The Italian geological expeditions to Tripolitania and Cyrenaic regions (Libya, N-Africa) between 1911 and 1914

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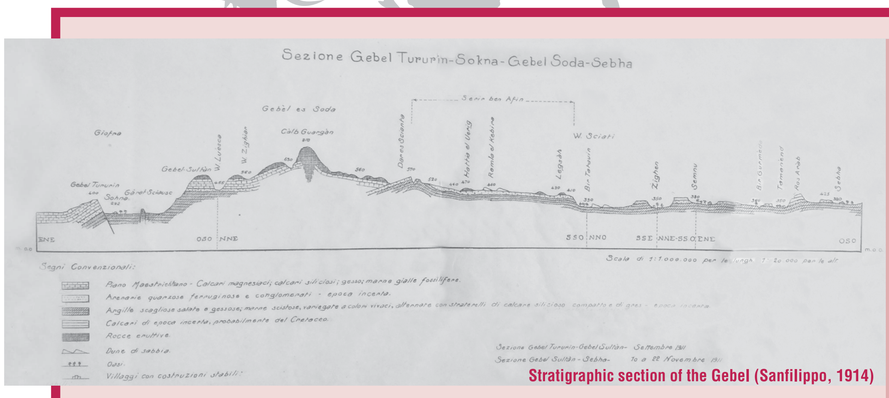
The early geological studies of Libya were carried out by Rolland (1880) who made the first geological map. Nevertheless, Italian geologists have conducted pioneering studies, and accurately described the stratigraphical architecture of the country. Taramelli and Bellio (1890) published a volume devoted to the geography and geology of Africa, in which the main stratigraphical aspects of Libyan desert were highlighted. Vinassa de Regny, in the period between 1901 and 1913, carried out several investigations on Libyan territories and produced the geological map of Libya at scale of 1.6.000.000.
At the beginning of the 20th century the political agreements of Italy with Great Britain and France gave rise to a colonial policy aimed to occupy the Cyrenaica and Tripolitania regions. Thus, for a better understanding of the mineral and agricultural resources, the Italian government organized several scientific expeditions carried out between 1910 and 1913. The main goal of these missions were the surveying of "supposed" sulphur- and phosphate-bearing deposits, as inferred by S. Giannò (1905).



Stratigraphic section of the Gebel (Sanfilippo, 1914)

The Sforza - Sanfilippo expedition

The first preliminary expedition to Libya, led by M. Sforza and I. Sanfilippo, lasted from June to August 1910. The research-team investigated the possible occurrence of sulphur- and phosphate-bearing deposits in the Sirte, Cyrenaica, Tripolitania and Fezzan regions. The mission was followed in 1911 by the "Missione Mineralogica Italiana Sanfilippo-Sforza" (Sanfilippo, 1914; Ferrara, 2012) that allowed to thoroughly reconstruct the Upper Cretaceous-Tertiary stratigraphical succession. About 300 mineral, rock and fossil specimens were collected and more than 500 photographs were taken. During the second expedition the five Italian team members were arrested because considered spies after the Italian declaration of war on Turkey. Nonetheless Sanfilippo continued his analyses also during the imprisonment writing his observations on cigarette papers that he carefully preserved. The Italian prisoners were released on November 1912. The collected rock samples were later studied by the outstanding mineralogist E. Artini while the rich Maastrichtian fossil fauna (bivalves, echinids, gastropods and cephalopods) were analysed by the famous palaeontologists G. Di Stefano and G. Checchia Rispoli.


Uadi el-Aium Valley: morphological and stratigraphic details. Photo was taken during the period 30/04/1911-06/05/1911; Archivio Vincenzo Ferrara.


Uàsen Mountains, stratigraphical detail; 14/05/1911-16/05/1911. Archivio Vincenzo Ferrara.


Fig. 45. - Tratta incassata dell'U. Mensci attraversata dalla carovaniera Tarhuna-C. Daùn. Sponda con banchi ciottolosi, letto sabbioso, ghiaioso.

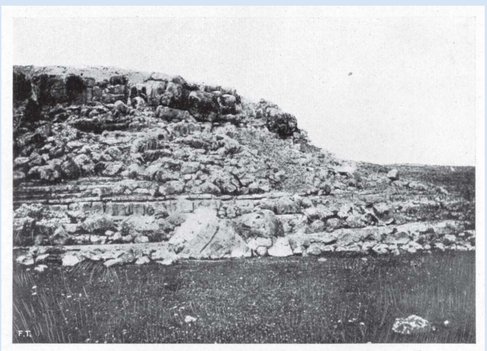


Fig. 26. - Balze mostranti banchi di calcare scompaginati e ridotti in sfacelo di blocchi dall'erosione meteorica. Viste dalla carovaniera da Tarhuna ad Abiar Migha presso Saniet Abdessamed Ennaas.

Pictures from the report volume of the "Franchetti mission", with original captions (Società Italiana per lo studio della Libia,1914)

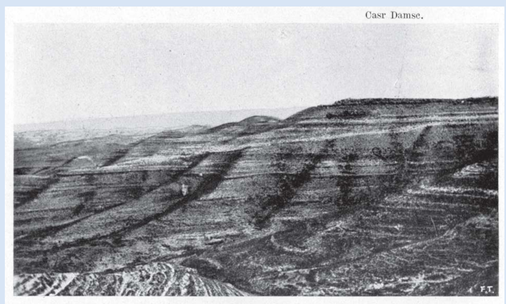


Fig. 23. - Balze di Casr Damsc con alternanza di banchi calcarei marnosi orizzontali viste da Casr Abdellhâdi (Confine Tarhuna-Msellata).

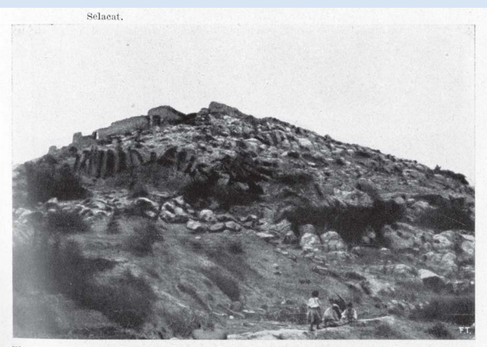
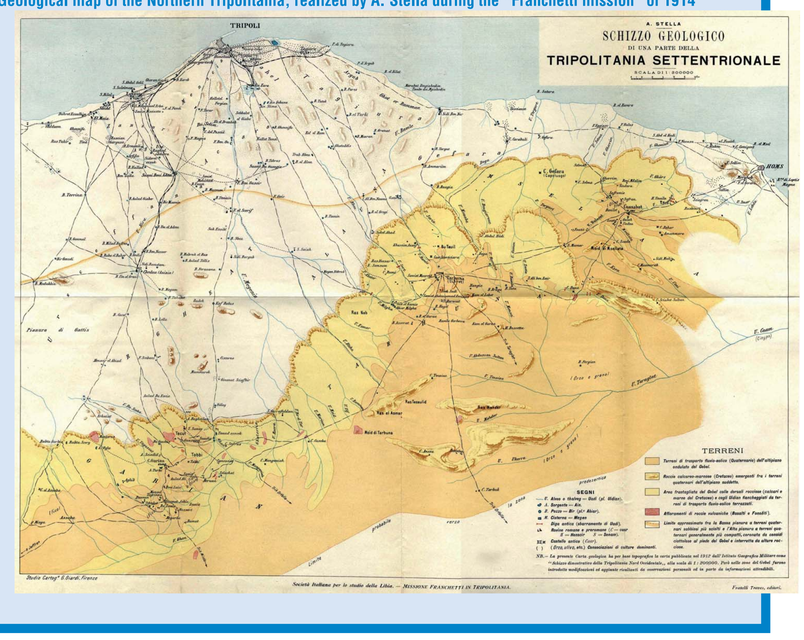


Fig. 31. - Balze basaltiche sotto Selacat (Garian) con struttura colonnare prismica e poliedrica.

The Franchetti Mission

In 1913 the economic and agricultural "Franchetti mission" started (Società Italiana per lo studio della Libia, 1914). Several geological, mineralogical and hydrographical data of the Gebel plateau were collected by A. Stella, mining engineer of the Royal "Politecnico di Torino". He realized a geological map of the Gebel area at the scale 1:300.000, in which he distinguished various lithostratigraphic units, a Cenomanian marly calcareous basement, Tertiary basalts and phonolitic volcanic rocks, and Quaternary fluvial and aeolian deposits; these latter were analysed in detail from a geomorphological point of view to investigate their suitability for agricultural uses. Stella finished his report highlighting the complete absence of exploitable phosphate deposits, concluding that the presumed occurrence was probably related to the closeness with the phosphate-rich levels of Tunisia.

Geological map of the Northern Tripolitania, realized by A. Stella during the "Franchetti mission" of 1914



The Franchi expedition

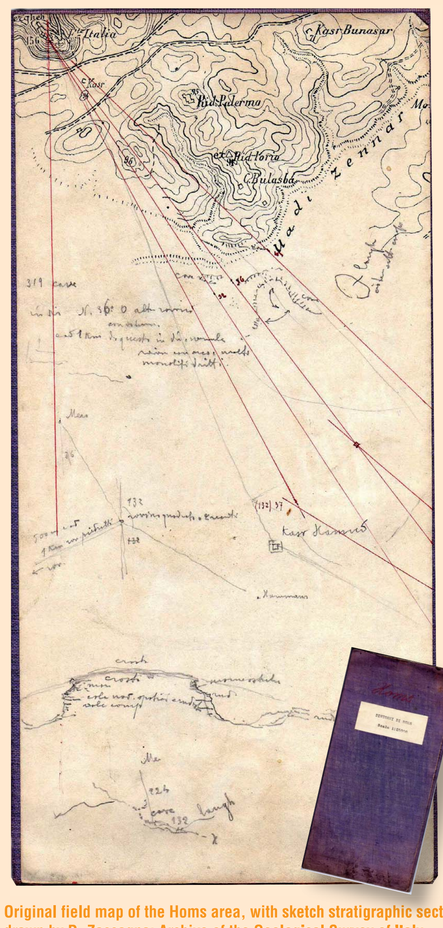
In the spring of 1912, after the claims of Italy over Libya, a new expedition leaded by S. Franchi, geologist of the R. Geological Survey of Italy, was carried out to examine the geological and hydrological features of Homs and Misurata territories extending his research up to El Arar Cape on the Sirte Gulf (Ministero Agricoltura Industria e Commercio, 1912). S. Franchi analysed Miocene deposits identifying the typical "Amphiope-bearing" sandy facies; he discovered also a well-developed and fossil-rich Maastrichtian horizon which were deeply studied by F. Parona and C. Crema, who joined the research-team in 1913. The occurrence of phosphate deposits was not confirmed by the expedition, that pinned its hopes on the Sanfilippo mission surveys.

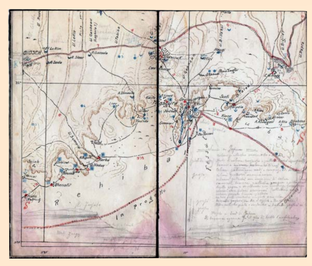

Lo stesso banco sabbioso

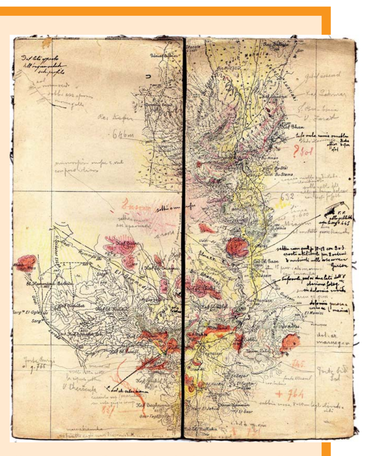
Pictures taken during the "Franchi expedition" of 1912, with original handwritten captions (in Italian): Archive of the Geological Survey of Italy


Discordanza angolare degli strati della panchina arenaceo- calcare sulle colline del Faro di Homs


Banco di sabbia dossetica intercalata fra le roccie arenaceo-quarzose sottostanti e quelle arenaceo-calcari soprastanti


Original field map of the Homs area, with sketch stratigraphic section, drawn by D. Zaccagna: Archive of the Geological Survey of Italy


Original field map of the Garian area, drawn by D. Zaccagna: Archive of the Geological Survey of Italy


Original field map of the Jeffren area, with sketch stratigraphic section, drawn by D. Zaccagna: Archive of the Geological Survey of Italy

The Zaccagna Mission

In 1914 S. Franchi and P. Zuffardi explored the central sector of Tripolitania, confirming the absolute lack of phosphate deposits in the examined territories. In the same year D. Zaccagna, a gifted geologist of the R. Geological Survey of Italy, former component of a hydrological mission of the Colonies ministry, was officially appointed for geological studies to better understand the stratigraphy and structure of the Gebel and Hammada, the wide plateau between the Gebel and Ghadames (Zaccagna, 1919). The lack of a detailed topographic map prevented the realization of a geological map, only allowing the production of local geological sections and spot maps. The fossils c ollected during the "Zaccagna mission" were studied by outstanding italian paleontologists, as Checchia-Rispoli, Fucini, Principi and Vinassa de Regny. Zaccagna first recognized that the Gebel escarpment, mostly made of Cenomanian to Maastrichtian rocks, overlie Wealdian (lowest Cretaceous) and possibly Albian beds, in contrast with previous interpretations inferring a wide hiatus between the Jurassic ant the Upper Cretaceous. In addition, he defined the structure of the Gebel-Hammada as a very wide syncline, with beds gently dipping southwards in the north (Gebel) and northwards in the south (Ghadames); this syncline is only affected by rare and local tectonic disturbances, with a striking regular stratification and homogeneity of facies throughout hundreds of kilometers. Zaccagna finally considered the cyclic repetition of facies as a clue for a sedimentation not controlled by tectonics ("cataclysms" in the original paper) but rather by gradual sea level fluctuations, at least since the Jurassic to the Eocene, predating of some tens of years the modern concepts of sequence stratigraphy.

Conclusive remarks

The material collected in these scientific missions is nowadays scrupulously preserved at the Geological Survey of Italy in Rome and consists of geological maps and documentary evidences. The palaeontological collection was split and is now preserved at the Regional Natural Sciences Museum in Turin and at the Paleontological Museum of the Sapienza University in Rome.
This research is still in progress and the final aim of the project is to analyse all the documents and material preserved in the Archives of the Geological Survey of Italy, to reconstruct the field activities carried out by the Italian geologists, emphasizing their contribution to the geological knowledge of these regions.

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