and I planted 5 bolts to complete the traverse. With a final vertical climb of 15m I reached the entrance of the gallery at around 11:30am. I called on everyone to follow. Even the guys at the camp were called upon by Johnny to join in the exploration, topography and photography of this gallery. Dirty cloths and boots were removed at the entrance in order to protect the fragile white environment in Salle Blanche (Fig. 3 and 4).

We regrouped at 3:00 pm in the camp site, ate a small snack, packed our gear in dry bags, wore our neoprene, and headed towards the exit at around 4:30 pm.

The last kilometer of the cave is a river passage (including the show cave section); therefore, it was necessary to make use of scuba diving fins to aid in swimming this section.

At around 8:30 pm on the 6th of August we exited the cave.

SALLE BLANCHE

The Salle Blanch represents a large dry L-shaped gallery that extends in the E-W direction. It measures more than 2250 m^2 (Fig. 5 and 6).

The entrance of Salle Blanche is rectangular in shape (Fig. 7) with a pool of water acting as a gate that separates the outer section which is a balcony overlooking the main gallery of Salles du Domes.

The walls, floor and roof of this gallery are all decorated with pure white calcite speleothems. The calcite is in the form of stalactites, stalagmites, war-club bulbous stalactites, columns, flow stones, rafts, popcorn, and moonmilk. All of those speleothems in the gallery are purely white in color from which the name “Salle Blanche” was derived.

After passing the entrance (Fig. 7) there is a descent into a dry pool with white calcite covering the floor. Moonmilk covers this calcite and it is sometimes so thick that it forms a soft spongy-like feeling under the feet. Large columns with diameters of more than 3 m are present (Fig. 8). The ceiling of this gallery is filled with white stalactites and soda straws.

Several bat skeletons were discovered in the southern end of Salle Blanche (Fig. 5). These skeletons were covered with a few millimeters of calcite coating.

At the end of this gallery war club like bulbous stalactites dangle from the roof. It is believed that these are features that form under water in cave pools. This is a clear indication that this gallery was under water for an extended period of time and later dried out due to unknown reasons. However, some small water-filled pools of various sizes are still present. The most important feature in this gallery is the large number of cave cones and tower cones scattered on the floor (Fig. 1). These vary in height and diameter, up to 2m and 1m, respectively. Cave cones of that size and number have never been documented in Lebanon before.

Most of the speleothems in this gallery are decorated with coralloids and covered with moonmilk (Fig. 8).

Salle Blanche proved rewarding in terms of its scientific value and beauty. We cannot but end this article by pointing out that care should be taken while visiting this gallery. It is important that cavers remove their caving shoes and their muddy gear before entering into this fragile environment.

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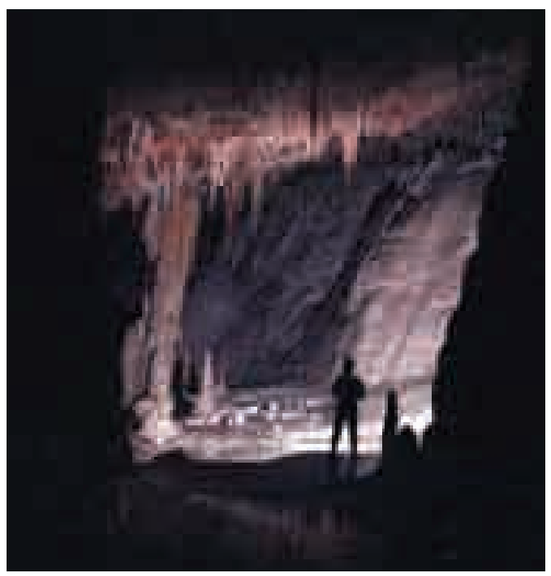

Fig. 7
A general view of Salle Blanche from the entrance showing one of the columns to the left.
(Photo by Issam Bou Jaoude)

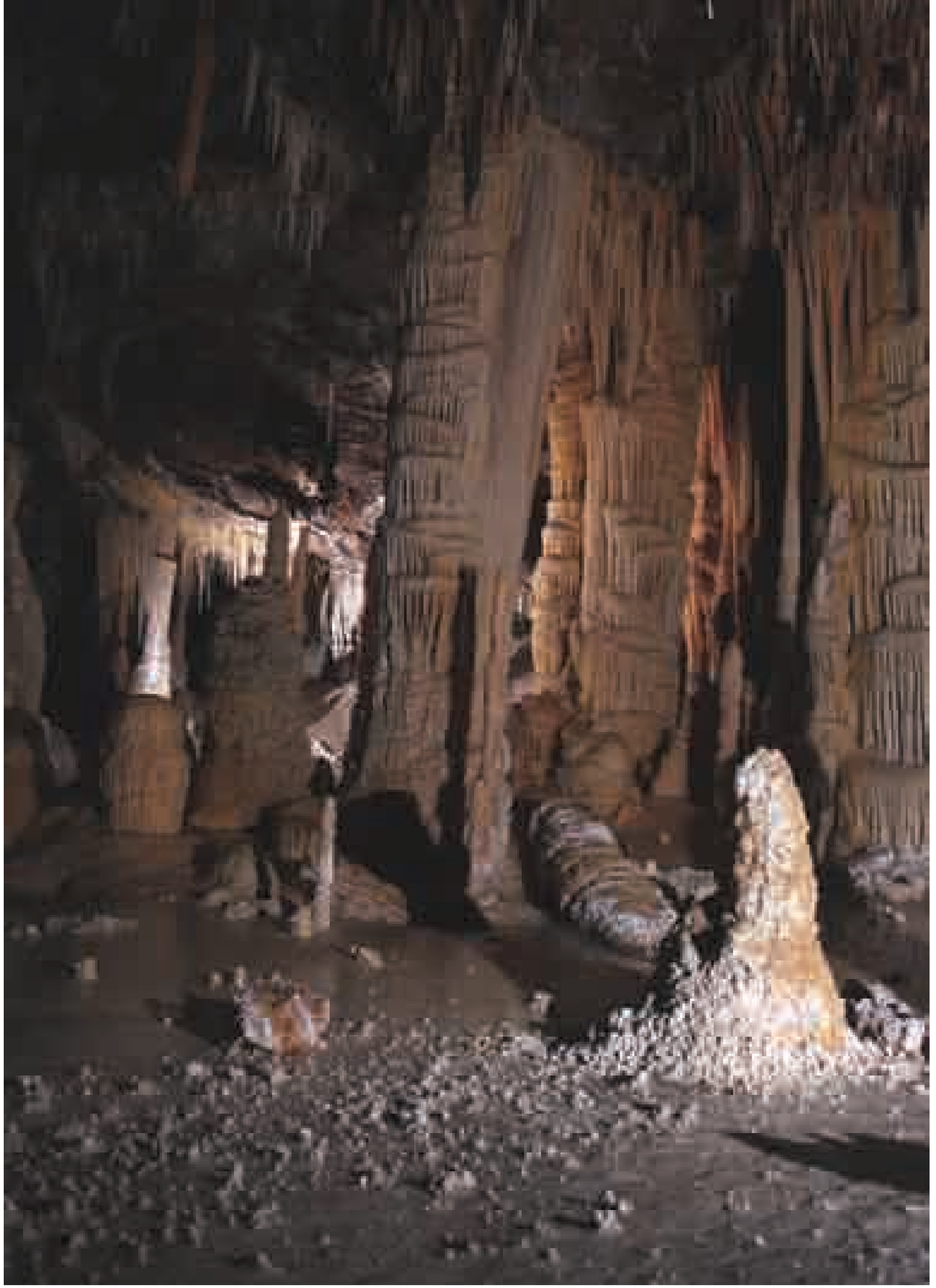

Fig. 8
A general view of Salle Blanche showing large columns.
(Photo by Issam Bou Jaoude)

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FIRST GEOCHEMICAL STUDY OF STALAGMITES FROM THE JIITA CAVE

Abstract

In a previous contribution, Nader et al. (2007) presented and discussed absolute-dated oxygen and carbon isotopic profiles from a Holocene stalagmite from the Jiita cave (Lebanon). This contribution has two main objectives: (1) to compare the previous oxygen and carbon isotopic profiles to the variations in crystallographic habit, stalagmite diameter and growth rate; and (2) to compare data of the Jiita cave speleothem with other speleothems and other proxies (pollen, lake sediments,…) in the Levant area, and provide additional information about the Holocene climate evolution in Lebanon. Based on the good correlation between the morphological, crystallographic and geochemical parameters in the stalagmite and the correspondence with other stalagmites form central and northern Israel, we relate high $\delta^{18}O$ and $\delta^{13}C$ values to drier conditions. Between 6.5 and 5.8 ka an increase in isotopic values, a decrease in growth rate and stalagmite diameter suggests a transition from wet conditions in the early Holocene towards drier conditions in the mid-Holocene.

Keywords:
Speleothems, oxygen isotopes, Holocene, Jeita, Lebanon, paleoclimate.

Introduction

The Levantine region (Lebanon, Israel/Palestine, Syria, and Jordan; Fig. 1) witnessed important Glacial - Interglacial (G-IG) climate changes as well as a shift of varying climate belts (Robinson et al., 2006). This region currently lies very close to the arid/semi-arid boundary and has a long history of human settlement and habitation (at least the last 5,000 years). Hence, the Levant is believed to be an ideal region for the study of climate and societal changes.

Previously constructed $\delta^{18}O$ and $\delta^{13}C$ curves from Israel/Palestine – e.g. Soreq, West Jerusalem and Peqiin caves – all show similarities for the last ~250,000 years, with changes in $\delta^{18}O$ and $\delta^{13}C$ corresponding to changes in precipitation and soil activity, respectively, and therefore demonstrated the high potential of speleothems for regional paleoclimate reconstruction (Bar-Matthews et al., 1997, 1999, 2003; Frumkin et al., 2000). They provided evidence for rapid and large climatic changes during the last Glacial-Interglacial cycle.

This paper attempts to reconstruct the Holocene paleoclimatic and environmental evolution of Lebanon, which is an important step for discussing the regional climate changes and vegetation dynamics in that region in order to evaluate climatic predictive approaches for the future. Furthermore, the particularity of Lebanon with respect to ancient human settlements and trades makes this study an attractive approach for further multidisciplinary research projects aiming to investigate the impact of climate on socioeconomic developments during the Holocene.

الدراسة العلمية عن الصاعدة من الطابق العلوي لمغارة جعيتا المطروحة في هذا المقال لها شقان. الشق الاول يقارن منحني الخواص للأوكسيجين و ثاني أوكسيد ألكربون مع المتغيرات في قطر الصاعدة, والمتغيرات في البلوريات, والمتغيرات في النمو. الشق الثاني يقارن المعطيات عن الصاعدة من مغارة جعيتا مع معلومات من دراسات اخرى في منطقة الشرق الأوسط.

Dans cet article, Nader F. et Verheyden S. ont deux objectifs:
(1) Comparer les profils précédents d'oxygène et de carbone isotopique aux variations cristallographiques, le diamètre des stalagmites ainsi que leur rythme de développement; et (2) comparer les données des formations de la grotte de Jiita avec des formations et des données (pollen, sédiments de lacs, ...) dans la région du Levant.

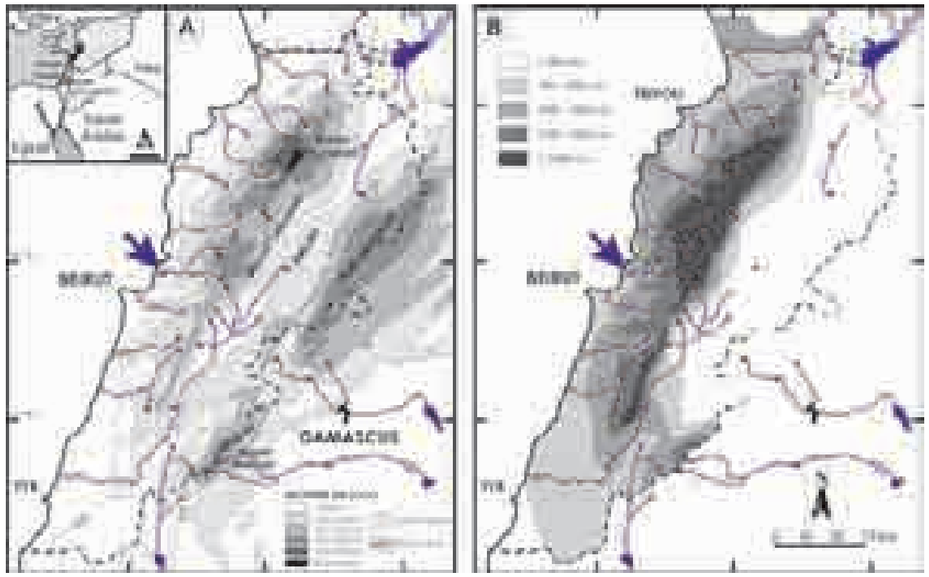

Fig. 1. A simplified topographic map of Lebanon showing the main physiographic units (Mounts Lebanon and Anti-Lebanon, and the Bekaa Plain) – the inset map shows the location of Lebanon and the Levant (striped area) in the Middle East. B. Simplified precipitation map of Lebanon – from UNDP (1970). The position of the Jiita cave is indicated with an arrow on both maps.

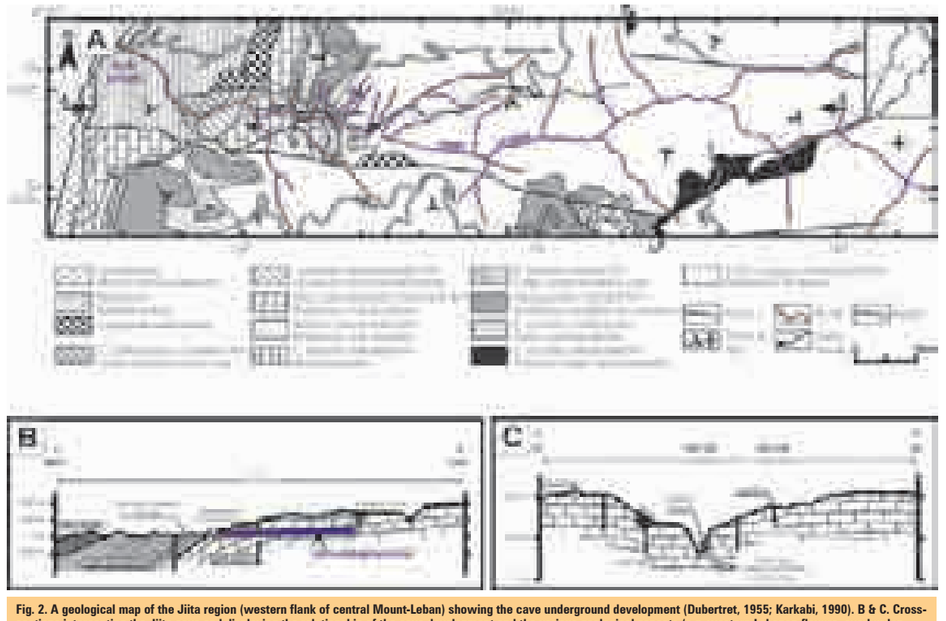

Fig. 2. A geological map of the Jiita region (western flank of central Mount-Leban) showing the cave underground development (Dubertret, 1955; Karkabi, 1990). B & C. Cross-sections intercepting the Jiita cave and displaying the relationship of the cave development and the various geological aspects (e.g. western Lebanon flexure, overburden rocks; Nader et al., 2003).

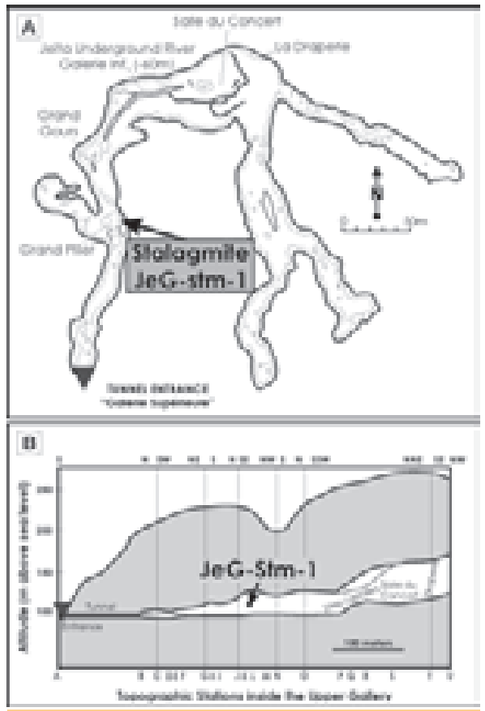

Fig. 3. A. Topographic survey of the Upper showcave (Galerie Supérieure) modified from Karkabi (1990), showing the location of the sampled stalagmite JeG-Stm-1. B. Composite cross-section showing the location of JeG-Stm-1.

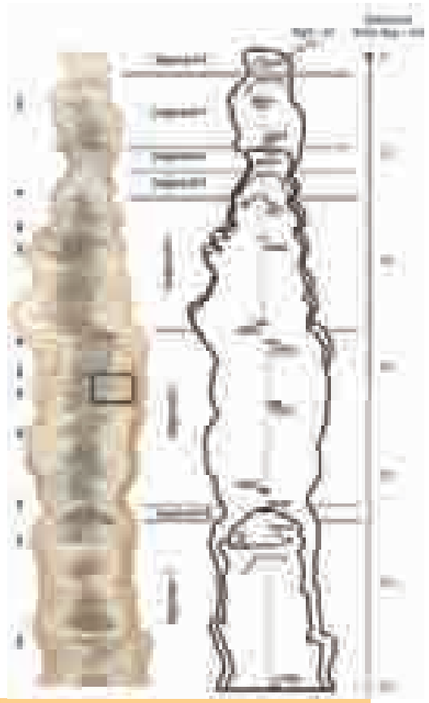

Fig. 4. Cut face of the JeG-Stm-1 and a sketch showing the U/Th dating values (from Nader et al., 2007) – rectangle shows the location of Figure 5.

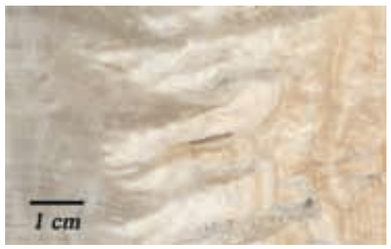

Fig. 5. Photomicrograph showing the 'wings' pattern at the sides of the stalagmite (location of photo is shown in Figure 4).

Climatological settings

The Lebanese territories cover the central-eastern coastline of the Mediterranean Sea, between latitudes 32°34'N and 34°41'N (Fig. 1A). It is characterized by a Mediterranean climate close to the arid/semi-arid climate boundary (in Israel/Palestine). The average annual precipitation rate at the Jiita cave site today is around 1000mm (Fig. 1B; UNDP, 1970). The climate is seasonal, with rainy winters (between November and February) and dry, relatively hot summers (usually the period from May to October).

Location

The Jiita cave (Fig. 1) is the longest and most well-known cave in Lebanon (Nader, 2004). It is located within the western flank of central Mount Lebanon (Fig. 1A, B). The natural entrance of the cave is situated at about 100m above sea-level (N32°56.616'; E035°38.516'), ~5km East of the Mediterranean coastline and ~15km North of Beirut City (Capital of Lebanon; Fig 1A, B). The cave system is entirely developed in Middle Jurassic grayish fossiliferous limestone rocks (the Nahr Ibrahim Member; Fig. 2A, B, C), a part of the Kesrouane Formation, which has an average stratigraphic thickness of 1000 m (Dubertret, 1975; Walley, 2001, Nader et al., 2004).

Since the 1950s, a part of this cave had been transformed into a touristic cave through the efforts of local cavers and cave scientists. A tunnel was dug making the cave more easily accessible to tourists. The cave was also subject to various studies mainly related to hydrogeological aspects, as it hosts a major underground river with a discharge of about 2.3m^3/s during the recession period (UNDP, 1970). The cave hosts numerous speleothems in large underground halls, especially in an upper gallery that is located in the touristic part of the cave (Fig. 3A). In many places, the ceiling is more than fifteen meters high (Fig. 3B) and most speleothems are characterized by a 'pile d'assiettes' or dish-stacks type structure. The stalagmite JeG-stm-1 was retrieved from the upper gallery of the Jiita touristic cave in October 2005. The stalagmite was collected at ~200 meters from the entrance (N32°56.620'; E35°38.640') of the upper gallery (Fig. 3). The ceiling of the cave at this location is situated at 16.45 m high, and the thickness of the overburden rock (mainly micritic limestone) is estimated to be around 100 m (Fig. 3B). Water dripping from the high ceiling occurs in the stalagmite site during winter and spring seasons, while possible short-term dryness prevails during the summer. Cave temperature at the stalagmite location is 22.0±0.5°C and remains constant throughout the year.

Petrographic Aspects

The sampled JeG-stm-1 stalagmite part is 121.5 cm long. The inner profile of the stalagmite (Fig. 4) displays a regular deposition of dense calcite, varying in colour from dark grey to light yellow-beige. A regular lamination with very thin layers (<0.2mm) is present but generally only visible at the sides of the speleothem in the "wing-like" structure, called dish-stacks morphology. In the central part of the section, the calcite is denser and mainly displays uniform, grey translucent texture. The stalagmite diameter is variable, thickened in its middle part, with a maximal diameter of 18 cm. It becomes thinner towards the top with a diameter of 7 cm at its topmost part and more whitish calcite without dish-stacks structure and a more classical candle-shaped structure.

Age and growth rates of the stalagmite

Dating results presented in this paper are originally published in a previous paper (Nader et al., 2007). Uranium-series dating indicates that the stalagmite (JeG-stm-1) was deposited between 11.9 ±0.1 (2σ) ka and 1.1 (extrapolated) ka (Fig. 6), when the stalagmite stopped growing.

Growth rate varied between 0.50 and 2.62 cm/100 yrs (Fig. 6), however, no important growth hiatus was detected. Five to ten red brown calcite layers are deposited around 4.0 ka, without a major change in growth rate (compare Figs. 4 and 6). The highest growth rates are observed in the parts of the stalagmite, where the diameter is the thickest and where the dish-stacks structure prevails. The lowest growth rates are observed in parts of the stalagmite with smaller diameter and where the dish-stacks structure disappears, e.g. around 85 cm and above 35 cm from the top of the stalagmite.

$\delta^{18}O$ and $\delta^{13}C$ records

Both $\delta^{18}O$ and $\delta^{13}C$ records roughly follow the same trend with relatively high values between 11.9 ka and 11.2 ka as at 10.3 ka. Generally lower values (~ -10.5‰) occur from 11.2 ka onwards with the lowest values (-6.1‰ for $\delta^{18}O$ and -11.2‰ for $\delta^{13}C$) occurring between 8.6 and 6.5 ka (Fig. 7). At 6.5 ka, $\delta^{18}O$ as well as $\delta^{13}C$ start increasing progressively, and, after a short return to lower values (at 5.9 ka), increases again in less than a century and remain relatively high until the top of the stalagmite at 1.1 ka except for the period between 3.5 and 3.0 ka.

According to the $\delta^{18}O$ and $\delta^{13}C$ curves, the stalagmite shows a tripartite partition with a base featuring relatively high carbon signature, a middle part showing decreasing values, and an upper part characterized with relatively higher $\delta^{18}O$ and $\delta^{13}C$ values (including the highest values at the top with respect to the whole stalagmite record; Fig. 7).

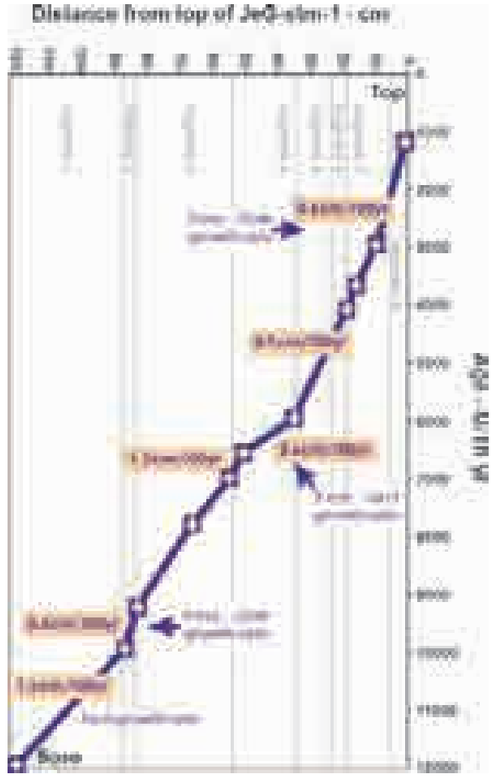

Fig. 6. Growth rate (in a/cm) of the stalagmite with respect to distance (in cm) from the top.

Discussion

Comparison of the isotopic profiles of the Jiita, Soreq and West Jerusalem cave records reveal similarities during the Holocene period (the interglacial period of the last 10ka) (Fig. 8). Based on a good understanding of the present-day isotopic response at the Soreq cave, the $\delta^{18}O$ variations in the speleothems from this cave were interpreted as mainly linked to variations in amount of rainfall (Bar-Matthews et al., 1997; 1999). Accordingly, the lower $\delta^{18}O$ values have been associated with rainy years and the higher $\delta^{18}O$ values with dry years.

The changes in carbon isotopic composition ($\delta^{13}C$) of speleothems in central and northern Israel are interpreted as mainly reflecting changes in contribution of the soil CO_2 (Bar-Matthews et al, 1997, 1999; Frumkin et al., 1999, 2000) and thus linked to changes in precipitation with periods of low rainfall inducing sparse vegetation and a lower contribution of "light" organic carbon in the speleothem resulting in higher $\delta^{13}C$ value (Frumkin et al., 2000). The Jiita cave and the West Jerusalem, Soreq

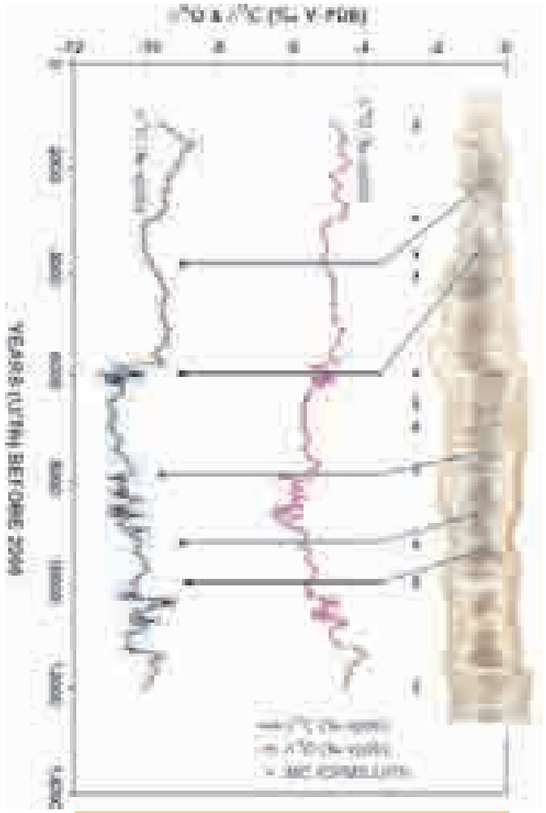

Fig. 7. $\delta^{13}C$ and $\delta^{18}C$ profiles (values are in ‰ VPDB) of the JeG-stm-1 stalagmite (Jiita cave, Lebanon). Slightly modified from Nader et al (2007).

and Pequin caves are located in the present-day semiarid Mediterranean-type climatic regions, all situated at less than 50 km from the East Mediterranean coast in the western Mediterranean – facing flanks of their respective mountain systems. The Jiita cave is at a distance of 115 km from the Peqiin cave, some 240 km from the West Jerusalem cave and 260 km from the Soreq cave. The present day similar climate and close geographical location of the four caves invoke a common isotopic response to climate and subsequent vegetation changes (Bar-Matthews et al. 1997, 1999, 2003; Frumkin et al., 2000). Furthermore, the similarity of the Jiita $\delta^{18}O$ record to that of the Soreq cave, and that of the Jiita $\delta^{13}C$ record to that of the West Jerusalem cave confirms that the studied speleothems reflect similar responses to regional climatic variations. Such climatic changes as invoked from the Jiita stalagmite isotopic record and compared to the records from the nearby caves are grouped into three major time periods.

Period from 11.9 to 10.1 ka:

According to the review of multiple datasets of Robinson et al. (2006) the Younger Dryas (YD), between 12.7 and 11.5 ka, was a regional event with extremely arid and cold conditions. The Jiita cave record starts at 11.9 ±100 (2σ) ka with high $\delta^{18}O$ values consistent with higher aridity during the YD. The Jiita $\delta^{18}O$ record begins to decrease at 11.2ka, at the same time compared to the $\delta^{18}O$ decrease in Soreq cave speleothems (Fig. 8) corresponding to the end of the YD and the transition to more humid conditions of the pre-Boreal (PB) Similar to the $\delta^{18}O$ record, the carbon record starts (at the base of the studied stalagmite) with relatively high values (-9.8‰) in agreement with a less favourable period for soil activity, associated with the drier conditions of the YD, however not dry enough to significantly decrease speleothem deposition as suggested by a still relatively high growth rate (1.65 cm/100yrs; Fig. 6) and thick speleothem diameter (between ten and eighteen centimetres).

Period from 10.0 to 5.8 ka:

During the period 10.0-5.8 ka (Early Holocene), the Jiita stalagmite displays particular low $\delta^{18}O$ and $\delta^{13}C$ values compared to the rest of the stalagmite. The isotopic data from the JeG-stm-1 stalagmite indicate that during the Holocene, most humid conditions in western Lebanon occurred between 9.2 and 6.5 ka. This period corresponds to parts of the stalagmite with particularly high growth rates (between 1.17 and 2.62 cm/100 yrs; Fig. 6) and in general the thickest stalagmite diameter giving further evidence for a high water availability and/or a high $CaCO_3$ saturation of the depositing water linked with an active vegetation above the cave. Simultaneously occurs the onset of clear dish-stacks stalagmite morphology; which needs a high ceiling (Gams 1981 in Hill and Forti, 1997), but also a high water supply with an important “splash effect” and high carbonate supersaturation for the development of the “wings” (cf. Fig. 5). Only a short part of the stalagmite around 6.7 ka, displays a slightly lower growth rate (0.92cm/100 yrs). Since $\delta^{18}O$ and $\delta^{13}C$ records are remarkably stable during this period, the observed change in growth rate is believed to have no regional climatic or environmental cause. It is more probably related to local changes in the water supply system, as also suggested by the horizontal shift in growth axis occurring at 6.7 ka (see Fig. 4).

A warm and wet Early Holocene is evidenced in several other proxy data (pollen, lake sediments,…) in the Levantine region. The Early Holocene (9.5-7.0 ka) could have been the wettest phase of the last 25,000 years across much of the Levant and Eastern Mediterranean(Robinson et al.,2006). The same period witnessed higher lake levels of the Lisan and Dead Sea lakes. The lake level record was further refined by Migowski et al. (2006), who dated this period between 10 and 8.6 ka; Fig. 8).

A sudden increase in $\delta^{18}O$ and $\delta^{13}C$ values in the JeG-stm-1 stalagmite suggests a decline from wet to drier conditions at around 6.0 ka. The transition occurred in two steps with a progressive decline from 6.5 to 5.9ka interrupted at 5.9 ka by a short (~100 years) return to

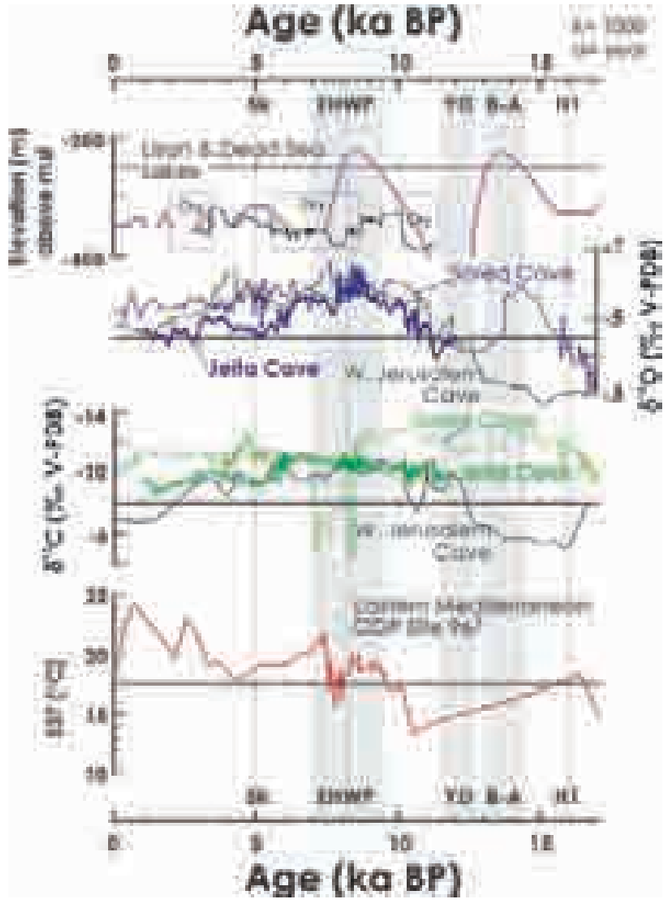

Fig. 8. Correlation charts from various speleothem records and proxies, see text for details (Bar-Matthews et al., 1997; Frumkin et al., 2000; Migowski et al. 2006; Robinson et al., 2006).

wetter conditions and followed by an equal but rapid decline in less than a century (Fig. 7). The change to dry conditions indicated by the $\delta^{18}O$ and $\delta^{13}C$ profiles is supported by the decrease in diameter, the drop in growth rate (Fig. 6) and a progressive change towards a matt white porous calcite (Fig. 4).

A wet Early Holocene was also recorded in speleothems from Oman (Neff et al., 2001; Fleitmann et al., 2003; 2007), and the probable link with other climate systems such as the Asian monsoon system and the North Atlantic Oscillation (NAO) is explained by Staubwasser and Weiss (2006).

Period from 5.8 to 1.1 ka

The JeG-stm-1 stalagmite displays indications for dry conditions until the end of stalagmite deposition at 1.1 ka through high $\delta^{18}O$ and $\delta^{13}C$ values (Fig. 7) and smaller stalagmite diameter, as well as changes to a more whitish porous stalagmite without dish-stacks morphology (Fig. 5). The Soreq cave record (Bar-Matthews et al., 1997; 1999) and other terrestrial data such as lake levels, paleosoils and snail records (Robinson et al., 2006; Fig. 8), suggest wet conditions for the period from 4.5 to 5 ka, while according to the JeG-stm1 stalagmite record, a wetter period occurred only between 3.0 and 4.0 ka (as suggested by a small decrease in $\delta^{18}O$ and $\delta^{13}C$ values). At about 4.0 ka, a brown layering suggests the occurrence of a flood event often responsible for the rapid transfer to the cave of impurities like oxides or clay particles with incorporation in the stalagmite. The absence of a drastic change in petrography as well as in $\delta^{18}O$ and $\delta^{13}C$ values confirms that the brown layering is not due to a regional climate event. Instead, a slight regular decrease in $\delta^{18}O$ and $\delta^{13}C$ values indicates a gradual change towards less dry conditions to 3.0 ka. The relatively wetter period between 4.0 and 3.0 ka seems contradictory with the evidences from other proxies for severe drought during the so-called 4.2 ka climate event brought in relation with the decline of the Akkadian empire (deMenocal, 2001) and several other civilizations of the Indus Valley (Staubwasser and Weiss, 2006). After the 4.2 ka event, entire regions of northern Mesopotamia, Syria and Palestine were intensively resettled (Staubwasser and Weiss, 2006), suggesting a return to relatively wetter conditions in agreement with the indications of JeG-stm-1

in the present study (see above). Between 3.0 and 1.1 ka, soil activity progressively decreased as indicated by increasing $\delta^{13}C$ values. $\delta^{18}O$ values present more variability and it is therefore less clear if the $\delta^{13}C$ increase is due to a progressive dryer climate (in which a $\delta^{18}O$ increase would be expected) or if it is to be ascribed to a decrease in soil activity linked with increasing agriculture and/or grazing.

Conclusions

This contribution emphasises on the importance of speleothem studies by providing complementary data that help in understanding the Holocene paleoclimate of the Levant area. Petrographic and geochemical studies carried out on the JeG-stm-1 stalagmite (previously dated; 11.1 to 1.1ka) from the Jiita cave, central Mount Lebanon, as well as regional correlation with speleothem records from several nearby caves in Israel/Palestine, resulted in the following conclusions:

1- The wettest period in western central Lebanon occurred from 9.2 to 6.5 ka.
2- A two-step transition from wet Early Holocene to drier Mid-Holocene conditions is observed between 6.5 and 5.8 ka.
3- The JeG-stm-1 stalagmite registered a dry Mid- to Late Holocene until the end of stalagmite deposition at 1.1 ka, with exception of a relatively wetter period between 4.0 and 3.0 ka.

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Left. the 1952 camp bottle showing the names of Sami Karkabi, Lionel Gorra and Raymond Khawam (This bottle can still be found on site inside Jiita cave).
Right, the 1951 camp bottle showing the names of Albert Anavy, Joseph Ghannum and Lionel Gorra with a small Lebanese flag (This bottle can still be found on site inside Jiita cave).
(Photos by Rena Karanouh)

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JIITA WITH SAMI

Fig. 1
Sami in Jiita, 1954.
(Photo by Sami Karkabi)

Fig. 2
Sami in Chaos.
(Photo by Issam Bou Jawdeh)

Une aventure extraordinaire vécue par quelques spéléologues en l'an 2000 et qui leur a permis de voir l'incroyable grotte de Jiita à travers les yeux d'un de ses explorateurs M. Sami Karkabi. Shangri-la, Styx, Maxwell, Bliss, l'Aigle, Dardanelles, Le Minaret, La Pagode, Pantheon, Chaos, Thompson, Crusaders Column, Rapides de l'Enfer, le Tunnel... tous ceux-là et bien plus ont inspiré le vieillissant Sami K. à vivre ses rêves à nouveau.

يتطرق هذا المقال الى المغامرة التى حصلت سنة 2000 داخل مغارة جعيتا وشارك فيها احد اعمدة الاستغوار وواحد من اهم مكتشفي مغارة جعيتا السيد سامي كركبي. وهذا المقال له اهمية لأنه يروي الاحداث وبخاصة المواقع والمحطات المهمة مثل موقع الصقر والشنغريلا وغيرها في تاريخ اكتشاف هذه المغارة من خلال اعين هذا المستغور العظيم.

IT IS GOOD WE ARE DOING THIS IN DARKNESS... WE WOULD NEVER DARE IF WE SAW WHAT WE WERE ACTUALLY DOING

H.BLISS

Shangi-la, Styx, Maxwell, Bliss, the Eagle, Dardanelles, La Minaret, La Pagode, Pantheon, Chaos, Thompson, Crusaders Column, Rapids de l'Enfers, the Tunnel…
What am I going on about?
What images do these wild places inspire?
They are all actual places soon to be seen by me for the first time!
To start.

Why are we doing this? How are we finally being taken by Sami K. to see Jiita through his eyes? The only thing I will say at this point is Sami Karkabi is Jiita. If there is anyone who knows, lives, breaths, and loves this cave, it is he.

A couple of months back he had said he wanted to tell us the history of Jiita. We (Issam and I) told him that it would so much better to go into Jiita and then he can explain the history on the ground. He agreed. We couldn't believe it. Sami Karkabi after a 20 year absence, was entering the lower gallery of Jiita to spend two days in the cave he helped discover and map in the 50's.

So that was it.
As simple as that.

We all met at 2pm in the parking lot of Jiita to enter the cave. For me this was the first time in this area of Jiita, so excited doesn't even begin to explain how I was feeling. We had planned to arrived slightly earlier than Sami as we wanted to prepare all the bags before we went inside. Sami was also notoriously known to get very angry if anyone was late. Sami's reputation preceded him.

But true to form we all arrived together! At least we were on time for once and not late.

We arrived at the parking lot of Jiita Cave in our cars. The pioneering explorers could only access the cave using donkeys to carry the supplies down into the valley, a 2.5km trek that used to take around half an hour. Our boat inside the cave was made of an aluminium alloy with a flat hull. In 1873 they used a few planks of wood tied together and supported by inflatable goat-skins (Al Ouat'Ouate, No5, 1990).

3:30pm

After the bags were placed in the boat we all got in. Marc steered at the front, Issam and I rowed, next sat Sami and finally Joe, who steered from the back. A steerer at the front and one at the back does not make for good steering, 'too many cooks…' came to mind very often. At last count there were 13 sacs, four cameras, lots of food, 2 writing books, lots of smiles, and the feeling that something special was happening. We also had a gallon of water because earlier in the week we had gotten a lecture from Marc about the water in Jiita being contaminated with Epoxi-hepi-fluoro-sewage-bacter'ium-includis…… no-one ever understands Marc but we didn't want to take the chance of ending up with the previously mentioned disease so we took our own water….ever heard of 'Water, water, everywhere but not a drop to drink?'…that was us.

We were finally on our way. The first 400m was the illuminated tourist section Lac Thomson, named after the first person to explore and write about the cave. Here we saw the Screen, a narrow passage where Sami had dynamited the rock to allow the boats to pass through. Before the dynamiting the barrier of rock meant that the boats had to be carried over the rock and then replaced into the water. Then came; Tower of Pisa on the right which was indeed a leaning stalagmite, the Weeping Willow on the left, a beautiful curtain wall, the Flic (the police roundabout) which was a protruding rock in the middle of the water.

We stopped at the sand mound on the right just after the Flic and before Maxwell's Column. Sami and Issam photographed, we modelled, held flashlights, and listened to Sami as he explained the history.

In 1873, W.J Maxwell, an engineer from London commissioned by the water board entered Jiita with the purpose of studying the cave to see if the water from the Dog River can be used to supply water to the city of Beirut. The other men who entered with him for the exploration were W.G Huxley his second on the engineering staff, Rev. D Bliss, then president of the Syrian Protestant College (later to be the AUB), and R.W. Brigstocke. Maxwell had read a previous account by a Dr. Thomson, an American missionary, who in 1836, had fired a gun into the cave and judging from the echoes he heard said the cave must be very big. He had no boat at the time to explore but he had seen the beautiful concretions at the entrance (with foresight this was a good thing because in his account he states that he longed for a boat so he can gather the stalactites and stalagmites. He became the first 'caver' to write an account of a cave in Lebanon. Unknowingly he had entered the first 50m of Jiita (Al Ouat'Ouate, No5, 1990).

4:00pm

From the sand mound we stood on we could see Maxwell's Column. This gigantic column is a landmark in the cave. I recognized it from all the old photographs and etchings I had seen in the Al-Ouat'Ouate. Issam of course found some concretions that got him all excited. Decalcification seems to get him all hot and bothered these days.

We all got back into the boat and made our way to Maxwell's Column. Surrounded by sand, this pillar is stunning. It is approximately 8m high and seems to stand guard to the rest of the cave. In Maxwell's report he writes that this column was so imposing and grandiose it stopped their exploration for a while,

'Standing out in bold relief, with fine fluted front and continued to the rear in a mass of pendent drapery, like a sheet let down in graceful folds from the roof. The leader of the party, amid ringing cheers was compelled to allow his name to be given to the central attraction.' (Al-Ouat'Ouate, No5, 1990)

From that time on the pillar came to be known as Maxwell's Column.

We climbed the rocks behind it only to discover a small bottle placed on top of a colonette. We opened the bottle and read the paper that had been placed inside, 'Christmas 2000, Dr. Nabil Hadad.' (Dr. Hadad is currently the director of Jiita cave). Sami didn't like this very much as all the bottles that had previously been placed in Jiita were placed as a reward and proof of the explorers' feats in the cave.

I wandered through the forest of stalagmites on the slope next to the column when Sami asked me, 'So do you recognize this?' I thought and thought and then I recognized it from his photos. I had seen it many times and here it was in front of my eyes. I shouted the answer to Sami and he smiled. This game was to carry on through the entire trip. I loved it. We had reached 'the Minaret' and 'the Pagoda'. Marc was wandering through the stalactites, Joe was sitting on a rock and I was watching Sami and Sami just stood there. What must have been going through his mind? It had been 20 years since he had been inside this cave. He had lived, breathed, explored, slept her for 15 days straight, twice, while he was drawing the survey and exploring the cave. For twenty years this cave was his life and during the civil war in Lebanon, due to political events, it had been taken over by someone else to manage. What a feeling. He was now back standing in the same places. This was a cave he had told us repeatedly that he would never enter again and this outing was special for us because of Sami. But here he was. I guess when you love something the heart always wins over the mind.

4:40pm

We left Maxwell's Column to pass through 'The Dardanelles', a series of water channels between protruding rocks. After that we arrived at a well known site, which is portrayed on the old Lebanese pound note.

Fig. 3
A dinghy passage, 1954.
(Photo by Sami Karkabi)

Fig. 4
The Lac Dorothy dinghy crossing.
(Photo by Issam Bou Jaoude)

We were sitting now looking at the real thing. We passed a curtain concretion called the Medusa, or 'The Jellyfish'. The English called it 'The Parachute'. In this passage we passed the postage stamp (original photo taken by Manoug) illustration called the 'The Camel'. Behind and above the Medusa lies a pocket of red straw concretions.

We stopped at a mound of eboulis with an iron ladder placed at the top. It was old, rusted and connected the Lower Gallery with the Upper Gallery. Here was where they had placed the mat and gone up to discover the beauty of the Upper Gallery. Marc and Joe went up to walk around a bit.

In 1957 a mat was bought from Grenoble in France. This was used by Raymond Khawam, in 1958, who went up the ladder and placed a rope. Later George Farra went up but it was finally Kasparian, Sami Karkabi and Raymond Khawam who went up and reached the upper gallery some 55m up. They actually climbed 80m up and then came down 33m to reach the Upper Gallery. On the first attempt they found themselves on the opposite side of what is now the touristic upper gallery. Then they took ladders and connected with the other side. President Chehab approved turning the Upper Gallery touristic from photographs taken by Sami. While they were exploring so many rocks fell below that the boat they were using was destroyed.

5.15pm

We were now some 600m inside the cave. Marc found an old coin that was apparently thrown from the Upper Gallery. Asking Issam to photograph it didn't go down all that well with Issam. Marc had thought that the coin was stuck on the calcite but Issam was able to take it out and later on, at the end of the sortie, Issam gave it to Marc who (to put it mildly) didn't appreciate the offer and immediately ratted us out to Sami. Sami just laughed it off. My comment of, 'It is not a naturally occurring element in a cave so it was good we took it out' was met with a hostile look. Oh well!

5:35pm
Rapid Bliss.
Where were they?
We could not find them.

We were then told that it was due to the dam that had been built at the 'entrance'. The water level had gone up and the rapids were lost.
And now, the Pantheon.
Maxwell explained:

More than a half mile underground we find ourselves in a spacious cavern, whose roof is lost in the gloom. Under this dome, standing out clear as alabaster in midst of darkness, is one of the most beautiful stalagmite formations of the grottoes, which, from its resemblance to the Pantheon, has been distinguished by that name (Al-Ouat'Ouate, No5, 1990).

As we rowed we missed the place were we could go up into the Pantheon. We tried to go up from another location but the rock was covered with a black slimy coating. Later we found out that this was manganese oxide. We went back to the proper de-embarkation point which we knew was correct as there was a survey point at the top that we found on the map as well. We explored inside The Pantheon and here Sami told us that we need to survey this part of the cave as they had not done it. We followed the black cable and arrived at a sand plateau. Here we found Issam...his nose (already very big naturally) stuck in some rather interesting concretions. Hot and bothered again! We were, at this point, getting used to it. He photographed them. We named them 'The Delta' and 'The Recrystalisation'. Issam tried to explain this phenomenon to Marc who only seemed interested in peeing and filling his carbide lamp with water. A small fight ensued over where Marc should pee. Should he pee in the water or the sand?…finally the sand won…As he was doing this Marc noticed bubbling in the water. He got all excited that this was a spring but Issam soon put an end to that saying it was his weight pressurising air in the sand and it bubbled out under the water. We made our way around the rest of the Pantheon which doubles back to the main axis river.

6:50pm

We were back in the boat. We passed by Bliss's bottle. This bottle had been placed at the top of a stalagmite. It is calcified now and the note inside is unreadable. Explorers of the cave have tried to shake the bottle loose but to no avail as explained by E. Thompson on his 1927 expedition.

In it (the Pantheon) is an island that rises to a peak, icy in pallor, and in slipperiness, on whose summit is the bottle containing the names of the first explorers, placed there more than fifty years ago. It stands in an incessant rain, and is now a solid part of the rock; we could not shake it in the least (Al-Ouat'Ouate, No5, 1990).

To date the known bottles with notes inside, that were placed in Jiita by the early explorers are:
-Bliss's bottle, Pantheon, 1873
-Bottle (unknown who placed it but probably Maxwell), Pantheon, 1874
-West and Crawford's bottle, Lake Dorothy, 1926
-Thompson's bottle, Thompson's Cavern, 1927
-Sami's bottle (unknown location)
-Gorra, Anavy, Ghanuum, inscription at 2800m (Falaise Karkabi)
-Grand Chaos bottle, 1951
-Salle Seche Camp, 1952

As we rowed we found we are approaching the 'Potern' and what seems to be a very narrow opening. In fact it was just large enough to fit the boat. 1.5m wide by 0.5m high from the water. A semicircle hole in the rockface. Sami said that they had to blast certain areas to allow the boat to go through. The tourist's boats used to reach here (800m) but now they do not because it takes them too long to reach this point and return. The route was decreased to 300m so that less of this beautiful cave can be seen by the public for purely economical reasons, less time, more people, more money.

Fig. 5
The 'cross' in the Rapides de l'Enfer, 1955.
(Photo by Sami Karkabi)

Fig. 6
The 'cross' in the Rapides de l'Enfer.
(Photo by Issam Bou Jawdeh)

7.35pm
Chaos.
No….. I mean the place!
1000m into the cave.
We had arrived at our bedroom for the night.
Chaos is a mountain of rocks surrounded by beautiful curtains of concretions, one, the Torpedo, is 12m high (after a haggling match with Marc), the Two Sisters (two identical large, white stalagmites) but what stood out the most was a column on the opposite side that was massive, known as Crusader's Column. We had to carry our equipment up as we were sleeping in Shangri-la. We took a break here and Sami once again started talking.

In 1892 and 1902 a professor A. E. Day reached the 1000m accompanied by a crew from the water works.
In 1923, Odinot reached 400m only researching the source of Jiita.
In 1925, Dr. Lamarche, Odinot, Delanges and Janvier enter reaching 1000m.
In 1926, Dr. Lamarche, Brun, Delanges and Janvier reach 1100m, using a hand made boat.
In 1926 W.A. West and J.P. Crawfard reach 1320m, reaching and naming Lake Dorothy and 'The Tunnel'.
In 1927, E. Thompson, D.H. du Bois, H.Hall, P. W. Ireland explored the cave using rafts made from 16 benzene tins.
1940, Clan Lyautey, 1060m. Lionel Gorra was not allowed to enter with them. He was told that he was too young (he was18 years old) but it is believed that he was not allowed in because he was Lebanese.
1946, L. Gorra, A.Anavy, L.Eid, N. Elnékavé, 1950m - The first Lebanese led expedition. Louis Eid was to discover Shangri-La. The Lebanese had finally taken back their cave back from the Americans and the French.
1947, 1949, 1951 saw Lebanese led expeditions into the cave. They reached 2800m (Al Ouat'Ouate, No5, 1990). The speleological age of the Lebanese had begun, there was no stopping them now.

As we transported the bags Sami told Issam that he had no photograph of the Crusader's Column (this was thus called because the 1940 expedition was lead by the French who where from the Clan 'Crusaders' who discovered this column). So Issam went down to check the site out. At this point I was praying (For what? I hear you ask).…well my prayers were not answered as a few minutes later I heard Issam's voice….'RENA…come here….' Oh well, I guess it will be a bit of flash holding and modelling for me….so grudgingly I went down and posed next to the column.

The fact that Issam forgot to tell me that he had finished taking the shot, and so leaving me standingfor a good five minutes in a very awkward position, one foot on the column and the other on a rock, made my scream of 'Haven't you bloody well taken it yet?' loud enough to get him out of his trance, releasing me from my position.

The Jiita cave has gone through lots of name changes, from the Grottoes of Nahr el Kalb, Djaita, Jehita, to finally settling on Jiita. The name change from Grottoes of Nahr el Kalb to Jiita Grottoes seems to have happened in 1927 when in newspapers the name Jiita Grottoes was used. Naher el Kalb was the name of the river that runs through Jiita Grottoes but the entrance to the cave is an area called Jiita which means 'roaring water' in Aramaic.

Finally we were all in Shangri-la. After a small clamber to the top of the Chaos's rockfall we found that we could see the entire room from the top. It was like a balcony overlooking a surreal landscape. The Crusader's Column was directly in front of us. The Torpedo concretion was to the left. The beautiful draperies of Chaos were to the right, and behind us was 'The Jug' (a huge

stalagmite shaped like a Lebanese jug). The old explorers had reached here wearing swimming suits and carrying candles. To just stand here knowing all the work Sami and the others had put into this place made me feel like I was walking on sacred ground. Marc of course decided to smoke the cigar Sami had given him on this jug. Sami also told us of the dry 1600m upper passage that leads to Clayton's Passage which starts from here. Basically it is a passage that runs on an upper level but on the walls of the lower galleries.

8:00pm
Shangri-La
To sleep per chance to dream…
No such luck!

We settled in for the night. First things first. Candles lit up the place making it appear to be like a temple. Shangri-la turned out to be a 10m by 6m white room undergoing decalcification. The floor was stone much to our distress….Sami told us this was the first time anyone had ever slept in Shangri-la. Marc argued that he would have liked to sleep on sand rather than rock…

'Did someone say 'karkabi'?' Sami asked, 'I had no idea what he was talking about until he pointed to the mess we had made with our stuff. 'Look at the 'karkabi' in Shangri-la!' he continued. Of course, to all non-arabic speakers reading this, you are not going to get the joke since it is a play on words in Arabic! Karkabi means 'mess' in Arabic.

As the noodles were cooking we asked Sami what they had eaten on their expeditions. 'On short trips dry things were on the menu. For long expeditions rice, chicken, eggs, stews'….Sami had also only allowed one glass of Arak a day for each person. He told us that he checked all bags that were entering the cave to see if anyone had brought with them any useless stuff.

What was on our menu?

Curried noodles, salami, ham, mushrooms, hot dogs, wheat, bread, and a bottle of wine brought by Sami.

10:30pm

All the food was packed and we settled to sleep. All the lights were switched off and it was so dark I couldn't tell if my eyes were shut or open. This was the time for thinking. If I had been born in Sami's time I would not be here. Sami had told us that he didn't allow women in explorations as they distract from the work. They only came on 'picnic' sorties. I am glad things have changed.

Issam told Marc to set the alarm at 5:00am. When everyone had settled in for the night Issam got his camera out and started photographing us while asleep. Sami shouted at him 'voyeur!'

7:30am

Sami woke us up. Marc had forgotten to set his alarm and if Sami had not woken up we would have slept even longer. The joke of the night was that we will wake up when the sunlight appears…well it was funny at the time and I guess you had to be there….

We were making breakfast debating why Shangri-la was called Shangri-la. Sami said it meant 'paradise'. I think the guys had other ideas. Breakfast consisted of tea, cheese, bread, fruit salad (Issam, who else?), croissant and wheat.

Fig. 7
The boat being used during surveying, 1955.
(Photo by Sami Karkabi)

Fig. 8
Arrival at the end point.
(Photo by Sami Karkabi)

8:15am

We packed all our stuff and placed the bags back into the boat. Carrying the dinghies we were on our way. We could hear the Rapid's d'Enfers (also known as Hells Rapids) known as Huxley and Bridstockes's Rapids… these rapids had stopped many of the earlier expeditions.

After walking for about 10minutes Issam climbed up to rig a ladder. I tried to find another way to go up and I did. Sami didn't like this a lot as he said we were trying to retrace the old explorer's routes. Issam gave me an exasperated stare…sorry…I just thought it would be easier. At the top of the rock we found old wine bottles from the 1902 expedition. Then we reached the rapids. Marc went ahead to find the walkway that would get us past them safely. He found it and we followed. There was a traverse and then a protruding rock from the rapids which was used as a foot hold and over to the other side, another traverse and then another cross over, until we reached a deep passage. We had to blow the dinghies up and use them to pass the deep part. All clear? Marc and I had a little race over the wall. He was not impressed when I got his feet wet! Calling me a little cheat was all I could hear in the distance as he ate my dust!!!…just kidding… he also swore unprintable things! Thompson in 1927 had written about this next part of the traverse.

You lower yourself from ledge to ledge, to a place where you can stretch one foot to a split rock in mid-water, an inch or two below the surface. The upper side of the split is firm; the lower is loose and is better not stepped on. From this rock you spring across, and then climb. Though never so high again (Al Ouat'Ouate, No5, 1990).

Here, in this passageway were two inscriptions could be found. The first was "1873"…the other being "1875 another hundred feet".

10:00am
1080m.

The dinghies were placed in the water and Issam and Sami went first so that Issam could rig the second ladder. There was an old metal ladder still dangling and Issam climbed about 2m and rigged the ladder. The water here is very strong as we were close to a waterfall. We followed and climbed up the two meters to a ledge. The dinghies were transported with us, carrying them over the climb and past the Deversoir Lamarche waterfall. We then walked through the 'Tunnel'.

The Tunnel turned out to be exactly as its name describes. It was an easy walk all through the entire section of this passage. It looked like a deep, straight canyon. Only one dingy was used to pass Lake Dorothy. Again this took two trips, transporting Sami, Issam and I first, and then going back to get Joe and Marc. Lake Dorothy is not really a lake as such. It is just where the river becomes wider and deeper.

We had finally landed on the sands of Thompson's Cavern. This room is massive. After walking for 5 minutes over rocks and sand beaches we arrived at what is commonly known as The Eagle Obelisk. This large stalagmite had what looks like a head of an eagle on its top. We were now at 1700m. I stood at the bottom of the pillar while Issam photographed, and Marc and Joe held flashes. Sami was wandering between the rocks and we followed him a few meters behind.

We then arrived at what was to be out final destination: The Gours. These turned out to be beautiful rimstone dams with cave pearls the size of marbles. What a sight….One by one we took our shoes off and walked on the wet dams. Joe placed a bottle here with all our names. Who knows, maybe in one hundred years someone will find it and wonder who we were. Issam, Joe and I are the only ones who know what was written on that note. I hope someday someone reads it and agrees with what was written.

We put our shoes back on and made our way back. Back through Thompson, the Eagle, Lake Dorothy, the Tunnel, the Inscriptions (at this point I have to tell you that we didn't actually see these writings but I am sure we will on later occasions), the Hell's rapids, the Crusaders Pillar, Chaos, Shagri-la, Styx, Pantheon, Maxwell's Column, Le Flic, the Willows, Lake Thomson…and finally the exit.

So we were finally back where we started.
2:00pm

Our boat was called Caroserce Abillama.
Thank you for not tipping us into the water.

We carried all our bags towards the cars. Sami wanted to get photographed under the sculpture that now stands outside the lower gallery of Jiita cave. 'The God of the Cave' I presume. So we took the most touristy photos ever (Fig. 10). All smiles and laughter.

2000m upstream. We still have a lot to do inside this cave as this was only the beginning. The history continues.

I came out of the cave full of emotions. I felt that this was something so special. Probably never to be repeated again. Sami promised to take us to the Upper Gallery and tell us about that escapade. The next report will contain names like Anavy, Gorra, Khawam, Kasparian and of course Karkabi. It will contain places like Cascade Mica, Falaise Karkabi, Salle Blanche, Salle Rouge, Salle du Dome, Palace of the Thousand and One Nights, Grand Chaos, I can go on and on….

At this point I would like to point out that Sami is 72 years old. Just a thought to ponder on.
Thank you Issam, for being patient with my endless questions.
Thank you Joe for being so reliable.
Thank you Marc for not asking too many questions.
But most of all thank you Sami for being who you are and for loving caving so much.
Last but not least thank you Jiita, for still having secrets you want to share with us.
Until next time.

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- S. Karkabi, 1990. Cinquantenaire de la speleologie Libanese, Al Ouatouate.
- Personal communication with Sami Karkabi.

Fig. 9
The 1950's SCL cavers of Jiita cave.
(Photo by Farid Zoghbie)

Fig. 10
The 2000 Jiita cave expedition. Issam bou Jaoude, Rena Karanouh, Sami Karkabi and Marc Metni (from left to right), Joe Mhanna took the photograph.
(Photo by Joe Mhanna)

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THE GIANTS OF JIITA CAVE

Stalagmites & Columns of Jiita

FROM THE TIME YOU SET FOOT INTO THE AMAZING CAVE OF JIITA YOU ARE CONFRONTED WITH GIANT CALCITE FIGURES IN THE FORM OF STALAGMITES AND COLUMNS. THOSE GIANT FIGURES HAVE BEEN AND STILL ARE BENCH MARKS FOR DISCOVERERS AND EXPLORES OF THIS AMAZING CAVE. HISTORICALLY CAVERS USED THEM AS REFERENCE POINTS DURING THEIR CAVING ENDEAVORS THAT STARTED AS EARLY AS 1873 AND CONTINUED TILL LATE 70'S. THEY HAVE WELL MARKED THEM ON THEIR MAPS AND CLEARLY DOCUMENTED THEM IN THEIR REPORTS. RECENTLY AFTER THE 1990'S CAVERS USED THEM AS REFERENCE POINTS FOR LOCATING THEMSELVES DURING THEIR LONG VENTURES INTO THIS MARVELOUS CAVE. THIS SHORT SYNTHESIS HIGHLIGHTS SEVEN OF THOSE GIANT FIGURES THAT TAKE THE FORM OF EITHER STALAGMITES OR COLUMNS.

Ces formes géantes de stalagmites et colonnes de carbonate de calcium cristallisé témoignent et tracent les évènements historiques qui ont abouti à la découverte et à l'exploration de la grotte de Jiita, et servent toujours de points de référence pour les nouveaux explorateurs et les aventuriers de cette grotte extraordinaire.

الأعمدة والصواعد الكلسية الضخمة الموجودة في مغارة جعيتا لها ميزتان: أولا هي شاهد على محطاط اكتشاف هذه المغارة وثانيا هي علامات فارقة تتيح للمستغورين التأكد من مواقعهم خلال عملية الأستغوار الطويلة.

THE MAXWELL COLUMN

The first of those giants is Maxwell Column located in Salle de Maxwell some 400 meters inside the lower water section of this cave. This calcite monster was named after W.J. Maxwell in 1873. He was the leader of a party of four: D.D. Bliss, W.G. Huxley and R.W. Brigstock who explored the first 800 meters of this cave in year 1873. The leader was part of a group of engineers who were trying to find an exploitation method to bring the water of the dog river (Nahr el Kalib) to Beirut. The following extraction from the report that was written in 1875 by Jas. Robertson unraveled the historical monument.

"At this time however, an object of imposing grandeur arrested their progress and claimed their admiration. It was an immense column, some fifty feet high… ….A shoal at the base of the column offered a convenient resting place for luncheon, and the leader of the party was compelled, amid ringing cheers, to allow his name to the central attraction of this cave."

Fig. 1
The Maxwell's Column.
(Photo by Marwan Zgheib)

THE BLISS BOTTLE STALAGMITE *(BOUTEILLE DE BLISS)*

The second of the giants is the Bliss Bottle stalagmite. This calcite giant foot like stalagmite stands 5 to 6 meters tall in the Pantheon in the middle of the water way approximately 600 m inside the water section of this cave. It was discovered in the 1873 by the same group of four lead by Maxwell and a bottle was placed on top of it by D.D. Bliss, one of the team members. However, the name was given to this growing calcite giant by the Ward and Thompson expedition in 1927 when they discovered a calcified bottle on top of this stalagmite and Ed Thompson a journalist for the Times and Sphere magazine wrote in his report following that expedition:

"In it is an island, which rises to a peak, icy in pallor and in slipperiness, on whose summit is the bottle containing the names of the first explorers, placed their more than fifty years ago. It stands in an incessant rain and now a solid part of the rock; we could not shake it in the least."

Since that time the stalagmite was known as the Bliss Bottle Stalagmite. Although the bottle now is totally covered with calcite the stalagmite still bears the name and holds amazing history in it.

Fig. 2
The Bliss bottle stalagmite.
(Photo by Johnny Tawk)

THE CRUSADER COLUMN

The third of those giants is the Crusader Column. This giant 20 meters calcite column greats you at the entrance of the Chaos some 800 m inside the cave. This area was the focus of much exploration during the years before 1940. But it was not been tagged by any name until the 1940's when Le Clan Lyautey reached the Chaos on the way to extend the discoveries in this cave and named it as the Crusader Column. On the rough schematic map of the cave drawn by A. Anavy in 1950 this column is well noted. Although it has been a giant figure in the Chaos that cannot be missed and a station for explores since the time of its discovery it has not been photographed until the 21 century.

Fig. 3
The Crusader Column.
(Photo by Issam Bou Jaoude)

THE OBELISK STALAGMITE
(OBELISQUE DE L'AIGLE)

Fig. 4
The Obelisk stalagmite.
(Photo by Issam Bou Jaoude)

The fourth of these giants is an eagle shaped calcite stalactite located in the Thompson cavern area of the cave some 2000 m from the entrance of the lower wet section. This stalagmite stands some 15 meters high and was given its name by explorers during the Ward-Thompson's expedition in the year 1927.

Ed. Thompson a journalist for the Times and Sphere magazines joined the 1927 expedition and wrote the following in his report on the expedition:

"Since we were in the mood of naming, when we held our breath in delight at a snowy pillar, rising 40 feet from a base 30 feet above the stream, Ireland called out, "I suppose we call this Thompson's Pillar." "Carried by acclamation," he announced, after my generous comrades' agreement. "No," said du Bois, a few yards further on. "Obelisk is a better word."

GIANT STALAGMITES & COLUMNS IN SALLE DU DOME

Fig. 5
The three stalagmites that make up 'the Totem' in Salle du Dome.
(Photo by Sami Karkabi)

Instead of having a single fifth giant in this cave the area located some 3000 meters inside holds a nest of them. This collection of giant calcite figures was named by the 1950 Lebanese explorers led by S. Karkabi as Stalagmites and Columns of the Salle du Dome in relation to the dome shaped chamber they are located in. They vary in diameter but reach heights of more than 15 m.

This group of giants greets you when you enter the Salle du Dome. They signal the start of a series of elongate humongous connected dry chambers that extend some 600m.

This is an extraction from the report written by Issam B. after the 2007 Jiita expedition "One cannot count the number of times members of the SCL have sat down under those giant stalagmites and columns in the Salle du Dome to catch their breath and snake before continuing on their venture into the cave or on their way out. The material left their stands witness of that and it also reminds us on the effect humans have on this fragile environment."

GIANT STALAGMITES & COLUMNS IN THE PALAIS MILLES ET UNE NUIT

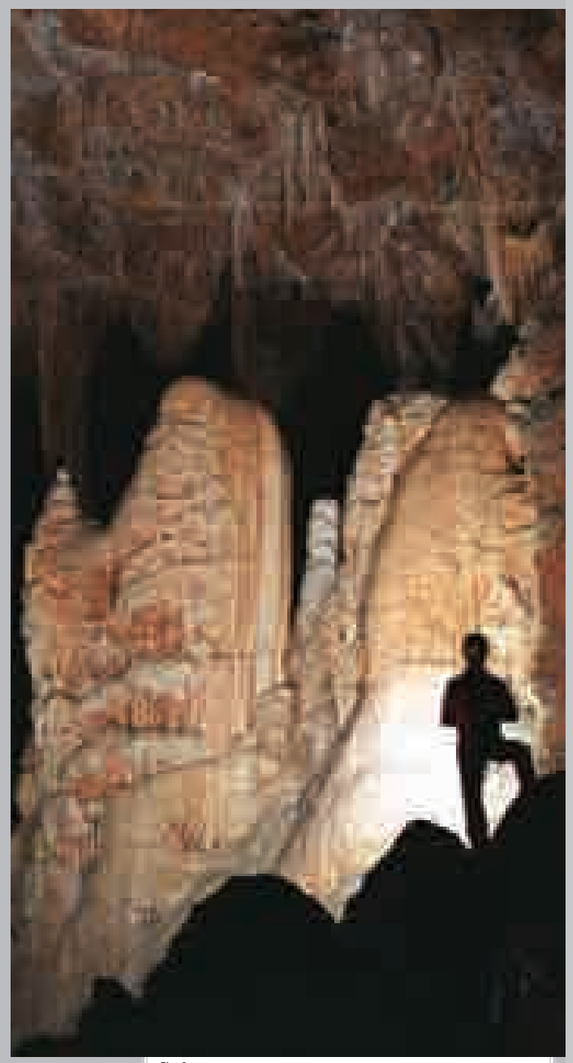

Fig. 6
Stalagmites at the Palais Milles et Une Nuit.
(Photo by Issam Bou Jaoude)

Another collection of giants, the stalagmites and columns in the Palais Muilles et une Nuit are located some 3300m from the entrance. Those giants are in a room called Palais Muilles et une Nuit named by the 1950 Lebanese explorers led by S. Karkabi. Those stalagmites and column stand tall more than 15 meters high sometime touching the roof in an area that is quite rewarding in its beauty. They are the sixth giant group figures inside the cave.

THE ICING COLUMN

Fig. 7
Icing Column, Jiita Upper Gallery.
(Photo by Issam Bou Jaoude)

The seventh of those giant calcite figures is located in the upper dry gallery of Jiita cave. Although when you enter the upper dry cave from the touristic tunnel you are confronted with amazingly large number of beautiful stalagmites and columns, one giant calcite column some 100 meters inside stands out. It is almost 20 meters high and fully decorated with icing shaped calcite features. Although the area was discovered in the late 1960's it has not been given a name until recently in the 21st century when it was nick-named the Icing Column.

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- Jas. Robertson, 1875. The Grotto of Nahr el Kalb. Good Words, Pages 768-773.
- Ed. Thomson, 1927. Crusader's coast. The dog river and its caves, Pages 147-171.
- S. Karkabi, 1990. Cinquantenaire de la speleologie Libanese, Al Ouatouate.

LA PHOTOGRAPHIE SPÉLÉOLOGIQUE AU LIBAN

Historique et Témoignage

(Suite de l'article du N°14 du Al Ouat'Ouate).

PHOTOGRAPHY

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Johnny Tawk (pour le traitement des photographies) | *johnnytok@hotmail.com*

معظم الصور في هذا المقال مأخوذ من الأرشيف الخاص للسيد سامي كركبي. ويتطرق بالأجمال الى نشئة الأستغوار في لبنان وتطوره مع الزمن. ويلقي هذا المقال الضوء على اكتشاف الطابق العلوي لمغارة جعيتا. وهي اول مغارة سياحية في لبنان واهمها في الشرق الأوسط. وتمّ تطوير هذا الموقع المهم تحت اشراف وزارة السياحة ولكن الخراب الحاصل في الأونة الأخيرة يعود الى الأدارة الغير سليمة.

Taken from the personal archives of Mr. Sami Karkabi this article is a photographic documentations and a testimony to the birth of Lebanese speleology. Special attention is dedicated to the underground exploration in Lebanon with emphasis on the development and improvement of underground exploration in Lebanon with time. This article also pays tribute to the discovery of the Upper Gallery of Jiita by Lebanese cavers and turning this great discovery into the first real show cave in Lebanon and opening an amazing unknown world to the public. The development was done under the supervision of the Ministry of Tourism and the National Council of Tourism and it actual degradation is mainly the result of current unprofessional management.

Photo 52
Les passages délicats ont été sécurisés par des mains courantes.
(Photo by Sami Karkabi)

Résumé

Le présent article est illustré de nombreux clichés inédits. Certains remontent à 1953 et demeurent d'inestimables et précieux témoignages des premiers pas de la spéléologie libanaise. Il ne s'agira ici ni de prodiguer des conseils techniques ni d'exposer de belles photographies souterraines, mais de montrer le cheminement premier et aventurier de ces passionnés du monde des ténèbres, de profiter pour rendre hommage à certains d'entre eux pour leur apport à la spéléologie nationale et de rappeler que l'an 2008, représente un cinquantenaire (1958-2008) qui ne devrait pas tomber dans l'oubli : celui de la découverte des 'Galeries Supérieures de Jiita'. Offerte sans contrepartie par le Spéléo Club du Liban à l'Etat libanais, elles sont devenues la première attraction du spéléo tourisme au Liban. Joseph Tarrab, que je remercie ici, en guise de conclusion à son introduction du N° 5 du Al'Ouat'Ouate - 1990, n'hésitait pas à écrire:

… Alors que la grotte était interdite au tourisme en raison de la guerre du Liban: "JIITA, une grande cérémonie: inaccessible depuis 15 ans, elle continue de nous hanter en ces temps incertains. Elle reste l'une des images les plus prestigieuses d'un certain Liban, je veux dire d'un Liban certain".*

Il reste à déplorer que le prolongement du circuit actuel, dont les travaux étaient prévus pour l'an 1975, ait été abandonné. J'éviterai, et l'envie ne m'en manque pas, de signaler la dégradation des Galeries Supérieures à l'heure actuelle, depuis le dessaisissement du ministère du tourisme libanais en 1992, en faveur d'une société d'exploitation ignorant totalement la fragilité du monde souterrain.

* Pour plus de détails, se référer au Al-Ouat'Ouate N°5 (1990), et le N°14 (2007).

En guise d'introduction.

C'est avec réticence que j'aborde le second volet de "La photographie spéléologique au Liban". J'aurais préféré, qu'une tierce personne achève ce reportage sous forme d'entrevue. Ce ne sera pas le cas.

J'avais décidé l'an dernier (2007) de mettre de l'ordre dans mes archives photo-spéléologiques et d'en faire don au SCL. Il fallait pour cela classer puis scanner non loin de vingt mille documents composés de négatifs couleurs et noir et blanc de petit et moyen format, de diapositives et de nombreux tirages sur papier. A cela il fallait joindre (progrès oblige) toutes les prises de vue en numérique.

L'idée m'est alors venue de créer en collaboration de nos photographes spéléologues, une photothèque au sein de notre club. Elle rassemblerait sous forme de banque de donnée une inestimable documentation relative aux cavernes du liban. Il reste à créer une équipe à même de gérer cet ambitieux projet et à rédiger un règlement destiné à préserver les droits d'auteur. En attendant sa réalisation,

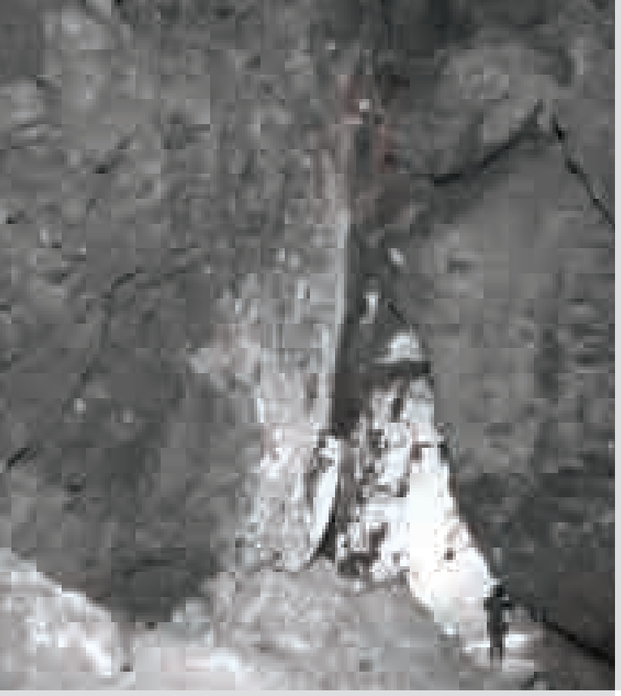


Photo 1
Franchissement de la falaise située à 2800 mètres de l'entrée en 1953 par S. Karkabi et F. Zoghbi.
(Photo by Sami Karkabi)

Photo 2
Franchissement de la falaise située à 2800 mètres de l'entrée en 1953 par S. Karkabi et F. Zoghbi.
(Photo by Sami Karkabi)

Photo 3
Découverte des sources de la rivière souterraine de Jiita en 1954. De gauche à droite : S. Karkabi, R. Khawam, A. Anavy et F. Zoghbi.
(Photo by Sami Karkabi)

Les photo 2 et 3 demeurent historiques. La première représente de gauche à droite: S. Karkabi, Yves Arambourg, F. Zoghbi et S. Mohbat. Aucun de ces aventuriers ne pouvait prétendre à cette époque avoir une quelconque expérience spéléologique. Et pourtant cette expédition réussit à franchir l'obstacle qui avait arrêté celles de 1951 et de 1952 et à découvrir plus d'un km de rivière souterraine. Pourquoi historique? Parceque aucun membre des anciens explorateurs n'en faisait partie. Sang neuf et jeune, futur noyau spéléologique du Liban.

je voudrais remercier Johnny Tawk qui fidèlement et de longs mois durant, a consacré son temps à scanner et à classer la totalité de mes archives personnelles. C'est à lui que seront confiés en un premier temps les originaux de cette collection.

Je ne m'attarderai pas sur l'aspect technique ou artistique de la photographie souterraine. J'avais pour cela, dès mes premiers pas, profité de l'expérience de mes prédécesseurs. J'évoquerai par contre et sous ses différents aspects le témoignage (la mémoire) que la photographie est seule capable de générer. Ce retour en arrière ne s'est pas fait sans réflexion et émotion. Inexpérience spéléologique alliée à la découverte d'un monde souterrain infiniment beau, aventure souterraine pleinement vécue, partage harmonieux et amical d'un groupe uni. J'en profiterai aussi pour rendre hommage à mon ami Raymond Khawam, trop tôt disparu, à qui la spéléologie libanaise doit dans nombre d'explorations ses sources de succès. Je n'oublierai pas non plus de signaler que l'année 2008 représente un anniversaire, un cinquantenaire qui ne devrait pas tomber dans l'oubli, celui de la découverte des « Galeries supérieures de la grotte de Jiita (1958-2008). Un long chapitre lui a été consacré dans le N° 5 - 1990 du Al Ouat'Ouate (pp. 76 -104). J'y ajouterai d'autres informations.

Mes premiers pas de photographe spéléologue.

Les premières tentatives ont été catastrophiques, l'errance la plus totale. En suivant les conseils de L. Gorra, je me trouvais confronté à la fumée abondante due à la mise à feu du ruban de magnésium, aux temps de pose trop longs et aux instantanés difficiles à exécuter. Le tableau proposé par Z. Hakim indiquant les temps de pose et les ouvertures en fonction des différentes sources de lumière nécessitait trop de temps de réflexion. J'ai finalement opté pour le flash non électronique à ampoule fort performant. (Pour rappel, le flash électronique à cette époque n'était pas encore miniaturisé). J'avais abusé de ce procédé. La réussite du cliché tenait du hasard. Manoug y a mis un frein. C'est de son expérience que j'ai le plus profité. A titre d'information je joins la liste des appareils photographiques utilisés lors de mes différentes explorations.

1953 : Voigtlander (Vito II - f .5.6).
1958 : Hasselblad 500c. - Modèle standard. Utilisé jusqu'en 1961.
1961 : Rolleiflex 50mm - f : 4.
1962 : Nikon sous toutes ses formes : Nikon F et la série des F2.
2002 : Adoption non sans méfiance du numérique Nikon D100 et D200.

La qualité et la variété des appareils photos, dont certains ont fini noyer ou mis hors de service en cours d'expédition, ne reflètent nécessairement pas le rendement espéré.

Rappel historique.

Deux périodes distinguent l'histoire de la spéléologie libanaise. La première s'inscrit entre 1946 et 1951 et la seconde dans l'après 1951, année de la fondation du Spéléo Club du Liban. La première période a été longuement décrite dans le N°5 du Al Ouat'Ouate-1990. La seconde moins connue s'ouvre sur un fait divers. En 1952, L. Gorra organise une expédition à Jiita accompagné de R. Khawam et de moi-même. Elle durera 6 jours, du 11 au 17 octobre et a pour but de parfaire la topographie de la "Salle du Dôme" et de franchir l'obstacle qui avait arrêté l'expédition de 1951. Cet obstacle est situé à l'est et dans le prolongement de la "Salle du Dôme". Il se présente sous forme d'un ressaut transversal s'adossant aux parois de part et d'autre de la grotte et dominant une galerie de grandes proportions. Il est estimé à 40 ou 50m de hauteur par L. Gorra (p.10 du rapport L. Gorra à l'Office des Eaux de Beyrouth), donc infranchissable avec le matériel dont on disposait à l'époque.

En 1953, riche de l'expérience de cette première expédition à laquelle je participais, je décidais de poursuivre l'exploration du réseau actif de Jiita. La falaise, au vu de l'éclairage dont nous disposions à cette époque, prenait allure d'inviolabilité. Cependant, contrairement à mes prédécesseurs qui estimaient la hauteur de l'obstacle à une quarantaine ou plus de mètres, je considérais qu'elle ne devait pas dépasser 20 mètres prise à l'une de ses extrémité. Je décidai sous l'oeil sceptique de mes prédécesseurs de reprendre l'expédition en 1953. Je contactai pour cela Robert de Joly inventeur des échelles souples et commandai deux trains d'échelles de dix mètres. C'est ainsi que l'obstacle a été franchi (Photo 1). Pour rappel le SCL est redevable à M. Kamel Mroué directeur du quotidien Al Hayat qui sponsorisa deux expéditions (1953 et 1954) en échange de l'exclusivité du reportage dans son journal AL Hayat de 1953 et du 26 septembre au 2 octobre 1954.

Les Photo 2 et 3 demeurent historiques. Le cliché 2 représente de gauche à droite : S. Karkabi, Yves Arambourg, F. Zoghbi et S. Mohbat. Aucun de ces aventuriers ne pouvait prétendre à cette époque avoir une quelconque expérience spéléologique. Et pourtant cette expédition réussit à franchir l'obstacle qui avait arrêté celles de 1951 et de 1952 et à découvrir plus d'un km de rivière souterraine. Pourquoi historique ? Parce que aucun membre des anciens explorateurs n'en faisait partie. Sang neuf et jeune, futur noyau spéléologique du Liban. Le cliché 3 représente l'équipe qui découvrit les sources du Nahr el Kelb. Autre exploit : la première expédition dans Jiita remonte à 1873 et il aurait fallu attendre 81 ans (et 19 expéditions) pour que l'énigme de l'origine du cours d'eau souterraine soit résolu.

La photographie souterraine, aperçu inédit.

Tout spéléologue détient dans un recoin de sa bibliothèque des ouvrages illustrés de haute ou moindre qualité d'impression, du monde souterrain. Il n'existe pas au Liban, hors les revues du SCL (Al Ouat'Ouate), du GERSL (Le Monde Souterrain) et de l'ALES (Spéléorient), d'ouvrages spécifiquement spéléologiques. Cependant le sujet ne manque pas d'intérêt et mériterait que l'on y accorde plus d'attention. Pae ailleurs, l'évolution du matériel d'exploration des premières années de la spéléologie libanaise n'a jamais été décrite. J'ai puisé dans mes archives de quoi illustrer cet aspect jusqu'ici méconnu.

L'équipement spéléo des années cinquante.

Les pionniers de la spéléologie libanaise n'exploraient à l'époque (1946 - 1951) que la rivière souterraine de Jiita. C'est à la suite de la fondation du Spéléo Club du Liban que le

Photo 4
Equipement personnel hétéroclite des premiers explorateurs libanais à la grotte de Jiita. De gauche à droite : S. Karkabi, N. Waked, R. Bouchereau, Z. Hakim, G. Kasparian et J. Koleita.
(Photo by Manoug)

Photo 5
Yvette Philippine.
(Photo by Sami Karkabi)

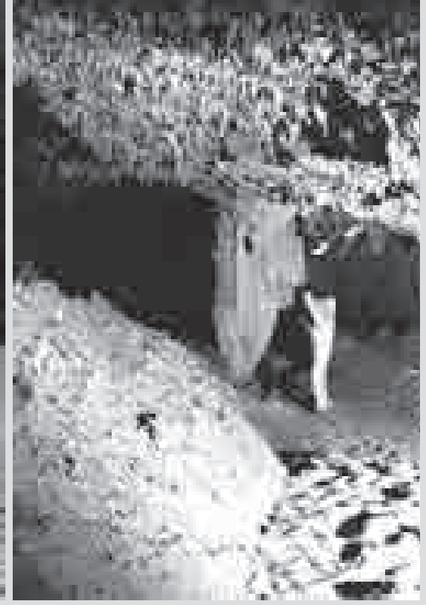


Photo 6
Hélène Gombert.
(Photo by Sami Karkabi)

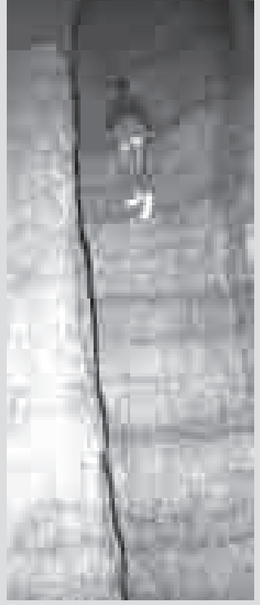


Photo 7
R. K hawam dans Dara en short et espadrilles de corde au puits de 15 m.
(Photo by Sami Karkabi)

Photo 8
Ernest Sasson en maillot de bain et espadrilles de corde à - 80 m. dans Dara.
(Photo by Sami Karkabi)

Photo 12
Youssef Hajj - Paysan mais néanmoins batelier à la grotte de Jiita qui visite en 1958 et en tenue traditionnelle les Galeries supérieures.
(Photo by Sami Karkabi)

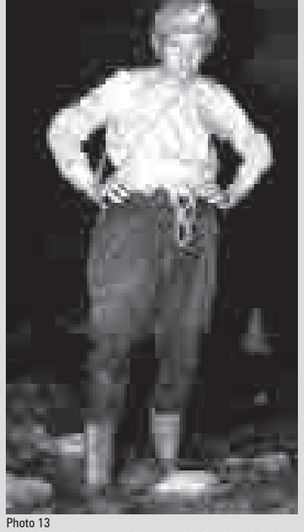


Photo 13
Abou Tony - Paysan du village de Aïn Saadé qui visite en 1969 la grotte Kassarat à Antélias. Tenue également traditionnelle de la montagne libanaise.
(Photo by Sami Karkabi)

Photo 14
Bivouac dans la Salle du Dôme (1960).
(Photo by Sami Karkabi)

domaine des investigations souterraines s'est étendu à d'autres cavernes. La tenue classique à l'époque se limitait au port d'un short ou d'un maillot de bain et d'une chemise à longues ou courtes manches (Photo 4).

L'équipement féminin n'échappait pas à la règle. Belle époque où la spéléo féminine ne s'embarrassait pas du superflu - Grotte de Nabaa el Chataoui - Antélias - 1955 - Photo 5 et Photo 6.

L'usage de cet équipement pour le moins élémentaire est demeuré en pratique jusqu'aux premières reconnaissances du gouffre de Fouar Dara (1958) où la température ambiante n'excédait pas 6°C. (Photo 7 et Photo 8).

Les spéléos réalisent alors l'inopportunité de cette tenue. Elle sera remplacée par la salopette en toile (Photo 9) et les espadrilles de corde par de grosses chaussures de montagne.

Deux principaux obstacles rendirent cette tenue obsolète. Marmites d'eau profondes à franchir et puits arrosés. Ainsi la salopette en toile perméable ne pouvait convenir Les spéléos choisirent d'y remédier. Pour les uns ce sera un sac en plastique couvrant le haut du corps (Photo 10), maigre protection il faut le reconnaître, pour les autres, un survêtement en toile plastifiée, fragile et peu efficace (Photo 11).

De l'exotisme en spéléologie Photo 12 et 13.

Le bivouac souterrain.

Il n'y a eu au Liban que deux cavernes ayant nécessité de bivouaquer : Jiita et Dara. Photo 14, 15 et 16.

Les repas.

Toujours bien équilibrés, les repas sous terre n'avaient lieu qu'en fin de journée - (Photo17 et 18).

Photo 15
Tente dréssée à -350m dans Dara (1962).
(Photo by Sami Karkabi)

Photo 16
Bivouac à -450m dans Dara (1965).
(Photo by Sami Karkabi)

Photo 9
R. Khawam, salopette en toile grise (1962).
(Photo by Sami Karkabi)

Photo 10
Yves Deshays, Dara (1965).
(Photo by Sami Karkabi)

Photo 11
Emile Ghanem, Dara (1965).
(Photo by Sami Karkabi)

Photo 17
Jiita - 2800m. - R. Khawam et F. Zoghb (1954).
(Photo by Sami Karkabi)

Photo 18
Dara - 450m. De gauche à droite, E. Ghanem, A. Boustany, G. Farra, Y. Deshay (1965).
(Photo by Sami Karkabi)

Les Mesures de Débit d'Eau.
Farid Zoghbi

Le SCL doit à F. Zoghbi l'ensemble des mesures de débit des cours d'eaux souterrains du Liban. Les plus importantes concernent celles effectuées au mois d'octobre 1960 le long de la rivière souterraine de Jiita. Jaugeages en 12 points répartis sur 10 jours. Le résultat est surprenant, le débit à la résurgence accuse 1203 l/s, alors que proche du siphon terminal seulement 975 l/s. (Voir rapport à l'Office des Eaux de Beyrouth en date du 8 septembre 1960) (Fig. 5), (Photo. 38,39).

Georges Dobroff

Dans le but de capter à sa source les eaux souterraines de la grotte de Jiita, l'Office des Eaux de Beyrouth entreprend d'établir une topographie précise du cheminement souterrain. Un tunnel (Daraya) devrait permettre un accès direct au siphon terminal situé à 6.200 de l'entrée. Elle s'adresse pour cela aux spéléologues à l'origine de la découverte et familiers des lieux.

L'entreprise n'était pas évidente. Il fallait disposer d'une équipe solide prête à séjourner de nombreux jours sous terre et trouver un topographe capable de réaliser ce projet ambitieux et coûteux. Le risque était grand vu l'objectif final.

Le choix d'un topographe ayant les compétences requises devait avoir deux qualités: une connaissance parfaite des appareils topographiques en usage: le théodolite, le tachéomètre et le niveau et, aussi bien, d'avoir une bonne forme physique et morale.

Je contactai Georges Dobroff (ami d'enfance), géomètre assermenté auprès du Ministère des Travaux Publics, afin de lui soumettre le projet. Il accepta sous réserve de découvrir les lieux, admettant n'avoir aucune expérience spéléologique. Nous partîmes pour deux jours en reconnaissance sous terre. Le test s'avéra positif.

Quant aux coéquipiers je ne nommerai que les plus réguliers : A. Boustany, E. Ghanem, R. Khawam, M. Spiridon et F. Zoghbi, sans pour autant oublier l'apport inestimable des membres du SCL et de Youssef Zakkour qui trois ans durant a été mon plus fidèle compagnon.

Les différentes étapes de ce pari souterrain.

La première étape, la plus déterminante, consistait à poser un point géodésique à proximité de la caverne. Le soin de cette opération délicate a été confié à M. Jean Grapotte, directeur auprès de la Direction des Affaires Géographiques et Géodésiques du Ministère de la Défense Nationale. Ce point a été matérialisé par une borne en béton située sur le toit de la station de pompage face à la résurgence de la grotte de Jiita (voir Fig. 6). La seconde étape consistait à établir un cheminement concrétisé par des stations aux coordonnées géographiques précises d'atteindre le dernier point situé au siphon terminal dans le but de percer un tunnel d'accès (Fig. 7). La troisième étape consistait en un levé de détail des parois et des principaux obstacles du circuit souterrain; à savoir le signalement des concrétions importantes et celui des passages clefs (Photo 40,41,42).

Photo 19
Jiita, 1960.
(Photo by Sami Karkabi)

Photo 20
Mgharet el Kassarat, 1969.
(Photo by Sami Karkabi)

Fig. 5
Fiche technique du jaugeage effectué en amont du déversoir Lamarche par F. Zoghbi.

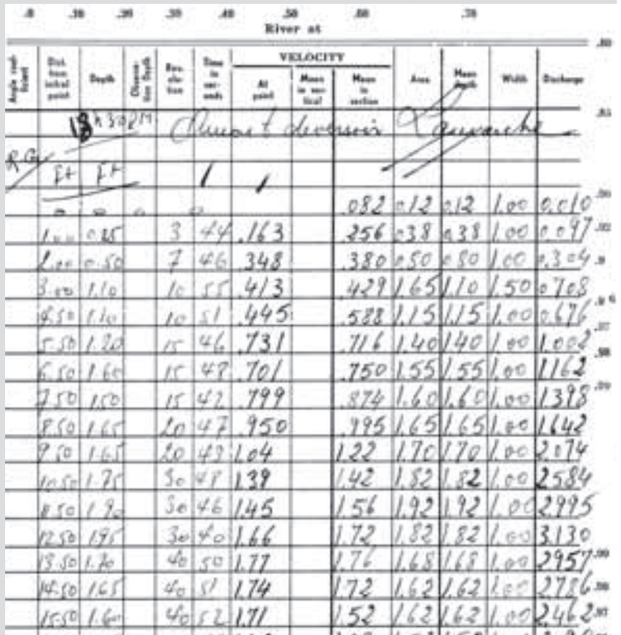


Photo 21
Le cheminement.
(Photo by Sami Karkabi)

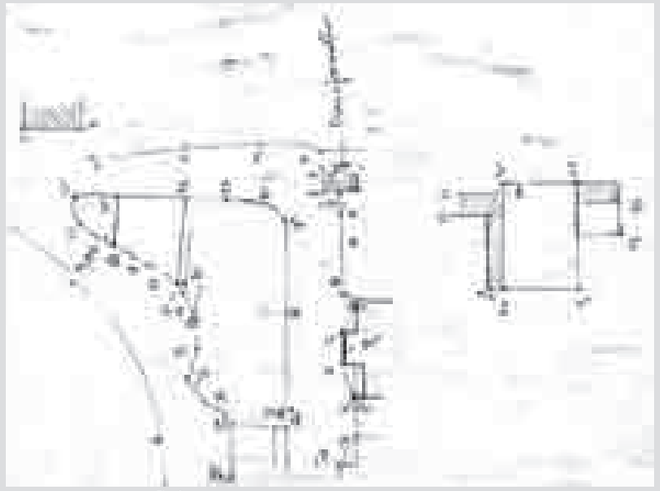
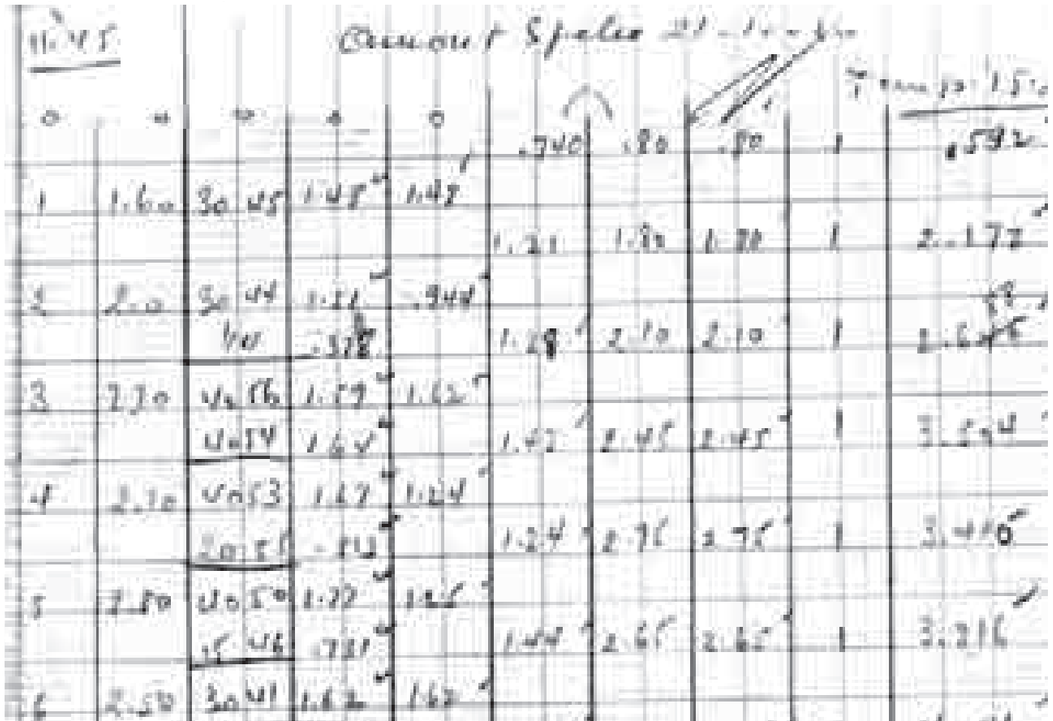


Fig. 6
Le point géodésique fixé sur le toit de la station de pompage (rive gauche) du cours subaérien du Nahr el Kelb.

Photo 22
Dernière visée au niveau du siphon terminal. A la mire Y. Zakkour et F. Zoghbi dans le canot pneumatique.
(Photo by Sami Karkabi)

Photo 23
Levé de détail.
(Photo by Sami Karkabi)

Fig. 7
Page du carnet de levé tachéométrique de G. Dobroff.



L'occasion se présente encore, de rappeler par la photographie documentaire un anniversaire qui ne devrait pas tomber dans l'oublie, celui de la très grande découverte par le Spéléo Club du Liban des ''Galeries Supérieures de Jiita." (1958 - 2008).

1958-2008
Le cinquantenaire de la découverte des Galeries Supérieures de Jiita.

Le mardi 8 juillet 2008 à 21h30 une émission télévisée a été consacrée aux grottes de Jiita. Le but avoué des organisateurs était, à l'occasion d'un vote international, de convaincre les téléspectateurs de classer cette grotte parmi les 7 merveilles du monde (wonders of the world). L'interview en directe se déroulait à l'entrée des Galeries supérieures de Jiita. Faisaient face à l'animateur le gérant touristique des lieux, entouré de deux spéléologues confirmé-es appartenant à l'Association Libanaise des Etudes Spéléologiques. Durant une heure trente, interrompue par de courtes publicités, nous avons eu droit à une réciprocité de compliments admiratifs et de monologues traitant de l'état d'âme face au monde souterrain des intervenant-es. Des Galeries supérieures nous n'avons entendu que des éloges concernant l'inimaginable beauté du lieu, de son aspect unique au monde, de son pilier stalagmitique géant, le plus grand du monde (sic le gérant) et de son souci permanent de protéger le milieu souterrain, tout en avouant sincèrement n'avoir aucune expérience spéléologique. En tout état de cause, je souhaiterai demander à ceux nombreux qui ont voté pour Jiita, s'ils ont eu l'occasion de voir, ne serait-ce qu'à titre comparatif, d'autres cavernes dans le monde. Ce choix était-il objectif pour nos autochtones ou simplement inspiré d'une impulsion nationaliste ?

Par contre, les participants à cette haute émission télévisée n'ont à aucun moment signalé les circonstances de cette découverte remontant à 1958, dont les auteurs sont tous de nationalité libanaise et membres du Spéléo Club du Liban. C'est à cette jeune équipe que revient l'initiative de son aménagement offert avec le plus grand désintéressement à la nation libanaise. Autre lacune, le silence entourant la réalisation de ce projet, à savoir son aménagement à grand frais par le Ministère du Tourisme et le Conseil National du Tourisme dès 1967, puis l'inauguration du site au mois de janvier 1969 par un concert électroacoustique au coeur de la caverne. Autre occultation de taille, la reconnaissance qui aurait dû être faite à notre grand artiste et architecte Ghassan Klink à qui l'on doit l'aménagement élégant et sobre qui fait l'admiration des spécialistes de l'aménagement des grottes touristiques. Le court rappel historique qui suit, rafraîchira la mémoire de ceux qui l'auraient oublié. Je conclurais cette courte introduction par une tirade entendue ou lue, attribuée à un grand homme d'Etat:

L'ignorance délibérée des sources d'information peut-être qualifiée d'imposture intéllectuelle.

Premier ticket émis lors de l'inauguration touristique de la "Rivière souterraine de Jiita". J'aimerais rappeler que jusqu'à sa fermeture en 1975 pour cause de guerre, les touristes naviguaient sur six cents mètres en période d'affluence et huit cents mètres en période de calme. Qu'en est-il aujourd'hui ? Circuit réduit hélas à deux cents cinquante mètres.

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Photo 24
Rapides Bliss - Concrétions connues sous le nom de"Trompe d'éléphant ou Oreilles d'éléphant".
(Photo by Sami Karkabi)

Photo 25
Le mât télescopique dit "mât t grenoblois" imaginé par F. Petlz (1958).
(Photo by Sami Karkabi)

Rappel historique.

Les spéléologues libanais ont toujours été intrigués par la hauteur inaccoutumée de la rivière souterraine de Jiita, à environ 500 mètres de la résurgence. Au lieu dit "Rapides Bliss" le cours d'eau se rétrécie. La rive droite en raison d'un haut-fond caillouteux n'est pas praticable pour nos canots pneumatiques. Du plafond de la rive gauche tombe de belles draperies au travers desquelles la rivière s'écoule rapide. Il faut s'agripper aux draperies pour le franchir. Maxwell dans son récit d'expédition" The grottoes of the Nahr el Kelb" de 1875 le baptise "Bliss' Straits". En voici en extrait :

...Two hundred yards further on the channel was found to be so narrow that only one craft could pass at a time, and the roof so low that the explorers had to stoop under gigantic fringes of stalactite, one mass which resembled the convolutions of an elepfant's trunk, while others were thin and shell-like, and when struck gave forth a sound like that a deep-toned bells. Maxwell baptisa ce lieu : Bliss' Straits et les concrétions Elephant Trunk.

A 12m en amont des Rapides Bliss et sur la rive gauche, un important cône d'éboulis de 15mx16m et 10m de haut se déverse et bloque partiellement le cours d'eau souterrain. En temps de crue, la rivière entraîne une partie de la caillasse et la dépose en aval au niveau de l*'elephant's trunk*. La rivière ainsi endiguée par ce bouchon barrage, creuse et se fraye un passage sous les draperies provoquant un mini rapide.

Cet éboulis nous intriguait. Nous apercevions à la lumière bien réduite de nos acétylènes et lampes à pression une importante ouverture à sa droite. Un obstacle d'une dizaine de mètres de haut en défendait l'accès. Il y eut bien quelques tentatives d'escalade en libre, bien vite abandonnées en raison de l'instabilité de la roche. Il ne restait plus qu'à tenter de franchir l'obstacle au moyen du mât télescopique.

1958
La découverte des Galeries Supérieures.

J'ai toujours affirmé que l'exploration d'une grotte est une oeuvre collective et l'honneur de la découverte revient à l'ensemble des membres de l'équipe en action. Je ferai une exception dans le cas de la découverte des "Galeries Supérieures de Jiita". Le mât est monté et dressé contre la paroi (Photo 25). A son extrémité supérieure est accroché une échelle souple. Raymond Khawam est le premier à l'emprunter. Il débouche sur une corniche large de deux mètres. Nous sommes à environ 18 mètres au-dessus du niveau de la rivière. La corniche bute contre une vire étroite et rejoint une coulée de pierres instables. Il devient évident qu'elle est à l'origine du gros cône d'éboulis formé au niveau de la rivière.

Georges Farra assuré par une longueur confortable de corde entreprend prudemment son ascension. Il atteint 15 mètres plus haut une large plateforme à l'abri des chutes de pierres. Il est rapidement rejoint par ses co-équipiers. Au-delà, le paysage est grandiose (Photo 45). La voie est ouverte pour les futures explorations.

Quelques jours plus tard R. Khawam, R. Kasparian et moi-même, reprenons en l'absence de notre ami G. Farra parti au US pour des études de pilotage, l'exploration de ce nouveau réseau. C'est alors une promenade le long de draperies translucides, de gours étagés, de colonnettes de toutes tailles et de piliers géants. L'excitation est à son comble et nous invitons à tour de rôle les membres de notre club à découvrir les lieux, sans oublier d'en faire profiter le personnel actif de l'exploitation touristique (Photo 28 et Photo 29).

Photo 26
Le spectacle grandiose qui se révèle à nos yeux.
(Photo by Sami Karkabi)

Photo 27
Les fondateurs du SCL. dans une des galeries de Jiita. De gauche à droite : R. Khawam, A. Anavy et L. Gorra.
(Photo by Sami Karkabi)

Photo 28
Un petit groupe de bateliers de Jiita. De gauche à droite : Y. Baroud, J. Aziz, R. Farrah, M. Nseir et en avant plan mon fidèle M. Hajj.
(Photo by Sami Karkabi)

Photo 29
Le Caterpillar déblayant la partie terminale du tunnel. A l'extrême gauche, la petite ouverture donnant accès directe aux "Galeries Supérieures".
(Photo by Sami Karkabi)

Photo 30
Les ouvriers affectés au percement du tunnel posant à l'intérieure de la grotte.
(Photo by Sami Karkabi)

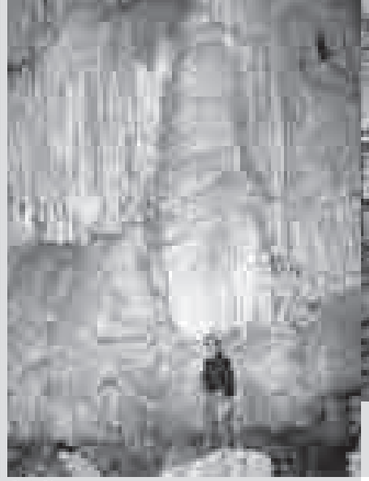

Photo 31
Ghassan Klink au pied d'une paroi stalagmitique dans les "Galeries Supérieures" (1967).
(Photo by Sami Karkabi)

Photo 33
Les travaux à l'intérieur de la grotte ont nécessité une main-d'oeuvre qualifiée et une surveillance soutenue.
(Photo by Sami Karkabi)

Photo 34
Le pont flottant par dessus les gours.
(Photo by Sami Karkabi)

Photo 35
Le grand escalier ondulant au-dessus du précipice.
(Photo by Sami Karkabi)

C'est en 1962 que l'engouement des touristes pour la grotte de Jiita, entraîne une situation inextricable (plus de 2000 visiteurs par jour). La seule solution envisageable pour décongestionner la rivière souterraine était de rendre accessible par voie pédestre les galeries supérieures. Il fallait pour cela convaincre les autorités compétentes de réaliser ce projet. Or "les galeries supérieures" ne sont accessibles que par la rivière souterraine. Il était évident que pour une exploitation rationnelle, il fallait un moyen plus direct pour les atteindre, d'où le choix d'un tunnel. Un relevé topographique des lieux établi par G. Dobroff avait déjà déterminé la voie d'accès. Ce n'est qu'au mois de juillet 1963 que le Président de la République le Général Fouad Chéhab donne des ordres destinés à réaliser le projet. En 1967, le projet devait voir le jour.

Le Tunnel d'accès aux « Galeries Supérieures ».
Août 1967 : le tunnel de 120 m de long est enfin percé. Il aboutit avec grande précision dans le prolongement de la galerie s'ouvrant plein sud (Photo 29 et 30).

Ghassan Klink
1967 - L'aménagement touristique des Galeries Supérieures par l'artiste et architecte G. Klink (Photo 31).

Le programme de l'architecte n'était pas simple.

Il fallait allier la technique à l'esthétique, soumettre les impératifs fonctionnels, cheminement, escalier, rampe, à l'harmonie des lieux. Le choix du béton a été retenu pour ses qualités plastiques et sculpturales. Le cheminement intérieur sera constitué d'un long ruban en béton rappelant les méandres du cours de la rivière souterraine (Photo 36). La pierre de taille enjolivera les courbes des escaliers. Il faudra aussi édifier un pont au niveau des gours créant l'illusion de flottement. Quant au grand escalier reliant la partie basse à la partie haute, il sera conçu comme un ruban ondulant au dessus du précipice (Photo 37, 39). Les câbles électriques destinés à l'éclairage seront fixés sous les passerelles et consoles du circuit touristique. Pour rappel l'éclairage avait été confié à **M. Khalil Gannouni**, haut fonctionnaire auprès de la centrale électrique de Zouk Mikhaël.

Janvier 1969. Inauguration des "Galeries supérieures" en présence de son excellence M Charles Hélou Président de la République Libanaise, de M le Premier Ministre Rachid Karamé de Cheikh Michel el Khoury et de Mme Nadia Kettaneh (Photo 32).

L'occasion se présente à nous pour remercier Cheikh Michel el Khoury et Mme Nadia Kettaneh pour la réalisation de ce projet, faute de quoi celui-ci serait demeuré au stade hypothétique d'étude.

Nous l'avions déjà dit dans un autre contexte que la réalisation de l'architecte Ghassan Klink ne pouvait se matérialiser sans la collaboration étroite des membres du Spéléo Club du Liban, familiers des lieux, mais, plus encore, riches en expériences quant aux visites et explorations de nombreuses grottes aménagées de par le monde. L'environnement extérieur de la caverne devait aussi être préservé. Le parking destiné aux visiteurs demeure en soi un chef d'oeuvre architectural (Photo 40).

Plus encore, il a été décidé de préserver le charme sauvage de l'accès par la route à la rivière souterraine et aux Galeries Supérieures. A cet effet il a été prévu dans les bâtiments du départ et d'arrivée de la télécabine, des locaux destinés à une exploitation commerciale collatérale incluant,musée de spéléologique, restaurants et magasins de souvenirs. La visite des grottes pour ceux qui souhaitaient marcher serait une promenade en milieu naturel et sans artifice alentour. En 1972, les autorités responsables confièrent à Ghassan Klink le soin de réaménager l'accès de la rivière souterraine dans le but d'homogénéiser l'exploitation touristique.

Photo 32
L'occasion se présente à nous pour remercier Sheikh Michel el Khoury et Mme Nadia Kettaneh pour la réalisation de ce projet, faute de quoi celui-ci serait demeuré au stade hypothétique d'étude.

Photo 36
Le cheminement en méandre rappelant celui de la rivière souterraine.
(Photo by Sami Karkabi)

Photo 37
La passerelle sur console au dessus du précipice dominant de 55 m la rivière souterraine.
(Photo by Sami Karkabi)

Photo 38
Vers l'embarcadère.
(Photo by Sami Karkabi)

Photo 39
Le porche d'entrée historique. C'est de là que pénétrèrent les premiers explorateurs dès 1836.
(Photo by Sami Karkabi)

Photo 40
La rampe d'accès du parking, de par ses circonvolutions reprenait le même schéma que le cheminement intérieur des Galeries Supérieures.

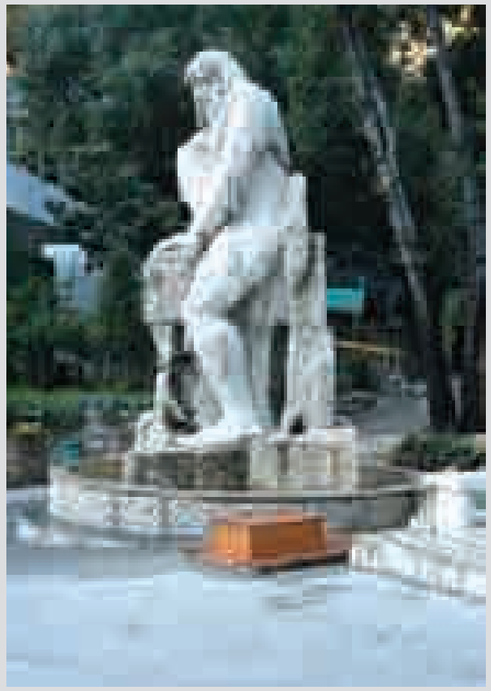

Photo 41
'La monumentale sculpture'.
(Photo by Sami Karkabi)

Photo 42
Le train tracté au moteur à mazout.
(Photo by Sami Karkabi)

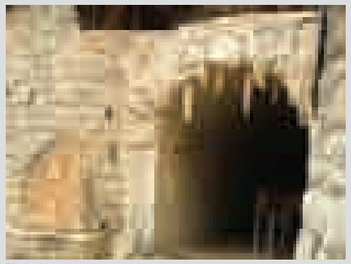

Photo 43
Les stalagmites artificielles suspendues à l'entrée du tunnel des 'Galeries Supérieures'
(Photo by Sami Karkabi)

Qu'en est-il aujourd'hui ? Peut-on affirmer que la nouvelle exploitation du complexe touristique a respecté le programme initial signalé plus haut. La route accédant aux grottes est parsemée de bas reliefs et de sculptures d'une effarante laideur. Je donnerai à titre d'exemple celui de la monumentale sculpture (Photo 41) qui obstrue la vue panoramique de l'entrée historique de la rivière souterraine. J'occulterai la présence ridicule d'un mini zoo et celui non moins polluant du train tracté au moteur à mazout (Photo 42) et de l'ensemble pitoyable d'un micro Disney Land de goût douteux. Je m'abstiendrai aussi de signaler la dégradation intérieure des Galeries Supérieures qui prend des allures de catastrophe tout au moins (et pour l'instant) dans ses cents premiers mètres.

Autres aberrances qui est hélas pléthore. Je n'en choisirai que deux d'entre elles.

a - Les stalagmites artificielles suspendues à l'entrée du tunnel des 'Galeries Supérieures' (Photo 43). Témoignage inapproprié si non ridicule vue l'étonnante et riche perspective concrétionnée que découvre le visiteur au débouché du tunnel.

b - La sculpture de Rudy Rahmeh intitulée: Moulin du temps, exposée à proximité du tunnel d'accès des "Galeries supérieures" est terrifiante à savoir ce personnage à tête couronnée d'épines et recroquevillé dans une fourche (Photo 42). L'ensemble de cet appareillage (fourche + roue) n'est-il pas plus proche d'un instrument de torture que celui du mécanisme d'un moulin ? L'homme est-il destiné à être écrasé et réduit à des débris humains à l'instar de ceux qui jonchent la plate-forme à ses pieds, ou simplement rappeler à l'homme son court passage terrestre. Représentation surréaliste et visionnaire non loin de rappeler les oeuvres de William Blake et de Gibran Khalil Gibran. Qu'a t'on besoin de tant de violence et de vision apocalyptique de monstres et êtres hybrides ?

En place n'aurait-il pas été plus heureux de représenter par une maquette une coupe instructive et éducative du développement des 'Galeries Supérieures', en indiquant les auteurs (Spéléo Club du Liban), la date de la découverte, de leurs ouvertures au public et signaler les maîtres d'oeuvre de son aménagement ?

En conclusion, la photographie documentaire demeure un témoignage irremplaçable d'un passé révolu et dans le cas de Jiita un triste constat.

Photographs of various Jiita expeditions *(Photos by Issam Bou Jaoude, Johnny Tawk, Marwan Zgheib & Rena Karanouh).*

Assaad Seif | assadseif@culture.gov.lb

HOUET MECHANE 4

PRELIMINARY ANALYSIS OF THE ARCHAEOLOGICAL MATERIAL

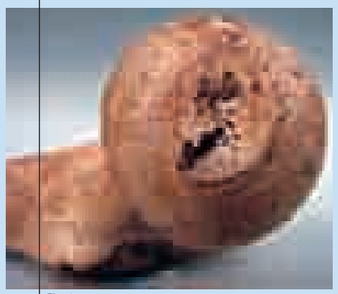

Fig. 1
Preliminary observation of one hip bone reveal the presence of osteoarthritis of the femoral head.
(Photo by Assad Saif)

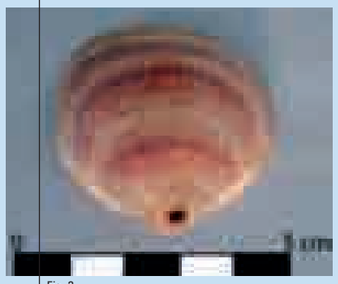

Fig. 2
The pierced shell, a cardium sea shell.
(Photo by Assad Saif)

Fig. 3
Piece of wood found with the skeleton.
(Photo by Assad Saif)

Fig. 4
Pot is typical of the middle of the 4th millennium BC.
(Photo by Assad Saif)

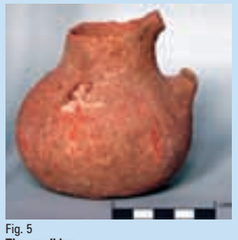

Fig. 5
The small jug.
(Photo by Assad Saif)

Fig. 6
A combed body sherd.
(Photo by Assad Saif)

Published earlier in 'Al-Ouat 'Ouat 13', this cave was discovered in 2003 by the SCL.

In the section 'A' levels 1 and 2 of this six level cave, a tomb with archaeological material was found. Moreover, some scattered sherds were collected for analysis.

I had the chance to visit the cave and observe the tomb location in addition to the collected material. Consequently, a preliminary analysis of the discoveries was done which revealed a long term use of the cave namely for funerary practices.

THE ARCHAEOLOGICAL MATERIAL

The material collected by the SCL in the year 2000 included bones, one pierced *cardium* shell, a piece of wood, two almost complete pots and 19 pottery sherds collected from different parts of section A of the cave.

As stated earlier in "*Al-Ouat 'Ouat 13*", the bones were partially smashed by falling rocks, still, some were intact. They included some long bones, short bones, vertebrae, a few ribs and parts of the skull. A preliminary observation of one hip bone revealed the presence of osteoarthritis of the femoral head (fig.1). Further analysis of the bones will shed more light on the approximate age, sex, diseases and diet of the inhumated individual, thus giving us more insight into his/her daily life and activity.

تمّ اكتشاف في داخل مغارة مشان 4 في سنة 2003 موقع اثري يتضمن مقبرة تاريخية، اصداف، خشب، فخاريات كاملة ومحطمة. يتطرق العالم في هذا المقال الى اهمية هذا الاكتشاف ومدلولاته العلمية.

Découverte en l'an 2000 par le SCL, cette grotte s'est avérée contenir dans ses deux premiers niveaux une tombe avec plusieurs éléments archéologiques incluant des os, une coquille de cardium percée, un bout de bois, deux pots presque entiers et dix-neuf morceaux en argile. L'auteur a eu la chance de visiter cette grotte une fois de plus et en a fait une évaluation préliminaire présentée dans cet article.

The pierced shell is a *cardium* sea shell found abundantly on the Lebanese coast (Fig. 2). This shell was obviously used as a necklace and deposited with the deceased as it was most probably of his/her personal belongings. Many examples of this type of funerary material are found on the coast especially within the tombs of Byblos.

The piece of wood found with the skeleton is in rather good condition (Fig. 3). This throws doubt on its contextuality and depositional dynamic; it could be a later intrusion. Still a dendrochronology or C14 analysis could ascertain its nature, date and origin.

The almost complete pottery types consist of a pot with two lateral handles, and a small jug. The pot is typical of the middle of the 4th millennium, BC (Fig. 4). It has two handles connecting the top shoulders to the upper part of the neck, almost to the level of the rim. These handles have a chevron impressed design on their surface. Many examples of this type were found in the "énéolithique" tombs of Byblos. The same goes for the small jug (Fig. 5), thus forming a coherent ensemble with the pot.

Among the 19 pottery sherds, one combed body sherd (fig.6) was identified dating from the Early Bronze II-III period (end of the 4th millennium, BC – beginning of the third millennium, BC). Another rim sherd with internal light horizontal combing was also collected (Fig. 7); this type of surface treatment is typical of the Early Bronze IV and Middle Bronze I periods (end of the third millennium and beginning of the second millennium BC). Examples of this light combing can be found in the akkar region and on the northern coast as well as in the Qadisha valley.

Fig. 7
Rim sherd with internal light horizontal combing.
(Photo by Assad Saif)

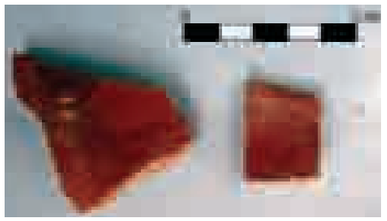

Fig. 8
Two terra sigilata sherds dating from the Roman period.
(Photo by Assad Saif)

Two *terra sigilata* sherds dating from the roman period were also found (Fig. 8).

Nine other body sherds could be easily dated to the middle 4th millennium BC because of their fabric and surface treatment. The remaining 8 sherds were non diagnostic; still their fabric and surface treatment may indicate a later date.

In addition to the above mentioned archaeological material, scattered sherds especially with combed surfaces were found incrusted within the calcite bed in level 2 section A of the cave. Those sherds could have been brought down by the sediments or they could have been part of the material of other tombs destroyed by later natural or anthropic activity.

PRELIMINARY CONCLUSIONS

Our knowledge of early as well as later period settlement in the Nahr Ibrahim Valley is presently very limited and this largely results from the lack of research undertaken in this region.

However, most of the discovered sites are located in the upper valley rather than in the lower mountain belt as is the case with the Mechane cave. Moreover few of the discovered sites in the valley date from the Bronze Age. The few Bronze Age sites of the high lands are Yanuh, Tadmor and the cave of St. John (Mgharet Mar Hanna), which makes the Mechane cave the only evidence of this period in the lower mountain belt region.

Out of all the sites found in the Nahr Ibrahim Valley, Mechane Cave provides the most pertinent evidence for long-term occupation in the Valley (4th millennium BC until the roman period). Furthermore, the similarity between the material culture found in the cave and that at the major sites along the coast, indicates that the two areas participated in a common dynamic of cultural exchange.

More intensive and systematic surveys in this region are likely to reveal many more sites and add to the evidence of continuity in settlement history.

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CAVE BIOLOGY

بعد وضع تصور لعمليات مسح الخفافيش ومراقبتها دوريا من قبل (2007 هورتشك) . قام واضعي هذه الدراسة بعملية مسح للخفافيش سنة 2008 و 2009 في 22 مغارة داخل لبنان. نتائج المسح جاءت مشرفة لارقام واعداد الخفافيش لتبين اهمية هذا المسح.

Cet article montre les résultats de la 2ème et 3ème saison de recensement des chauves-souris dans les grottes libanaises, dans le cadre du projet de surveillance proposé par Horáček et al. en 2007. Les auteurs nous propose d'observer 22 grottes libanaises entre Janvier 2008 et 2009.

BAT CENSUS IN LEBANESE CAVES 2008 & 2009

Following the article published in the Ouat'Oaute Magazine issue 14 and in frame of the monitoring project of bat population in Lebanese caves proposed by Horáček et al. (˚2008) a bat survey was conducted in almost 21 different caves in the year 2008 and 17 caves in the year 2009 mostly in the same way conducted in 2007. The two seasons revealed startling new discoveries. A simple key for visual bat identification is highlighted at the end of the article to aid cavers in continuous monitoring such a delicate species.

RESULTS OF THE 2ND SEASON

From 16 January to 25 January 2008 controls in 21 Lebanese caves, mostly those inspected in the same way also in January 2007. The results of the census (surveyed in Table 1) revealed the following picture:

(1) We found no essential differences from the previous winter (2007) in species composition, proportion of particular species and abundances in particular caves and in general. This suggests a recurrent pattern of inhabitation of the respective underground spaces by bats in winter and, hence, a promise of a reliable output of the monitoring project.

(2) The large hibernating colonies found in 2007 appeared either at the same place (*Miniopterus schreibersii* in Er Rouiss) or in different chambers of the same cave (*Rhinolophus ferrumequinum* in Afqa), in both the caves the total numbers were even higher than in 2007. In Afqa, the colony was splitted in four clusters (39, 33, 10, 9 ind.) and number of solitary individuals mostly roosting closer to entrace than in 2007. The similar pattern was observed also in other sites and also an incidence of active or semi-active bats was higher than in 2007.

(3) Apparently, the winter 2008 has been undoubtedly warmer than that in 2007, snow cover was much less pronounced at time of census, temperature in low altitude caves was higher etc. In contrast to 2007, oranges were fully ripe and the fruit bats started already to feed on them. In all colonies of that species, the average body condition of fruit bats was excellent - great contrast to situation in 2007 when these bats show obvious signs of starvation. In three of four colonies controlled in winter 2007 we found a significant increase of abundance (by about 20% on avergage).

(4) In fissures at entrances of two caves (Achou, Afqa) we found hibernating individuals of *Pipistrellus pipistrellus* and *Myotis capaccinnii*, not found there in 2007, which also can be ascribed to specific climatic conditions of 2008.

RESULTS OF THE 3ND SEASON

From 14 December to 25 February 2009 controls in 12 Lebanese caves, mostly those inspected in the same way also in January 2007. The results of the census (surveyed in Table 2) revealed the following interesting observation:

(1)There is a noticeable increase in number of bats in large hibernating colonies. In the Roueiss cave roost which was found in the same place as the year 2008 a noticeable 4% increase was observed.

(2) Two major new colonies were also found. One in Marjaba mines a roost of 700 Greater Horseshoe bat, *R. ferrumequinum* was discovered in the galleries of a newly discovered Marjaba mine (not controlled in previous years), and a colony of 69 bats of *Miniopterus schreibersii* was found in the Achou cave.

(3) Apparently the winter of 2009 is a bit colder and came earlier than the previous year that is most probably why the bats were found in large quantities. The snow covered most of the mountains.

(4) In fissures at entrances of two caves (Afqa, Roueiss & Marjaba) we found hibernating individuals of *Myotis capaccinnii* and *Eptesieus serotinos* not found there in 2008.

(5) The next years of the census are expected to answer which of the above mentioned differences may refer to some general trends.

BAT SURVEY OF 2008				BAT SPECIES										
Locality			Date	Raeg	Rfer	Rhip	Rbla	Mcap	Mbly	Msch	Ppip	Eser	Hsav	Phyp
L20	M. Lebanon	Rouiss Cave	17-Jan-08		16	2				1250				
L59	M. Lebanon	Seraaya Cave	21-Jan-08		5	3								
L48	M. Lebanon	Bechara Cave	21-Jan-08											
L57	M. Lebanon	Terrash cave=Qana Cave	20-Jan-08		7	2								
L21	M. Lebanon	Afqa Cave	17-Jan-08		99	12		2			5	1	?	
L69	M. Lebanon	Aabadi cave	22-Jan-08	200										
L50	M. Lebanon	Nabaa el Saqia cave	20-Jan-08						7					
L-54	Tripoli	Achou Cave	18-Jan-08		1	4	1	3			7			
L51	Tripoli	Matal el Azrak	18-Jan-08	300	5		1							
L-25	Chekka	Musailha Castle	18-Jan-08							1				
L-25b	Chekka	Gallery near Musailha Castle	18-Jan-08				1							
L-18	Aamchit	Saleh Cave	22-Jan-08	150	4		3							
L-37	Antelias	Kanaan Cave	25-Jan-08	100										
L-32	Antelias	El-Kassarat Cave	25-Jan-08	400										
L-31	Marjaba	Marjaba Mines/7 galleries	21-Jan-08		4	7			1					
L-15	Jezzine	Water spring Gallery	24-Jan-08											
L-14	Jezzine	Cellar in a house	24-Jan-08			1								
L-64	South	Mgharet el Ouataouit	19-Jan-08	850										
L65	South	Mgharet el Aaonamine	19-Jan-08	20		1								
L-10b		Adloun cave	16-Jan-08	26										
L-41	Anjar Bekaa	Anjar Cellis Cave	21-Jan-08											
L-42	Bekaa	Kfar Zabad Cave	21-Jan-08		1		17							

Table 1
Results of 2008 winter bat census of the Lebanese caves

BAT SURVEY OF 2009				BAT SPECIES											
Locality			Date	Raeg	Rfer	Reur	Rhip	Rbla	Mcap	Mbly	Msch	Nnoc	Eser	Phyp
L20	M. Lebanon	Rouiss Cave	11 Feb. 2009		2		4		1		1300			
L59	M. Lebanon	Seraaya Cave	11 Feb. 2009		6		4				17			
L48	M. Lebanon	Bechara Cave	11 Feb. 2009											
L57	M. Lebanon	Terrash cave=Qana Cave	11 Feb. 2009											
L70	M. Lebanon	Nabaa el Mghara Cave	14 Dec. 2008		8		4							
L21	M. Lebanon	Afqa Cave	11 Feb. 2009		28		4							1
L-54	Tripoli	Achou Cave	18 Feb. 2009		2		1	2			13			
L51	Tripoli	Matal el Azrak	18 Feb. 2009	300										
L-25	Chekka	Musailha Castle	1 Feb. 2009											
L-25	Chekka	Gallery near Musailha Castle	16 Mar. 2009		1		2							
L-18	Aamchit	Saleh Cave	8 Feb. 2009	150	10		2				69			
L-37	Antelias	Kanaan Cave	23 Feb. 2009	100										
L-32	Antelias	El-Kassarat Cave	23 Feb. 2009	400										
L-31	Marjaba	Marjaba Mines/8 galleries	24 Feb. 2009		700		3			1				
L-15	Jezzine	Water spring Gallery	25 Feb. 2009											
L-14	Jezzine	Cellar in a house	26 Feb. 2009		1		4							
L-64	South	Mgharet el Ouataouit	2 Feb. 2009	820										
L65	South	Mgharet el Aaonamine	2 Feb. 2009	20			1							

Table 2
Results of 2009 winter bat census of the Lebanese caves

A SIMPLE KEY FOR VISUAL IDENTIFICATION OF LEBANESE CAVE BATS

1}
Bats of very big size, usually in a larger colony, active in winter, with large eyes shining when illuminated by hand reflectors:

EGYPTIAN FRUIT BAT
ROUSETTUS AEGYPTIACUS

Rousettus aegyptiacus **in Mtal al Azrak cave**
(photo by Issam Bou Jaoude)

2}
Medium to large sized bats (8–12 cm of head and body length) freely sitting on walls, conspicuous by their long (as long as a body) tail freely extending from short membrane:

MOUSE-TAILED BATS
GENUS RHINOPOMA
Apparently quite rare; it is highly recommended to catch an individual, take measurements (forearm length 45–62 mm: R. cystops, 61–72 mm R. microphyllum) and a detailed picture or a voucher specimen.

A mouse-tailed bat
(photo by I. Horáček)

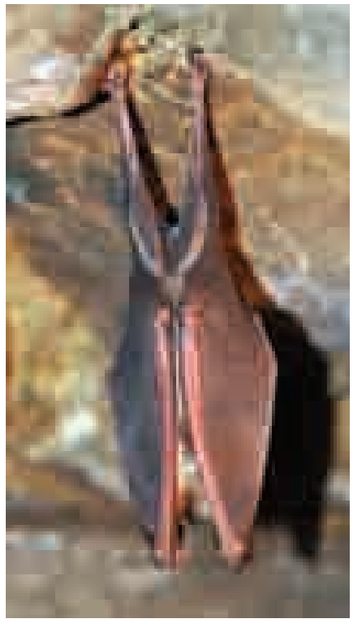
3}
Bats freely hanging from a ceiling or at walls, when torpid usually wrapped in membranes, when active they are conspicuous for intensive location movements of head, soon fly away, at shorter distance you can note large membranous leaflet around nose through which they emit their echolocation calls:

HORSESHOE BATS
GENUS RHINOLOPHUS
All are typical cave-dwelling species.
By visual identification you can easily distinguish three size categories:

-A larger species (10 cm when hanging):
Greater Horseshoe bat, *R. ferrumequinum.*

-A small species (about 5 cm when hanging):
Lesser Horseshoe bat, *R. hipposideros.*

-Medium-sized species (about 8–10 cm when hanging).
This is a bit more complicated category as there are several species which come in account in that category, all - in contrast to the preceeding two which are widespread) relatively rare or even not yet found in Lebanon. It can be recommended to catch one, take a measurement (length of forearm) and examine shape of noseleaf and take its macrophotograph, eventually. ***Rhinolophus euryale, R. mehelyi*** *and* ***R. blasii*** *are characteristic by a pointed central leaf (visible from a side view). The other possible species,* ***Asellia tridens****, not known from Lebanon, is pale or rufous coloured and has a noseleaf of a completely different shape.*



Photograph of the Mediterranean horse shoe bat found inside an old house in Jezzine.
(Photo by Rena Karanouh)

4}
Large bats (forearm length 75–95 mm, body length ca. 15cm), roosting in fissures, elongated head with short and mutually separated auricles and naked belly:

NAKED-BELIED TOMB BAT
TAPHOZOUS NUDIVENTRIS
Not known from Lebanon as yet, voucher specimen or a detailed photograph obligatory.

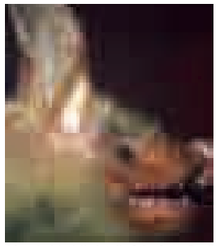
5}
Smaller (body length ca. 7–8 cm), pale greyish brown coloured bats, often in large colonies hanging in cave ceiling, typically in spacious chambers deep inside the cave, short but broad auricles not extending dorsal profile of a rounded head:

SCHREIBER'S BAT
MINIOPTERUS SCHREIBERSII
Schreiber's bat**,** ***Miniopterus schreibersii*** *almost strict cave-dweller which colonies should be monitored with particular attention.*

Several small clusters of Shreiber's Bat found in Saleh mines.
(Photo by Issam Bou Jaoude)

6}
Larger bats (length of body ca. 10–12 cm) with long elongated and pale coloured membranous auricles, either hanging from walls or roosting in crevices, forming summer large colonies in high chambers inside the cave:

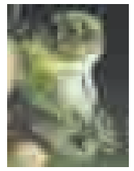
LARGER & LESSER MOUSE-EARED BATS
MYOTIS MYOTIS and M. BLYTHII
Sibling species, both cave-dwellers, which can be separated essentially only with genetical techniques, the former is larger and has a more eliptic and broader auricle.



Myotis blythii, **detail of the face, Baalbek**
(photo by I. Horáček)

7}
The remaining species which do not correspond to any of the above mentioned characteristics, are not the typical cave-dwellers, occupy preferably crevices in rocks, in shallow caves or in cave entrances. In most instances these are rare species which identification is not easy as a rule and should be supplemented with a detailed examination of an individual in hand. This holds true also for the two species which preferably roost in caves.

GEOFFROY'S BAT
MYOTIS EMARGINATUS AND
LONG-FINGERED BAT, M. CAPACCINII
They both remind the large species of the genus (see above) but are distinctly smaller (length of body ca. 5–7 cm).



A long-fingered bat
(photo by I. Horáček)

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KARST PROTECTION COMMISSION

Established in 2007 as a working group in the Spéléo Club du Liban, its main focus is the protection of caves and karst environments in Lebanon.

Preliminary steps where taken in order to identify the vulnerable sites and assess the urgency of measures that need to be taken.

After establishing these priorities the commission focused its efforts on Kanaan cave. This cave required protection even from cavers themselves. The next protection project was Al-Kassarat cave where a government project was being implemented. This required a great deal of monitoring and protection measures.

The commission will also address issues related to Jiita cave, the longest cave in Lebanon and the most visited show cave in the Middle-East.

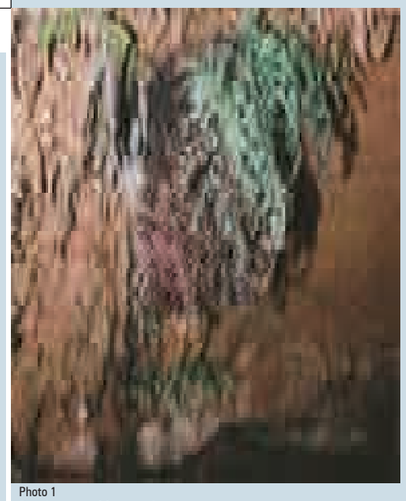


Photo 1
Development of ferns at the cave entrance.
(Photo by Issam Bou Jaoude)

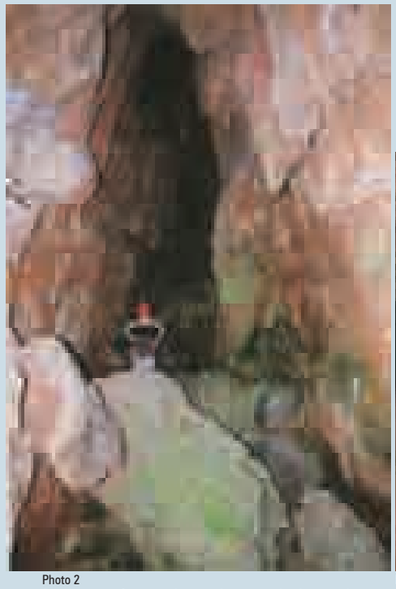


Photo 2
Development of moss and green algae on speleothems and walls close to the cave entrance.
(Photo by Issam Bou Jaoude)

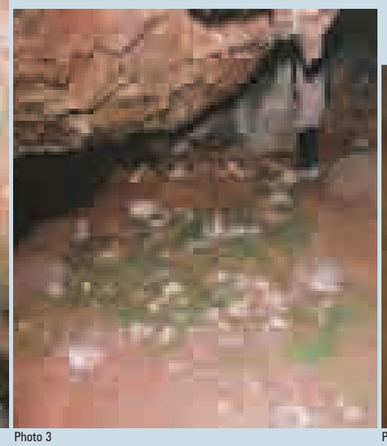


Photo 3
Moss and green algae on the floor close to the cave entrance.
(Photo by Issam Bou Jaoude)

Photo 4
Impacts of muddy footsteps on white calcite shown in the circles.
(Photo by Issam Bou Jaoude)

EVALUATION OF **HUMAN IMPACT** ON **KANAAN CAVE**

Cet article propose de présenter les différents impacts humains sur la grotte de Kanaan, dans la région d'Antelias afin de sensibiliser les lecteurs, les spéléologues et les amateurs sur la protection des grottes au Liban. Il contient une description de l'état actuel de la grotte, une identification des principaux impacts ainsi qu'une proposition de mesures de protection et de conservation de ce milieu fragile.

الباحثة في هذا المقال تعالج موضوع تأثير الأنسان على مغارة كنعان. وتتطرق لاهمية حماية هذه البيئة الحساسة. وتناشد جميع اندية الأستغوار والمغامرة للعمل على المحافظة على هذه البيئة الحساسة.

INTRODUCTION

Human impact on caves is an endless challenge but the duty of a speleologist is to increase awareness among the people familiar and unfamiliar to the caving world. The following article identifies human impacts on Kanaan cave for the purpose of awareness and protection of the cave and other similar fragile environments. The article is dedicated to every caver and outdoor recreational group, especially in Lebanon.

CAVE LOCATION AND DESCRIPTION

Kanaan cave is located in the region of Antelias, few kilometers North of Beirut. It was discovered in 1996 by SCL members wandering around the quarries area (same area containing Al Kassarat cave). The cave is 80 m long and can be divided into three different parts (Nader, 1998):

- The entrance: area intensively damaged by quarrying activities from the early sixties. It contains large blocks of collapsed rocks and broken speleothems. This area is biota rich with the presence of vascular plants such as ferns (Photo 1) and non-vascular plants such as moss and green algae (Photo 2 & 3). It also contains a variety of insects, spiders and an important bat colony with species such as the Egyptian fruit bat (Rousettus aegyptiacus) and Savi's pipistrelle bat (Hypsugo savii) (Horacek et al., 2008);
- The middle part: large muddy section also containing collapsed rock and cave features. Cavers developed the habit of taking their shoes off in that area before further progression towards the last section know as the temple of speleology;
- The end part: described as the temple of speleology (Nader, 1998) contains a high variety of cave features condensed in a small area, such as stalagmites, stalactites, eccentrics, columns, curtains, flowstones, tulips and cave pearls.

CAVE IMPACT IDENTIFICATION

Since its discovery, the cave encountered many problems due to its proximity to urbanized areas and its easy accessibility and developed a high risk factor from continuous human contacts. An assessment of these impacts has been elaborated to evaluate and visualize the intensity of damage.

The source of cave damage is generated by human activities and interventions in the environment. The identification of impacts has been classified into two main groups:

a. Direct human impact generated from current activities of visitors and cavers;
b. Indirect human impact as a result of previous activities.

a. Direct human impact

Direct human impact in the cave is generated by three type of visitors:

i. Recreational groups;
ii. Local and random visitors;
iii. Cavers.

The main damages observed are the muddy footsteps on the white calcite (Photo 4) and the muddy palms on cave features. Sensitive features such as cave pearls are crushed by visitor's footsteps. Eccentrics and soda straws are broken under people's palms, as visitors tend to ignore their highly delicate constitution.

Litter is also a recurrent problem. How many times have we visited the cave to find a cigarette butts or an empty bag left behind on the floor?

Furthermore, the impact of cavers is to be noted with special attention. Even with a credo of protecting caves, cavers tend to leave too many footsteps behind them and

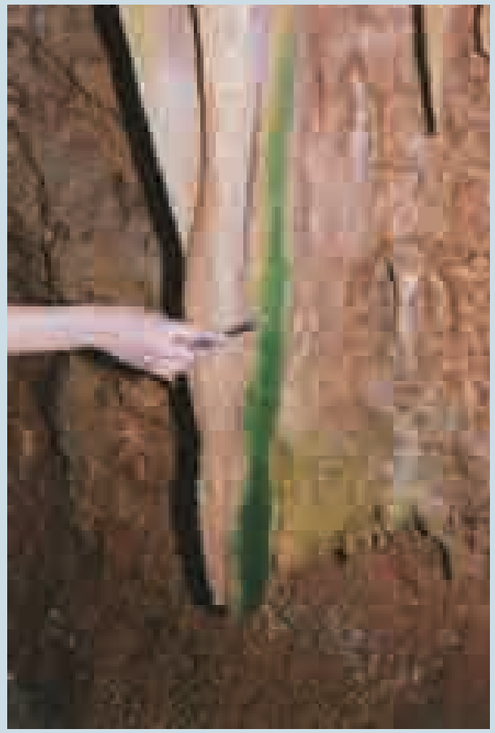


Photo 5
Development of a green patina on the exposed side of a speleothem to air flow and humidity at the cave entrance.
(Photo by Issam Bou Jaoude)

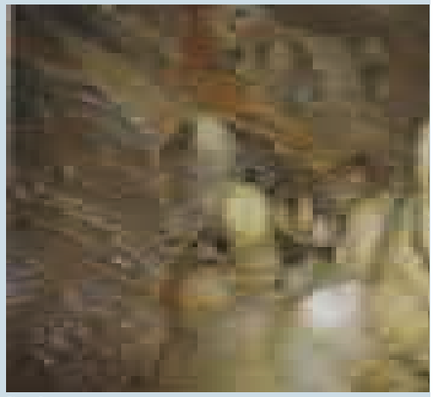


Photo 6
Mice incident I: Feces on cave features.
(Photo by Issam Bou Jaoude)

Photo 7
Mice incidens II: Tape damage and trail interruption.
(Photo by Issam Bou Jaoude)

Photo 8
Mice incident III – Final assessment: Trail interrupted and tape dragged to the hole.
(Photo by Issam Bou Jaoude)

muddy palms on highly sensitive areas. First, cavers used to adopt the norm of taking their shoes off while entering the temple of speleology, a habit that was progressively lost due to lack of continuous awareness. Furthermore, the easy accessibility of the cave and its rich environment, have attracted several scientific studies in the last couple of years. Unfortunately, some of them did not adapt the caving world of ethics and left too many scars.

b. Indirect human impact

It is assumed that Kanaan cave had no natural entrance before the quarrying activities were actively initiated during the late sixties. The blasting involved in these activities caused immediate impacts such as the collapse of large geological strata, generating an artificial cave opening.

That direct exposure to air flow and humidity caused irreparable alterations to the cave and created a chain of long term reactions due to the direct exposure to the external environment. Several threats are therefore noted to the cave system such as :

- **Deposition of dust and mud particles** by air circulation, slowly progressing into the cave to mask the existing features;
- **Change in the cave's microclimate** with the infiltration of micro-currents of air, affecting the growth of speleothems;
- **Change in the cave's biodiversity** by increasing the development of vascular and non-vascular plants, especially at the entrance. The change in ventilation and humidity led to the development of a green patina on the surface of exposed speleothems (Photo 5). It is believed that this substance is a kind of microflora revealing a change in the microclimatological conditions. The increase in temperature and the change in concentration of carbon dioxide increases photosynthetic ability and encourages the faster growth of flora. An association could be made to the "maladie verte" (green disease) of caves, term mainly referring to the touristic impact generated in show caves (phenomenon that became famous in the 1960s with the development of chlorophycea from illuminated spotlights and human breath on the famous rock paintings of the Lascaux cave in France) (Merdenisianos, 2005).

Fig. 1
Chain of impacts generated by the quarrying activities

We also note that mice feces were observed on the white calcite gours inside the Temple of Speleology section (Photo 6, 7 & 8).

The bat colony found at the cave entrance should be an important indicator of the caves' biodiversity evolution. But in the case of Kanaan cave it is not known if the colony inhabited the cave before its exposure or if it migrated from the Kassarat Antelias cave system after the quarrying activities and the artificial cave opening.

A recapitulation of the immediate and long term impacts of quarrying activities is shown in Figure 1.

c. Cave impact mapping

In order to visualize these impacts a cave impact mapping was established to assess the damages in each of the affected areas (Fig. 2).

The purpose of impact mapping is to locate the damaged areas generated by direct and indirect human activities. Each of the three parts of the cave has been assessed and classified according to the following rating classes:

- Light impacts: impact present at a reduced scale – no severe damage to cave features;
- Heavy impacts: heavy damage to cave features with possible remediation or restoration;
- Severe impacts: irreversible damage to cave features with no possible remediation.

Assessments of the impact intensity in each area have been identified by several field observations and are summarized in Table 1.

Area 1 or cave entrance is severely impacted as it contains large collapsed strata, several broken speleothems and an integrated biota system unfamiliar to the cave's natural environment.

Area 2, the middle part, is heavily impacted as well as it contains collapsed strata from blasting and a thick deposit of mud.

Area 3, temple of speleology, contains light and heavily impacted areas that could be restored by proper practice.

ACTIONS TAKEN FOR CAVE PROTECTION AND CONSERVATION

Many techniques might be considered to restore damaged features and speleothems. A first step towards conservation was taken by the Karst Protection Commission by putting forward an action plan with the purpose of increasing awareness among cavers and visitors and possibly decreasing further degradation:

Area/Damage	Light	Heavy	Severe
Area 1			X
Area 2			X
Area 3	X	X	

Table 1
Assessment of impacts per area

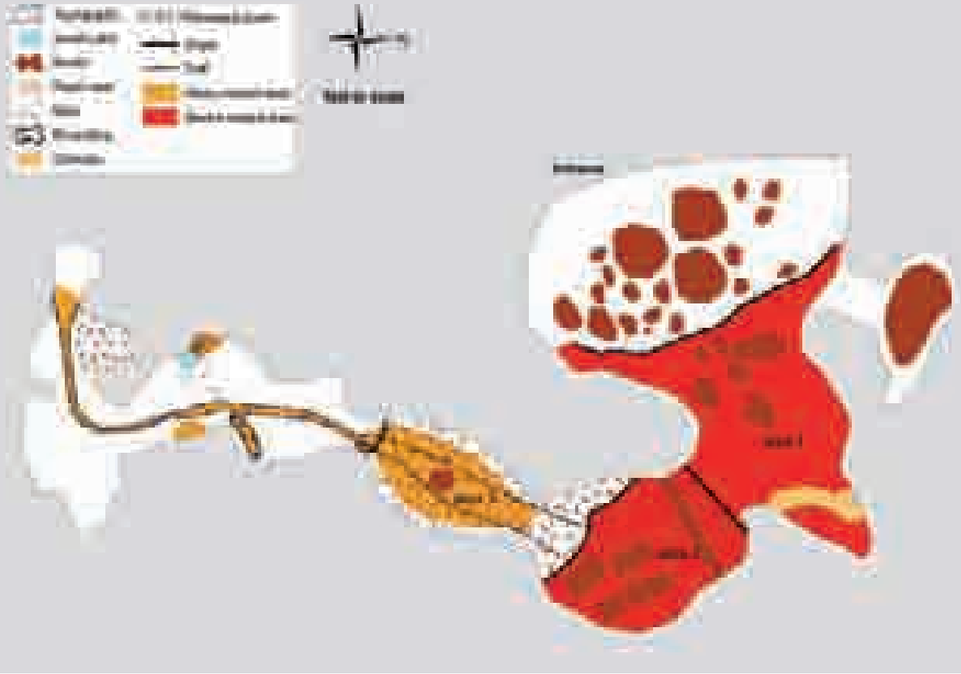
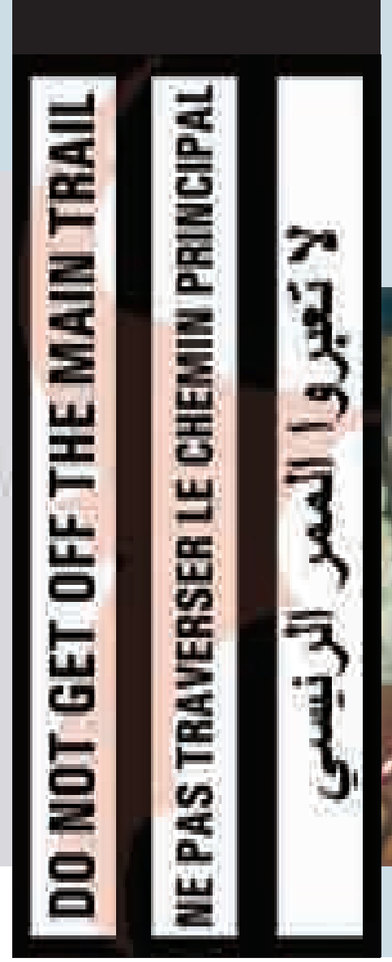


Fig. 2
Map showing the impact assessment in Kanaan Cave.
(comprehensive map that does not show all the cave features)



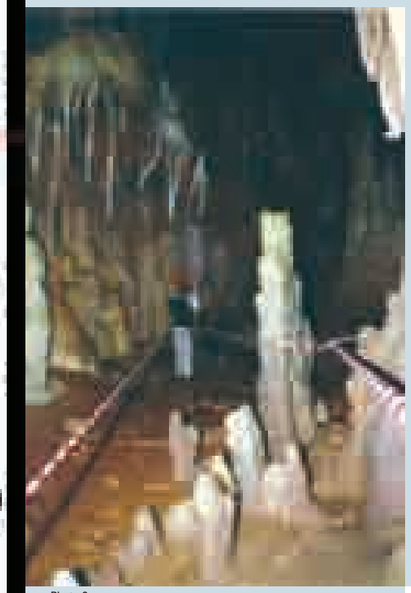


Photo 9
Trail delineation inside Kanaan cave.
(Photo by Issam Bou Jaoude)

Photo 10
Sign assignation along the defined pathways.
(Photo by Issam Bou Jaoude)

> **STEP 1: AWARENESS CAMPAIGN**

Campaign among SCL cavers were given to highlight the cave's sensitive environment and the negative impacts caused by lack of good practice. Cavers were also prompted to limit the number of outings to the cave, reducing the occurrence of eventual damage and destruction. Local communities within the areas and outdoor recreational groups are the next target for an awareness presentations.

> **STEP 2: TRAIL DELINEATION**

Routing was chosen to define boundaries for visitors and cavers away from sensitive and damaged areas, especially eccentrics, cave pearls, gours and curtains (Photo 9). Non biodegradable tape was used on parallel continuous strips to delineate an appropriate pathway on both sides of the cave. Though wild caves do not need trail designation and should be free of access, the observed cumulative impact from visitors has led to its serious degradation and routing will help protect the cave value.

Though not rated as the most aesthetic way, trail delineation is an excellent tool for managing sensitive cave resources. When visitors are confined in defined pathways features are better preserved (Hildreth-Werker & Werker, 2006).

> **STEP 3: SIGNS ALLOCATION**

Along with the defined pathway, signs were assigned in specified locations as indicators for visitors to take their boots off before entering the temple of speleology and as a reminder to respect the path erected all along the cave. The signs were written in three languages (Arabic, English, and French) stating the following:

- Vulnerable area ahead! Please remove boots here
- Do not get off main trail

> **STEP 4: REMIDIATION MEASURES**

- The slow progression of mud and dust deposition from the middle muddy part could be stopped by the construction of a natural gate from site existing rocks to reduce micro-currents of air circulation;
- The visitor's impact with muddy footsteps and muddy palms left on different speleothems can be reduced by the definition a routing, away from sensitive and damaged areas;
- Cleaning the damaged features is a remediation option that requires intensive work, meticulous and long methods using tools such as plastic toothpicks, tweezers, toothbrush, sponges, combs, brushes, syringes and other customized techniques.

RECOMMENDATIONS

Even though cavers do not like to be told how to behave, we must not forget that the first enemy of caves is us. Do we need a code of conduct? Listed below are some selected practices recommended by Val Hildreth-Werker and Jim C. Werker to minimize negative impacts on caves (Hildreth-Werker & Werker, 2006):

- Stay on established trails. Sit inside the trails. Keep packs and other items within the path. Choose the most impacted pathways.
- Move carefully and gently through the entire cave - avoid kicking up dust.
- Always spot each other in fragile areas. Especially watch heads, backs, hands, feet and packs.
- Touch as little as possible. Avoid leaning on walls, ceilings or speleothems. Don't sit on formations. Look and avoid trampling floor deposits. When movement requires hand holds, look first to avoid delicate features and use knuckles or fingertips for balance rather than dirty open palms.
- During survey and exploration, establish pathways on durable surfaces to minimize future impacts.
- Point out surface or damaging behaviour. It is every caver's responsibility to ensure that cave environments remain as pristine as possible and that every team member is safe and aware of conservation ethics. Cave softly…and leave no trace.

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RAYMOND KHAWAM

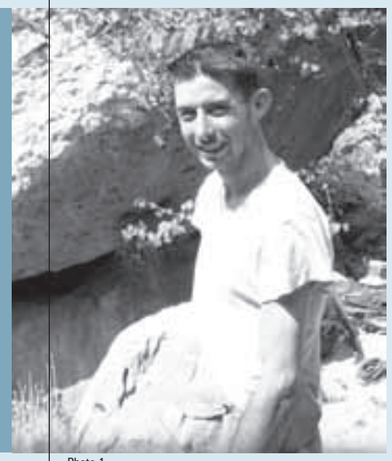

Photo 1
Raymond Khawam.
(Photo by Sami Karkabi)

Raymond Khawam was born in Haifa on the 24th October 1924, and died in Faraya on the 13th June 1974, after 20 years of great inventions and contributions to speleology in Lebanon. An electrician by profession he joined the SCL in 1951. He invented a number of items that facilitated the exploration of caves such as the underground telephone, the 'Mouse' ascender, the 'treuil', a pulley system and the enhancement of cave lighting.

ولد رمون خوام في حيفا في 24 تشرين الاول عام 1924 وتوفي في حزيران عام 1974 بعد عشرون سنة من الاكتشافات والاعمال المهمة فى حقل الاستغوار في لبنان. مهندس كهربائي تنطوع في النادي اللبناني للتنقيب في المغاور عام 1951. ومن اختراعته التي ساعدة المستغورين في اكتشافاتهم هي الفارة والهاتف وغيرها.

Raymond Khawam est né le 30 Octobre, 1924, à Haïfa et décédé le 13 Juin, 1968, à Faraya.

Il fait des études d'électricité et était en charge des installations de rayons X pour le Proche-Orient aux établissements Kettaneh.

C'est là qu'il rencontre Lionel Gorra (premier explorateur libanais de la rivière souterraine de Jiita) en charge de l'audio visuel dans ce même établissement.

C'est en 1951, qu'il fait ses premiers pas en spéléologie.

Marié en 1963 à Augusta Gombert, il est père de deux enfants : Dominique et Yves.

Membre actif du Spéléo Club du Liban il participe à de nombreuses explorations et demeure l'inventeur de nombreux matériels destinés à améliorer le mode d'exploration.

-1954: L'ÉCLAIRAGE FRONTAL À L'ACÉTYLÈNE.
-1955: LA SOURIS.
-1956: LE TÉLÉPHONE LÉGER ET PEU ENCOMBRANT.
-1962: LE TREUIL DE DARA.

La Souris *(R. Khawam - Al Ouat'Ouate N°4-1955)*

L'idée de la conception de la SOURIS m'est venue en étudiant un jour la technique de la descente d'une équipe entière dans un gouffre. Le système courant employé pour assurer la dernière personne est d'amarrer une poulie au point de départ, de faire coulisser la corde, d'attacher une extrémité à la ceinture et d'envoyer le reste à l'équipe d'en bas. Rien de plus simple; on descend, l'assureur donne de la corde et le frottement est minime comme le montre la Figure 1.

Mais supposons que le gouffre ait l'aspect de la figure 2. Si la corde est tendue, il y aura usure par frottement contre la paroi. De plus elle risque de s'emmêler à l'échelle ou de céder en cas de chute.

La "SOURIS" n'a rien de tout cela. Elle grimpe ou descend sur une corde fixe en compagnie du spéléologue, le bloquant en cas de danger sur simple pression produite par l'assureur sur la corde.

Le fonctionnement est le suivant; la corde est attachée en haut à X, passe en dessous de la poulie A sur C, contourne la poulie B, coulisse sur D par dessous A et descend au fond de l'abîme. L'assuré s'accroche à la Souris par F et G. L'assureur tient la corde en main et tire sur celle-ci. Que se passe-t-il? D est mobile et peu se déplacer vers

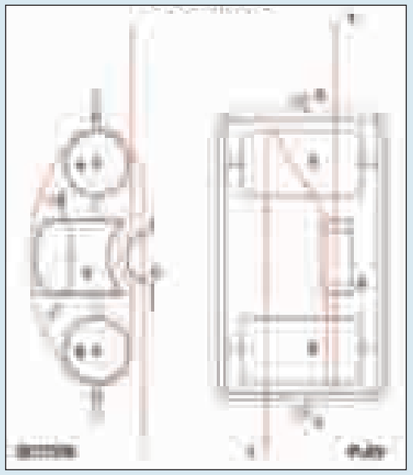

Fig. 1
Le Souris.

Fig. 2
Utilization de la Souris

C mais garde sa position normale grâce au ressort E. A une certaine pression donnée par l'assureur qui est au fond du puits vers Y, la corde qui passe sur D, pousse D vers C et s'y coince entre C et D, d'où blocage de la Souris sur la corde. Pour le déblocage, il faut relâcher la corde.

Le Téléphone *(R. Khawam - Al Ouat'Ouate -N°6 – 1956)*

Schéma d'un téléphone léger et peu encombrant pouvant porter à plus de mille mètres.

1° : Câble employé : 1/2 mm de diamètre.
2° : F et L ne sont employés qu'en cas de camping sous terre ou par temps douteux.

La Chèvre (Photo 3)

La Chèvre crée en 1955 est destinée à éviter tout frottement de la corde en l'éloignant de la paroi. Elle est composée de trois tubes d'aluminium qui reliés forment une fourche. Dans la partie supérieure du manche est fixé une poulie dans laquelle coulisse la corde destinée à l'exploration. Un régulateur d'angle posé contre la paroi permet de contrôler l'angle de la fourche et par conséquent la verticalité de la corde. La Chèvre est reliée au sol par un câble tendu entre le manche et le bord du gouffre.

Le Treuil (Photo 4)

Mis au point en 1962, a été spécialement conçu pour faciliter les manoeuvres dans le puits de 120 mètres du gouffre de Faouar Dara. Sa conception est simple (voir schéma) mais nécessite quelquefois la présence de deux volontaires.

L'éclairage (Photo 5 et 6).

L'éclairage se réduisait à une torche électrique à la main ou frontale et en cas extrême au recours à la bougie. L'éclairage ambiant était diffusé par la lampe à manchon dite lampe Lux. Cet équipement devait perdurer jusqu'en 1953. La lampe frontale à acétylène mise au point par Raymond Khawam n'a été introduite qu'en 1954.

Le Spéléo Club du Liban doit à Raymond Khawam un grand nombre d'inventions et d'améliorations du matériel spéléologique individuel et collectif.

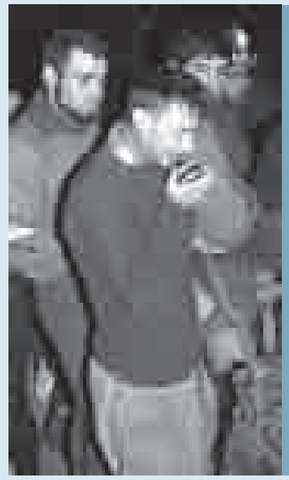

Photo 2
R. Khawam en démonstration de sa capsule téléphonique.
(Photo by Sami Karkabi)

Fig. 3
Reconstitution du treuil par Johnny Tawk.

Photo 3
La chèvre au gouffre de Houet Sidani à Jwar el Hoz (1955).
(Photo by Sami Karkabi)

Photo 4
Le treuil à Dara.
(Photo by Sami Karkabi)

L'ÉCLAIRAGE FRONTAL ÉLECTRIQUE ET À ACÉTYLÈNE

Photo 5
La première lampe frontale électrique en usage en 1953. Il s'agit du corps d'une torche électrique, décapitée de son phare.. En guise d'intérrupteur une poire en plastique.
(Photo by Sami Karkabi)

Photo 6
La lampe frontale à acétylène de R. Khawam en 1954.
(Photo by Sami Karkabi)

Photo 7
Le bec est posé à l'intérieure d'un réflecteur en inox fixé à un serretête métallique recouvert de tissu mousse. Le tissus est relié au réservoir à carbure par un tuyau en plastique. Un adaptateur sur le côté règle le serre tête à volonté. Un protège front de forme elliptique protège l'avant-crâne de l'échauffement du réflecteur.
(Photo by Sami Karkabi)

Photo 8
En 1955, R. Khawam met au point la lampe frontale mixte, électrique et à acétylène.
(Photo by Sami Karkabi)

Photo 9 **Eclairage frontage vu de face.**

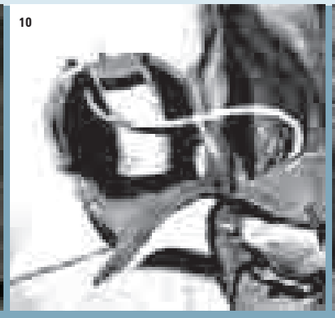

Photo 10 **Même éclairage vu de dos.**

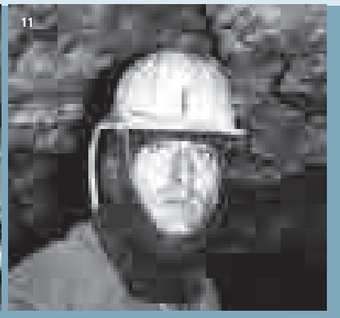

Photo 11 **Casque muni d'un simple bec d'acétylène.**

Photo 12 **Casque avec réflecteur.**

Photo 13 **Eclairage avec rajoût du briquet piézométrique.**

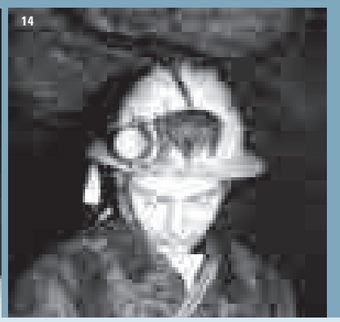

Photo 14 **Combinaison mixte indépendate, électrique et acétylène.**
(Photos by Sami Karkabi)

Photo 15
Écusson en cuivre incrusté sur le coté du réservoir de la lampe à carbure.
(Photo by Sami Karkabi)

Photo 16
Le premier lampe, made in england Cristella - engineering co TP Leeds.
(Photo by Sami Karkabi)

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رسم الخرائط المستدام

Sustainable mapping does exist. Experience has shown that remapping of caves is an ever-repeating issue. Often, remapping without including necessary data occurs because the cavers involuntarily lack knowledge of what is needed and why. The aim of this paper is thus to inform the speleologist working in the field why quality mapping is needed and what elements are necessary. These elements include the «holy trilogy» of plan view, longitudinal section (and cross-sections), and a written description. We, the team of cave mappers all over the world, hope that this article will be as widespread as possible, to minimize future impacts of remapping projects and to maximize the amount of information than can be taken from mapping a cave, even to non-geologic speleologists.

Il est commun de renouveler la topographie d'une grotte. L'expérience a montré que c'est une procédure qui se répète sans cesse. Refaire la topographie d'une grotte sans en inclure les données nécessaires arrive souvent, dû aux spéléos qui involontairement, manquent de connaissance au niveau de ce qui est demandé et le pourquoi. Le but de cet article est donc d'informer le spéléologue sur le besoin d'une topographie de qualité ainsi que sur les éléments nécessaires. Ces éléments incluent la "sainte trilogie" de la vue du plan, de la section longitudinale (et intersections), et de la description par écrit. Nous, l'équipe de topographes de grottes dans le monde, espérons que cet article soit répandu autant que possible, pour minimiser les futurs impacts des projets de re-topographie et pour maximiser la quantité d'informations qui pourrait être obtenue par la topographie d'une grotte, même aux spéléologues non-géologues.

قد يبدو عنوان هذا المقال غريباً بعض الشيء. بالرغم من انه في ايامنا معظم المواضيع ذات النفع العام تحمل لقب المستدام. لذلك اذا اخذنا كلمة المستدام كتخفيف التأثير على البيئة واحترامها نجد انه من غير المستهجن الحديث عن المسح المستدام.

إن غرض هذا المقال ليس ابداً الاشادة بنوعية معينة من اقلام التخطيط نوع احمر الشفاه (الغير سام بالافضلية) لكن اظهار ان رسم الخريطة المستدام في حال تم مسح المغارة بشكل جيد. في الحالة المعاكسة . وخلال بضعة سنوات . ستشهد المغارة الممسوحة بشكل سيء مسحاً جديداً وهذا لن يكون له سوى مزيد من الانعكاسات السلبية على بيئتها الرقيقة.

التجربة تظهر ان اعادة مسح مغارة ما من جديد ليست الا عملاً مكرراً. هناك الكثير من الاسباب لإعادة المسح. مثلاً النسخة الاصلية غير موجودة . اما ضائعة واما الاحداثيات الاساسية غير متوفرة او غير مستعملة. او تنقص المقطع العرضي .نوعية النسخة المتوفرة قد تكون ايضاً دون مستوى المقاييس المعتمدة.

والامر الاكثر تخيباً للآمل ان العديد من المستغورين . الذين يعيدون مسح المغاور بشكل دقيق وعلمي ينسون رسم المقطع العرضي للمغارة او معلومات مهمة اخرى. لدرجة الاضطرار لمسح المغارة مرة اخرى فقط لإضافة هذه العناصر الناقصة.

في الغالب تكون هذه الهفوات غير مقصودة. هناك نواقص في تعليم رسم الخرائط . " لماذا هذا الامر ضروري".

غرض المقال هو اذا مزدوج : التوضيح لمستغوري هذا المجال (رسم الخرائط) ضرورة المسح بتأنٍ وتبيان العناصر الضرورية للمسح النوعي الجيد.

هذه العناصر ليسوا سوى "الثالوث المقدس" . سواء الرسم السطحي . او المقطع العرضي(مع اقسام الدهاليز) والوصف الخطي. ونحن كأعضاء بفريق يعمل بمسح المغاور. نأمل ان يساهم هذا المقال بشكل واسع بتخفيف الاضرار اللاحقة بالوسط الجوفي من جراء الاعادات المتكررة للمسح وتحسين رفع المعطيات والمعلومات خلال المسح هذا موجه ايضاً للمستغورين الغير جيولوجيين.

اساسيات رسم الخرائط

هناك عدة طرق لإجراء رسم الخرائط في العالم . بعضها افضل من البعض الآخر . غير ان هدفنا ليس تشجيع طريقة معينة على حساب أخرى (سيكون هذا موضوع مقال قادم) بل تذكير رسامي الخرائط ان القواعد الاساسية هي واحدة لا تتبدل . وهذا يؤدي بنا الى النقاط التالية والتي تشكل الاساس في رسم الخرائط:

– استعمال اجهزة قياس بحالة ممتازة مع صيانتها باستمرار: القياس بالشريط . آلة القياس بالليزر ... ونستعمل بالافضلية اجهزة مجربة طبقاً للمقاييس.

– اعتماد فريق مدرب وذو خبرة ومتنبه للمقاييس مع الاحاطة بأية عيوب بصرية.

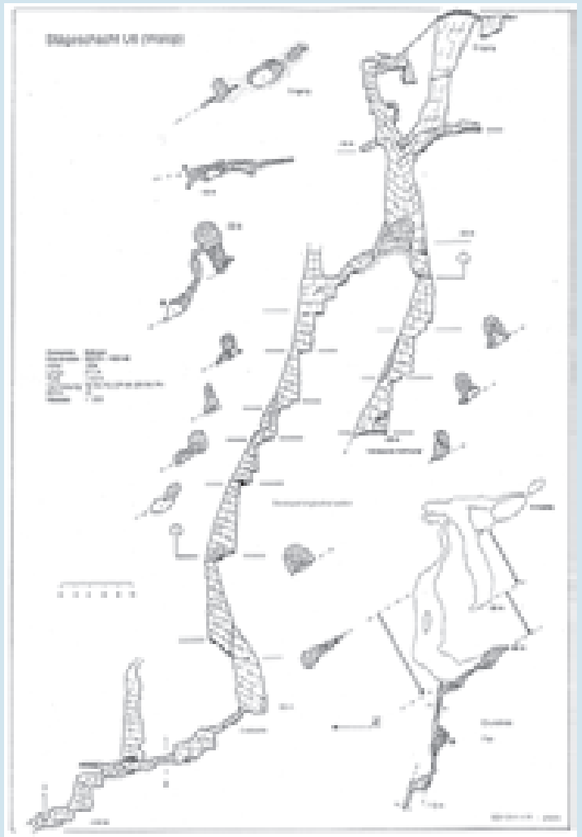
– الإنتباه الى اخطاء القياس العائدة الى المعادن (اضواء الإنارة البطاريات تجهيزات المغاور السياحية النظارات). وقد تم اكتشاف انه حتى انوار اللاد (led) الحديثة تؤثر على الحقل المغناطيسي (البعض فقط في حالة الاشتعال) لذلك يرجى التأكد ثم التأكد من ذلك.

– نصر هنا على رسم الخرائط من نقطة الى نقطة. لذلك يرجى تجنب استعمال رأس الزميل الموجود في منتصف الممر. يجب اختيار نقاط ثابتة . على الحائط على الصخور او اي نقاط ثابتة من الممكن تعليمها واعادة إيجادها اذا لزم الأمر. يجب تعليم المحطات بطريقة ذكية ودائمة (طلاء الأظافر مثلاً او الشرائط العاكسة. يجب تحديد المحطات بطريقة ثابتة كأن نحترم مثلاً الجدار الأيمن فقط او الأيسر فقط الأرض او السقف. (طريقة واحدة لقياس الممرات). المحطة ممكن تعليمها في كل جزء من المغارة لتسهيل إيجادها في المستقبل.

وبما اننا نتكلم عن الطريقة : فقد درجت العادة على تدوير المقياس على العشر الأقرب فمثلاً 3.56 تصبح 3.55 او 3.56 فلماذا؟ لقد اعطي المقياس الحقيقي بواسطة آلة القياس فلماذا يتم انقاص الدقة ان لم يكن هذا مفيداً.

موقع نقاط الرسم يظهر انه حساس – بعض مدققي المقال يرون انه لا يجب ترك علامات داخل المغارة (بهدف الحفاظ عليها بيئيا) في حين يرى آخرون انه يجب ترك علامات واضحة ومقروءة ودائمة تظهر المفارق والدهاليز لوضع نقاط الإلتقاء النهائية. رأيي الشخصي هو بوضع علامات خفية لا تظهر الا عند البحث ولا توضع الا عند المحطات الرئيسية.

–النقطة الأخيرة هي وضع رسم سريع (كروكي) واضح وامين ومفصل. اهمية هذا الرسم ستظهر فيما يلي ضمن فقرة لماذا الرسمة السريع مفصلة؟ بعض رسامي الخرائط ترسم الكروكي باعتماد المقياس حتى داخل المغارة (باستعمال المساطر الهندسية) وهذا يبطئ بشكل ملموس عملية رسم الخرائط لكنه يؤدي الى تقليص الأخطاء ويحسن دقة الرسمة.



رسمة 1

–مقطع موسع قسم مع رؤية سطحية لهوة الدرج . المقطع يظهر ان المغارة تتوسع رئيسياً بناء لكسر واحد منحن . ومن ثم انها تظهر مسطحات الطبقات والشكل المطوي للبئر العليا. المقطع يظهر مكانين يدور فيهما قبل ان يصعد . من جهة الكسر الممتد للأسفل Verstürzte Hoffnung والمتوازي مع البئر الأساسي. ومن جهة أخرى من اجل ان تكون

–الرؤية المسطحة والمقطع الموسع متلاصقة.

–الرؤية السطحية للقسم الأفقي الفوقي الدنيا وسعت مع الاقسام المتساوية. لهذا الاتصال بين كل هذه الممرات باتجاه السطح يظهر بالإضافة الى اتجاه الانكسار الرئيسي.

لماذا الرسم الثلاثي الابعاد؟

اول سؤالٍ يطرح لماذا نحتاج الى اكثر من رسم افقي وخصوصاً في المغاور الأفقية؟ الجواب هو بسيط : سطح الأرض هو شيء مؤلف من بعدين فقط مما يؤدي الى تمثيله بسهولة على خريطة وهذا ما تتبعه الخرائط الجغرافية الجيولوجية وخرائط الطرقات. بالعكس من هذا فالمغارة وحتى الأفقية هي بالفعل شيء ذو ثلاثة ابعاد ولا يمكن تمثيله بدقة بواسطة خريطة. حتى في مغارة افقية بالكامل فإن حجم وشكل الممر يحتوي على كثير من المعلومات التي لا يمكن تجاهلها. بالتالي نحن نقدم مميزات هذه الابعاد الثلاثة والمعلومات التي تحتويها عادة. ومن ثم نحن نشرح لماذا من الأفضل العمل على رسمة (كروكي) بمقياس عن العمل على رسمة اكتشاف سريع او فقط طريق سريع. في النهاية نحن نصر على نشر الخرائط والنتائج.

لماذا الرسم المسطح؟

– الجواب الأول هو الحافز الأول للجميع لإجراء الرسم. ان الخريطة المسطحة تظهر الإتجاهات والطول للمغارة وتظهر حجم الممرات, والوصلات فيما بينها وتظهر كل تفاصيل هذه الممرات.

– واكثر تحديدا فإن الرسم الأفقي يسمح بالحصول على معلومات حول الوصلات المحتملة مع مغاور أخرى على نفس المحور . لذلك من الضروري القاء نظرة على الخرائط الأفقية للمغاور العامودية (الهوات) والتي عادة لا يوجد من أجلها الا خرائط عامودية اي مقطعية (coupe) . الإمتداد الحقيقي للمغارة في الاتجاهات كلها يمكن ان يبين مثلاً انها قريبة جداً من امتدادات عائدة لمغارة أخرى مما يشكل امراً بالغ الأهمية (رسم 1) الملاحظات المأخوذة على السطح تظهر العلاقة بين الأشكال الجيولوجية للسطح وتلك داخل المغارة.

– رؤية المخطط السطحي تؤدي الى معلومات حول تشكل المغارة. لذلك المخطط السطحي يعطينا دائماً الكثير من المعلومات مثلاً اذا كانت المغارة تشكلت بناء لحركة الإنكسارات او اذا كانت من نوع الوديان (حفر بواسطة جريان الماء) (رسم 2)

– ان الرؤية السطحية هي مصدر للمعلومات حول الترسبات الملتقاة في المغارة. في كثير من الأحيان نجد انه اساسي لإيجاد تكملة معرفة اماكن تمركز هذه الترسبات ولأي درجة تعيق المرور في الممر الرئيسي. هذه انوع من المعلومات ملاحظ من المستغور لكنه ان لم يكتب في خريطة مسطحة لن يكون هناك بحث بإمكانية الإكمال في هذا المكان

– يبقى النقص في الخرائط المسطحة انها لا تظهر ارتفاع الممر ولا الإمتداد العامودي للمغارة.الابعاد الناقصة

لماذا المقطع العرضي الموسع ولماذا الأقسام؟

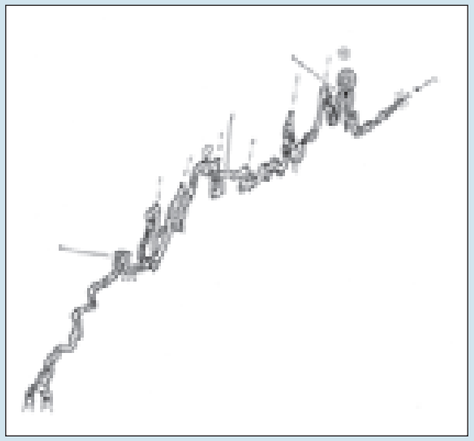
بعكس السؤال السابق"(لماذا لا يمكننا الإكتفاء بمقطع عرضي مسقط ؟) الجواب هو ان المقطع العرضي المسقط يخفي الكثير من المعلومات . مثلاً في حال كان الإسقاط على محور شرقي غربي لمغارة تمتد بإتجه الغرب (اذا رسم واضح للمغارة) ثم تنحرف هذه المغارة بإتجاه الشمال وتكمل بنفس الإنحناء (رسم 3) هذا الجزء سيظهر المغارة كما انها بئر عامودي. واذا كان هناك تغير لشكل الممرات في هذا القسم لن يظهر اي شيء وستضيع المعلومات. إن الطوبوغرافي الجيد يقدر ان يعيد تكوين الإسقاط بمساعدة الرسم السطحي والمقطع العرضي الموسع لكنه يبقى من الصعب بمكان (ومستحيل في حالة تغير الإنحدار) استخراج مقطع موسع عن طريق مقطع مسقط.

– إن المقطع الموسع يعطينا دلائل الإنكسارات والترسبات التي لا يمكن ان ترى بالنظر للخريطة السطحية فقط.هذا المثل معطى بالرسم 1

– المقطع الموسع يظهر بشكل اسهل الصعوبات المنتظرة (بئر . زحف. شلال ..) ويسمح بتنظيم بشكل عملي اكثر الرحلة القادمة. يجب ان يظهر المقطع التوسع الكامل وبالمقياس.

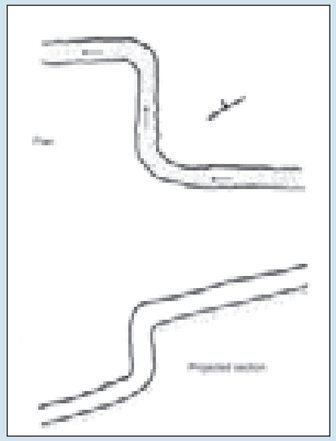
– الإستعمال الأكثر انتشاراً والأهم للمقطع الموسع يرتكز على المعلومات التي يحتويها حول تشكل المغارة. كل الإنكسارات و توزع الترسبات يمكن تصويره بالخريطة المسطحة لكنه لا يعطي نصف المعلومات الموجودة في المقطع. هل هذا الممر اصله ترشح مائي (مثلا ممر مضغوط) ؟ اين تقع تراكبات الممرات . ممر بشكل فتحة القفل؟ بطريقة مؤكدة هذه المعلومات موجودة في الأقسام . لكن ايجاد علاقة بينها كلها مهم جدا وافضل ما تظهر هذه العلاقة في المقطع الموسع. مثل واضح يظهر في الرسم 4

ايضاً جمع المعلومات ورسم المقاسم مهم جداً: انه يعطينا شكل الممر الحالي ويمنحنا المعلومات حول شكل التشكيرت . وبهدف اظهار المميزات الجيولوجية المهمة للمغارة الرؤية الثلاثية هي ماسة (خريطة مسطحة . مقطع موسع واقسام)



رسم 2

رؤية سطحية لممر ضيق في Anglorusskaya peshtshera (القوقاز – روسيا) . هنا الرؤية السطحية تحتوي على عدة معلومات ذات تسلسل منطقي. بالتأكيد فإن المقطع الموسع هو اطول وبالتالي فإن امكانية التواصل مع مع مغارة اخرى او مع السطح هو مقروء فقط على هذه الخريطة.

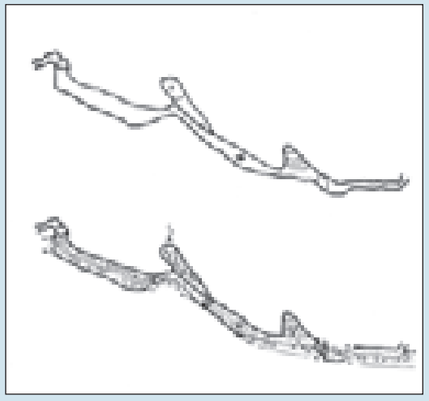


رسم 3

رؤية سطحية (من الأعلى) ومقطع مسقط (بالاسفل) لممر بمغارة محتملة. الإسقاط يبين تكون بشكل بئر في حين انه في الحقيقة إن يهبط ببطء ونعومة بشكل عامودي مع مسطح الإسقاط. برؤية هذه الرسمة من المؤكد ان فقط المقطع الموسع هو الذي يظهر الشكل الحقيقي.

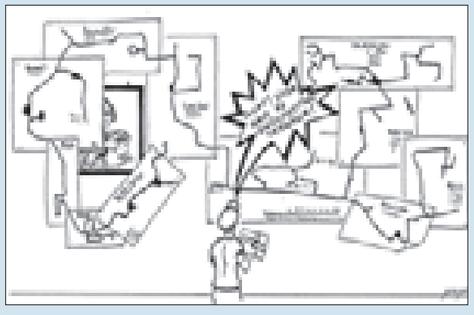
رسم 4

رسم كروكي سطحي من اعلى ومقطع موسع من الاسفل لمنطقة مدخل Pestera Humpleu في رومانيا . هذا الرسم من نوعية سيئة (لا يحتذى به المثل).لا يوجد الى المقطع الموسع الذي يمكننا من خلاله رؤية المراحل الثلاث لتكون المغارة. يجب ان ترسموا ايضاً المقاطع الموسعة للمغاور الافقية.



رسم 5

اهمية نوعية الرسم تظهر في هذا القسم من المغارة في رومانيا. الرسم الاعلى هو كروكي لإستكشاف . الرؤية السطحية بدون التفاصيل في حين ان الرسم الادنى يظهر نفس الممر مع كل التفصيلات الملاحظة.(يجب الإنتباه ان التفصيلات هي من الذاكرة و من الممكن مناقشتها و من المؤكد ان هذا الدهليز سيكمل في احد الاماكن). فقط الرسم الدقيق يظهر التكملة المحتملة للدهليز الذي قد يكون الممر الرئيسي لهذه المغارة الراعة.



رسم 6

تعبئة " باسم كل القديسين ! لقد نسيت وضع لوحتي لا اعرف اين.

لماذا الوصف الخطي؟

الجواب جدا بديهي : هل حاولت ان ترسم وطواط على الخريطة المسطحة (باعتماد المقياس لن يظهر) او الاماكن المبللة الملحوظة على حوائط المغارة ؟ كيف ستعطي رأيك حول تشكل المغارة؟

الوصف الخطي هو مصدر اساسي للمعلومات ويمكن ان يكون رئيسي . ليس فقط بالنسبة للعلماء لكن بالنسبة للمستغورين: لوازم التركيب الممرات المغمورة نوعية الصخور الجلاميد الغير ثابة وجود الجبس البيولوجيا وعملية التكوين... هذه الأمور لا يمكن ان ترسم وتحتاج دائماً الى الكتابة. واخيراً الوصف لا يكتفي فقط بنص بسيط يعيد وصف الخريطة (مثلاً عن يسارك ممر يؤدي الى البئر 32) لكن يجب ان يذكر فيه المعلومات الأساسية والمهمة. نعم كلنا قادرون على القيام باستطلاعات مهمة!

لماذا نرسم بدقة الخرائط وليس فقط الطرقات في المغارة او رسم سريع (كروكي)

للوهلة الأولى هذا سؤال ممتاز لأن الرسم الجانبي والدقيق هو الذي يستهلك الوقت ويؤدي لأن يكون رسم الخرائط عملاً مملاً. اذا لماذا لا نكتفي برسم كروكي سريع يدوي؟ للإستعمال العلمي يظهر جليا ان رسم دقيق يحمل المعلومات الكاملة . وبالنفس الطريقة يستطيع المستغور الحصول على الكثير من البيانات من الرسم الدقيق. الرسم 5 هو استخراج لرسم خرائط لمغارة . الجزء الأعلى يوضح رسم تقليدي اما الجزء الأدنى فهو بطريقة اكثر جمالاً. اين هي مكونات الدهليز العريض؟ في الزاوية الدنيا اليمنى نستطيع الحفر وايجاد التكملة. وهذا ما لا نستطيع فعله مع الرسمة الكروكية.

بإختصار : إن شكل الممرات وبشكل خاص الترسبات ومواقعها مرتبطة بمعلومات أخرى حول ضيق وتوسع حجم الممر . تعطينا معلومات حقيقية حول احتمالات التكملة المحتملة. لكن هذه الأدلة لا تظهر الا بالخرائط الواضحة والدقيقة والمفصلة.

بهذا الخصوص : اذا ضجرتم من قراءة الأجهزة بانتظار ان يقوم الرسام برسوماته . ماذا تصنعون (وحتى تتخلصون من البرد ايضا)؟ حاولوا إيجاد ممرات جانبية محتملة.ستجدونها كونو اكيدين . هناك طريقة اخرى حتى لا تبردون كثيراً هي اخذ مقاييس بالاتجاه المعاكس لتأكيد الدقة للمأخوذة مقابلةً. توقعوا مفاجأت.

من الممكن ان تنشأ بعض الإشكالات المتعلقة بمقياس الخريطة. المقياس يجب ان يحدد بالنسبة لإستعمال الخريطة. إن موقع استعمل للسكن ممكن استعمل مقياس 1/50 له بينما شبكة طويلة جدا نستعمل لها 1/500 وبعدة اوراق. في أوروبا نحن نستعمل عادة مقياس 1/100 لكل المغاور الصغيرة. 1/200 للمغاور بين 20 و 500 متر و 1:500 متر للمغاور الكبيرة. حاولوا ان لا تخلطوا عدة مقاييس في نفس الجزء من الرسمة حتى نستطيع المقارنة بين الأحجام لعدة رسمات. من المؤكد اننا اذا كنا نريد ان يكون رسمنا النهائي بحدود ال 1/500 . ليس من المفيد ان ندون ملاحظات او ان نجري كروكي بال 1/50 لكن لا شيء يمنع بالمقابل. اما الذي لا يحق لنا ابداً ان نفعله هو رسمة سريعة (كروكية) بمقياس 1/500 في مغارة ومن ثم رسمها بمقياس 1/50 بدقة. فلنفكر بالنهاية قبل ان نبدأ بإجراء الرسم واخذ المقاييس

لماذا النشر؟

قد تجدون مغارة واعدة جميلة سهلة الدخول فترسمونها بدون اي مجهود. ولكنكم قد تخشون ان يقوم مستغورون من نواد منافسة او سواح او اشخاص يحبون المشي بدخولها فيفقدوها خصوصياتها. ردة فعلكم الأولى هي الحفاظ على هذه المغارة كسر دفين . الجانب السلبي هو انه اذا كان احدكم قد سافر او اضطر الى التوقف عن الاستغوار لبضعة سنوات او ان احد رسامي الخرائط في ناديكم اختلف مع والدته فقامت باحراق الخرائط من الغضب. (تخيلوا وهذا ليس مستحيل اذ انني عرفت حالات من هذا الأمر) وبالتالي فالمعلومات قد ضاعت.

اذا سمحتم انشروا كل مغاوركم كل خرائطكم كل معطياتكم ! اذا كان النشر بشكل خطر حقيقي للمغارة . ضعوا نسخة من الخرائط في الأرشيف الوطني للمغاور . هناك مؤرشفين في عدة بلدان يقترحون حفظ الخرائط والمعطيات بسرية تامة. استعملوا هذا الإحتمال. لا تعرضوا عملكم للخطر بتخبئته في ادراجكم الغير مجهزة.

نصيحة: حتى اذا نشرتم اعمالكم . من الممكن ان تدخل المعطيات الأساسية بنموذج ثلاثي الأبعاد في منطقة دراسة مع السطح خلال بضعة سنين من الآن. هذا مهم جدا مثلا ليتأكد احد ان مغارة ما تمتد لبضعة امتار تحت ارضه ... او للإتصال بممرات لشبكة قديمة. في كل هذه الأحوال من الحبوي حيازة المعطيات الاصلية سواء عندنا او في ارشيف النادي او في الأرشيفات الوطنية. ابداً لا تقومو برمي مذكراتكم وملاحظاتكم ورسماتكم السريعة . حتى لو كانوا متسخين .وهذا يعفينا من الذهاب لإجراء المسح الطوبوغرافي من جديد في حال كانوا مكتوبين سابقاً. احتفظوا بها.المكان التي تشغله لا يشكل شيئاً بالنسبة ان نعيد رفع الأرقام من جديد بالمستقبل.

نظرة الى المستقبل

شيئاً فشيئاً يأخذ الكومبيوتر محل الرسم اليدوي. في السنوات الأخيرة هناك برامج للرسم (مثل الأدوب) تستعمل لرسم الخرائط الرائعة والجميلة التي نراها الآن. تقدم التكنولوجيا يسمح ايضاً حتى بزيادة الألوان. (للرمل او الماء او الصخور...) وللأشخاص المهتمة بالرسة الالكتروني هناك مواقع انترنت مذكورة ادناه حيث نجد معلومات واسماء مراجعمصنوعة لتكبيع رسم الخرائط. لكن احفظو ان الأرشيف الدائم حتى الساعة الحالية هو الورق — الورق يحتفظ 20 الى 500 سنة اكثر في حين ان بعض السي دي لا يمكن قراءتهم بعد سنتين. كونوا متبصرين . مجرد ما تنتهوا من الرسم الالكتروني اطبعوا الخرائط وارشفوها . بهذه الطريقة فقط تكونوا قد اتممتم عملكم.

يوجد الكثير من مواقع الانترنت التي تقدم معلومات ونصائح حول تقنيات رسم الخرائط. المشاكل والحلول. لذلك لا يمكن ان نحصيهم كلهم لكن سنذكر الأكثر استعمالاً:

http://www.sghbern.ch/hrh.html
Site Internet de la HRH (Siebenhengste, Suisse) où l'on trouve bon nombre d'articles à propos de la topographie, des erreurs fréquentes, etc.

– حيث نجد عدد كبير من المقالات حول الرسم والأخطاء الشائعة.

http://www.carto.net/neumann/caving/cave-symbols/
Les symboles officiels de topographie de l'UIS

– المصطلحات المعتمدة من الاتحاد العالمي لاستكشاف المغاور.

http://www.sghbern.ch/surfaceSymbols/symbol1.html
Les symboles pour la cartographie géomorphologique de la surface

– الرموز للخرائط الجيومورفولوجية.

http://www.ngdc.noaa.gov/seg/geomag/jsp/Declination.jsp
Pour calculer la déclinaison magnétique tout autour de la Terre

– لحساب الانحراف المغناطيسي حول العالم.

http://www.speleo.ch/~scmn/topographie.php
Librairies Adobe Illustrator (version 9 et 10) pour dessins sur informatique.

– مكتبة الادوب 9 و 10 للرسم بالكومبيوتر.

http://www.ssslib.ch (rubrique topo)
Librairies Adobe Illustrator (version 10 et CS) pour dessins sur informatique.

شكر الى :

كل الاشخاص الذين قدموا المواد. والتصحيحات. والمقترحات. والذين ترجموا هذا المقال:
Lukas Plan (Autriche), Ralph Müller (Allemagne), Ken Grimes (Australie), Gabriel Redonte (Argentine), Rafael Carreno (Venezuela), Jelena Calic (Serbie), Erik Agrell (Suède), Pat Kambesis (USA), Andy Dickert (Suisse), Yvo Weidmann (Suisse), Alex Hof (Suisse), Eckart Hermann (Autriche), Arnauld Malard (France), Daniela Spring (Suisse).

العديد من هؤلاء الاشخاص ينتسبون الى فريق عمل ('UISIC) 'للرسم والخرائط'.

GRAPHIC DESIGN **Nadine Sinno** | *info@speleoliban.org*

THANK YOU TO ALL THE CAVERS WHO TOOK THE TIME TO SEND THEIR LOGOS

WHAT'S IN A **LOGO?**

'The logo was designed in 1955 featuring a bat and the Lebanese national tree, the Cedar.' The newer version (on the right) has been digitized into vectors with the cleaning of the cedar tree and more definition in the bat.

Sami Karkabi, founder, Speleo Club du Liban

What is a logo? Why is it important and how do we relate to it? There are many famous logos recognizable the world over. They can be images, letters from an alphabet or a combination of both. Understanding why a certain logo is easily recognizable is the main reason a good logo is considered exactly that. A logo does not have to show everything it is trying to identify. It just has to give us a shortcut to particular product, place or person. The best logos in the world are the ones that have withstood the ravages of time, allowed for flexibility and growth and have managed to remain identifiable even as they evolve.

Most elements in the world today have logos. It is hard to find a famous company or a shop or manufactured goods that has not been 'logo'ed to death. It seems that caving clubs have also followed this route.

The idea for this article was simple. If logos where brought together from caving clubs around the world would they be similar as they are all identifying the same thing? An open letter was sent out asking caving clubs to send their logo along with a certain explanation for the logo design. Over seventy replies were received.

It was found that the caving club logos fit into five different categories: *Karstic terrain*, where images of cavers in caves, cavities underground and general water-flow through rocks prevailed; *Cave fauna*, showing mainly bats and proteuses; *Type based* logos where the initials of the caving clubs are used; *Equipment* from karabiners to helmets; *Abstract* which are mainly geometrical patterns. *Combinations* of some of the other categories together elements.

There does not seem to be a predominant colour for the logos. Only when the colours are significant to the country does a logo tend to have specifically different colours as with the KARST logo and the Mexica.

The predominant shape is the circle and over 60% of the logos were circular in format.

It was found that from the hundreds or so logos researched the most used image to be placed on caving clubs logos is that of a bat, with approx. 30% of the logos.

Some represent typical design elements of that specific country. The Swiss and German cleanliness and their strict geometrical typeface is typical of the design history of these countries.

The *combination* logos can also create interesting images. The combined images of type with karst elements such as the NSS logo and the CSS show the integration of different aspects of caving such as the bat and a carbide lamp and type and karstic features.

Some of the most beautiful logos remain the simplest. Depicting the most fundamental caving images these seem to keep the design identity of a country as well as understanding what caving is. The Carbide lamp with wings, the man climbing inside a country's shape. There are too many to speak of.

All in all it seems that caving clubs' logos do not vary that much from each other with respect to the images they portray because in the end that is what joins them all together. Whether we see the differences or the similarities we all represent one thing and that is we all love these little (or not so little in some cases) underground heavens. How we choose to represent them depends on the country we come from and its graphic design history. We can see that the older the logo the more it is influenced by graphic design trends of the country but in recent time and with the newer logos this seems to have disappeared as it indeed has from mainstream graphic design since the advent of computers and the internet when so many styles are prevalent and so much is available to look at.

THIS IS AN ON GOING PROJECT SO IF YOU ARE INTERESTED IN SENDING YOUR LOGOS AND DETAILS PLEASE SEND THEM TO:
renakaranouh@hotmail.com

اذا تم جمع شعارات اندية الاستغوارفي العالم هل ستكون متشابهة من حيث المضمون لكونها تتطرق لنفس الموضوع وهو الأستغوار؟ هذا هو السؤال الذي عولج في هذا المقال. وبعد ان جمعت الباحثة عدد وفيرمن شعارات اندية الاستغوارفي العالم قصمها الي خمسة فأت تلحظ في شعاراتها: مواضيع الكارسة أو حيوانات المغاور أومصطلحات اسماء الاندية أومعدات المستغورين و اخيرا شعارات تلحظ مواضيع خيالية.

L'auteur de cet article se pose: si les logos des différents clubs de spéléo dans le monde étaient regroupés, seraient-ils pareils vu qu'ils identifient la même chose? Il a été trouvé que les logos des clubs de spéléologie appartiennent à cinq catégories différentes : le terrain karstique, où les images des spéléos sont des grottes, des cavités souterraines et des écoulements d'eau généraux à travers des rochers dominants; la faune des grottes, montrant surtout des chauves-souris et des proteus; des logos en lettres, où les initiaux des clubs de spéléologie sont employés; l'Equipement, des mousquetons, aux casques; Abstrait, des logos à motifs géométriques: combinaisons de certains éléments des autres catégories.

VICTORIAN SPELEOLOGICAL ASSOCIATION, AUSTRALIA

'This logo is called «Nargun». The «Nargun» is the name of a mythical creature who lived in caves and caught people who came near. This is a myth of the East Gippsland aboriginal tribes. We have at least two caves associated with this myth. The emblem logo was stylized as a cave man from a silhouette photograph of a caver in the entrance of a cave.' **Nicholas White, Australian Speleological Federation.**

KARST, ORGANIZACIÓN ARGENTINA DE INVESTIGACIONES ESPELEOLÓGICAS, ARGENTINA

'The colours are the colours of the Argentine flag: Blue and White. The brickyard is the geological symbol of the limestone. The caver inside with the form of a 'K' is the first character of the word KARST, the name of our group that was create in 1972.' **Enrique Lipps, Karst, Organización Argentina de Investigaciones Espeleológicasadheridos a La Sociedad Argentina de Espeleología.**

UNIÓN MEXICANA DE AGRUPACIONES ESPELEOLÓGICAS, MEXICO

'The first semicircle means the union between the speleological groups; the second semicircle symbolizes a cord, which is an important element to practice the speleology. The human figure represents a seated Mayan wise person within the cave and is a symbol of the knowledge that is due to have to study the caverns suitably. Finally in the center of the emblem there are stalactites and stalagmites, typical formations that are observed in the surroundings of the means in which you make its activities the speleologists.' **Dr. Palacios-Vargas, Mexico.**

PLANIVY SPELEO CLUB

The official logo of this speleo club was established in 1959. The pigmy in the center of one is the basic symbol of the Planivy speleogroup.

AGRUPACION SPELEOLOGICAL CLUB, MEXICO

'Our logo is a Mexica - our ancient culture - stylized bat with a waterfall coming out it's mouth and a red caving helmet. Surrounded by a yellow frame with stalactites and stalagmites.' **Guillermo González Canales, Mexico.**

SOCIEDAD VENEZOLANA DE ESPELEOLOGIA, VENEZUELA

'Here you are the logo of the, FEALC, Federacion Espeleologica de America Latina y el Caribe, Designed in 1981 in Cuba (valid for Brazil, Venezuela, Argentina, Cuba, Costa Rica, Republica Dominicana, Mexico, Bolivia). You can choose the best electronic version as you want. I also will re-send your mail into the Latin-American Email list, so dozens of societies inside these countries can help you in your work.' **Rafael Carreño Federacion Espeleologica de America Latina y el Caribe FEALC.**

CZECH SPELEOLOGY SOCIETY, CZECH REPUBLIC

I am sending the logo of the Czech Speleological Society - it was drawn by Karel Saudek, a famous Czech painter. **Jirina Novotna, CSS**

LATIN AMERICAN AND CARRIBEAN SPELEOLOGY FEDERATION

'Here is the logo of the FEALC, Federacion Espeleologica de America Latina y el Caribe, designed in 1981 in Cuba (valid for Brazil, Venezuela, Argentina, Cuba, Costa Rica, Republica Dominicana, Mexico, Bolivia).'

'A symbol of a complete collaboration between the historical speleological groups of our city: Bologna Speleological Group (1932) and Bologna Speleological Union (1957).'
Stefano Cattabriga Secretary of Bologna Speleological Group

BOLOGNA SPELEOLOGICAL GROUP, ITALY

PLANIVY VERTICAL TEAM, CZECH REPUBLIC

Planivy speleo club which are interested in research or making of expeditions to deep vertical cave systems.

Some of the logos were sent with an explanation of the reasoning behind the imagery. There does not seem to be an area specific single logo identity but most follow local legends or myths or just caving equipment. Some take into consideration the main interest of the club such as vertical descents or diving.

LOGOS BASED ON CAVE FAUNA

SPORT ASSOCIATION OF SPELEOLOGY, MOROCCO

VENEZIANA RICERCA GROUP, ITALY

SPELEO CLUB OF MONTAGNES NEUCHATELOISES, FRANCE

ARAGON SPELEOLOGY CENTER, SPAIN

DOCUMENTATION CENTER OF SPELEOLOGY, ITALY

CZECH SPELEOLOGICAL SOCIETY, CZECH REPUBLIC

SPELEOLOGICAL SOCIETY OF SEŽANA, SLOVENIA

SPELEOLOGICAL CLUB ORCUS, CZECH REPUBLIC

SPELEOLOGICAL SOCIETY, ITALY

SPELEO CLUB OF TOULON, FRANCE

TOPAS SPELEOLOGICAL CLUB, BRNO

KARST AND CAVES / MUSEUM OF NATURAL HISTORY VIENNA, AUSTRIA

OTXOLA SPELEOLOGY CLUB, SPAIN

CENTRE ROUTIER SPELEO, BELGUIM

SPELEO CLUB OF ORVIETO, ITALY

SWISS SPELEOLOGICAL SOCIETY

SPELEOLOGICAL SOCIETY OF JAPAN

SPELEO CLUB OF ROME, ITALY

POTOMAC SPELEOLOGICAL SOCIETY

UNDER ACHIEVERS CLUB, AUSTRALIA

JAMARSKO DRUSTVO SEZANA, SLOVENIA

ALPINE AND SPELEOLOGICAL CLUB

SPELEOLOGICAL CLUB OF SAVONESE, ITALY

The majority of the cave fauna that were placed on logos were bats accounting for over 30% of logo imagery. The proteus also seems to be a common favourite.

LOGOS BASED ON CAVE FAUNA (Cont'd)

JAMARSKA ZVEVA, SLOVENIA

SPELEO CLUB OF VALCERESIO, ITALY

JOURNAL LOGO, SLOVENIA

KARST INSTITUTE, POLAND

CAVING CLUB LJUBLJANA, SLOVENIA

ASSOCIATION SPELEOLOGIQUE & ARCHEOLOGIQUE GOUYTOISE

JAMARSKI KLUB, SLOVENIA

SPELEO CLUB OF ARIZE

LOGOS BASED ON CAVE EQUIPMENT

SWISS SPELEOLOGICAL SOCIETY, SWITZERLAND

CZECH SPELEOLOGY CLUB, CZECH REPUBLIC

GERMAN SPELEOLOGICAL FEDERATION, GERMANY

CLUB ESPELEOLOGÍA TALPA, SPAIN

SPELEO-DIVING GROUP HRANICKY KARST OLOMOUC, CZECH REPUBLIC

CLUB FOR THE SPELEOLOGICAL RESEARCH

SPELEOLOGICAL SOCIETY OF WALLONIE

SPELEO CLUB OF NUORO, ITALY

SPELEO CLUB OF FORTE DEI MARMI. ITALY

SPELEO CLUB OF FRANCONVILLE VAL D'OISE, FRANCE

SPELEO CLUB LES STALACS, FRANCE

SPELEO CLUB GODINNOIS, FRANCE

SWISS CAVE DIVING, SWITZERLAND

SPELEO PETRA SPELEOLOGICAL GROUP, ITALY

SPELEOLOGICAL FEDERATION, ARGENTINA

The caving helmet seems to be the favourite among cave club logos with the carbide lamp featuring too. The entire range of SRT equipment is also shown with carabiners and rope descents.

LOGOS BASED ON KARST FEATURES

CROATIAN SPELEOLOGICAL FEDERATION, CROATIA

FOND SPÉLÉOLOGIQUE DE BELGIQUE, BELGUIM

AUSTRIAN CAVING ASSOCIATION , AUSTRIA

NATIONAL SPELEOLOGICAL SOCIETY, USA

NORWEGIAN CAVING CLUB, NORWAY

SPÉLÉO CLUB DE LA VALLÉE DE JOUX, SWITZERLAND

REDAN CAVING CLUB, BELGUIM

ESPELEO SOCORRO, SPAIN

ITALY

THE DEVON KARST RESEARCH SOCIETY, UK

BOSTON GROTTO, USA

SOCIETE SPELEOLOGIQUE DE WALLONIE

BALKAN SPELEOLOGICAL UNION

LEBANESE ASSOCIATION OF SPELEOLOGICAL STUDIES

NATIONAL CAVE AND KARST RESEARCH INSTITUTE

SPELEO CLUB OF RIBALDONE. ITALY

QUEBEC SPELEOLOGICAL SOCIETY, CANADA

CASTELLI ROMANI CAVE GROUP, ITALY

TEXAS SPELEOLOGICAL SURVEY, USA

LINCOLN SCOUTS CAVING CLUB, UK

ICELANDIC SPELEOLOGICAL SOCIETY

NATIONAL CAVING ASSOCIATION, UK

GREECE

Underground karstic features do indeed show up a lot whether it is fractured rocks, underground terrain or speleothems.

LOGOS BASED ON TYPE

HOHLENFORSCHERGEMEINSCAFT REGION HOHGANT, SWITZERLAND

GRUPO ESPELEOLÓGICO ANTHROS, COSTA RICA

BELGIUM UNION OF SPELEOLOGY, BELGUIM

CAVE RESEARCH INSTITUTE OF KOREA, KOREA

SPELEOLOGICAL GROUP OF URBINATE, ITALY

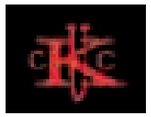
CANTERBURY CAVING GROUP, UK

CAMBRIDGE CLIMBING AND CAVING CLUB

GROUPE D'ETUDES ET DE RECHERCHES SOUTERRAINES DU LIBAN, LEBANON

SPELEOLOGICAL GROUP OF ARTIFICIAL CAVES, ITALY

GEDA SPELEOLOGY GROUP, CUBA



KINGSTON UNIVERSITY CAVING CLUB, UK

Typography based logos do not seem to be very popular and only a few were identified mostly forming combined logos and rarely type on its own.

AUCKLAND SPELEO GROUP, AUSTRALIA

AUCKLAND SPELEO GROUP

AUCKLAND SPELEO GROUP

LOGOS BASED ON ABSTRACT SHAPES

SANDIA GROTTO, USA

SPANISH CAVING FEDERATION, SPAIN

SPELEOFORUM, CZECH REPUBLIC

SPELEO RESCUE, MEXICO

SPELEOTHERAPY CENTER SVEJAN, SLOVAK REPUBLIC

ALBERTA SPELEOLOGICAL SOCIETY

NEW ZEALAND SPELEOLOGICAL SOCIETY

Some logos are abstract and have a symbolic aspect to them where the logo can be understood on a number of different levels.

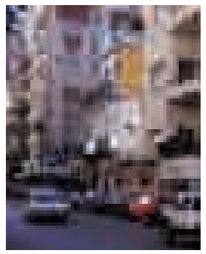


Fig. 1
LIONEL GORRA'S HOUSE, BEIRUT.

Fig. 2
ALBERT ANAVY'S HOUSE, BEIRUT.

Fig. 3
RENTED HOUSE, TALLAT JUMBLAT ST. BEIRUT.

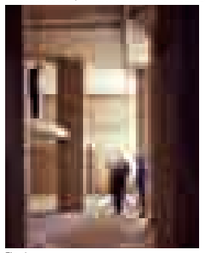


Fig. 4
SCL HEADQUARTERS, 1998, BSALIM.

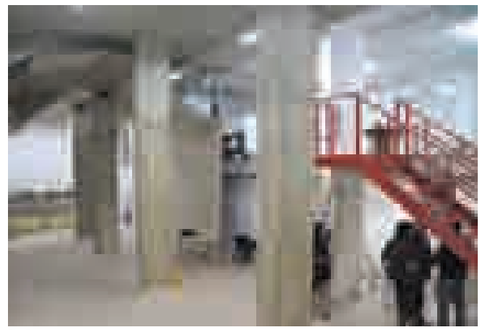
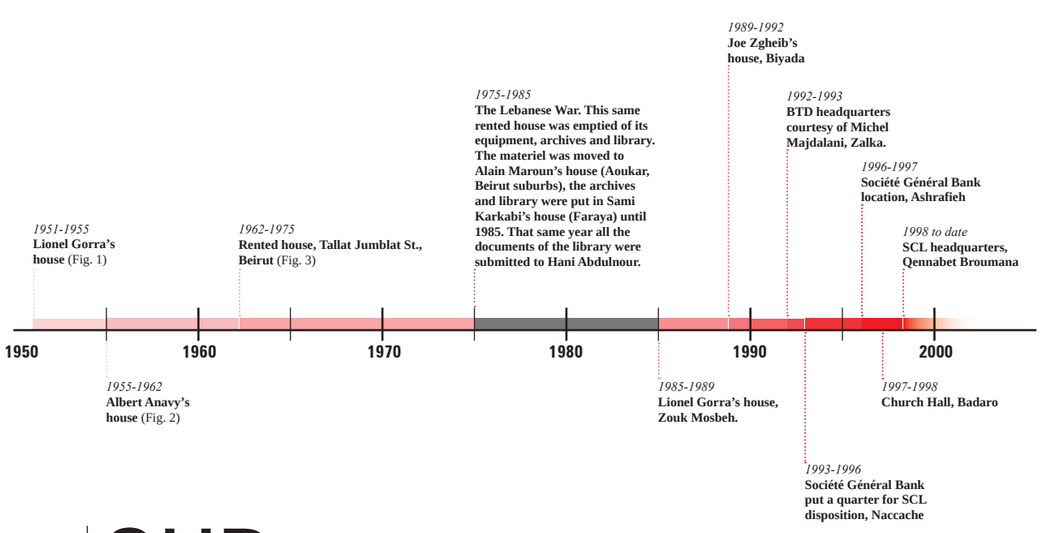


Fig. 5
THE CLUBHOUSE WITH THE CLIMBING WALL, 2009.

We always had this problem. We were on the move regularly. Even before the war we were always nomadic. We did not stay in one place for long. We had to move all our equipment and change our weekly meeting location frequently, for various reasons. The material we owned and collected throughout the years were sometimes lost and other times stolen due to this wandering existence.



OUR THURSDAY MEETING HEADQUARTERS

EVER SINCE THE FOUNDING OF THE SPÉLÉO CLUB DU LIBAN IN 1951 WE HAVE MOVED HEADQUARTERS MORE THAN TEN TIMES.

على مدى 47 عاما ظل النادي اللبناني للتنقيب في المغاور يتنقل من مكان الى اخر، الى أن استقرّ في قنابة برمانا سنة 1998. وفي سنة 2007 وضع اعضاء من النادي مخطط توجيهي لتحسين مقر النادي وينفذ هذا المخطط على مراحل حسب متطلبات الأعضاء المستقبلية.

Dans cet article, l'auteur met l'accent sur le problème d'avoir dû déménager plus de 10 fois déjà depuis la fondation du Spéléo Club du Liban en 1951. Le SCL n'a pas duré longtemps dans le même emplacement pour plusieurs raisons. Le matériel du SCL, approprié et collectionné au fil des années était parfois perdu, d'autres fois même volé malheureusement, jusqu'à l'année 1998 lorsque le SCL a acheté les locaux à Bsalim. Cet article expose comment les quartiers généraux du SCL sont restaurés et commencent à prendre forme, pour devenir un centre où tous nos livres, archives, équipements et matériels peuvent être conservés.

Fig. 6: **The first floor**

Fig. 7: **The mezzanine floor**

In 1998, we no longer had to move, the club-house in Bsalim was bought (Fig. 4).

The importance of finding a central hub where all our books, archives, equipment and gear can be stored was beginning to take shape.

The club-house was bought in 1998 when Hughes Badaouie was the president of SCL. The cost at that time was $30,000. Half of it came from club members who donated money and the other half came from work done on the Qattine Azar sinkhole project conducted by BTD (Bureau de Techniques et du Development) managed by M. Majdalani.

The location is a two-level, 370 sqm warehouse located in Qennabet Broummana, 10 minutes from Beirut.

Since 1998, club members worked on improving its condition. This included painting, tiling, installing a metal staircase, an entrance door, and lighting. They also allocated a room for the caving equipment and a small room for archiving. This was all done with very good intentions but without any proper preplanning.

The new design for SCL's club-house came about after members showed a need to identify themselves to the space in order to appropriate it and feel at home.

How are we to satisfy these aspirations?

Recently Johnny T. and I have worked on a new design for the club-house that satisfies the modern caver's needs and aspirations. The plans in Figure 5 and 6 show this new design of the lower level and the upper level or mezzanine level.

A roof covering the entrance was necessary not only to conceive a small working space for washing and storing dirty equipment and ropes which is very vital for the cavers, but also beautifies the club's entrance.

Rearranging the stairs to the mezzanine level provided direct access from the entrance. Direct access to the upper level was necessary for transporting material in and out of the library which was named "Sami Karkabi's Library". This library is now recognized by the UIS as being the Middle East caving documentation centre.

The 15 sqm library is moved to a bigger 40 sqm space (Fig. 6). This area is now called the Media and Library room. This will accommodate the continuous flow of Middle Eastern caving books and materials and to provide a suitable environment for research activities. The room will also be provided with a round table for work groups and committee meetings. The area that housed the old library and the old archive room will join to become a large archive room.

Toilets, showers and a small kitchenette are located on the upper level (Fig. 6).

The meeting room remains in its old location on the lower level (Fig. 5). However modifications were made to isolate it by defining it spatially, and to reduce sound echoes and create thermal isolation.

A museum to expose our rich club heritage (next article) was situated in front of the entrance next to the equipment room. This gave it more value and central position with special lighting effects.

Finally an area in the middle of the club was allocated for training activities optimal for maintaining physical fitness and technical abilities of the club members. This includes ropes and ladders to practice SRT techniques. A 120 sqm climbing wall with overhangs and a bouldering area in the shape of an arc resembling part of a tunnel-cave that highlights our caving identity is also present in this area (Fig. 7).

This dream come to life, a child of SCL's intuition and years of hard work, is what we were all waiting for; it is what we still needed for our family to become closer to accomplished: we finally have what we can proudly call HOME. Now, even Our Thursday's meeting place will very soon take form in our newly born Darling Hub.

SCL would like to acknowledge all those who helped and contributed to make the SCL club-house reality.

CAVING HERITAGE MUSEUM **Karen Moarkech** | *karenmoarkech@hotmail.com*

Le besoin permanent de rassembler, organiser, conserver et exposer les différents objets de spéléo, révélant la longue histoire et l'héritage de la spéléologie au Liban, a mené le SCL à consacrer un petit coin dans ses locaux à Qannabet Broumana, pour être l'emplacement du musée d'Histoire et d'Héritage de la Spéléologie au Liban.

الحاجة الملحة لجمع, تعريب, حفظ وعرض عدد لا باس به من معدات المستغورين القديمة للمحافضة عليها وتبيان هذا المخزون التاريخي للاجيال القادمة ادت الى ان يخصص النادي البناني للتنقيب في المغاور جانب من مقره في قنابة برمانا ليكون نواة للمتحف تراث الاستغوار في لبنان.

PROTECTING OUR **CAVING HERITAGE**

SCL'S CAVING HISTORY AND HERITAGE MUSEUM

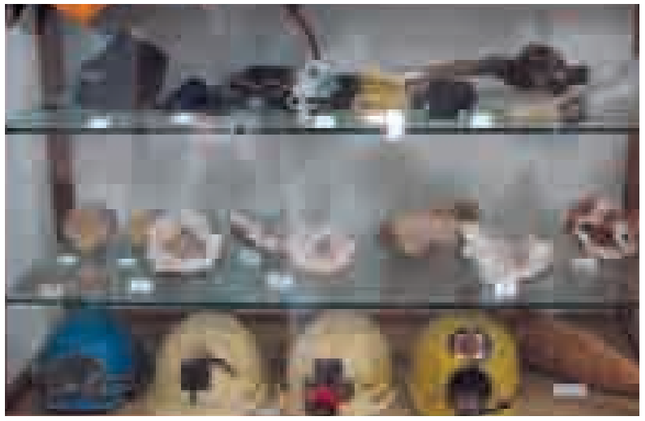


Fig. 1
A general view of one of the museum's cabinets showing old helmets, geodes and old caving photography equipment.
(Photo by Rena Karanouh)

The ever growing need to collect, organize, store and display varied caving items, revealing the long history and heritage of caving in Lebanon, has lead the SCL to allocate a small corner in the its headquarters in Qanabet Broumana, Lebanon to be the home of the Caving History And Heritage Museum.

After cavers stop caving their equipment is usually stored away and collects dust. It is a huge loss if these items are sold or thrown away as they represent the history of caving exploits.

After the dawning of the millennium the SCL decided that along with allocating a specific section in the club house for a library and an archive they decided, with a limited budget, to allocate a special space for a Caving History and Heritage Museum within the caving club headquarters. With the great efforts of dedicated cavers such as Issam B. J., Karen M. and Rena K. the idea came into life. When cavers were contacted and informed of the nature of the project contributions to the museum began and have continued to trickle in ever since.

In wooden cabinets behind protective glass, the museum displays a varied array of caving paraphernalia (Fig 1). The current museum is made of four stands composed of shelves on the upper part and closets on the bottom. The closet holds the major part of the items classified into different categories according to their nature. Due to space and financial limitations only significant items of each group are displayed inside the glass shelves.

The following briefly describes each group and some of the interesting items displayed:

Rocks collected from caving expedition form an interesting section in the museum. Rocks such as geodes, breccia, pisolites, limestone, dolomite and fossils that reveal the geological history of Lebanon are all present. Each rock is carefully labelled and displaced. Cavers can not go by without understanding some of the geological history of Lebanon and how few types of rocks form and evolve.

The next category 'Speleothems' represents a big number of concretions from different forms of calcite to tar. Decalcified stalactites, calcite crystals, cave fans, cave corals, cave pearls, stalactites and stalagmites are all displayed. A few cave pearls were cut and are displayed to show the concentric rings. They educate the audience on their beauty and fragility.

It is worth noting here that the SCL are aware of the fragility of caves. They have a clear picture on the natural conditions and time needed for a cave to grow and thus don't collect anything from inside caves. The famous 'take only pictures from caves' stands but in Lebanon many caves are being destroyed by construction activities such as roads, houses and quarries. When we know a cave is going to be destroyed we enter and remove any elements we deem important and educational after documenting it carefully.

Animal and human remains and artefacts such as bones, pottery and jewellery have a category on there own and they are worth noting. Those items are collected and documented by specialized cavers from caves in Lebanon. Examples include the Brown Bear bones (*Ursus actors cf. syriacus*) including several skulls that were found in Mgharet el-Wahch in Lebanon. Those items are valuable since this species is not found in Lebanon anymore. Some pottery remains from the burial site found in Mgharet Michane.

War has been with Lebanon since its creation. War artefacts were and will always be found in caves. Caves during the war were used as places to store, hide and even dump weapons. Several items of war

Fig. 2
Report written by Samir Akil about his shoe adventures in Jiita cave.

Fig. 3
One of the carbide lamps used in the Jiita cave explorations in the 50's.
(Photo by Rena Karanouh)

are displayed. The items were disarmed and extracted from caves with the help of the Lebanese Army. They include hand grenades, guns and shells.

Caving, like any other extreme sport, relies on specialized technical equipment in order to progress. For that reason, a number of tools have been developed by the cavers throughout time and that equipment uncovers the history of caving not only in Lebanon but also in the world. This history is unfolded to all visitor of this museum.

Personal equipment such as ascenders, descenders, harnesses, anchors, carabiners and helmets are exhibited. Some of the highlights are the first helmet that was made in 1953 by Raymond Khawam made of a simple metallic head light connected to a carbide lamp (Fig. 3). In comparison, a 'modern' helmet is also displayed that played an important role in saving the life of a caver when a 1000cm^3 rock fell on his head in Houet el Dakhoun. As well as that a broken Croll from Qattine Azar Sinkhole is present. The Croll broke 400m underground and the caver had to hold the Croll closed using his hand all the way to the surface.

The harness that was made by SCL cavers from Tripoli, when they were eager to do caving before they could have a chance to join SCL and learn proper caving techniques. An anchor, similar to the hook that we use today in aid climbing, that was used by Marwan Zgheib in the exploration of Houet el Aaqroub is also displayed. This anchor allowed the cavers to explore a new section of the cave when he used it to pull himself 20m towards a distant pinnacle. The anchor was thrown until it hooked and then the caver pulled himself towards the pinnacle.

The category 'photography' displays items such as old cameras, flash holders and bulbs used in the fifties and sixties as photographic aid tools. Most of the black and white photos we see today were taken with such equipment donated by Sami Karkabi.

Sami Karkabi has donated many of his old clothes such as the tops worn on their exploration of Fouar Dara where the cold and water elements inside the cave presented its own problems.

Samir Akil's handmade shoe is also exhibited when he lost one of his boots 3km inside Jiita at the beginning of a three day expedition and had to put together (from inner tube lining) a shoe to protect his foot and complete the expedition.

Figure 2 shows the hand written Arabic formula that shows the way the boots were assembled.

Other minor items are classified under general speleological items such as food items used by the first expeditions. Old cans that have been removed from Jiita and Fouar Dara are exhibited.

The museum now represents a historical memory of the efforts made by different generations of cavers in the exploration of the caves in Lebanon. It offers a wide range of speleological tools that had been used since the foundation of the club in the 50's. The SCL museum has gone through the first step of referencing some scattered and forgotten caving items. Although tedious the effort should not stop and the museum should grow. Members should actively contact old cavers and collect their old no-longer-being-used caving paraphernalia that most still keep probably under their beds or in garages. A bigger collection could also be exposed after finding proper funding, making the museum more informative to its visitors. Old and new reports and maps will be hopefully displayed in the near future. This window will hopefully highlight the importance of such museum and will attract in the near future support and funds to preserve this part of Lebanese history.

CAVE CLIMBING

Issam Bou Jaoude | *iboujaoude@gmail.com*
Additional contributions by **Fadi Farra, Michel Mufarej and Samer Harb**

ADVENTURES IN CAVE CLIMBING

‘LOOK UP, THERE MUST BE SOMETHING HIDDEN BEHIND THAT DARK HOLE…’

This is how it usually starts and this is how we begin dreaming of a certain cave climb.

There is always a high dark unreachable hole that could lead to new passages or to a tight impenetrable squeeze or just simply to nowhere. Yet we can never know until we actually climb to reach it. So a small group of avid SCL cavers learnt to rock climb in order to reach these seemingly inaccessible parts of caves.

Most often the ‘adventure’ is the journey itself rather than the ultimate destination. This journey took us to six different Lebanese caves in the last few years where we witnessed and lived various cave climbing adventures.

انظر الى اعلى ماذا يوجد خلف هذا العتم الدامس. هكذا تبدأ الاحلام ومنها تخرج المغامرات مغامرات التسلق داخل المغاور. قام بعض من مستغوري النادي البناني للتنقيب في المغاورفي التخصص بتصلق الأماكن المرتفعة داخل المغاور لأكتشاف ماذا يوجد خلف هذا العتم الدامس. ان اهمية الرحلات السة لمستغوري النادي اللبناني للتنقيب في المغاور في ألأعوام القليلة السابقة هي ما تتظمنه من مغامرة وتشويق وليس الهدف بحد ذاته.

‘Regarde là-haut, il devrait y avoir quelque chose qui se cache derrière ce trou noir…’ C’est généralement comme ça qu’on commence à rêver d’une escalade en grotte. On trouve toujours un trou noir, haut et inaccessible qui pourrait nous mener à de nouveaux passages, parfois serrés, très étroits, même impénétrables, ou menant à tout simplement rien. Mais nous ne pouvons le savoir qu’après avoir grimpé pour y arriver. Un petit groupe avide de spéléologues du SCL ont alors appris à escalader dans le but de pouvoir atteindre les parties inaccessibles des grottes. Très souvent, c’est l’excursion elle-même qui fait ‘l’aventure’ plutôt que la destination finale. Nous avons été dans six différentes grottes libanaises où nous avons vécu et assisté à des aventures variées d’escalade en grotte.

JIITA CAVE
CAMP SCL, THE GIANT ORANGE FLOWSTONE

Ever since the days of Sami K. and his team, every black hole observed in the ceiling and cliffs of this cave was a target of some sort of climbing endeavour. There are hundreds of potential climbs that still need to be attempted though and one cannot but help dream of finding other galleries like Salle Rouge, Salle Blanche and Salle Beayno in the amazing Jiita cave. One small adventure however has led us up a massive flowstone at camp SCL in Jiita cave.

At the entrance of camp SCL, 1000m from the terminal siphon, looking up to the left one can clearly see a big flowstone that embraces the ceiling. During the 2007 Salle Beayno expedition, attempts were made to unravel its mystery and try to find a possible connection to Salle Beayno from this upper level.

The climb starts from the right side as a fairly easy free climb. This was easily traversed with no rope onto a ledge that passed to the left side of the flowstone. By then we are approximately 15m from the floor and at the bottom of the giant flowstone (Fig. 1).

Team 1 (Samer H., Hani H., and Hiba A.) lead by Rena K., started the climb by using aid climbing techniques. They climbed several meters and decided to go laterally for 20m in order to reach a ledge which led to another climb up to the top of the giant flowstone. Five bolts were planted, starting the traverse. Team 2 continued (Elias L., Harout G., Samir A. and Issam B (the team leader)), where they planted several bolts to get to the ledge on the other extremity of the flowstone. The ledge was actually a small muddy room with small stalagmites and stalactites. Elias L. and Harout G. traversed the ledge and then decided to continue the climb. Issam belayed Elias who had to lead climb up the flowstone to get to a small opening at its top. He disappeared behind the flowstone only to shout later that he could not go further for it was too narrow to penetrate. Our hope of connecting this section with the Beayno Gallery faded.

Fig. 1
Team 1 attempting the climb to the ‘Flowstone’ in Jiita cave.
(Photo by Rena Karanouh)

ROUEISS CAVE
UP 100M AND THAT IS IT

At the intersection between two major geological faults a dark hole up in the roof of the Dream Theater (a huge room in the upper galleries of Rouaiss cave (Figure 2)), held captive the imagination of a few SCL cavers in 2001. These cavers, that committed themselves to this impressive 100m climb, could not but admit that the climb led absolutely.... nowhere.

The following report was written by two members of the climbing team, Michel Moufarege & Fadi Farra:

The very enigma of the knowledgeable Lebanese caver who is supposed to have been to the most frequently visited cave in Lebanon, namely Roueiss cave, was undoubtedly the upper galleries ceiling that revealed to the attentive eye an intriguing chimney whose end blurred in the deep darkness of the cave.

Given the imprecise and aging map of the Roueiss cave drawn by the club years ago, in addition to the cave being quite large and mazy, the Committee had launched a contest in 2001, in which club members would unite in teams and complete a new topography of the cave by the end of the year. The winning team was to obtain caving overalls at the next general assembly.

We did not really have the competition in mind, but rather the will to reveal what lay above this unreachable level. An unorganized yet energetic team was randomly assembled during a Thursday meeting, composed of Michel Moufarege, Jean-Claude Janssens, Fadi Farra, and Aram Sulkdjian. We were accompanied sporadically by May Farra and Youssef Assaf, who was tested, for the first time, on the rope, in quite a challenging first time environment.

It was undoubtedly our “Spiderman”, Michel, who took the lead of the climb, as fearlessly and as crazily as the superhero. Closely followed by Jean-Claude, who took care by passing the equipment periodically, and Fadi who ensured safety (if any) and suggested itineraries by looking at the “big picture”.

It took us five outings and as much as 20 bolts to reach the top, which unfortunately dead-ended. The cliff is quite large (width ranging 7-25m depending on the height) and extends up to approximately 100 m. At the end of the cliff, an overhang reveals a slightly upward-angled slope, presenting several active concretions, mainly coatings and rim stone dams on the wall, and each side surrounded by stalactites and stalagmites often joining together in a column. The end can be simply described as the junction of the ceiling and the slope. A small hole on the upper right corner gives at first sight a hope of continuation, yet turns out way too small to fit anyone.’

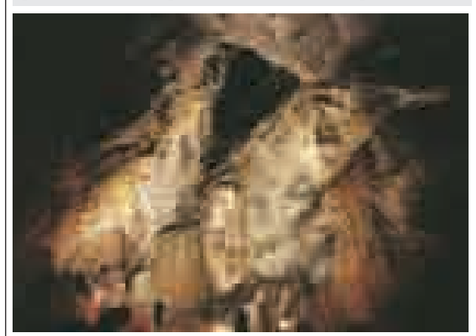


Fig. 2
Photographs of the Dream Theatre in Roueiss cave where the climb was done.
(Photo by Elias Labaki)

AL KASSARAT CAVE
HOW NARROW CAN IT GET?

In the summer of 2005, a dark space, which signalled the possible presence of a gallery, was observed at an elevation of approximately 37m from the underground river in Al-Kassarat Cave. It is located on the wall opposite to the President Gallery, slightly offset from it (Fig. 3).

A potential climb was confirmed during the wet season of that year when the water, of the underground river, was 12 meter higher than normal. Bolts were planted during that season to facilitate the climb during the dry season and to have a jump start on this climb (Figure 4) in summer when the river's elevation went back down to normal.

Aid and traditional climbing techniques were applied with the help of a battery powered drill to climb the remaining 25 meters (Fig. 5). Thick mud covered the wall making them slippery and the climb dangerous. The danger was not only from slipping but also from dislodged blocks. Unstable loose blocks of different sizes were continuously falling on the climber and his be-layer. Fifteen bolts were planted along the route with several natural rigs. At one point Rena K. got flustered, after I inquired about the problem, she pointed out that we were hanging in the middle of a cliff, at around 25m from the ground, with no rope going up and no rope going down and just hanging on a few natural rigs and some bolts. I had not noticed this predicament as I had been climbing for a while, but to a caver, having no rope is like cutting their lifeline. It was interesting to note the difference in thoughts, and I planted another rigging point just so that she would feel more comfortable! I do not think she did.

It took us two attempts to reach a huge opening next to the roof. Rena K. was the first to reach the top followed by Johnny T. then myself. According to Rena K. the last few meters of the climb were the most treacherous for no rig points could be found and very thick mud was covering most of the slope.

The dark hole was actually a big opening that led to a short walk able passage that narrows down very quickly into a very tight squeeze. We had to remove a few rocks in the passage to squeeze ourselves through after taking all our climbing gear off. As usual Rena K. was the first to go in for she is the most experienced person in these tight squeeze passages. I followed and to our surprise we found out that it connects after 40 meters with the Well Gallery. The map published in the Ouat Ouate magazine issue 13 year 2005 shows the connection.

Not that there wasn't a great discovery at the end of this climb, especially in length discovered, but the attempt and the success themselves are what matters the most and what we will always be remembered.

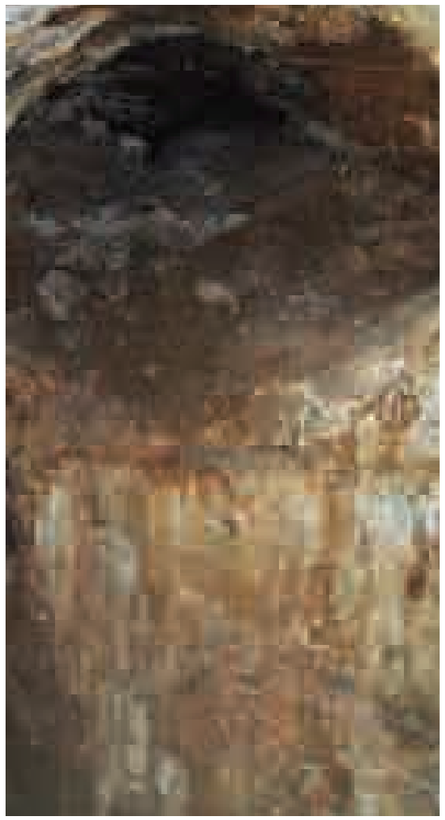


Fig. 3
The climbed cliff face and the entrance to the discovered gallery with the rigged rope seen in the lower middle.
(Photo by Rena Karanouh)

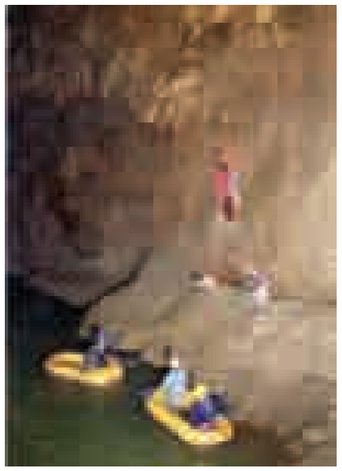


Fig. 4
Drilling the first bolts when the water was high after spotting the potential climb.
(Photo by Issam Bou Joude)

Fig. 5
Issam B.J. climbing the cliff face with Johnny T. belaying him.
(Photo by Rena Karanouh)

JIHAD SINKHOLE
TAKE THIS.... A FAULT PLANE!

In the years following its rediscovery in 2001, Jihad sinkhole was the focus of many caving trips. Only 60 vertical meters separate it from the underground river of the Al Kassarat Cave. For this reason, any potential opening and climb was being investigated to try to make the connection.

A potential continuation lured in my mind for several years; until 2006 when it was attempted. Located at the lowest level L8 (Kronfol et al 2001) was a small opening at the extreme end of the diamond gallery. This might be the one that will finally get us to the underground river. The diamond gallery is named after its calcite spar crystals of various sizes that covers its walls (Figure 6).

The opening required a lateral traverse. In the first attempt we rigged the traverse and reached the opening after planting four bolts and assembling a natural rig (Fig. 7). Rena K. as usual was the first to go in the tight squeeze. After a few meters she reached a drop of 7 meters which led to another beautiful gallery decorated with the same but larger spar like calcite crystals. At the end of the small room another 12 meters climb was spotted with a potential continuation.

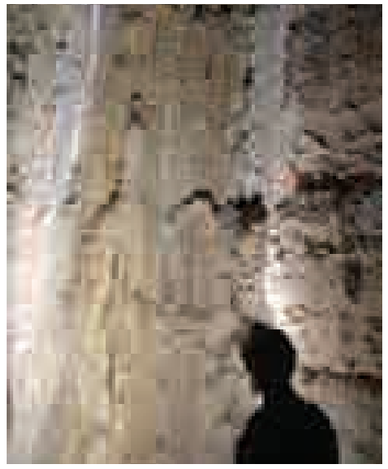
The new climb was attempted on a second trip. I started the climb using aid and traditional climbing techniques. Rena K. was my belay and Fadi T. was the support team. Climbing was tricky but not slippery. A lot of the crystal and small dark chert ledges were crumbling under my feet. Several bolts were planted and natural rigs were assembled and the climb ended after 10 m.

Boom there it was... a big, big fault plane. Do not get me wrong! I love finding geological features inside caves but that time I hated it. The fault plane was flat, long and completely cutting off any passage that might possibly continue.

The total development was approximately 40m with a 7m drop and a 12m climb. The survey of this section of the discovery was published in the last issue of the magazine (Ouat Ouate, 14).

Another black hole that led to a small discovery, however, it did not end up connecting the cave to the underground river of Al Kassarat Cave which is what we were hoping for. Well maybe next time!

Fig. 6
The traverse-line being set up to the opening shown in the dotted red circle.
(Photo by Rena Karanouh)



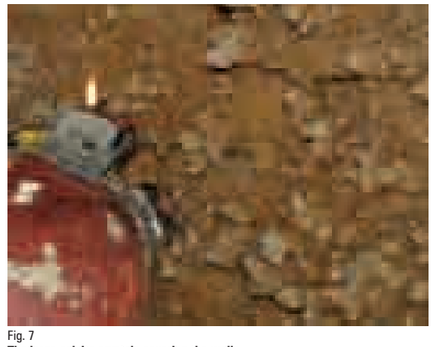


Fig. 7
The large calcite crystals covering the walls.
(Photo by Rena Karanouh)

Fig. 8
The opening is situated in the middle of the photograph.
(Photo by Rena Karanouh)

AIN EL KEDDAH (ALBERT SINKHOLE)

SINKHOLE INTRODUCTION TO CAVE CLIMBING

I have never been to Ain el Keddah Sinkhole before. In June 2007, I decided, with a few SCL cavers, to rig this sinkhole and check it out. Who would have known that it was going to be a trap? No one had thought that we might be in for a new climbing adventure.

'Look up there at that dark spot in the ceiling. There must be something up there.' I called upon Rena K. at the bottom of the sinkhole, a few meters of the terminal siphon. 'We might be able to bypass the siphon from above.'

All that can be said is that Albert sinkhole has a lot of potential being in the Kersrouane Formation of Jurassic aged dolomitic limestone rocks.

Here we go again. Another climb.

It took us three outings to complete the climb and exploration, two outings in June and July of 2007 respectively and one in May 2008. A combination between aid climbing and traditional climbing techniques got us up the first 13m where a small ledge was present. The first few meters were the hardest and Rena's face got a blow from my rubber boots after a 3m fall where I kicked her cheek in. We took turns climbing and Samer H. was available to assist and act as the belayer.

The following is a section of the report written by Samer H. after his introduction to cave climbing in Albert Sinkhole.

> This is how I was introduced to cave climbing. I was 'invited' to climb up to the first level and check what's going on.
>
> Innocently I clipped and climbed up. I was eager to reach the platform Issam was talking about, I mean I was hoping to reach an actual platform where one can rest and just sit and look around and enjoy the cave… well… not only have I reached an uncomfortable place where I had to stay standing attached with my short cowstail but also I had to find room for Rena who came up right after me to continue the climb! …
>
> As usual, getting trained to do something new doesn't take away the rush of the actual experience… In other words, all the trainings that we got and being exposed to climbing techniques involving working at dizzying heights, didn't prevent me from staring continuously at the anchor I'm attached to, as if making sure it won't pop out!…naturally enough it was not easy to see no rope going up and no rope going down, but just a few anchors or two to trust…
>
> The position became natural afterwards and I had something else to worry about, for I had to secure Rena's climb…she went up and placed three additional spits and replaced all the knots, a major feat as we wanted to remain secured properly, then it was time to leave…"

It took us two outings to climb 28m (Fig. 9) and reach a safe ledge at the top few meters below the ceiling. The platform was actually blocks of fallen boulders that were detached from the roof along a big fault plane (Fig. 10). It was tricky to manoeuvre between and over those boulders. In May 2008, we completed a loop (Fig. 11) where the top ledges go backwards and actually bypass the siphon room and reached the main chamber at the bottom of the 50 meters pitch.

At the end, the dirty siphon of this sinkhole was not bypassed. A rope was left dangling from the ceiling, as a witness to the climb and everything that had happened.

Fig. 9
The climb from the bottom of Albert Sinkhole. *(Photo by Rena Karanouh)*

Fig. 10
Elias L. on big blocks of rock forming a ledge at the top of the climb. *(Photo by Issam Bou Jaoude)*

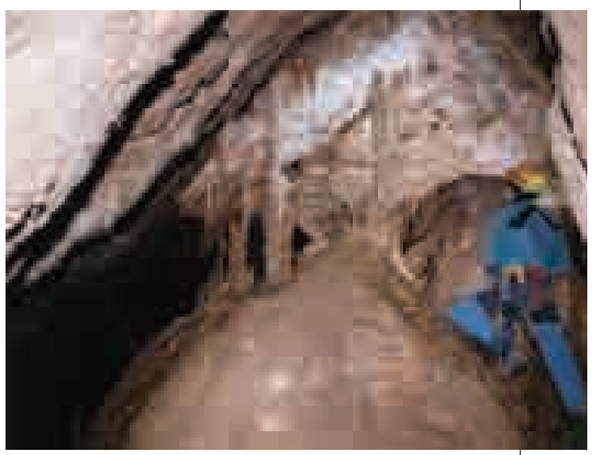


Fig. 11
The Gallery at the top of the climb in Albert sinkhole. *(Photo by Issam Bou Jaoude)*

EL HADID CAVE A ROCK IN THE LAP

This cave was lost for a couple of years but was rediscovered in 2007 when SCL cavers mapped and studied this cave and discovered new sections. The next issue of the magazine will hold a lot of information on this cave and the spring that issues from it. For the sake of this article I will only discuss information related to two cave climb attempts that tried to uncover what is behind those dark holes in the roof.

Is there an upper gallery and can we bypass the terminal siphon? The first potential climb was located not far from the entrance, only 100m in a small room that has a chimney of around 20m. Similar to most of our climbs, the aid and traditional climbing techniques were used to get to the first platform, 10 meters from the bottom. The first few moves and first two rigs were the worst. Rena K. belayed me and then followed me up to the first ledge. The ledge is only 1m in width and approximately 5m length. After checking the second pitch, it was clear that it was narrowing down. It narrowed down to 20 cm in width and 3 meters in length and finally the ceiling could be clearly seen (Fig 12). So we descended back to the ground and headed towards the second climb at the terminal siphon.

In the hope of bypassing the terminal siphon of this cave, a small 12m chimney was the focus of our second attempt in that cave. The following is an excerpt from the report I had written after the climbing incident that had taken place on August 4, 2007.

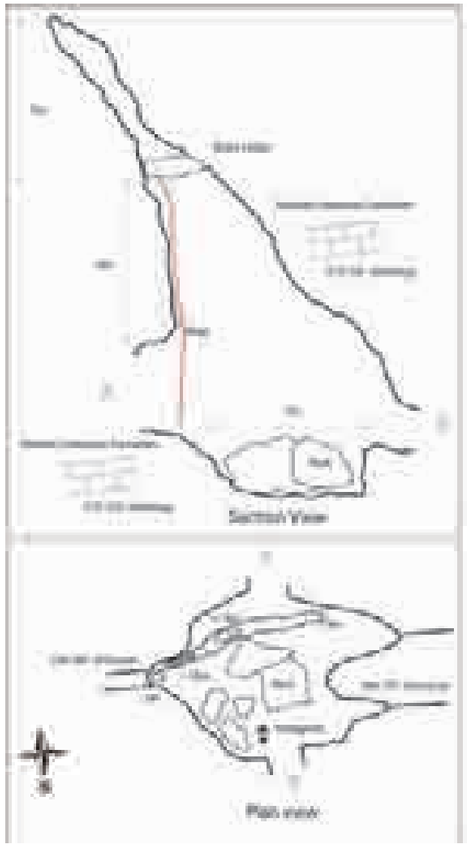


Fig. 12
Map and cross section showing the location of the first climb in El Hadid Cave

> We got to the siphon and Rena K. managed well in planting the first bolt, and using aid climbing ladders to help her climb higher up into the chimney. The chimney is around 12m so she had to plant a second and the third bolt. The rock face was covered with a layer of slippery mud but she managed well after the third bolt to sit on the ledge at the top of the first pitch and tried to explore and look around for any continuation.
> Suddenly she shouted, 'Oh my God, I cannot hold it for long!!!'
>
> 'What?' I shouted back …
>
> 'I cannot carry it for long….it is on my lap and it is heavy,' she said
>
> 'What is that Ka Rena what are you talking about?' I said,
> Rena then says 'Issaaaaaam ….' in the sharp Rena voice,
>
> 'I have a huge rock sitting in my lap and I cannot hold on to it and I need to throw it down…so you better take cover and move all the stuff from under me'.
>
> What had happened was as Rena was adjusting her position at the top a huge boulder that looked very stable dislodged from the mud. She managed to hold on to it directly on her lap so it would not fall down without warning.'But what about the dynamic rope?', I asked
>
> 'I have no choice' Rena said 'I will try to throw it away from the rope…'
>
> I shoved everything under the ledge and took cover and called to Rena
>
> 'Throw it, but be careful throw it away form the dynamic rope you that you are tied to it.' And so she did.
>
> The rock came tumbling and roaring down and dropped next to her carbide lamp which I had forgotten to move out of the way.
> Sorry Rena, I know you like your Hisbollah yellow carbide lamp but I forgot it.
>
> It did survive though as the rock missed it by 10cm. It was close ….'Are you ok?' …. 'yes'… 'are you'… 'yes', we exchanged concerns for it was a big big rock,....Then Rena calls down, 'I am coming down, it is too unstable here...' 'OK. ..come down. No worries. But check around if there is something worth the risk …'
>
> Rena used her light to check her surrounding especially the section in the direction of the terminal siphon that we hoped to bypass. 'No no' says Rena 'nothing worth it … nothing much is up here anyways…only mud'
>
> 'Ok ok let us leave, there is nothing up here.'

No further discussions were made. Rena descended.

Black holes are not only rewarding but also dangerous and adventuring into them is like venturing into treacherous unknown territories. Rena felt the real danger that day and so did I.

Going up does not always get you closer to heaven. That dark spot in the ceiling most of the time leads nowhere. It is indeed the adventure in trying that makes climbing inside caves so unpredictable. Climbing upwards is a fine venture in itself for that is the undertaking which is always educational, satisfying and rewarding even if it does end with a kick in the face or having to throw a huge rock on your be-layer.

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INTERNATIONAL CAVING

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THE SPELEO CLUB DU LIBAN IN IRAN

INTERNATIONAL SPELEOLOGICAL EXPEDITION TO IRAN, ISEI-2008

23 September – 6 October 2008

Fig. 1
All the cavers on the final day of the expedition in Tehran amphitheater.

SCL went abroad again, this time to join the International Speleological Expedition to Iran (ISEI-2008). Organized between 23 September and 6 October 2008 under the patronage of the UIS, three members from Lebanon, Fadi Nader (expedition leader), Habib el Helou and Johnny Tawk joined the twelve cavers from Switzerland, Croatia, & Belgium (Fig. 1).

The objectives of the expedition were to train thirty-eight Iranian cavers on self cave-rescue, cave topography, cave photography, and cave exploration. To achieve those objectives the thirty-eight Iranian cavers were split into two groups. Each group focuses on two different caves.

Although the expedition was set to train the Iranians, several new discoveries were recorded and proper documentations of new and old finds were collected from the four caves visited during training. The four caves that were visited are Bournic cave (near Harandeh village), Gholezard cave (near Polour village), Yakh Morad cave in Kohnedeh Village and Ghalekord cave in Qazvin area (Fig. 2). They will be presented below by order of visit during the expedition.

Fig. 2
A cropped map for Iran showing the itinerary of the expedition near Tehran province.

شارك ثلاث أعضاء من النادي البناني للتنقيب في المغاور هم فادي نادر, حبيب الحلو, وجوني طوق في (ISEI 2008) المنظمة من قبل الأتحاد العالمي للأستغوار (UIS) .انضم الأعضاء الثلاث لعدد من المستغورين من اوروبا وقاموا بتمرين بعض المستغورين الأيرانيين ومساعدتهم على اكتشاف وتوثيق اربع مغاور هي : مغارة بورنيك, مغارة غوليزاد , مغارة يخمموراد, مغارة غاليكورد.

Le SCL est parti à l'étranger de nouveau, cette fois-ci pour participer à l'Expédition Internationale de Spéléologie en Iran 2008, organisée sous le patronage de l'UIS dont trois membres du Liban, Fadi Nader (chef de l'expédition), Habib el Helou et Johnny Tawk se sont joints aux douze spéléologues venant d'Europe. Même si l'expédition avait pour but de former les spéléologues iraniens, plusieurs nouvelles découvertes ont été notées et des documentations convenables de nouvelles et anciennes trouvailles ont été recueillies dans quatre grottes visitées: les grottes Bournic, Gholezard, Yakh Morad et Ghalekord.

Fig. 3
The entrance of Bournic Cave near Harandeh village.
(Photo by Johnny Tawk)

BOURNIC CAVE

Bournic cave is in Harandeh village which is located about 125 km from Tehran city. This cave is a touristic cave which was previously partly mapped by two Austrians clubs, "Verein Fur Hohlerkunde in Obersteier (VHO) and Bad Mitterndorf in 2007. The length of the surveyed passages was approximately 517.1m in horizontal development and 86.1m of vertical development.

This cave is characterized by a big 14 meters wide entrance (Fig. 3). Close to the entrance a new 91.56m long gallery was discovered (Fig. 4 and 5) and surveyed by the Iranian trainee team under the supervision of Neven Bocic. It extends in the SE direction.

Going right from the big entrance, a concrete stairway goes down towards a big hall, about 60m long and 24m wide. From that big Hall and to the left another concrete stairway goes down further 30m. At that depth SCL cavers mapped a 370m long section and explored a new gallery approximately 50 m long full of concretions (Fig. 5).

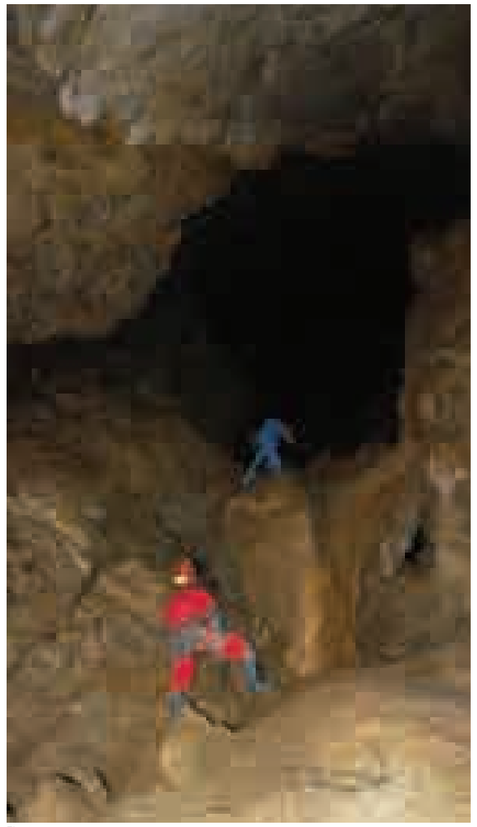

Fig. 4
Exploration inside Bournic cave.
(Photo by Johnny Tawk).

Fig. 5
Map of Bournic cave showing both the Austrians and the ISEI 2008 survey, (*Digitized by Johnny Tawk)*

GOLEZARD CAVE

Located in Polur village, north East Tehran and nearby Damavand Mountain, Golezard cave was the second stop. It is a wonderful cave with plenty of speleothems, with an active river and lakes (Fig. 6). Habib H., Johnny T. and two Iranians entered the cave and equipped a traverse line beyond the second waterfall (Fig. 7). Unfortunately, no continuation was found. The cave is well surveyed and explored. The air temperature is approximately 13°C and water temperature is 12°C. The end terminates in a huge collapse.

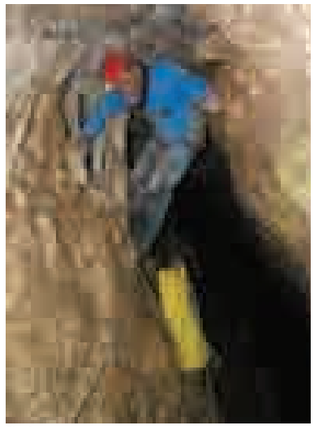

Fig. 6
Traverse line inside Ghalekord cave.
(Photo by Johnny Tawk)

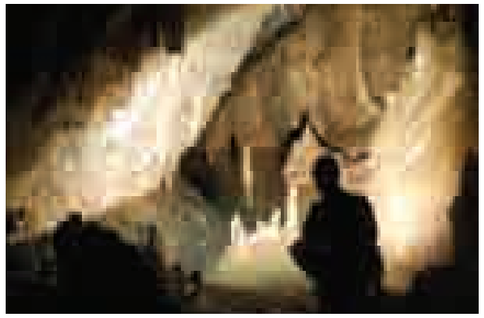

Fig. 7
Inside Ghalekord cave.
(Photo by Johnny Tawk)

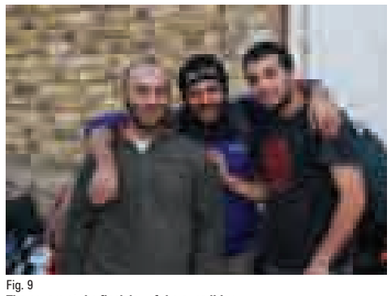

Fig. 9
The cavers at the final day of the expedition.

YAKHMORAD CAVE

The Yakhmorad cave (healing ice) is located on the west side of Kohnedeh village at an altitude around 2350m above sea level (Fig. 10). It is a well known touristic cave. It was mapped earlier by Iranian cavers under the supervision of Simon Brooks. The cave temperature is 0°C. After the first pitch, you could find ice everywhere in the form of waterfalls and stalactites (Fig. 11). Being accessed by the locals and visitors in the area, the cave was full of unwanted material like paper, thin ropes, gas tanks, plastics, batteries, ….

A lot of exploration was done inside the cave, especially at the end of a gallery were possible continuation were noted, only 28.43m of new development was found and surveyed. On the way back, it was decided to clean the cave from the waste left by local visitors.

Fig. 10
Kohnedeh Village.
(Photo by Johnny Tawk)

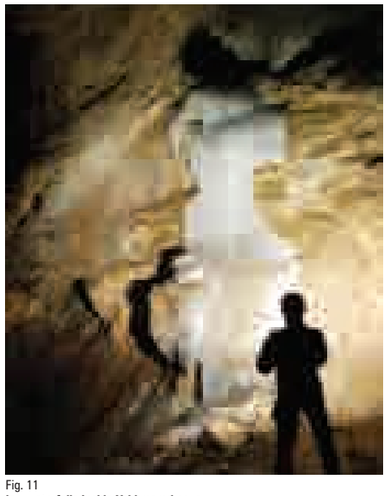

Fig. 11
Ice waterfalls inside Yakhmorad cave.
(Photo by Johnny Tawk)

GHALEKORD CAVE

The Ghalekord cave (Fig. 12) is located in Ghalekord village (known as the castle of the Kurds). This village is distinguished with its mud houses, water canals and tight roads.

Joined by the Iranians, the surface exploration team found several small caves and two sinkholes that still need exploration. An important cave was found on the opposite side of the mountain on same altitude as Ghalekord cave named Ghalekord 2 and has a 55m of development (Fig. 13). The importance of it is that it has several archaeological remains. First, a man made wall is located at the entrance. It has three different burial chambers. In each chamber many rounded depressions were found with rocks and bones lying in the middle. Other rectangular cavities of around 1m depth were found to have a 30cm thick layer of ash. Many potteries were also identified. All this requires proper archeological excavation.

On the other hand, Ghalekord cave was a cave that has not been mapped yet. Mapping was conducted under the supervision of Neven Bocic. A big entrance characterizes this cave that leads to a narrow gallery towards a 12m pitch. At the bottom of the pitch, a distinguished room appeared, with a lot of side galleries. At the end of the expedition, about 500m were mapped and much work is still needed (Fig. 14). Many speleothems were observed such as cave pearls and gypsums decorations. Two big colonies of bats with noticeable quantity of guano were also observed.

Joining this expedition, SCL cavers (Fig. 9) with the Iranians and the other trainers from Europe, explored and mapped more than 1000m of cave passages in four different caves. Eleven training days for 38 Iranian cavers from 12 different clubs were enough to establish tight friendship bonds between the ISEI 2008 foreign members and the Iranian cavers.

Fig. 13
Survey of Ghalekord 2 cave,

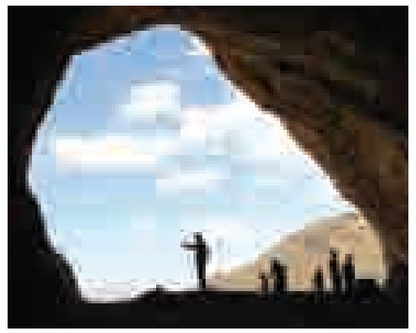

Fig. 12
Entrance of Ghalekord cave.
(Photo by Johnny Tawk)

Fig. 14
Survey of Ghalekord cave. (*digitized by Neven Bocic)*

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DISCOVERING **ES-SUWAYDA LAVA CAVES** IN SOUTHERN SYRIA

A limited number of written documents and maps of Syrian volcanic caves are currently available. In January 2008, an expedition was organized by Spéléo-Club du Liban to As-Suwayda Province in southern Syria to explore and document lava caves. Located in the centre of the Aariqa town, Aariqa cave was our main target. In December 2008, another expedition was set to finalize the survey of Aariqa cave, and explore and survey Umm ar Rumman cave. The Ariqa cave reached 562 m in cave development and Umm ar Rumman cave resulted in 1615m. Umm ar Rumman cave is now the longest development of lava tubes in Middle-East (after Umm Jirsan in Saudi Arabia with total development: 1481.2m). This paper discusses both Umm ar Rumman and Aariqa lava caves and provides speleological, brief geological and historical investigations.

INTRODUCTION

As-Suwayda, Daraa and Hawran (Golan) provinces form the southwestern portion of the Syrian Arab Republic, bordering Jordan (to the south) and Palestine/Israel (to the west; Fig. 1). In the centre of this area lies Jabal Ad-Drouz volcanic range, which trends NW-SE and has a maximum elevation of 1785m (asl). This range has numerous volcanic cones, often organized in ridges whose slopes are covered with many lava flows (DUBERTRET, 1933). This volcanic terrain (called Al-Harra) stretches southwardly crossing Jordan and part of northern Saudi Arabia. In Jabal Ad-Drouz, the annual precipitation range between 200 and 350mm, while in the nearby Al-Harra plain it does not exceed 100mm. The average annual temperature is between +15 and +19°C (PONIKAROV, 1967).

Although the geographical and geological aspects of this volcanic region were already studied during mapping surveys (DUBERTRET, 1933 & PONIKAROV, 1967), no significant exploration and surveying of the lava caves have been published to date.

This contribution discusses two major caves in As-Suwayda province: Umm ar Rumman and Aariqa (Fig. 1). The first one (Aariqa cave) has a historical significance as it was used for housing in historical times. Whereas Umm ar Rumman cave is a fantastic lava cave with beautiful speleothems (volcanic and calcite) and features typical of lava tubes. Here, it must be mentioned that the whole area features historical Nabatean and Byzantine settlements before the Arabian period. A typical example of this rich historical area is the nearby Bosra town which hosts a huge amphitheatre made-up almost exclusively of carved basalt stones.

المعلومات الموثقة عن المغاور البركانية في سوريا نادرة. في كانون الثاني و في كانون الأول قام عدد من اعضاء النادي اللبناني للتنقيب في المغاور باكتشاف وتوثيق ومسح مغارتي عريقا وأم الرمان. أتضحا أن عريقا لها ممرات بطول 562 م وأم الرمان لها ممرات بطول 1615 م. بذلك تبين أن مغارة أم الرمان هي اطول مغارة بركانية في الشرق الأوسط.

Un nombre limité de documents écrits et de topographies des grottes volcaniques syriennes sont actuellement disponibles. En Janvier 2008, deux expéditions ont été organisées par le Spéléo Club du Liban dans la Province de As-Suwayda au Sud de la Syrie pour explorer et documenter deux grottes de lave: Aariqa et Umm ar Rumman. La grotte d'Ariqa atteint 562m de développement et Umm ar Rumman 1615m, faisant de cette dernière le plus long canal de coulée de lave du Moyen-Orient.

Fig. 1
Map of the Syrian Arab Republic, showing the approximate locations of Umm ar Rumman and Aariqa caves in As-Suwayda Province.

Umm ar Rumman Cave

Umm ar Rumman cave is located south of As-Suwayda near the border with Jordan, and about 20km south-east Bosra city. This lava tube is located within the earliest Quaternary sheets (1 million years in age, PONIKAROV, 1967), namely the Paehoehoe lavas, in a flat agricultural area. It is characterized by an entrance (14m deep and 20m wide) that may have been formed by roof-collapse. The entrance is cluttered with fallen rocks, a big opening leads through an inclined gallery 10m deep, to reach a linear gallery characterized by a well traced trail.

The total development of Umm ar Rumman cave is 1615m (Fig. 2). As the longest reported lava tube in Arabia was the Umm Jirsan cave in Saudi Arabia with a development reaching 1481.2m (PINT, 2008; http://www.saudicaves.com/jirsan/index.htm), Umm ar Rumman becomes now the longest surveyed lava tube development in Middle East.

Umm ar Rumman is a typical lava cave hosting almost all features (Fig. 3,4,5) found in volcanic caves: levees and gutters, flow ledges, splash stalactites, lava columns and drip stalagmites, as well as rafts. In addition, beautiful calcite speleothems decorate this cave.

The average diameter of the tube is 7.5m with a height of 8m (Fig. 6). At 190m from the entrance, a huge collapse is located. A 1m splash stalagmite is found, near a molded tree. The collapse ended with braided maize. After a small crawl, a second part began with calcite gours covering the floor where many fragments of pottery were found. After examination, they appeared to belong to the Islamic period (Ayyoubide or Mamlouk, ref. Dr. Leila Badr, conservator of AUB Museum, American University of Beirut). In this part, many collapses change the homogeneity of the cave profile. At some places the roof could reach the height of 14m.

At 800m from the entrance, a braided maze was found, calcite speleothems such as popcorn, stalagmites, helectites are present in the right gallery. At the end of the right sided tunnel, the cave's floor and walls became reddish with a lot of fallen rocks. Umm ar Rumman cave ends with a narrow 10m long tunnel.

Aariqa Cave

The Aariqa cave is situated in the center of the Aariqa village. It was also called Ahiré cave and was used during different historical period in Syria. This cave is located northward of the Umm ar Rumman and within the relatively younger, recent Paehoehoe lavas which have been dated to about 4,000 years (PONIKAROV, 1966). At the end of the cave, the transition from paehoehoe basalt and the aa-lavas of the overlying (younger) sheet has been observed. The entrance is an impressive open collapse seen from the main road with average of 14m wide and 16.2m depth (Fig. 7). At -14 m from the road, and at the left side, a basaltic stair under two arches goes down 5m towards Aariqa spring used for domestic purpose in the city. The total development of the cave is 562m (Fig. 8).

The entrance of the cave is protected by a carved monolithic basaltic door from Nabatean or Roman era (64 B.C to 391 A.D) about 90cm wide and 110 cm high, no inscriptions are observed. After 3 steps, you could reach the first part of the cave which is an east-west 165m long tube (Fig. 8). This part is developed as a show cave, electrical cables and projectors are seen on both sides. It is 16m large and 9m high with a flat muddy clay floor caused by dripping water from lateral sides. Scarce calcite stalactites are apparent. At the end of the tube, a large chunk of wall is fallen creating lining (Fig. 9). Beyond this tube, the morphology of the cave takes different aspect followed with four smaller tubes linked by tight and low passages.

The first tube (Fig. 10) is distinguish by an important rock collapse, on which we could map seven enclosures separated by non carved stone walls not exceeding than 30cm. At the interior of these enclosures reveal a fireplace, animal bones and fragments of pottery (Arab period, after 634 A.D, pres. Communication Dr. Leila Badr, conservator of AUB Museum, American University of Beirut). This reveal a past human occupation. Though some fragments are recent, a detailed study must be carried out in situ. The second tube is 72m long, 13m wide and 5m high. Here also, non carved stone structures are located on both sides of the floor, along with animal bones and pottery . This tube is at -12m from the touristic area. The third tube is 40m long, 10m wide and 5m high. This part represents the continuation of the second tube (which is separated by a ceiling collapse (Fig. 8)). At the end of the third tube, a side passage 20m high, reaches a second entrance to the cave located in the garden of a private house. At the end of the cave, a rounded construction, bones and pottery were observed as well as dripping water. Two cupolas are seen in the ceiling.

In general, the temperature of the cave is 18°C (In December, 2008) and some volcanic formations were observed in this cave such as linings, splash stalactites, breakdown areas and contraction cracks.

Fig. 2
Survey of Umm ar Rumman Cave.
(surveyed by members of the Spéléo-Club du Liban and drawn by Johnny Tawk)

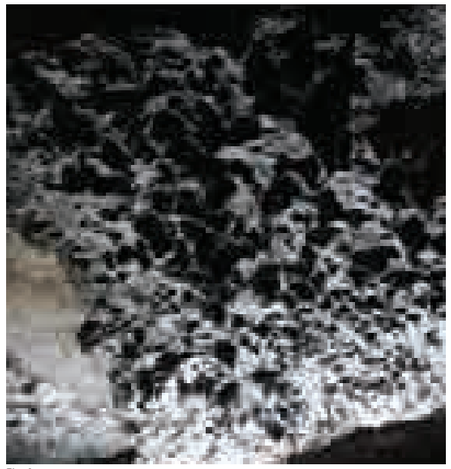

Fig. 3
Photo inside Umm ar Romman Cave showing splash stalactite.
(Johnny Tawk)

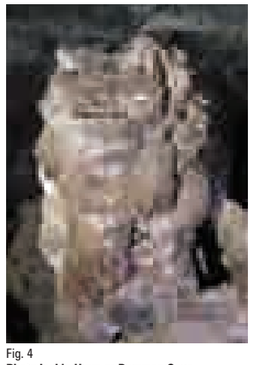

Fig. 4
Photo inside Umm ar Romman Cave showing drip stalagmite.
(Johnny Tawk)

Fig. 5
Photo inside Umm ar Romman Cave showing a lava feature.
(Johnny Tawk)

Fig. 6
Photo of a gallery inside Umm ar Romman Cave.
(Johnny Tawk)

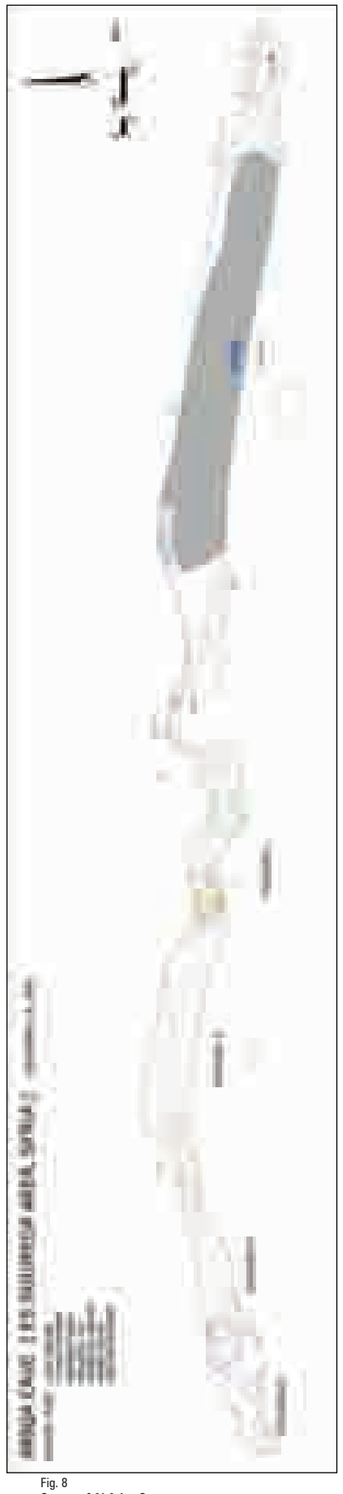

Fig. 8
Survey of Al Ariqa Cave.
(surveyed by members of the Spéléo-Club du Liban and drawn by Johnny Tawk)

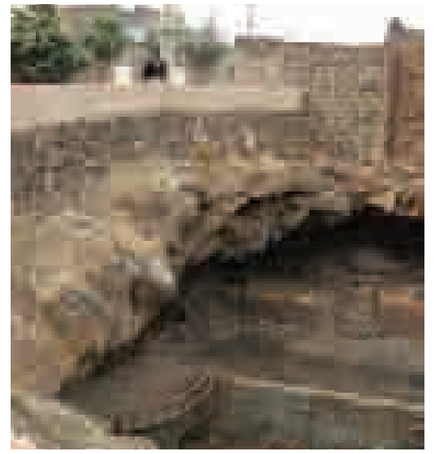

Fig. 7
Entrance of Aariqa Cave.
(Johnny Tawk)

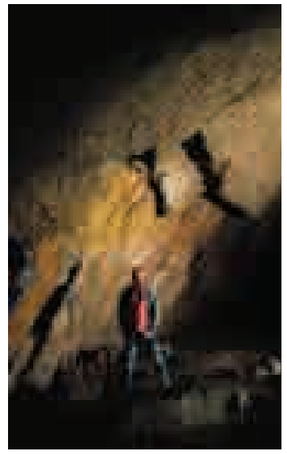

Fig. 9
Lining inside Ariqa Cave.
(Johnny Tawk)

Fig. 10
The first tube inside Aariqa Cave. *(Johnny Tawk)*

CONCLUSION

Two expeditions led to the exploration and surveying of two significant lava caves in southern Syria. The first, Umm ar Rumman Cave with its 1615m of underground development can be considered the longest of its kind in the Middle East. This cave probably older than a million year, is decorated with volcanic and calcite speleothems. The second which is Aariqa Cave has a development reaching 562m. It holds an important historical aspect as housing remains were found in its galleries. Most probably Aariqa Cave is younger than 4,000 years.

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BARLANGS IN BUDAPEST & UNDER AGGTELEK

Egeszsegedre! On trinque les bouteilles et on passe autour du local Bulls Blood and Unicum. C'est formidable de retourner à Budapest, la « ville des grottes », avec nos amis spéléos hongrois. Onze parmi nous viennent de différents clubs de spéléologie du Royaume-Uni, et Firas et Hadi du SCL, jouissent ici d'une courte sortie spéléo en ville avant de se diriger vers la 11ème Conférence Internationale de Spéléo-Secours tenue à Aggtelek, au Nord-Est de la Hongrie.

تروي هذه المقالة بعض أحداث الاستغوار التي رافقة عناصر من المستغورين البريطانيين وثلاث اعضاء من النادي اللبناني للتنقيب في المغاور في منطقة هنغاريا قبل ان يشاركوا في المؤتمر الحادي عشر للأنقاذ داخل المغاور.

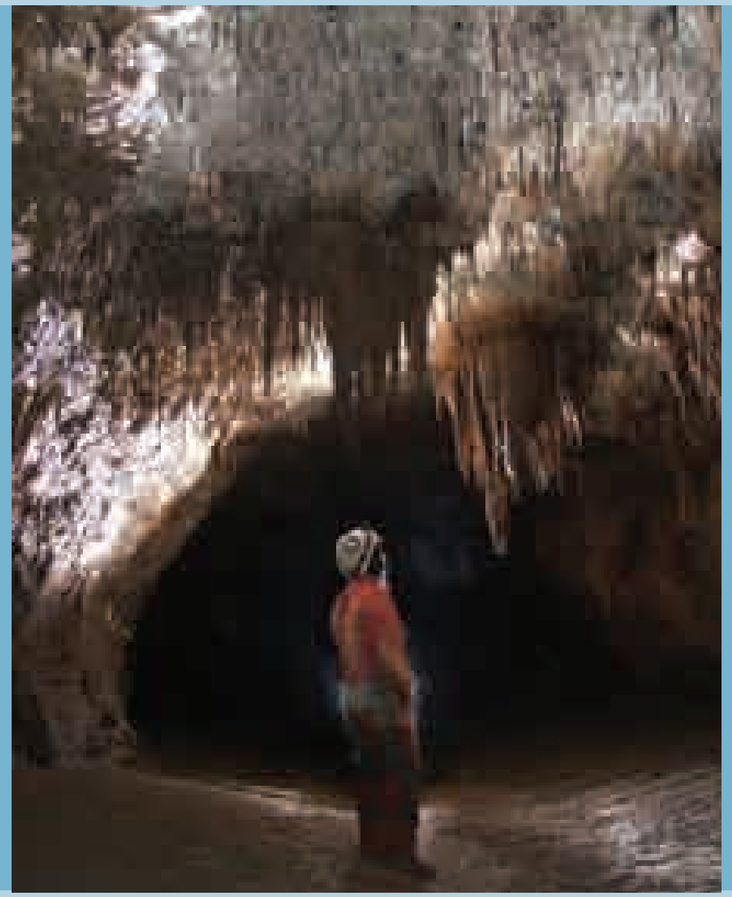

Fig. 1
Szilvia Vaspori in Domica Cave, Slovakia.
(Photo by Mike Clayton)

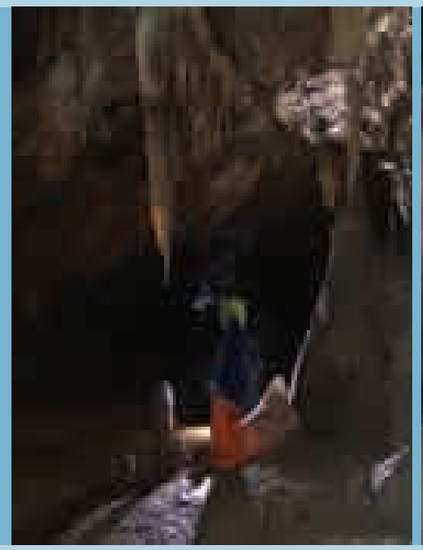

Fig. 2
Beautiful concretions in Baradla Barlang, Hungary.
(Photo by Mike Clayton)

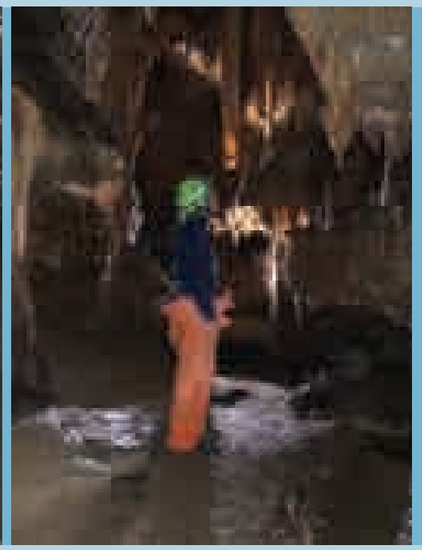

Fig. 3
Deanne Wilkins in Baradla Barlang, Hungary.
(Photo by Emma Porter)

THE TEAM
From Speleo Club du Liban
Avo Avedis, Firas Fayad, Hadi Kaassamani

From various UK caving clubs and cave rescue teams
John Allonby, Jo Campbell, John Christie, Mike Clayton, Pete Gray, Tony Harrison, Chris "Zot" Harvey, Neville Lucus, Mike Peters, Emma Porter, Steve Tomalin, Deanne Wilkins and Mike Wilson

Egeszsegedre! The bottles clink and we pass around the local Bulls Blood and Unicum. It is great to be back again in Budapest, the "city of caves" with our Hungarian caving friends. There are eleven of us from different UK caving clubs and Firas and Hadi from SCL, here to enjoy a short city caving break before heading to the 11th International Cave Rescue Conference to be hosted in Aggtelek, north-eastern Hungary.

Hungary has a rich speleological history, and its scientists were the pioneers of speleotherapy, still practised in Hungary today. There are three main caving areas, in the north both the Bukk and Aggtelek are typical karst areas with stream caves and in the capital, the Buda Hills which make Budapest unique, by having the highest density of thermal caves anywhere in the world.

After arriving into Budapest airport on the morning of Saturday 12 May 2007, we were greeted by our friend Marci and swiftly transported to our accommodation for the next three days, a small caving club hut in the "Beverley Hills" part of Budapest, nestling between foreign embassies and millionaires' pads. It is a very precious piece of land as far as cavers in Hungary are concerned, the equivalent of an SSSI, hosting stunning views overlooking the Danube and the city. But what makes this land so special is that hidden beneath the surface lies a mini Lechuguilla, called Jozsef-Hegyi Barlang.

Like many caves in Budapest, Jozsef-Hegyi was discovered by workers excavating the land to develop and build houses. The small cave entrance was found in 1984 and excavation work had to cease whilst the cavers were given a set time period upon which to dig, extend and explore the cave. The cavers were fortunate to soon break through into some large chambers full of gypsum and due to the importance of the find the builders were not permitted to continue with their works. Whilst this important and unique cave has in the short time been saved, due to the cave being positioned in such an exclusive part of Budapest, the cavers have at times had to fight to keep the land from being developed and hence access is very restricted, even to cavers.

Fig. 4
Formations in Ochtinsha Aragonite Cave, Slovakia.
(Photo by Emma Porter)

Fig. 5
Having fun in Budapest, Hungary (left to right Mike Wilson, Firas Fayad, Joanna Campell, Hadi Kaassamani, Deanne Wilkins, Steve Tomalin, Emma Porter).
(Photo by Mike Clayton)

After a short rest in the sun from travelling, we were led into the 5.5km long and 103m deep cave by our good friend Csaba "Mr Dyson" Koblos, entering a 20ft shaft via a metal ladder, the alternative route via the cellar of the caving hut was unfortunately locked. We carefully descended the entrance series via rope climbs and boulder chokes until several large chambers were reached, the largest chamber being 70m long by 20m wide. Once through the entrance series, the cave is an abundance of gypsum crystals and flowers, aragonite needles reaching 510-cm in length and the amazing Christmas tree features, formed it is believed, by the result of calcite flakes precipitating on the former water surface and being deposited on top of each other. We had a steady paced trip in order to keep cool and had ample opportunity to admire the underground delights. It was a real privilege to be able to venture into the gypsum wonderland but almost a relief reach the surface away from the fragility and pristine nature of the beautiful cave.

The following day, we ventured to the nearby show cave of Pal Volgyi discovered in 1904. Here, large quarrying activities in the Szep Valley revealed a number of underground labyrinths and now Pal Volgyi is part show cave after being opened to the public in 1927. In 1994, the cave was already the second longest in Hungary and the longest in Budapest and by the end of 2001, a connection was created between the 13.3km long Pal Volgyi and the 5.4 km long Matyas-hegyi Barland that opens in the opposite quarry.

Like the majority of the Budapest caves, access is restricted and we were fortunate to have a guide pre-arranged. After originally being split into two parties, we quickly merged into one large group, as the route finding on the round trip became more complicated and as one of the Mendip cavers discovered his chest girth was not quite conducive to some of the squeezes. The route gave us a good insight into the nature of the cave, with its maze-like routes and bizarre rock formations that resembled exploring the holes in a large piece of cheese. Further into the system, in the western part, it is said to be particularly pretty, although time and our group size prevented us from going this far.

On our way back to the caving hut, as on previous trips, we climbed the steps above the show cave of Szemlohegyi Barlang to a small memorial garden to cavers who have died in the pursuit of exploration, to pay our respects. It is beautiful setting with a piece of limestone and plaque for each caver overlooking the city – a poignant reminder of the risks of our passion.

The last day of our short city caving break was spent exploring the "Pearl of the Danube" with all its interesting architecture, lively streets, sprawling over both sides of the river. Budapest is perhaps most well known for being a spa city with its alleged medicinal waters and so a drink of the sulphur water at Lukacs Medicinal Baths was in order (which cured Jo's knee pain!) followed by a trip to enjoy the thermal pools in the architecturally elegant surroundings of the Gellert Spa with its Art Nouveau furnishings, artistic mosaics and stained glass windows. Our day in the centre of the city ended in an "eat and drink as much as you want" for £10, before heading back to the hut to grab our possessions to meet the coach at Szemlohegyi Barlang. Upon our arrival at the show cave, we were given a quick tour around the show cave before Mike Wilson, Zot and Firas headed back to the UK, and for the rest of us, we had a four hour journey to Aggtelek.

The Aggtelek National Park is dominated by extensive karst plateaus with an average altitude of 600m, and together with the neighbouring Slovak Karst, the caves feature on the World Heritage list. The venue of the 11th International Cave Rescue Conference was in the heart of the National Park in north-eastern Hungary, between the two villages of Aggtelek and Josvafo and saw cavers converging from Mexico, Scandinavia, obviously Lebanon and across Europe with the largest group, apart from the hosts, being the Brits.

During the journey, we met up with the other delegates of the Conference, including two more Lebanese, Avo Avedis and Badr Jabbour-Gedeon (ALES) and two more from the UK, Pete Allwright and Roy Holmes. It seemed a long journey to Aggtelek and we arrived in the early hours of the morning of Tuesday 15 May. We were soon guided to three cosy wooden cottages by our friend Moha and crashed out, making sure we were ready for some serious caving and socialising when the conference started.

Registration at the conference commenced later that morning and we were shortly planning some underground excursions. With Pete Allwright, Roy Holmes and Tony Harrison providing the British representation at the conference lectures, our Hungarian caving friends had a whole schedule of trips planned for us during the week and we were soon heading to Rakoczi Barlang, to a cave that was discovered through mining. The cave was accessed via an abandoned tunnel which was constructed in the 1920's and the miners came across the cave whilst digging new side passages in their search for iron ore. Unfortunately, not realising the significance of their discovery, one of the lakes was filled with thousands of tonnes of spoil. Today, this cave is now protected and a series of fixed metal ladders leads visitors around some beautiful formations to a lake. With the cave only being 650m in length, we managed to put in an appearance at the opening ceremony of the conference before giving Hadi, who was heading home to Beirut that evening, a good send off and we joined the rest of the British contingent for the Gulyas Party, and enjoyed some goulash and local beverages.

On Wednesday, we headed off to Slovakia, the border being all of 1 mile away, with Gustav from Meander caving shop to explore Buzgo Cave, following a series of wire traverses to the end. In the afternoon, we joined all the conference participants for the excursion to the cave baths of Miskolctapolca, a popular tourist attraction. The cave baths were formed by thermal waters and a building was constructed in the 1930s around the cave and made suitable for bathing in 1959. There are several artificial extensions to swim through interspersed with natural cave passage and small pools, jacuzzis and several large outdoor pools.

The following day, we visited three show caves in Slovakia and saw the stunning aragonite formations in Ochtinsha Aragonite Cave. Whilst only 300 m long, this cave was protected in the World Heritage List in 1995 due to its unique aragonite needles and phenomenal helictites. We then visited the long straws of Gombasecka cave in Slovakia before returning to Hungary to then party in only a way the British can in the famous Baradala Barlang to the Miskolc Dixie Band. A superb feast was enjoyed by all, with plenty of singing and the Brits introducing the other cavers to the Hokey Cokey!

Of course, we could not be in Aggtelek without completing a traverse of Baradla Barlang from Aggtelek to Josvafo. The total length of the system is 26km with a quarter lying in Slovakia, known as Domica Cave. The traverse is an underground hike through massive chambers, some extremely well-decorated. At the picnic tables, we shared some food and drinks before deviating down the Radish Branch to admire the Mother in Law's Tongue.

Whilst some of our group were flying back to the UK, the final day of the trip saw a smaller Anglo-Hungarian contingent entering Domica Cave by a lesser known entrance. The trip was perhaps the highlight of the week, as we followed the beautiful stream passages, skirted round gour pools and crossed the underground border post. Our Hungarian friends pointed out the remnants of the metal gates that had once divided the cave and the two countries, and advised us that this has been their "Berlin Wall".

A very big thanks must go to our Hungarian friends and hosts of the conference for looking after us so well as usual. Egeszsegedre!!

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Fig. 6
John Christie admiring formations in Jozsef-Hegyi, Hungary.
(Photo by Emma Porter)

Fig. 7
Chris «Zot» Harvey, Firas Fayad and Hadi Kassamani in Jozsef-Hegyi.
(Photo by Mike Clayton)

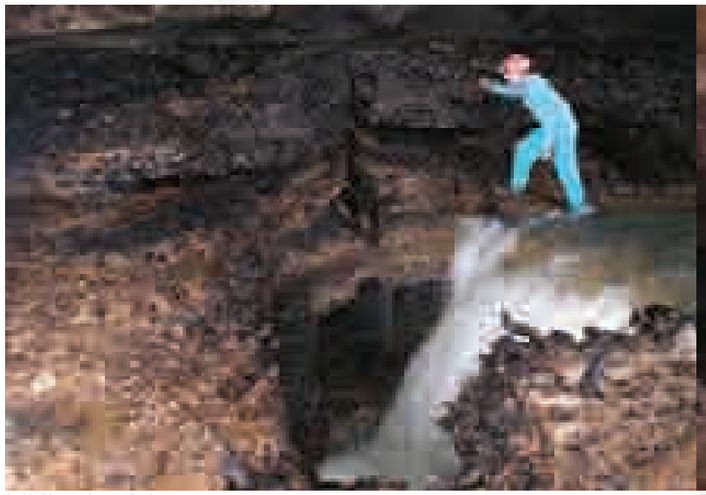
Rena Karanouh | *renakaranouh@hotmail.com*

مغامرة شيقة تاخذ المؤلف الى اطول مغارة في العالم "مغارة ماموث" في الولايات المتحدة الأمركية. بعد الوصول الى كندا تسافر المؤلفة برفقة اصدقاؤها الى ولاية كنتاكي في شمالي الولايات المتحدة الأمركية للتعرف على هذه المغارة وعلى مكتشيفيها.

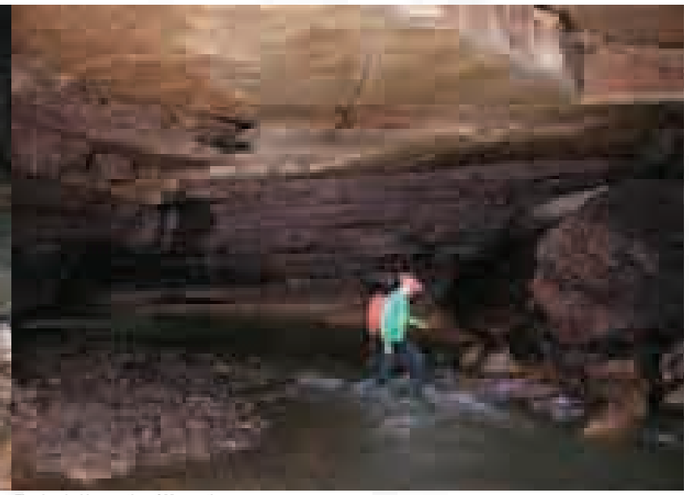
Encore une autre aventure extraordinaire qui ammène l'auteur à la plus longue grotte du monde, la grotte Mammouth cave aux Etats-Unis. Du voyage en avion, à l'arrivée au Canada, au voyage de route vers Kentucky, enfin à l'incroyable aventure en grotte dans la plus longue grotte au monde. Tout cela et plus dans cette merveilleuse aventure.

A RENDEZVOUS WITH MAMMOTH CAVE

2007 THANKSGIVING EXPEDITION



Inside Mammoth cave, Doyle entrance
(Photo by Peter and Anne Bosted, www.cavepics.com)



The river inside a section of Mammoth cave
(Photo by Peter and Anne Bosted, www.cavepics.com)

I was on the plane sitting next to Issam (albeit high on Gravol!) waiting for the time I will enter the longest cave in the world. We were flying to Canada, meeting with Martin, and then driving down to Kentucky, USA.

I didn't know what to expect from a twelve hour drive. Martin and Issam were to do all the driving since I didn't have a license that was valid in 'first' world countries. As I sat in the car watching the road pass by it was easy to let go and just allow the mind to wonder. This drives Issam mad as he thinks I get quiet in the car and always fall asleep. But it is much more than that. Just watching the landscape change…the type of houses…the trees…the colour of the sky…all these little things make me aware that seeing and taking part in something new is always worthwhile.

Issam wanted to show me a very special billboard he had seen on a previous trip. 'Used Cows for Rent'. It was so funny. I couldn't believe it. What does it mean? It was true. He had spoken about this billboard in Lebanon and I thought he was making it up.

So after twelve hours of driving we arrived in Kentucky, Hamilton Valley. We were actually staying inside the National Mammoth State Park. We drove through a wooded area seeing a sign that read "Mammoth State Park'. Finally we had arrived. I was excited and apprehensive and my heart was beating fast….I was just excited about gaining as much info as I can about how they did things…how they thought…how they surveyed….how they caved.

So after about half an hour the car finally stopped. We carried all our stuff to the cabin we chose. We had four bunk beds…two on top of each other. The bathroom was a few minutes walk away and the lounge area was in the same area. Issam and Martin were completely at ease having been there many times before. They knew who everyone was and where everything was and what to do. I just followed them like a lapdog. The best room was the work room where the survey maps were hung and there were a few computers and the library.

We were some of the first people to arrive. So, we decided to leave for a few hours and go and have dinner in Cave City. Yes it is true. This is the actual name of the city. We went to this place that Martin liked and that sold fried chicken. We sat down and the waitress approached us…'YALWANSUMICEWITHAT?'…we were like…sorry? 'YALWANSUMICEWITHAT?' was she actually speaking English? 'YALWANSUMICEWITHAT?'…we were very worried to have looked like people who spoke no English until she slowly and loudly repeated for the last time 'Y'all want some ice with that?'…that being our iced teas…we laughed for hours.

We returned to Mammoth Park only to find that other people had arrived. They were all talking…. asking us where we wanted to go…what we wanted to do in the cave. I just listened. Martin and Issam seemed to have things under control. All that was going through my head was 'I am in Mammoth…I am in Mammoth…' over and over like a song. So as the evening progressed it seemed that finally they had decided to take us to Doyle Entrance to photograph with the Bosteds. That is Anne and Peter Bosted. Well known caving photographers. It was going to be fun because I was to use the flashbulbs. I had seen these in our SCL museum from Sami but I did not know how they are used. Now I was going to find out. The cave entrance is an artificially dug wellshaft. Mammoth is so long (over 500km) that some artificial entrances had to be dug in specific locations in order to complete exploration.

The rope rig was a simple affair and we all descended the 20m quickly. There it was…my feet had just touched inside the longest cave in the world. It was kind of daunting. On the inside Mammoth looks like any other cave…looks the same…standard passages… but it feels strange. It is just all in the head; that there are 500km of passages; that every small crawl way has the potential to extend for 20km; that if you really get lost here you can die.

Anne and Peter wanted to photograph us for their 3D pictures. After quickly showing me how the bulbs work we began. In 3D photography there has to be something in the foreground, middle and background so the effect works when the 3D glasses are put on. First Issam had to change his clothes (as they wanted to photograph cavers wearing very colourful clothes so they would be offset of the black dark walls). Ha ha ha…seeing Issam wearing those bright pink and green sweatshirts (that Anne had brought) was enough to make anyone laugh (since Issam's clothes colour palette is limited to blue/grey/white/navy) it was the funniest thing in the world. He got some Arabic 'reflections' on that front and luckily for us the Bosteds spoke no Arabic and could not understand me taking the mickey out of Issam. After about 7 hours inside the cave, we ended my first trip into Mammoth. The sheer scale of this cave is overwhelming. The tunnel we were in actually goes on for 25km…yes that is km….it is not a typo…!

Our second trip was through Roppel cave to an area 4 hours away from the entrance. It was Peter, Issam, Martin and I. We were to survey a tunnel that Peter knew from previous trips. All was going well. Roppel's entrance is a 30m descent on metal ladders. I found this strange until Issam pointed out why the route was not SRT rigged. He said most of the cavers in the CRF do not really do much SRT so it is easier this way and they do not have to constantly change ropes. I thought it was strange for us not to use SRT yet if it worked for them…why not? After about an hour's walk in the cave, we arrived at the infamous Popcorn alley. Now all Lebanese cavers know of the Diamond Gallery in Houet Jihad. You know the annoying one where all the hanging equipment gets caught on the protruding rocks and it is really narrow and annoying. But it is only about 10m. So back to popcorn alley. What can I say? Nearly 2km of a narrower Diamond Gallery passage with popcorn concretions pricking our whole bodies and after a while it got very frustrating but we kept slogging at it. Then, finally we arrived at a 7m drop where I saw my very first crayfish. I was mesmerized…wondering if they can be eaten…they were a perfect cave fauna…all white and transparent in places…I could not take my eyes off it…the rest were all used to seeing them and were apathetic to my excitement but to me this lone miniature lobster was truly amazing... We changed our wet clothes to warm dry ones and proceeded to walk to the entrance of the cave passage we were to survey.

So we began to map. Issam was on meter. Martin and I on compass and Peter drawing. I never did see his drawing, by the way, for some reason. The passage got tighter and tighter….the water got deeper and deeper and the mud got thicker and thicker. We asked in Arabic…Come on Martin…when does it end?...Martin kept saying it continues. And we kept swearing at him (in Arabic!)…it was getting uncomfortable now… but finally after 200m it closed up. We were finished. It was getting quite cold now…..then back through the passages… aaahhh…popcorn alley again…ouch…ouch….then finally the ladders….when I arrived at the top I could not close my fingers as the metal was so cold and my hands froze. Anyway…that was the trip to Roppel. Nice, cold and entertaining the best part being my introduction to the crayfish I must say. By Roppel standards, it was a short trip at 14 hour.

Our final trip was to the historic touristic mammoth. We took the 2 hour guided tour. It was nice to see people of all ages want to hike for two hours inside a strange environment. We learnt a lot. The guide was entertaining and good. She answered all the questions the people asked. Even strange questions from children. I could not help remembering that I had read in a book once a woman asking one of these guides 'how much of the cave is underground'…ha ha ha….We walked in tight winding passages and large halls. I could not believe it. They made a big issue of a 20m chimney with stairs and a light show. I do not think I saw a single beautiful concretion during the whole tour. We have a beautiful cave called Jiita and we do not know how to make people get excited about going inside it and educate them on its history and science. The nice thing about the Mammoth tour was that it was filled with myths, history and discovery. A nice mix for non cavers. I imagined how this can be translated to Jiita and our touristic caves. So easy and simple and yet so educational.

And so ended my Mammoth adventure. My first mammoth experience will always be treasured for its contrasts; On the drive down, the Porno sale signs on the left and the religious billboards on the right; the warmth of the touristic section of Mammoth with the coldness of Roppel cave; the massive tunnels with the tight crawls...I met a lot of great people…the most memorable being the US equivalent of 'Sami Karkabi', a very respected gentleman called Roger Brucker. He told me about caving and what he had done and the books he had written and Mammoth history and general life experiences. Like Sami and Jiita, I felt that stories through Roger were like living the experience. This is the beauty of meeting other cavers.

Martin and Issam, what can I say? Caving with you two was like being home. Thank you for being my partners.

CAVE SURVEY

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A YEAR IN ROUEISS CAVE

Après avoir réexploré et refait la topographie avec succès certaines des plus longues grottes du Liban (2002: la grotte Chatawie, 2004 : la grotte de Qadicha, 2005 : la grotte de Afqa), le même groupe de topographes du SCL ont décidé de revoir la grotte de Roueiss. Un bref exposé de l'année investie dans la topographie de cette incroyable grotte au Liban.

تروي هذه المقالة عمليات اعادة المسح لمغارة الرويس عام 2005 من قبل اعضاء النادي اللبناني للتنقيب في المغاور. تـقع المغارة في منطقة العاقورة في أسفل جبل المنيطرة. بلغ طول المغارة نتيجة المسح الجديد 5460m مترا لتصبح ثاني أطول مغاور لبنان بعد مغارة جعيتا.

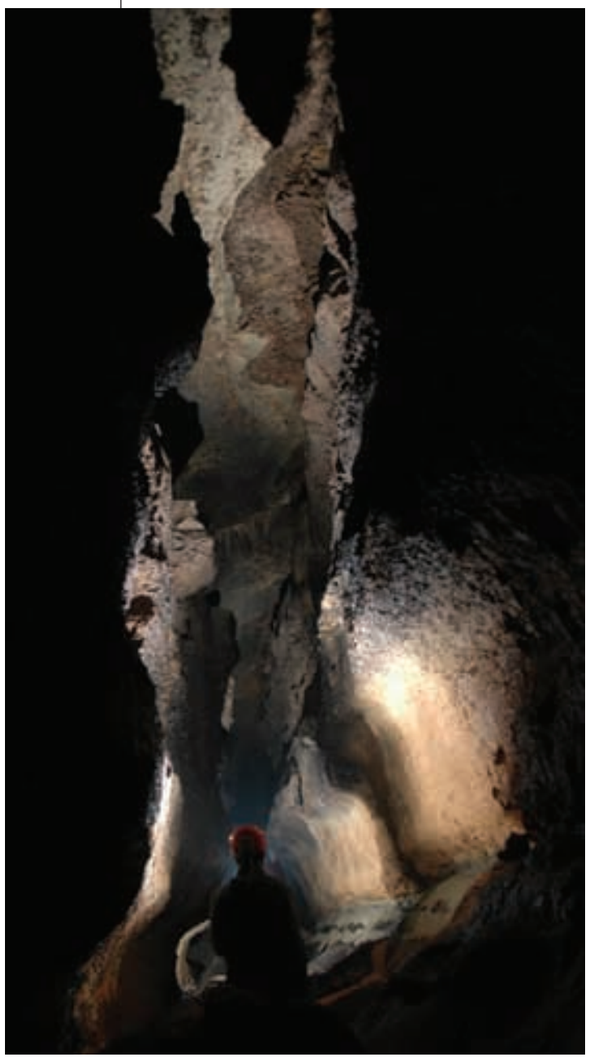

Photo 1
The 'Galleries des Marmites'.
(Photo by Rena Karanouh)

WHY ROUEISS CAVE (or Mgharet Roueiss)?

After successfully re-exploring and re-surveying some of the longest caves in Lebanon (2002: Shatawie cave, 2004: Qadisha cave, 2005: Afqa cave) the same group of SCL surveyors decided that it was time to re-survey Roueiss cave.

Following the huge and tiring feat to re-survey Afqa cave (which resulted in Afqa cave becoming the second longest cave in Lebanon measuring 5260 m of development) we thought we should give Roueiss cave the chance of being re-surveyed to see if it could make it back to second longest after Jiita cave. It was believed that Roueiss cave would be an 'easy' survey since we had the experience of previous years behind us. We could not have been more wrong!

THE LOCATION

Roueiss Cave is located 2km south of Aqoura village, at the foot of Jabal El Mnaitra, Mount Lebanon. Its entrance lies at around 1500m above sea level. It can be reached from both the Faraya highway and from the Kartaba road. It is approximately 1.5 hours drive from Beirut.

Roueiss Cave is a well known cave among Lebanese caving clubs. It is usually selected by clubs to carry out their 'educational' outings. To teach newcomers a little bit of speleology and what it entails to be a caver from the adventurous, the scientific, as well as protection aspects.

Maybe Roueiss Cave is not as beautiful as Jiita Cave, but it has a unique feel to it with its varied assortment of cave features ranging from wide and tight passages, marvelous speleogens, underground rivers, mazes, balconies, upper passages, lower passages…etc (Photo 1).

Photo 2
The gate entrance of Roueiss cave.
(Photo by Rena Karanouh)

HOW IT CAME TO BE?

The team that surveyed Afqa cave had thoughts (albeit deep down) about Roueiss cave and what it would take to survey it. "If Afqa cave was such an amazing cave (that never seemed to end and was full of places to discover), what would Roueiss cave be like?"

But no-one said anything….until…"We'll have to check Roueiss cave if this is what Afqa cave looks like." No-one will forget when that statement by Rena K. was uttered, as we surveyed Afqa cave. It was there, finally said, finally out there. We can't really remember what it was that day that made Rena K. say such a statement, but everyone had had it floating in the back of their minds, but had not dared to say anything, knowing that the survey of Roueiss cave would be even worse than Afqa cave in complexity.

Actually, we did not know what we were really getting ourselves into, but we all knew that it would be worth a try!

FLASHBACK!

Most of Roueiss cave was believed to have been surveyed by the older generations of SCL cavers.

In November 1954, Sami Karkabi and Raymond Khawam made the first survey attempt for Roueiss Cave. During a three day expedition, they generated a sketch map. It was not until August 1974, when another SCL attempt was made to re-survey the cave and re-draw the map. The attempt at that time was led by Claude Chabert with Emile Saleh, Alain Maroun, Hani Abdel Nour, Nadim Bahou and Sami Karkabi. They succeeded in surveying the cave and the map generated was published in the Ouat' Ouate 2 (new series) and is still used by Lebanese cavers today. The expedition was followed by an outing in January 1975 to verify the survey. In August 2001, a newly explored section of about 250m was surveyed by SCL members and added to the old 1974 map. The war began in 1974 and nothing was done until 2006.

THE CAVE AND THE WORKING SCHEME

Exactly a week after we finished the resurveying of Afqa cave, the work in Roueiss cave began.

Roueiss Cave has two entrances, making it one of the few caves in Lebanon with the prospect of entering from one entrance and exiting from another. The main entrance (that is mainly used for the educational outings), has an iron cage (Photo 2) with a locked door and permission to enter from it is always needed from the landlord who keeps the keys. As for the second entrance, it is open and accessible to anyone; yet the access path to this entrance is a little bit more difficult when compared to the first entrance (Photo 3).

The cave consists of three main levels with interconnected passages and rooms. Surveying them required a lot of effort and patience; however, these activities were blended with pleasant feelings and funny and memorable incidents that can never leave the minds and hearts of those who took part in this project.

Rena K. took the lead in mapping and the following was written by Maia S. after an excursion that took place in Feb 19, 2006.

"Topo wise, we all depend on Rena's skills in drawing and noting practically everything she sees. We get her the info and get back to her with the attitude of: that's the way it is, figure it out and draw it!! So let's give her the credit she deserves… As for Hadi, he seems to have an amazingly good sense of orientation; he always knows where we are, where this passage could lead us and how it is connected to the previous one, unlike others… That must be part of his full loaded memory skills."

The work which maily consisted of mapping took place in three main phases. The first phase started with the surveying of the main entrance to the lower levels of the cave, reaching the second entrance, and mapping the outer area to connect the two entrances. The second phase started from the second entrance mapping all of what was left un-surveyed in the ground level. The last phase was to map the upper level.

THE 1st PHASE

FROM ONE ENTRANCE TO ANOTHER

The aim during this phase was to finish surveying the main tunnels connecting the ground level to the lower passages before water floods some of the main channels as we were working in winter (Photos 4 and 5).

Photo 3
The entrance to the lower labyrinth.
(Photo by Mike Clayton)

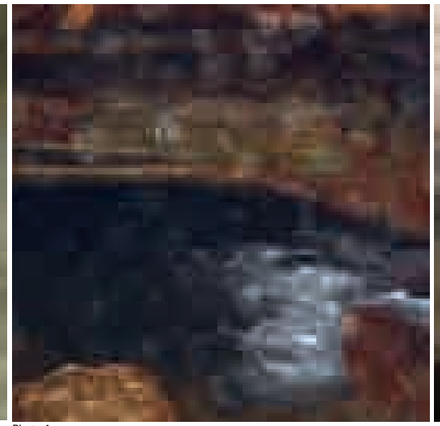

Photo 4
The passage leading from the Pyramid room when flooded.
(Photo by Hadi Kaasamani)

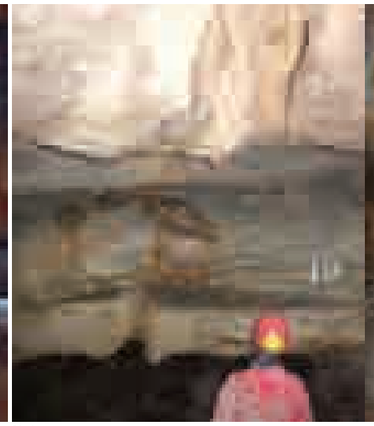

Photo 5
The same passage leading from the Pyramid room.
(Photo by Rena Karanouh)

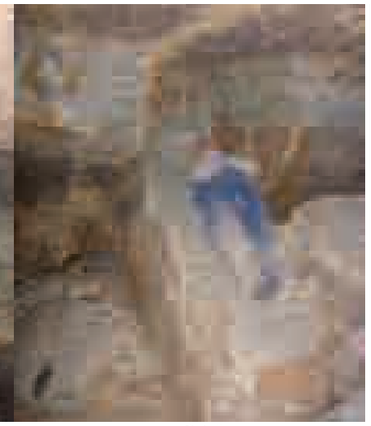

Photo 6
The Sargophagos.
(Photo by Hadi Kaasamani)

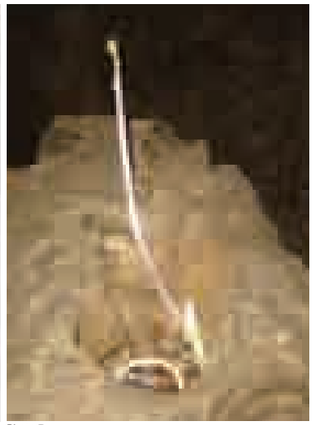

Photo 7
The 'Laouze'.
(Photo by Hadi Kaasamani)

Photo 8
A passage in Faux Plafond.
(Photo by Rena Karanouh)

During this period, many rooms and passages were surveyed, some already had names (check the survey at the back), while others were discovered and named during the mapping process.

Here is a list of the main ones and some stories on how they were named:

The Pyramid Room (Salle des Paysans):

Located in the ground level of the cave, this room got its name from small rounded rocks forming a large pyramid shape in its middle.

The Sarcophagus (Photo 6):

Just east from the Pyramid room, there is a big rectangular rock that seems to have fallen from the passage ceiling. It was funny that no-one noticed this distinctive rock until Rena K. gave it its name "The Sarcophagus" and lay on top of it to hammer the message home.

The 'Laouze' (almond tree in English) (Photo 7):

Located between the Pyramid Room and Salle Dayaa'. It became so famous due to many reasons but most importantly it made everyone enthusiastic on how it could have grown without sunlight in the middle of the cave and not even close to the entrance. Even more, some of the cavers were connected to it and they would travel from the entrance just to check if the "Laouze" was still alive. Others even took it as a point of reference whenever they got lost with their sense of direction, no wonder! If Motel Al-Rabih is one!

Salle 'Dayaa':

It got the name after Rena K once got lost when we saw that room from an upper level and couldn't recognize where it is located though it is considered one of the main connecting points in the cave. Its location can hardly be mistaken with other passages.

Faux Plafond Passage:

This large tunnel got its name from the older generation of cavers after ceiling collapses showing different rock layers.

During snow melt, this passage becomes a gushing river making it inaccessible. One of the small side passages off Faux Plafond passage is rich with beautiful colourful speleothems and features such as the brown wavy cloud-like calcite inside small pools or the amazing brown and white stripped spherical stalactites and soda straws.

Salle Sushi:

Located at the end of the Faux Plafond Passage, it was named while the team on that day was having a break and spoke only about Sushi as it is obvious that all seemed to have been very hungry.

Gallery Marmite (Photo 1):

Located few meters from Salle Sushi. As named on the 1974 map. It is one of the most well known passages in Roueiss Cave and is so named after the many small rounded water potholes that dot its length.

The Big Room:

Located at the end of Gallery Marmite; it is simply named due to its huge size. It is a room that connects several different passages including the biggest tunnel in Roueiss cave. Through this big tunnel is the entrance to "Bokhsh Raja" which we were told was named after Raja fell couple of meters somewhere inside this passage (Urban legend?).

One particular trip worth mentioning is titled Rami & The Darkness by Hadi K., February 5th, 2006:

"And another sound of a hammer hitting the rock like as if there is a quarry working inside the cave, which was Rami trying to scare the bats from approaching his area if they decided to or if there is one anyways!"

They reached and Maia opened her tiny anti-water proof notebook which contains mainly all swears of the underground world. Then she showed Rena four pages of maps as if Rena will know where Maia is located and the direction. So Rena informed her that next time she needs to stay close and inform us with each move unless it is a big section that needs mapping."

Rami was asking if we will go up so that he won't need to go down that s****y rock. So we told him to stay up for a while until we decided otherwise. At that time you can feel how much he was relaxed. He tried to enter a bit in the tunnel for like 3 minutes but then came out like in three seconds! As if he saw a rock looking at him!"

At the end of this period, it was really a superb feeling to know how to enter from one gate and exit from the other without getting LOST!

THE 2nd PHASE

THE ANNOYING MAZES

The aim was to complete surveying all the side openings that were left from the first phase. Mainly all the work took place in the ground and lower levels of the cave (Photo 9-13). This period was the toughest among the three as it took the longest time to finish. It consisted, most of the time, of crawling in long tight interconnected labyrinths and passages.

Quoting Maya in one of her reports:

"Every time we get into a couloir we pray for it to be closed few meters ahead of us, but it often keeps going longer and gets increasingly tighter..."

This time the work started from the second entrance. The plan was to finish the section area by area. The main rooms and passages that were surveyed during this phase are the following:

Salle Tewzee or the Distribution Room

A room located in the middle of some intersected and interconnected tunnels connecting the second entrance all the way to reach the Big Room. Salle Tawzee became one of the most important places during the second phase as many surveys were initiated from this room. From this room one can see most of the tunnels in this section.

Maya's Tunnel:

Named after Maya S. entered one of the low, tight tunnels and said it is too tight and nothing continues. Then Shadi C. entered to find that what had appeared to Maya as small and tight, was big… in fact... huge. This tunnel is one of the widest passages that exists in Roueiss cave and thus has been named Maya's tunnel. Following this tunnel we arrive at the Big Room.

Croatia Passage:

This wet passage is named after its' mapping was carried out with Croatian cavers that where visiting during the MESS2 Congress that the SCL had organized in 2006. The aim of mapping together was to exchange our knowledge in surveying. It was achieved through mixing teams. It was exciting to see how they surveyed as an actual accurate map was drawn inside the cave.

The Hamburger:

Named by Nour F., this passage lies parallel to Salle Sushi where there is a three meter climb up and then head first down into a tunnel to reach a large area which is known as the Hamburger. One will feel like they are the 'meat' in a hamburger, sandwiched by two rock beddings. The ceiling is so low that many a caver have been stuck in this area as their bellies had not allowed them to continue (no name mentioned but you know who you are!).

THE 3rd PHASE
THE UPPER LEVEL

A couple of meters from the main entrance and going up north with an increasing slope is where we worked the last phase of the surveying of Roueiss Cave. This period was the fastest as it didn't contain a lot of the tight passages or complexity.

Some of the main galleries in this section:
The Dream Theater:

Named by Samer H. and Loucy L., it is simply the largest room in Roueiss cave with a very high ceiling. The room just looks like a theater and thus it was named. In this room there is a 100m chimney that was climbed in 2000 and 2001 by our club members.

The Big Lake:

Located to the left of the Dream Theater, it is a beautiful lake with crystal clear blue water. Many a caver had fallen in after attempting the wall-walk to bypass it.

That is all that Roueiss had to unveil to us. Three levels of long complex passages and a year of surveying outings with a lot of stories, adventures, friendships and laughter.

MEMORIES

Before ending here are quotes from some outing reports written:

MARCH 19, 2006 NABIL S. WROTE

"Starting from a previously surveyed point to a journey that will blow the head off, yes its one of Roueiss's labyrinth, its all right… left… parallel… none parallel… tight... muddy… and all other directions that you can think of."

The labyrinth seems to reach no end, the more we cover the more it grows, couple of hours of working we reached the centre of labyrinth where Rena started to ask about the link to (Bokhosh Raja) point, she wanted to see it in order to draw. So we had to link the centre to (B.R.) survey point.

At the beginning it was confusing when each one of us start to give his analysis (NAZARIYAT) where no visual or physical proof exist, and Rena needed all that to understand how to draw, and she was hoping to draw the link on the same page of the drawing, so she started to shout 'FIND ME BOKHOSH RAJA.' Frustrating isn't it Rena!

3:30 pm – Changing location of work
At that point no break was taken, we were working fast, no time to waste we wanted to cover a large section, (plus "Wassim will sleep if he stops moving" you can ask him why later)."

MAY 6, 2006 RENA K. WROTE

"We continued surveying the cave where Neven and Igor stopped. It is getting worse! Nothing ever closes, why should it?"...

JUNE 25, 2006 MAIA S. WROTE

"Joe Z. was the first to go out; he went outside while we were still bringing the bags we left aside. I was following and I saw that the main gate was closed, so I guessed we had to climb in the old monkey style to get out as we usually did when we had no key for the gate. And so I did… Then I see a huge laugh on everyone's faces and then Nabil simply opens the gate beneath me and gets out!!! I didn't have the reflex to check if it was open, I trusted Joe's words, but now I can see from where the old sense of humor (manyakeh) comes from in the club!!!"

In the end it was not an easy task but we did it and Roueiss cave is currently 5460 meters in development and the second longest in horizontal cave development in Lebanon.

We would like to thank all the cavers (national and international) who helped in surveying Roueiss cave. They made working in such an environment fun. Special thanks goes to Rena K. for drawing nearly all of the cave and being patient, Maia S. for all the detailed reports she wrote, Chadi for being there most of the times even with his injured fingers, Loucy and Samer for forming the alternate team, Issam BJ for his overseas support, Emma and Mike for all the help and pictures, the Hungarian team, for their great spirit, and bandaging Shaggys' fingers and the Croatian team for exchanging their knowledge in surveying with us.

Photo 11
Surveying in the lower labyrinth.
(Photo by Hadi Kaasamani)

Photo 9
A rockfall inside the ground level.
(Photo by Issam Bou Jaoude)

Photo 10
A passage inside Faux Plafond passage.
(Photo by Rena Karanouh)

Photo 12
A passage near the ground level gate entrance.
(Photo by Rena Karanouh)

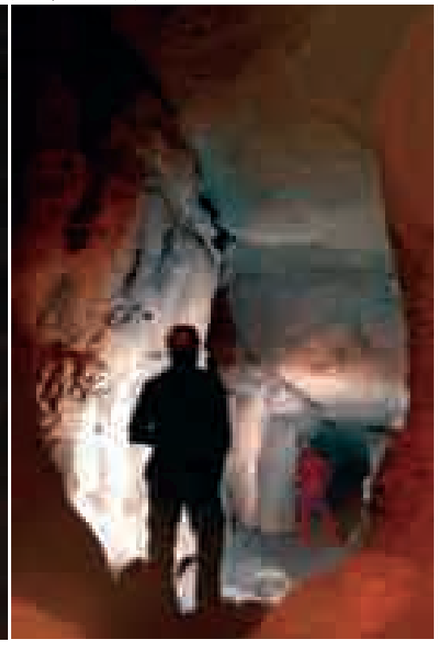

Photo 13
The water in the Lost lake.
(Photo by Rena Karanouh)

The Big Room in Roueiss cave.
(Photo by Issam Bou Jouade)

تقرير عن الزيارة الاولى لمغارة الرويس بقلم باسم رسلان

كانت لي فرصة بالمشاركة، وللمرّة الأولى، مع فريق "Speleo Club du Liban"، المختص في تنقيب المغاور. أنا من محبّي السياحة والمغامرات البيئيّة. والدخول في أعماق الجبال، وفي باطن المغاور، كان خبرة لطالما أردت أن أكتسبها. والزيارة الأولى لي كانت لمغارة الرويس، والواقعة في منطقة أفقا الشماليّة.

بدأت رحلتنا إلى مغارة رويس في الصباح الباكر من يوم الأحد الواقع في 2006/09/02، حيث بدأ الفريق بالتجمّع في الطريق المؤديّة إلى أفقا. محطتنا الأولى كانت عند "فلافل أبو أندريه"، حيث تناولنا وجبة فطور "ثقيلة" من فول وبليلة. ومن ثم انطلقنا نحو المغارة. في الساعة الحادية عشر ترجّلنا عند مدخل المغارة، حيث اندمج فريقنا الصغير بفريق آخر. وعند المدخل تحضّر الفريق باللبّاس الخاص للدخول في رحلة وحل وحصى، ومغامرة مغارة الرويس.

عند الحادية عشر والنصف دخلنا المغارة. لقد كنا فريقا كبيرا. ضمنيا، تكوّن هذا الفريق من فريقين. الفريق الأول، وقد كان برفقة أحد الأعضاء للنادي، هاتي، بدا أنه يتكوّن من زوّار جدد لهذه المغارة. أمّا الفريق الثاني، والذي كنت أنا برفقته، وتضمّن كلّا من رينا، هادي، شاغي، نادين، وهبة، فقد كان هذا الفريق بمهمّة "تكييل" للمغارة. كان أعضاء النادي يجولون بنا في أرجاء المغارة. كانوا يقدون بنا النفق تلو النفق، والهوة تلو الهوّة، والممرّات الضيّقة تلو الأخرى، وكأنهم كانوا يتجوّلون في أرجاء منزل صديق أو قريب، يدركون كل ممرّ وغرفة. ما أثار إعجابي في هذه الرحلة في داخل المغارة هو أسماء الممرّات والغرف. وقد مرّ على سمعي أكثر من أسم عجيب، كال: "Hamburger" و "Sushi" و غيرها من أسماء غريبة، معظمها كان أسماء وجبات ربما. بدا لي لاحقا أن مسمّوا هذه الأسماء، عندما أطلقوها على غرف وممرّات المغارة، لم تكن بليلتهم "الأبو أندريّة" دسمة كفاية لهم في صباح نهار ذلك اليوم، فالتجأوا إلى أسماء رغبات طعام وهم في جوف الجبال. وبعد جولة استمرّت ساعتين في أرجاء وأنفاق المغارة، قرر الفريق الأوّل المؤلف من غالبيّة زوار، قرروا الخروج من المغارة. وبقي الفريق الذي قررت الإنتساب إليه: "فريق التكييل"، مستعدا لمهمّته.

بعد استراحة قصيرة اتجه الفريق مرّة أخرى إلى جوف أنفاق المغارة. وقد تضمّن الفريق هذه المرّة فريقين: واحد لأخذ مقايس المغارة، وآخر كانت مهمته إستكشاف ممرات جديدة. في البدء أنا وهادي بدأنا ب"التكييل". كانت رين، منسّقة المجموعة، تدوّن على دفتر صغير، عراه الوحل من على جوانبه، مقياس المساحة بين ممرّات المغارة. أنتقلت ثم إلى فريق آخر: أنا ونادين، وقمنا برحلات استكشاف لممرّات وأنفاق جدّ ضيّقة. وأنا أصارع الوحل والصخر والحصى في أحد الممرّات الضيّقة، راودني سؤال سريع: ما سبب وجودي هذا اليوم في رحم من أرحام الجبال؟ وقد كان الجواب أسرع: "حبّي للمغامرة والإستكشاف"، وهو الشريك السادس بين طاقم الفريق. ومن جملة الإسكشافات للممرّات، كان اكتشاف ممرّ، ربما كانت نادين من أوّل مدشّنيه. ممر طويل، تعيقه في بعض الأحيان صخور جميلة، لكنه ينتهي بهوّة ضيّقة جدّا في آخره. كان ذلك الممر آخر "الإقتحامات" التي قمنا بها ذلك اليوم في قعر المغارة. ومن ثم توجّهنا إلى خارج المغارة بحلة وحل جديدة. لقد أمضينا أكثر من ست ساعات بدت أسرع من عقارب الساعة. توجّهنا أخيرا إلى آخر محطة لنا: إستراحة العرزال.

لا شك أنها مغامرة وخبرة أوّد أن أعيدها مرّة أخرى. الرويس، كما قال لي هادي والجميع، هي أسهل المغاور دخولا... ولأنني محبّ للتحدّي قبل المغامرة، فإنني بانتظار رحلة أخرى لمغارة أخرى ممرّاتها أضيق و أطول، والمغامرة فيها أصعب. وفي الختام أوّد أن أشكر جميع الفريق الذي حملني على طاقمه، ولو ضيفا في المرّة الأولى، آملا تكرار مثل هذه المغامرات مرّة أخرى.

A Roueiss cave outing report written by first time caver Bassem Reslan from the Speleo Club du Liban archives.

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ROUEISS CAVE: POTENTIAL SIMILARITIES WITH AFQA CAVE

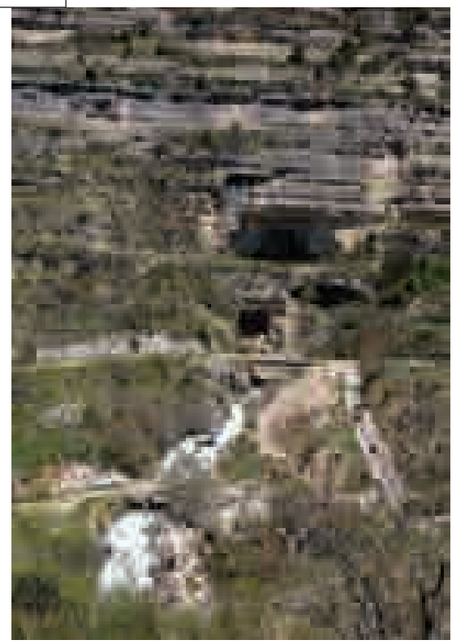


Fig. 1
The entrance of Roueiss cave in April 2009.
(photo by Issam Bou Jaoude)

La rivière du Nahr Ibrahim est principalement alimentée par les sources de Afqa et Roueiss, jaillissant des grottes portant le même nom. L'étude de la géologie, la spéléogenèse, la géomorphologie et l'hydrogéologie de ces réseaux souterrains révèle des similarités et différences intéressantes à noter pour la compréhension de leur développement et fournit des explications probables sur le développement de grottes similaires au Liban.

ان ينابيع أفقا والرويس يغزيان نهر أبراهيم ويتدفقان من فم مغاور أفقا والرويس. ان تشابه وفوارق خصائص تكوين هاتين المغارتين من النواحي الجيولوجية والهدروجيولوجية والجيومورفولوجية والسبيلوجينيسية تزويدونا بمعلومات عن كيفية تكوين هاتين المغارتين وتعطينا أيضاحات عن كيفية تكوين بعض المغاور الشبيهة لهاتين المغارتين في لبنان.

DEVELOPMENT	[illegible]	[illegible]
FORMATION	Upper Albian, Hammana Formation	Upper Albian, Hammana Formation
LEVELS INSIDE CAVE	3 Levels Three fully developed levels	3 Levels Two fully developed level
DISCHARGE OF SPRING	[illegible]	[illegible]
SIZE AND TYPE OF ENTRANCE	Two natural bridges with large collapsed blocks	Large collapse entrance measuring 30mx30m
CAVE PASSAGE SHAPES	5 types	4 types
UNDERGROUND RIVER	Located in the lower levels flowing from downstream vadose with no clear river flowing	Located throughout the cave from a large tunnel passage
TYPE OF CAVE	Fracture network cave	Fracture network cave
LOCATION OF CAVE WITH RESPECT TO MAJOR FAULT	North of the fault (on the lowered block)	South of the fault (on the lowered block)
WATER RESEVOIR AQUIFER	Cenomanian Formation	Cenomanian Formation
WATER BARRIER FORMATION	Sannine Formation	Sannine Formation
FRACTURE ANALYSIS	Set 1 [illegible] Set 2 [illegible]	Set 1 [illegible] Set 2 [illegible]
FLOWING DIRECTION (Sannine Formation)	[illegible]	[illegible]

Table 1
Similarities and differences between Afqa cave and Roueiss cave

Two major springs which are 6 km apart (as the crow flies), Afqa and Roueiss, are the primary sources of Nahr Ibrahim River. These two springs issue from the same named caves respectively. Those caves have developed in the Upper Albian aged rocks (Hammana Formation), and both of their springs are fed primarily from the Cenomanian aquifer (Sannine Formation). In addition to that they both have similar cave passage shapes, they are of similar size, and they both have similar structural control on their cave development. However, Roueiss cave has developed on the northern block of a major fault while the Afqa is on the southern block of a similar fault.

The similarities and differences between these two cave systems based on their geology, speleogenesis, geomorphology and hydrogeology is interesting as it gives insight on how those caves have developed and provides a possible explanation on how similar caves have developed in Lebanon. This paper will introduce the issues surrounding the development of Roueiss cave and try to compare those elements with its counter-part Afqa cave.

Introduction

Roueiss cave is the second longest horizontal cave in Lebanon, measuring 5460m in cave development. It is located in central Mount Lebanon between the villages of Kartaba and Aaqoura. The Lambert coordinates for the entrance of Roueiss cave are x=167,000m and y=240,940m, with an elevation of 1300m (asl). It lies approximately 6km (as the crow flies) from the third longest horizontal cave in Lebanon, Afqa cave which has a development of 5260m (Table 1).

A perennial spring, Roueiss spring, issues from the cave but does not issue from the cave's two entrances directly (Fig. 1); it flows from the lower levels of the cave through collapse boulders. During winter, the water floods the cave and issues from a higher location close to the lower entrance of the cave. The average rate of the spring according to Edgell (1997) is $0.5m^3/s$ - $1m^3/s$. A spring with similar characteristics issues from Afqa cave, however, contrary to Roueiss spring it issues from the mouth of the cave and during flooding condition water emerges from the lower levels. The location of the springs during flooding and dry season and the difference in development of levels in the two caves might indicate that Rouiess cave could be more developed than the Afqa cave.

Roueiss cave, similar to its counterpart, is made up of three separate levels. But in Roueiss cave the three levels are fully developed while in Afqa cave only one level is (Table 1). The Ground level, which is effectively rectangular in shape, consists of fissure passages, keyhole passages, mazes, and large rooms. The Lower level is a set of grid-like labyrinths set in a rough rectangular pattern. The Upper level is a long, large L-shaped tunnel which includes the Dream Theatre the largest chamber in the cave measuring approximately 50m by 50m.

Hydro-Stratigraphy

The area around Roueiss cave contains rocks that span nearly the entire sequence of the Cretaceous period from the Chouf Sandstone formation until the Sannine Formation (Fig. 2). There are also some Quaternary deposits in the region as well as a large alluvial fan located approximately 500m NW of the cave.

Similar to Afqa cave, Roueiss cave lies in the upper Hammana Formation (Albian epoch) in a sequence of interbeds of limestone and marl beds of varied thicknesses. Overlying the Hammana Formation are rocks of the Sannine Formation. Nearly 400 vertical meters of Sannine formation limestone lie above the Roueiss cave. This can be considered the source rock of Roueiss spring while the Upper Hammana can be considered the discharge rocks whose lower volcanic beds act as a barrier to water flow.

The percentage of infiltration of precipitation into the Sannine Formation is approximately 60%, average rainfall in the area is around 1200mm/year (Atlas Climatique, 1977) and an average discharge from the cave is $0.75m^3/s$ (Edgell, 1997). Taking these measurements into consideration a rough estimate of the catchment area was calculated and found to be $33km^2$. Afqa cave's catchment area is 66 km^2 based on a spring average discharge of $1.5m^3/s$ (Edgell, 1997). Considering this we can deduce that in the 1970's the discharge out of Afqa cave is double that of Roueiss cave.

Structural Geology

Much like Afqa cave the area around Mgharet Roueiss cave is highly faulted and has undergone a great deal of deformation.

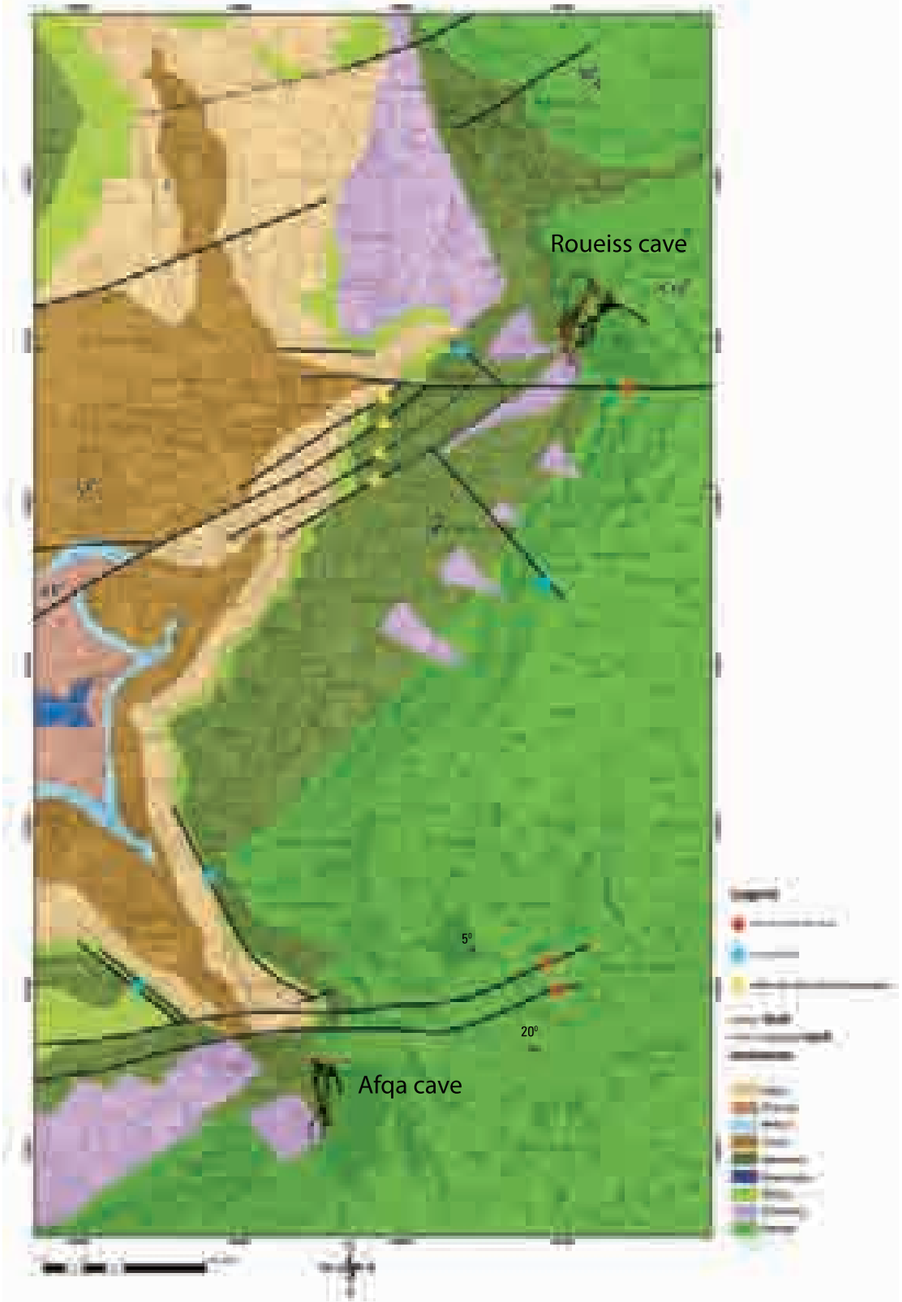
Faults

The major fault in the Roueiss cave area is an E-W trending dextral strike-slip fault (with a normal dip-slip component), passing approximately 250m south of the cave. The orientation and inclination of this fault is 260/70º with a vertical displacement of about 70m and a horizontal displacement of nearly 330m. Lineations on this fault were measured and found to have a pitch of 12° E. The major fault in the Afqa cave area has a similar structural imprint but it passes north of the cave. Both caves have developed on the lowered faulted block. For Rouiess cave it is the northern block and for Afqa cave it is the southern block (Fig. 2).

Secondary synthetic strike-slip faults trending NE-SW were identified. Also secondary normal faults trending NW-SE and NE-SW are present. The vertical displacement of these faults range from 2m to 20m.

There are six major faults (Fig. 3) observed inside Roueiss cave. Three were located in the Upper Level passage with orientations trending NE (with slickenlines pitching 15º East). One fault passes through the Big Room and has a trend of NW. Another lies in the Large Tunnel of the Lower level trending also NE.

Fig. 2
Geological map of the Afqa-Aaqoura area showing both Roueiss cave and Afqa cave.



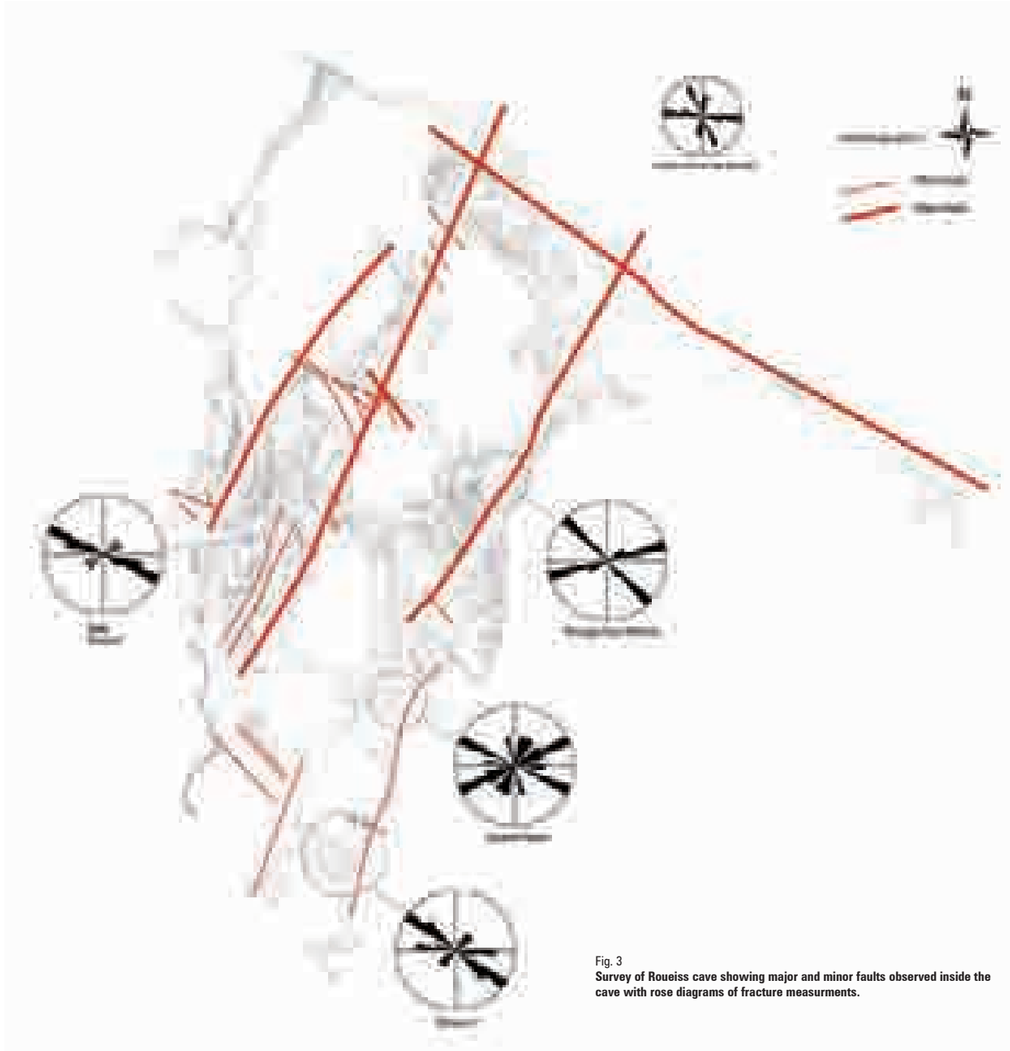


Fig. 3
Survey of Roueiss cave showing major and minor faults observed inside the cave with rose diagrams of fracture measurments.

Bedding

The area around Roueiss cave can be split into two regions. The first is the block south of the E-W fault with a general bedding inclination ranging from 15° to 20° NNE. The second region lies north of the NNE-WSW fault. The bedding in this area ranges from 15° to 35° NNW.

Beds in the Afqa cave area are also different between the northern and southern blocks for the northern block 5° SE and in the southern block 10° to 20° NNW.

Joints and Fractures

Five locations were chosen for fracture analyses. A total of 63 discontinuities were measured inside and outside of the cave. Rose diagrams were constructed for each location (Fig. 3). The general orientations of these sets were found to be WNW-ESE and SW-NE.

- In Salle Tawsee (in the Lower level), 8 discontinuities were measured. The dominant orientations were WNW-ESE and to a lesser degree NE-SW.
- In the Faux Plafond Gallery, 9 discontinuities were measured. The dominant orientations were NW-SE and to a lesser degree WSW-ENE.
- In the Pyramid Room, 11 discontinuities were measured. The dominant orientations were NW-SE and WSW-ENE.
- In the area near the Entrance One, 11 discontinuities were measured. The dominant orientations were NW-SE, and to a lesser degree E-W and NE-SW.
- In the area outside, west of the cave (next to the bridge), 24 discontinuities were measured. Three different directions for the discontinuities were measured, two for joints, ENE-WSW and NNW- SSE, and one for veins, NW-SE.

These joints can be considered as secondary conjugate sets for the major strike-slip fault.

It is clear from the rose diagrams that the fracturing correlates well with the directions of the faults observed inside the cave as well as the general orientation of the tunnels. Similarly the major passages in Afqa cave are developed along the major fracture directions which are NNW-SSE.

Passage Morphology

Fissure, tubular, keyhole passages, lenticular tubes, shafts and large collapse rooms were identified inside Roueiss cave

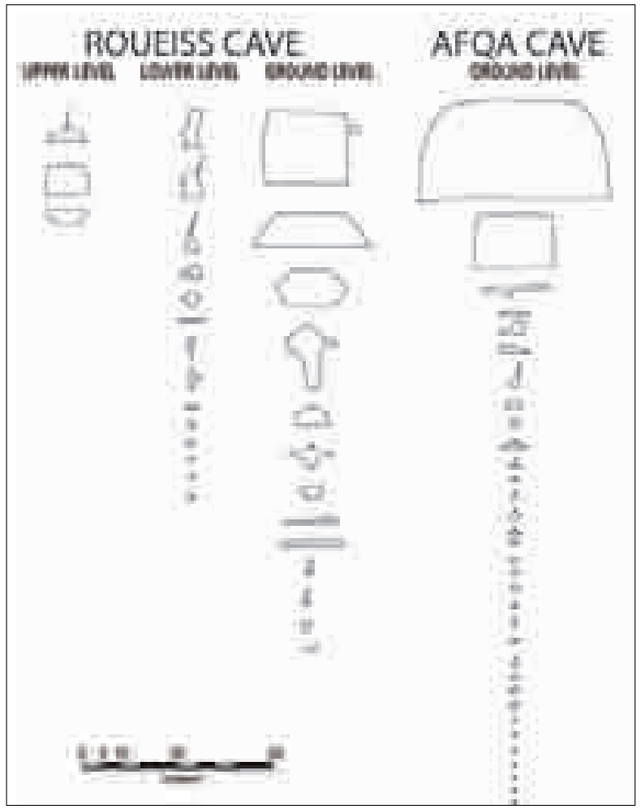


Fig. 4
Roueiss cave passage morphology with comparison to the Afqa cave counter parts.

(Fig. 4). In high water flow during winter the lower levels become inaccessible due to flooding. This all supports the notion that the cave is still very active in its lower passages, and the upper level has become a fossil gallery.

Ten different passage shapes were observed inside Roueiss cave. Although the sizes of each passage differed, the actual shapes of the openings were similar (and were consequently placed into one category). The different sizes of the passages have a direct relationship with the level they are located on. The Upper level contains some of the largest passages while the Lower level contains some of the tightest. The Ground level has varied sized passages. This might be due to the lithological nature in which each passage has developed. The larger upper rooms are developed in thick massive limestone of the Sannine Formation. While the smaller tighter formation of lower level passages are developed in the upper Hammana thin limestone beds. Afqa cave has nine different shapes of cave passages which are similarly controlled by lithology and structural geology.

Large rooms in Roueiss cave appear to be formed at the intersections of faults with collapse being the main process enlarging the volume along with solution action. For these rooms to have become as big as they are means that a substantial stream used to run through these rooms to remove debris and to enlarge them. This appears to ascertain that water level has dropped over time, from water eroding and forming the Upper level, to the current water flow at the Lower level since the big tunnels are located in the Upper levels and hence the oldest and largest.

Small scale speleogens solution features were found in most passages. Scallops, flutes, rills, spongework, solution pockets and potholes were seen in various sizes throughout most of the Roueiss cave.

The cave is not overtly well endowed with speleothems. It has its fair share of the traditional concretions including stalagmites, columns, stalactites, flowstone, rimstone dams and there is nothing extraordinary about these calcification features. This might be due to the large volume of fast moving water that has flowed through this cave. Afqa cave also has a lack of

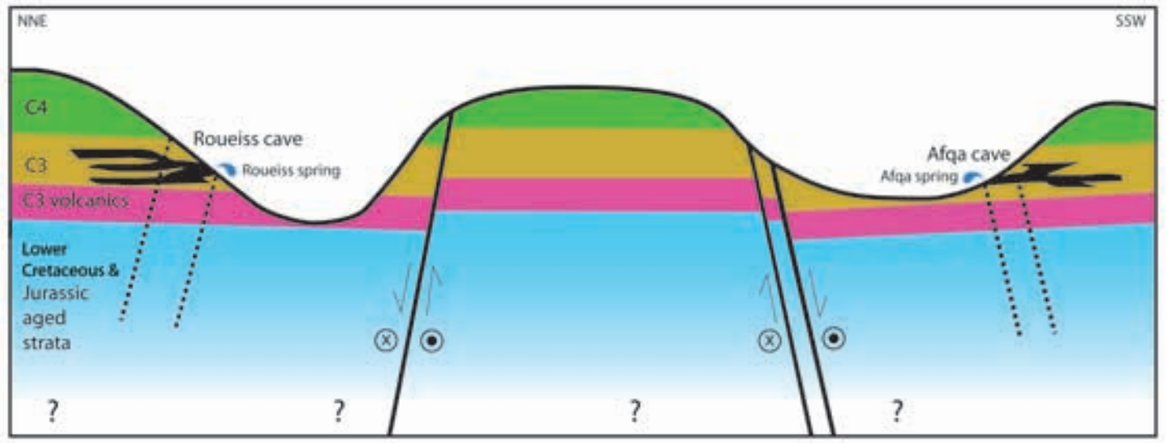


Fig.5
A schematic cross-section showing the geology in Roueiss cave and Afqa cave area.

speleothems inside it. Much like Roueiss cave it has the standard common speleothems of stalactites, stalagmites and flowstone with no large-scale special deposits.

Discussion

The second and third longest caves in Lebanon are 6km apart. Both feed the waters of Nahr Ibrahim and both have imprints of the local tectonic activities on their formation and development.

Similar to Afqa cave, Roueiss cave is a structurally controlled cave. They were developed on the lowered blocks (Fig. 5) of an EW strike-slip fault with normal dip-slip componant. The caves follow two general fracture sets in the area which in turn follow the orientations of secondary faults in the region. Essentially Roueiss cave is a fissure network cave with the underlying layer of impermeable rock (Hammana Volcanics Formation) acting as the lower boundary of the cave much like Afqa cave. Both caves are also formed on the structurally lowered block as a result of water damming (Karanouh & Bou Jaoude, 2007). There is also a clear alignment of cave passages with local discontinuities in both caves and this can be observed in the cave, on the rose diagrams and on the geological map. There is also an alignment between the faults in the cave and the secondary ones observed outside.

Considering Afqa cave and Roueiss cave as having been formed essentially by the same processes (water banking on faults with water flow along bedding planes) we can also suppose, with the three levels in Roueiss cave being well developed while only one well developed level in Afqa cave, that Roueiss cave has been developing longer than Afqa cave. The systematic regional lowering of the water-table over time has formed the different levels, with the passage sizes affected by the different flow rates of the underground water as well as lithology it passes through.

An interesting observation is that in Afqa cave the perennial spring flows above the flooding springs and in Roueiss cave the perennial spring flows below the flooding springs. This indicates that Roueiss cave is possibly more developed than Afqa cave.

The Upper passages in Roueiss cave are now fossil galleries. The Ground level is effectively a potential fossil gallery although during flooding water still does pass through it and the range of small and large passages is a testimony to this interplay of water flow, lithology and structure. The Lower level is the youngest level and it is still enlarging its current small passages, but the extent of enlargement is restricted by the bedding thickness.

The comparison made, showing a noticeable correlation between these two caves, allows further understanding of the development of the Lebanese caves. Although the Afqa and Roueiss caves are in different stages of development they draw a picture, albeit a vague one, on the events that led to their development.

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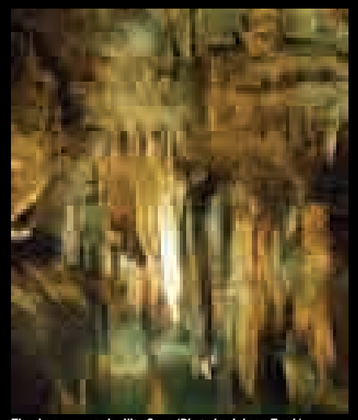
THE LONGEST CAVES OF LEBANON

(as of 2008, Speleo Club du Liban archives)

1	Jîita cave	10050 m
2	Roueiss cave	5460 m
3	Afqa cave	5260 m
4	Al-Kassarat cave	4648 m
5	Ain al-Libné cave	4560 m
6	Nabaa al-Shatawie	4130 m
7	Faouar Dara sinkhole	3500 m
8	Qattîne Azar sinkhole	3100 m
9	Dahr al-Ain cave	1500 m
10	Nabaa al-Moutrane cave	1200 m

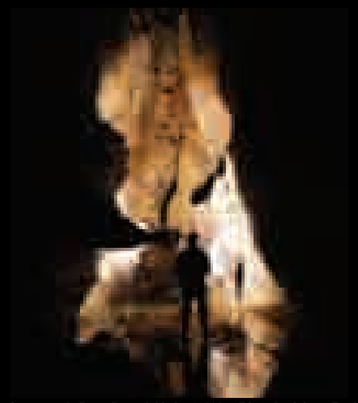


The river passage in Jiita Cave *(Photo by Johnny Tawk)*

THE DEEPEST CAVES OF LEBANON

(as of 2008, Speleo Club du Liban archives)

1	Faouar Dara sinkhole	- 622 m
2	Qattîne Azar sinkhole	- 515 m
3	Ballouh Baatara sinkhole	- 255 m
4	Jouret al-Abed sinkhole	- 225 m
5	Al-Badaouiyé sinkhole	- 205 m
6	Ain al-Libné sinkhole	- 195 m
7	Othman Remaïhy sinkhole	- 163 m
8	Aaqroub sinkhole	- 155 m
9	Ballouh Balaa sinkhole	- 152 m
10	Tarchich sinkhole	- 147 m



A passage in Fouar Dara sinkhole at -620m *(Photo by Johnny Tawk)*

NEW DISCOVERIES

Mtal al Azrak
Mgharet el Sowan
Houet Mrah El Hbas
Houet Tawko
Houet Ras el Astar
Houet El Doueik
Mgharet el Nissian
Houet el Dakhneh
Antelias cave
Jouret el Ballout sinkhole

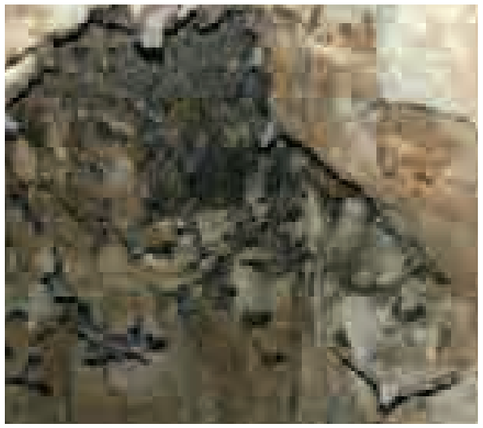
MGHARET MTAL AL AZRAK

Located on the outskirts of Tripoli this cave was discovered in 2003 by a group of SCL cavers lead by Issam B. It proved to be an interesting cave for it is developed in the Miocene conglomerates and it had a large bat community. It was then mapped later that year by a group of SCL cavers lead by Joanna D.

The bat roosts which are mainly fruit bats are being monitored on yearly bases. This might provide clue on how to protect this fragile environment.

This cave is under threat from a sewage line that is passing over it and leaking into the cave and contaminating it and destroying it habitats.

LOCATION	x = 159,816m y=274,582m z=20 m asl
DISCOVERED IN	2003
DEVELOPMENT	150m, horizontal
GEOLOGY	Miocene
SURVEYED BY	Joanna Doummar Georgina Catacroa Elias Kasouf
DRAWN BY	Joanna Doummar
DIGITIZED BY	Johnny Tawk and Bashir Khoury



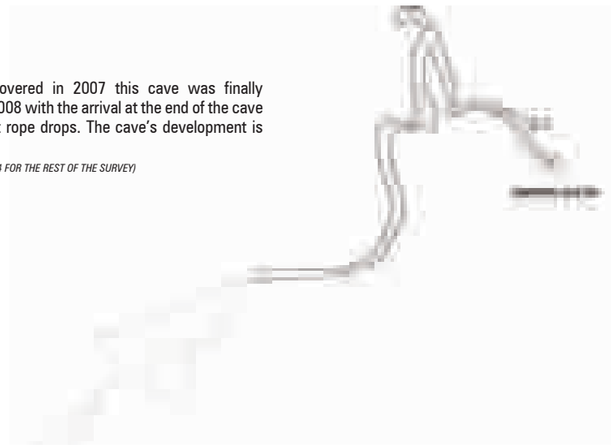
The fruit bat colony inside Mtal al Azrak cave.
(Photo by Rena Karanouh)

Location of Mgharet Mtal Al Azrak

MGHARET EL SOWAN

First discovered in 2007 this cave was finally completed in 2008 with the arrival at the end of the cave after two short rope drops. The cave's development is now 370m.

(CHECK OUAT'OUATE 14 FOR THE REST OF THE SURVEY)



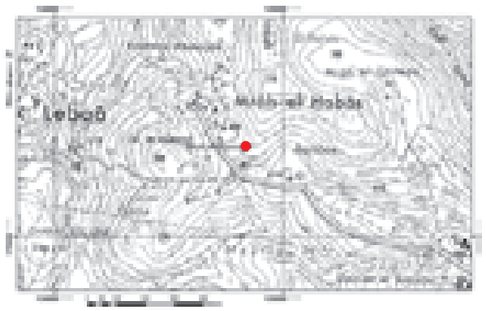
HOUET MRAH EL HBAS

An article from An Nahar newspaper on the cave, February 2004

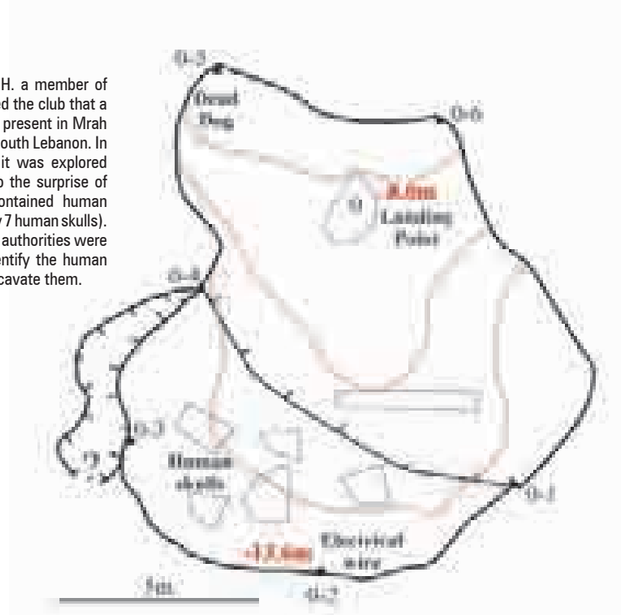
An article from Al Balad newspaper on the cave, February 2004

LOCATION	x= 124,833m y=179,387m z=395m asl
DISCOVERED IN	2004
DEVELOPMENT	13.6m, vertical
GEOLOGY	Keserouane Formation
SURVEYED BY	Fadi Nader Hiba Aboul Hosn
DRAWN BY	Fadi Nader, Hiba Aboul Hosn
DIGITIZED BY	Johnny Tawk

Mr. Habib H. a member of the SCL informed the club that a new sinkhole is present in Mrah el Hbas village south Lebanon. In February 2003 it was explored and mapped. To the surprise of the group it contained human bones (precisely 7 human skulls). The appropriate authorities were called on to identify the human remains end excavate them.



Location of Houet Mrah El Hbas



HOUET TAWKO

During the geological investigation of the Bchare area in 2005, a local shepard informed SCL members of a sinkhole close to his farm.

This sinkhole was found to have an extremely tight entrance with an initial drop of 7m. Larger cavers could not enter so it remained to the thin ones to survey the cave. It proved to be an interesting cave because it developed in Quaternary deposits like Qadisha cave.

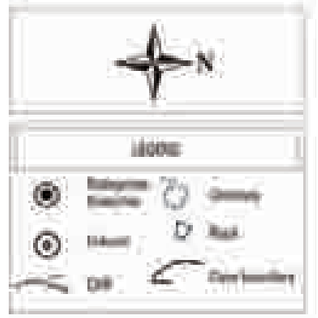
The cave consists of two levels. The first is a small room with a muddy floor leading to a 14m drop which leads onto a ledge that drops another 4m into a large room filled with concretions and boulders.

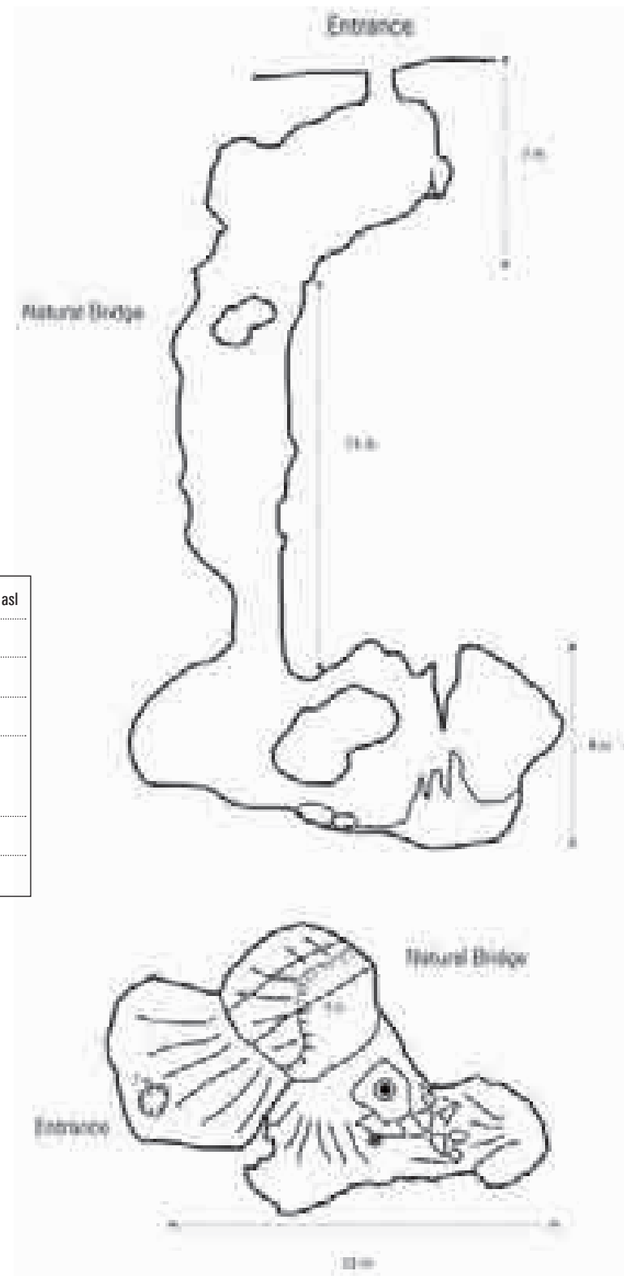
The location of Houet Tawko.

The very tight entrance of Houet Tawko.
(Photo by Issam Bou Jaoude)

Wassim H. getting ready to descent into Houet Tawko.
(Photo by Issam Bou Jaoude)

LOCATION	x=179,761m y=256,802m z=1955m asl
DISCOVERED IN	2004
DEVELOPMENT	25m, vertical
GEOLOGY	Quaternary deposits
SURVEYED BY	Wassim Hamdan Bashir Khoury
DRAWN BY	Wassim Hamdan
DIGITIZED BY	Wassim Hamdan





HOUET RAS EL ASTAR

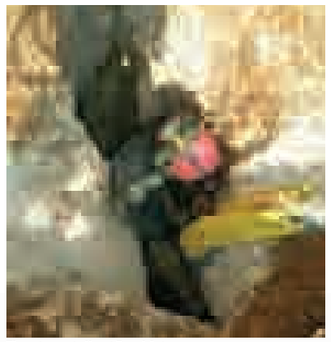
This pothole was spotted by a member of the club while driving along the Daraya road. A team then undertook the exploration after removing a large rock that was blocking the entrance and slightly widening the opening to allow cavers inside.

It is located on the road leading to Daraya from Ballouneh about 200m South of a well known farm in a relatively newly cut road.

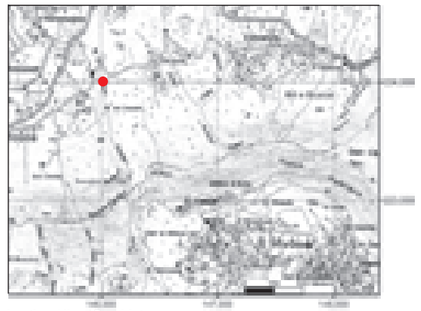
The entrance is on the side of a road cut just below a small four meter cliff. After descending about 12m, you will reach a platform of about 6 m long and 3m wide. After the deviation the sinkhole is tight.

The bottom is 4m long and 2.5 m large, a tight passage is seen that leads to a blocked tight room at about -1m from bottom. The pothole is rich in fragile concretions. One must pay attention from fallen rocks.

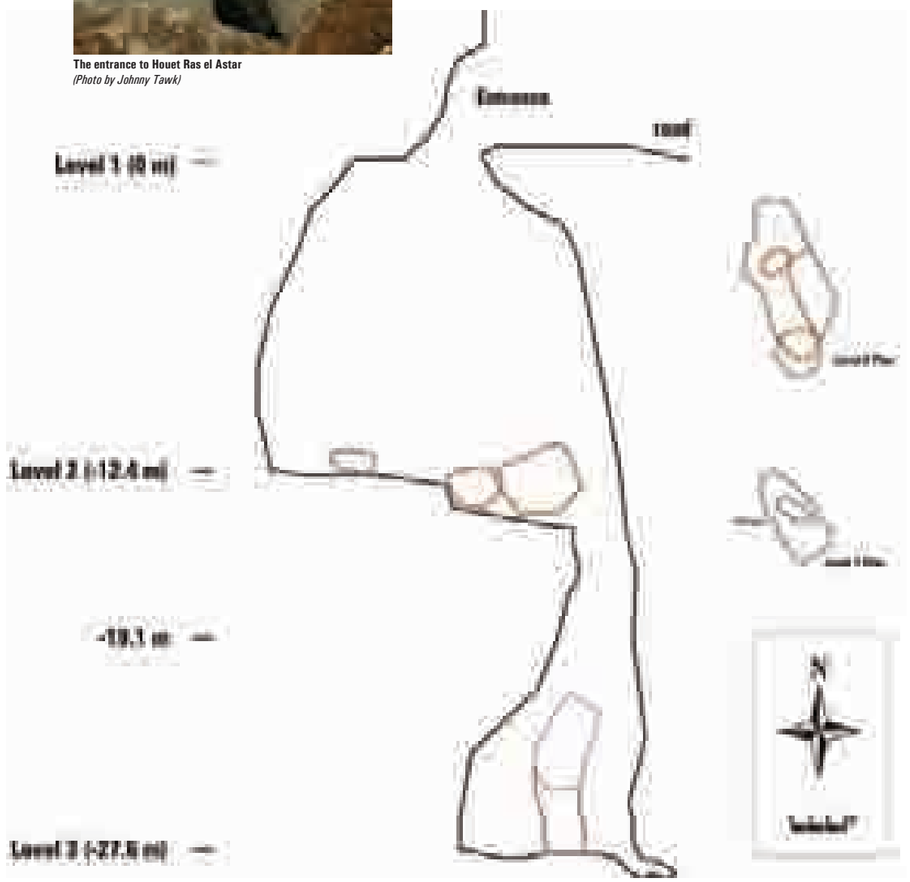
LOCATION	x: 146,024m y: 224,000m z: 648m asl
DISCOVERED IN	August 2006
DEVELOPMENT	25m, vertical
GEOLOGY	Keserouane Formation, J4
SURVEYED BY	Johnny Tawk Shadi Chaker
DRAWN BY	Johnny Tawk
DIGITIZED BY	Johnny Tawk



The entrance to Houet Ras el Astar
(Photo by Johnny Tawk)



Location of Houet Ras el Astar



HOUET EL DOUEIK

This pothole has been explored by SCL in the past and was not revisited for a very long time. While searching for this pothole based on the known coordinates, it was discovered that those are wrong and about 100 m away from the true location which was pinpointed by a local shepherd. This pothole was recently used as a sink by workers who were involved in construction.

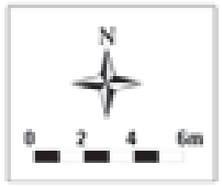
The pothole is located along side the road leading down to the Jeita terminal siphon tunnel from Ballouneh just below an artificial rock-wall.

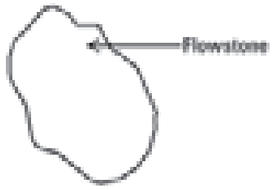
The relatively narrow entrance leads to a fracture oriented (310°-130°) pothole that is elongate in shape with a wider side towards the 130° direction. Down to 7m below the entrance, the pothole is still small and narrow until it dramatically expands to more than 8m in length and 4m in width. The bottom is filled with rubble and garbage including nylon and tires. The walls are either exposed or covered with calcite.

LOCATION	x: 145,597m y: 223,536m z: 632m asl
DISCOVERED IN	March, 2008
DEVELOPMENT	38m, vertical
GEOLOGY	Keserouane Formation, J4
SURVEYED BY	Marc Metni Waleed Jad Phillipe Saade Habib Helou
DRAWN BY	Johnny Tawk
DIGITIZED BY	Johnny Tawk

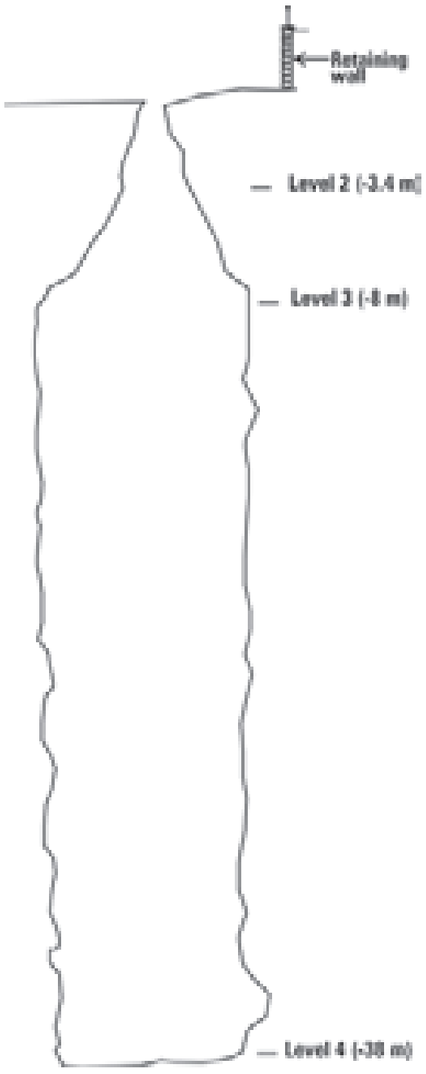
The entrance to Houet El Doueik
(Photo by Johnny Tawk)

Location of Houet El Doueik





Level 4 Plan



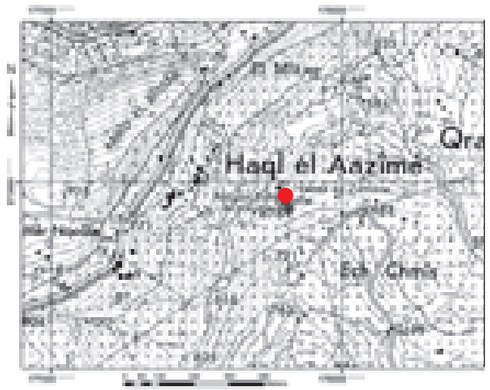
MGHARET EL NISSIAN

This cave was discovered in 1999 by mistake when a group of cavers were looking for Achou cave and stumbled upon it thinking it was Achou cave. When they realized it was a completely new cave they decided to return and draw a full survey.

This cave lies about 15m below the entrance of Achou cave. Its name is derived from the fact that one of the members who first discovered the cave had forgotten his boots, wallet and caving clothes that day. Nissain means forgetfulness in Arabic.

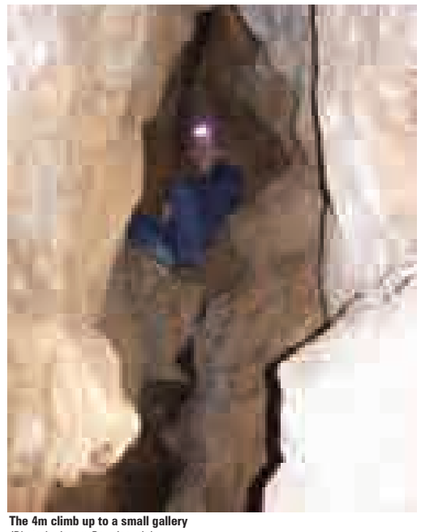
The cave consists of a series of passages all extending treelike from the one branch. Some bats were located at the end of one of the passages and a four meter climb was made to explore a passage but it was found to be very tight after about six meters to continue.

Some archeological remains can also be found inside the cave. Part of a human skull was found as well as pottery and bones.



Location of Mgharet el Nissian

The entrance of Mgharet el Nissian
(Photo by Issam Bou Jaoude)

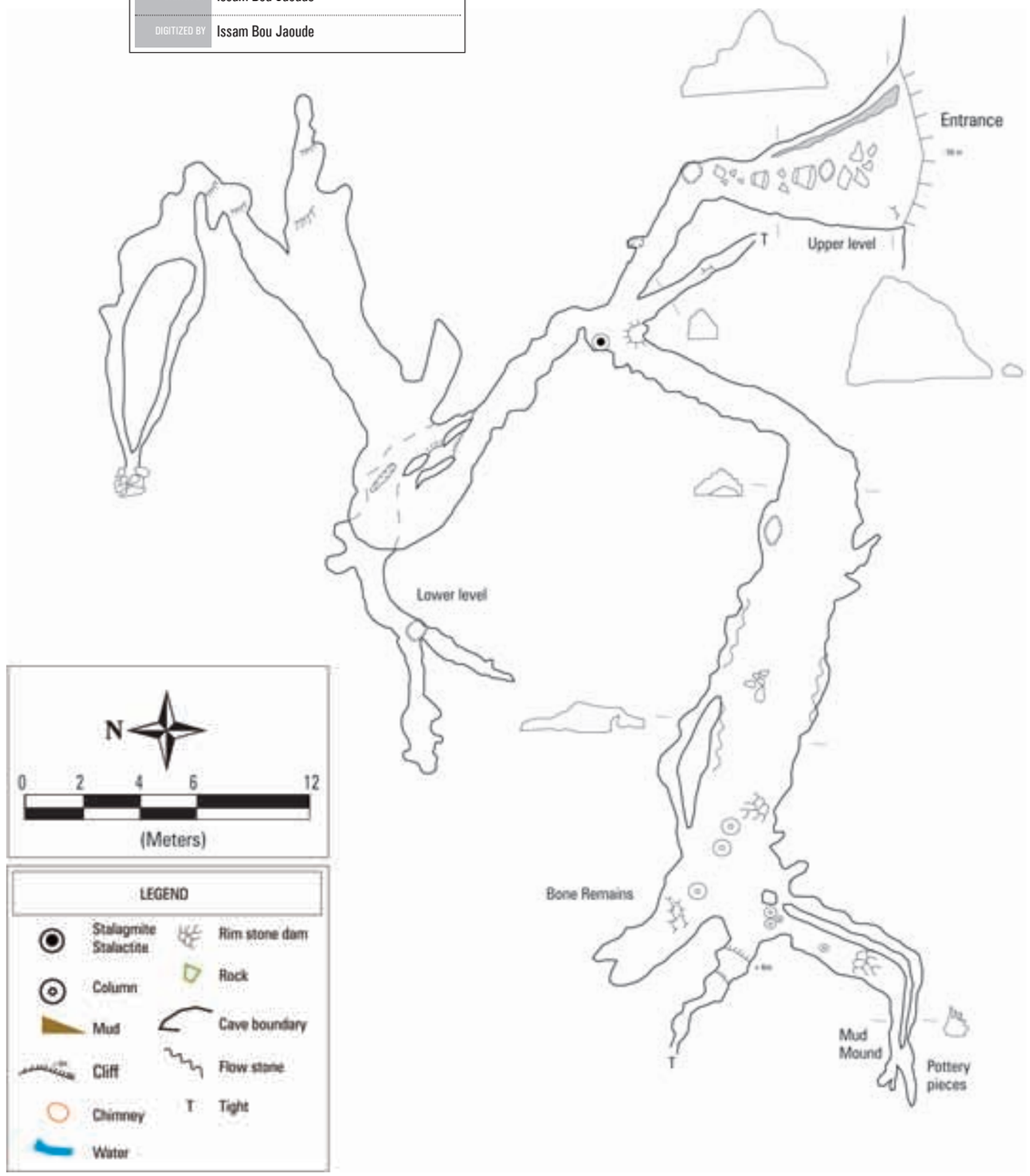


The 4m climb up to a small gallery
(Photo by Issam Bou Jaoude)

A tunnel inside Mgharet el Nissian
(Photo by Issam Bou Jaoude)

A small bat found inside one of the cave passages
(Photo by Issam Bou Jaoude)

LOCATION	x = 177,805m y = 272,938m z = 650m asl
DISCOVERED IN	Summer, 1999
DEVELOPMENT	150m, horizontal
GEOLOGY	Keserouane Formation, J4
SURVEYED BY	Rena Karanouh Issam Bou Jaoude
DRAWN BY	Issam Bou Jaoude
DIGITIZED BY	Issam Bou Jaoude



HOUET EL DAKHNEH

In March 2008, Hisham Bou Jaoude, the brother of one of the members of SCL, discovered, in Beit Merry, a sinkhole, while digging the foundations of a house.

The sinkhole was located below one of the potential footing of the building. That is why it was important to define the dimensions of the sinkhole.

First Issam Bou Jawdeh went to check it to see if it was worth an outing. To his surprise it was filled with smoke. Apparently workers had burnt cement bags (TRABET EL SABEE) and threw them into the sinkhole to check its depth. They said the light faded slowly and it was deep, more than 50m! This is how Houet el Dakhneh got its name.

The RISE clan, from the Spéléo Club du Liban, went to explore it the next day after the smoke had dissipated. The clan rigged on four pieces of wood (Mourina, Photo 2 - long pieces of wood used in building) and Issam B. J. descended into the smoke to find a 21m pit.

After this first shaft there was another drop of 40m. At the bottom this shaft it bifurcated into two directions, one to the left, leading to a 5m drop that ends up in a choke. There is an opening below the rubble and the choke as verified by the tumbling of a small stone.

LOCATION	x=177,805m y=272,938m z= 650m asl
DISCOVERED IN	Spring, 2008
DEVELOPMENT	90m, vertical
GEOLOGY	Keserouane Formation, J4
SURVEYED BY	Rena Karanouh Elias Labaky Issam Bou Jaoude Samer Harb
DRAWN BY	Issam Bou Jaoude, Rena Karanouh
DIGITIZED BY	Issam Bou Jaoude

The second opening to the right led to a 10 meter climb. Issam B spotted Elias L. The climb led to another two drops. Rena K. followed Elias L. and they rigged the two sinkholes. One was 10 meters and the other was approximately 21 m and both end in chokes that have no potential according to Elias the only one to check them.

On the 22nd of March, British cavers joined in the dig. Mike C. rigged with the help of Emma. Issam B. and Rena K. blasted some large rocks. The 'caterpillar' Dave (now known as 'the Old Cat') did a great job in enlarging the entrance with his special technique, having a lot of digging experience, obviously! We were awe struck when he began digging. If he had taken over from the beginning the dig would have been one hour long instead of the five it took.

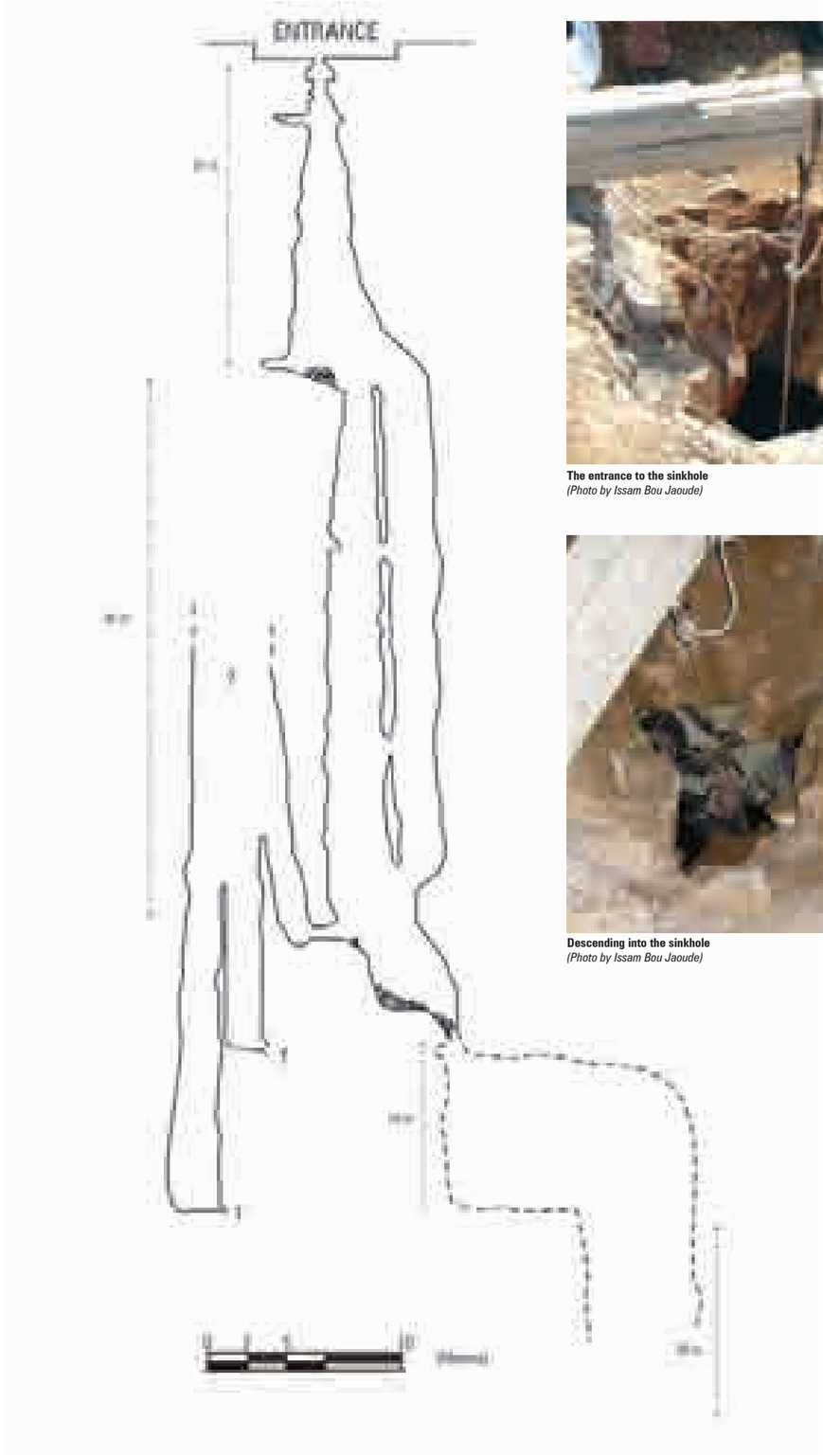
The 'dug' entrance, finally, after all the hard work, was large and safe enough (a lot of rubble had to be cleaned before anyone attempted to descend) for passing. Another two shafts one 10 meters and another approximately 30 meters were observed. Both had lots of potential.

The following is an extract from the report written by Issam B. J. in 2008:

We decided to not continue as we were all tired from the hours of digging so we decided to come back early the next day. We knew we had a hard climb back up to the surface because, in this cave, the ropes get covered with so much mud that the ascending devices do not immediately grip the rope and they tended to slip a lot. So for every movement up with the hand ascenders we had to repeat it about a couple of times until the device's teeth gripped. It was very annoying and dangerous.

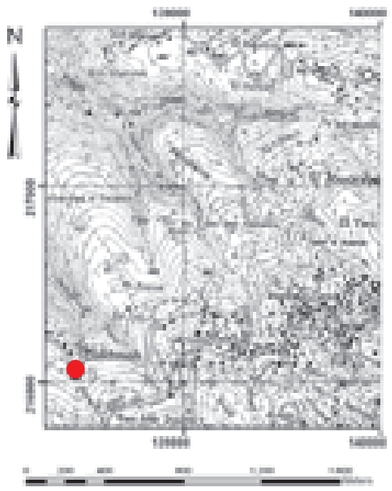
We came back the next day, eager to explore the two remaining shafts, dreaming about them the night before and what treasures we would find, only to discover, to our horror, that the entrance of the cave had been closed with a huge cement slab.

No words can ever describe how we felt when we saw this.

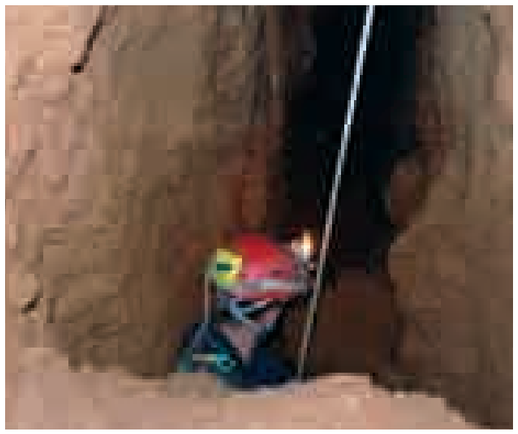


The entrance to the sinkhole
(Photo by Issam Bou Jaoude)

Descending into the sinkhole
(Photo by Issam Bou Jaoude)



Location of Houet el Dakhneh



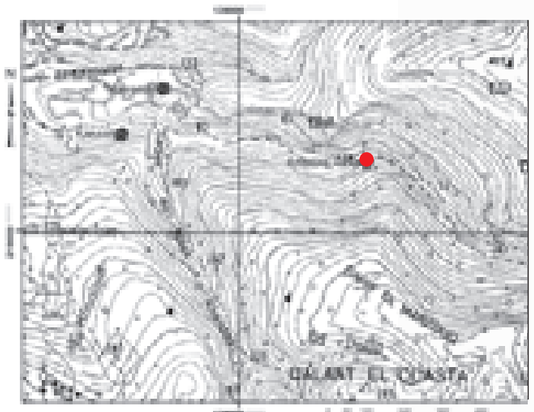
The first level of the sinkhole
(Photo by Rena Karanouh)

ANTELIAS CAVE

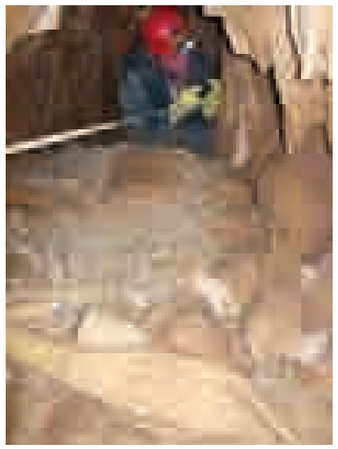
Discovered in 2008, this cave is located approximately 300m from the water works entrance of Mgharet el Kassarat.

It consists of a long nearly straight tight passage measuring 40m. It is adorned with flowstone, speleothems of all kinds and some dry water pools. Mouse nests were seen inside and the first time the cave was explored a snake was found inside.

LOCATION	x = 139,400m y = 219,220m z = 140m asl
DISCOVERED IN	Fall, 2008
DEVELOPMENT	40m, horizontal
GEOLOGY	Keseroune Formation, J4
SURVEYED BY	Rena Karanouh Marc Metni Issam Bou Jouade Georges Hadad
DRAWN BY	Rena Karanouh
DIGITIZED BY	Rena Karanouh



Location of Mgharet Anterlias

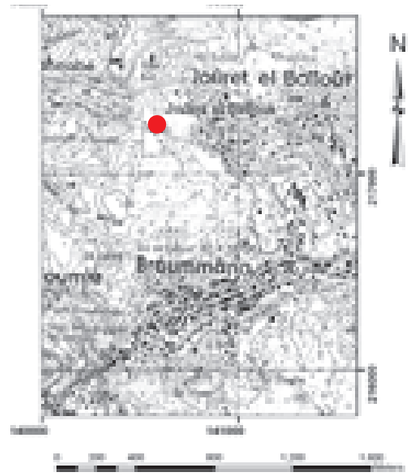


Surveying Antelias cave
(Photo by Rena Karanouh)

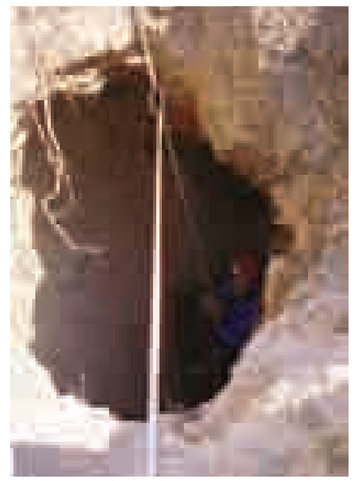
JOURET EL BALLOUT SINKHOLE

This sinkhole is located in the middle of the road on the new Metn highway in Jouret el Ballout village. Knowing that this sinkhole will be forever lost once the highway is finished the sinkhole was explored as soon as it was brought to SCL's attention.

LOCATION	x = 140,590m y = 217,247m z = 540m asl
DISCOVERED IN	Spring, 2004
DEVELOPMENT	31.5m, vertical
GEOLOGY	Bikfaya Formation, J6
SURVEYED BY	Rena Karanouh Hadi Kaasamani Naoum Bashir Wael Sabra
DRAWN BY	Naoum Bashir
DIGITIZED BY	Issam Bou Jaoude



Location of Jouret el Ballout sinkhole



The entrace of Jouret el Ballout sinkhole