

## Multimedia petrographic guide of the city of Torino, Italy

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**ABSTRACT.** — This paper describes a petrographic guide of Torino, organized as a multimedia CD-ROM. It considers the monuments and historical buildings that are especially interesting or significant as to the stones used and from the historical or artistic point of view. Specific lithologies are described in filig cards which illustrate the geological, petrographical, lithoapplicatory and durability features.

The CD-rom also includes a short note on the geological setting of Piedmont stones, a comprehensive bibliography and five geological maps.

**RIASSUNTO.** — Viene presentato il modello della guida petrografica della città di Torino, strutturata come CD multimediale, della quale è già stata realizzata una prima versione in italiano. Essa prende in considerazione le rocce impiegate in monumenti ed edifici storici, particolarmente significativi dal punto di vista dei materiali impiegati e da quello storico-artistico. I litotipi sono descritti in schede illustrative, che ne sintetizzano le caratteristiche geopetrografiche, litoapplicative e conservative.

**KEY WORDS:** *Turin stones, petrographic guide, multimedia guide, applied petrography.*

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### INTRODUCTION

A century is passed by now from 1907, when Federico Sacco (AA. VV., 1999), a distinguished figure in the scientific and academic circles of Torino, described the rocks used in the main buildings of the town, mentioning the building where they could be observed (Sacco, 1907). However, although the petrography of the city of Torino has been the subject of several papers (e.g. Peretti, 1937; Rodolico, 1953; Fiora, 2001) and both stone materials and provenance have been individually described in articles published during the last decades in proceedings of meetings or in special volumes (e.g. Chiari *et al.*, 1992; Frisa Morandini and Gomez Serito, 1998; Fiora *et al.*, 2001), an updated and comprehensive treatment of the most significant stone buildings, *i.e.* a petrographic guide of the city, was missing.

The aim of the present paper is, therefore, the presentation of a novel guide model of which a preliminary version has been already given (Fiora and Carando, 2006), a guide that, it is hoped, is useful since of simple reading, self-explanatory because rich in pictures, easy to be updated and, last but not least, of low cost.

### PETROGRAPHICAL GUIDES

The petrographical guide of a town is generally intended as an earth science educational tool, but also as an aid in understanding the history and physical development of the town; it is thus targeted not only to professionals (geologists, architects, restorers, and students of such subjects) but also to tourists and city dwellers interested to know their town more in depth and from a new viewpoint.

For Italian towns the reference work still is the book by Francesco Rodolico "Le pietre delle città d'Italia" (1953), that dates back to the middle of the twentieth century. Other examples include geological guides of city monuments produced for a scientific meeting (e.g. Malesani *et al.*, 2003) or areal rock descriptions mentioning the buildings where specific lithologies have been employed. In general, however, such data on the lithological patrimony of Italian towns have been confined to the proceedings of scientific meetings and are not easily available to people outside academic circles.

Petrographic guides are available in the international book market and generally follow either of two approaches: i) important monuments and buildings are described lithologically (e.g. Withington, 1975; Bollin, 1996), or ii) buildings along specific routes covering the whole centre of a town are described lithologically (e.g. Robinson, 1984, 1985). In the first approach, every building is described in a file giving its name, place, history and a list of the lithologies used in the building. In the second approach, the guide describes the lithologies that can be observed at each building.

Lithologies may be described in general terms (Withington, 1975), or in depth, with specific file cards (Bollin, 1996). Information on history and architecture is in general synthetic, but in a few examples it may be extensive (Bulack, 2004). Petrographic guides usually also include some geological information on the area surrounding the town, and in a few guides also the principles of rock classification and a glossary. Of course, in such guides printing costs severely limit the number of pages, and especially limit the number of color illustrations, a fact that in our opinion strongly decreases the visual impact on un-professional users.

Best known among petrographic guides in English are the "Geological walking Tours" for several towns in the U.S., the first of which was devoted to Washington D.C. (Withington, 1975). In this guide geological and petrographical information is given for the most significant buildings.

In Europe a well known example is the two-volume petrographic guide of London (Robinson, 1984; 1985), a detailed description of all stones that can be seen in every important building of that town, giving in addition to lithological information also the amount of material employed and type of processing.

In "Pierres naturelles à Fribourg" Bollin (1996) describes the stones of some twenty significant buildings in the town; each building is then dealt with in detail from a geological-petrographical view point. "The building stones of Cape Town" (Cole, 2002) includes a geological setting of Cape Town, a description of lithologies employed in the main buildings, a list of suggested visit routes and a glossary of scientific terms to make interpretation easier. St. Petersburg is certainly the town whose stones are most comprehensively described. The book by Bulack (2004) provides excellent historical and architectural information in addition to geo-petrographical data and information on quarrying and processing the stones. The book is also available as a CD-ROM. Some information on the building stones is also given in most tourist guidebooks of several towns, but, unfortunately, it is often incorrect.

### MULTIMEDIA CD "PIETRE DI TORINO"

For the Multimedia Guide "Pietre di Torino" (produced in Flash 8) we have chosen a communication strategy that tries to convey scientifically accurate information that may be understandable to all classes of potential users. A preliminary Italian version (Fiora and Carando, 2006) has been published by Zusi Editore, Verona.

The guidebook is organized in files that are accessible from an interactive **townplan** where the petrographically most significant **buildings** and **monuments** are identified by numbered boxes (Fig. 1). For each numbered box, a file (Fig.

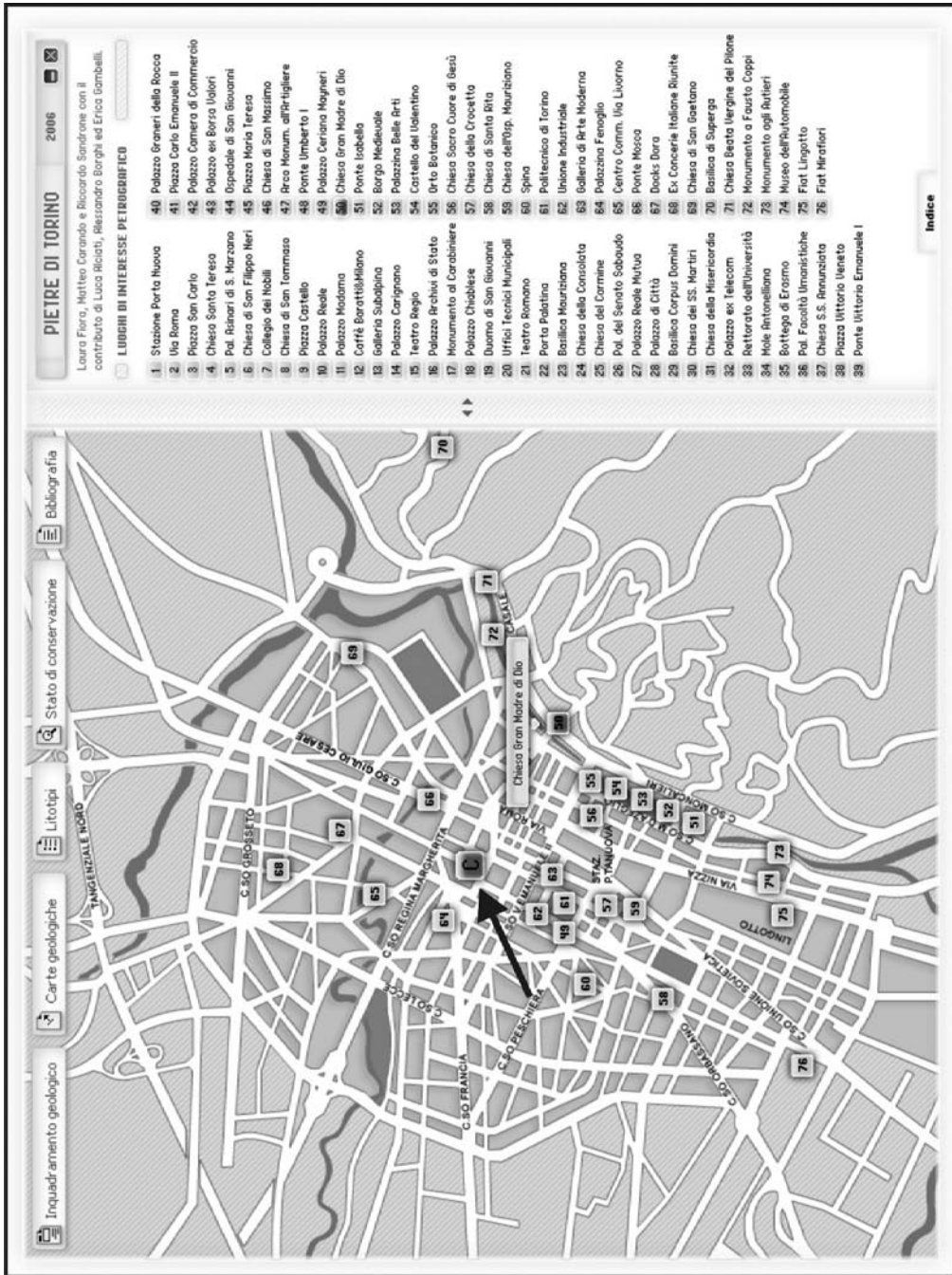


Fig.1 – Full-screen image of the interactive townplan of Torino. Numbers in squares link to descriptions of buildings and monuments that are also listed to the right. The downtown square C (arrow) links to a more detailed interactive map of the Torino centre.



Fig. 2 – Portion of a screen image with some historical information, list of lithologies and images of one the most relevant building of Torino: the so-called Mole Antonelliana, symbol of Torino and built in 1863 as Synagogue, now the site of the National Cinema Museum. Images link to high-resolution photographs. At bottom-left, links to petrographic pages describing the “Granito di Baveno” (a two-feldspar, pink granite of Permian age quarried at Baveno, western shore of Lake Maggiore), and the “Pietra di Luserna” (a foliated orthogneiss from the Dora-Maira Massif, see also Fig. 3).

2) provides name and location of the building, a synthetic description, in most cases with some historical information, a list of lithologies used in the building, their location and when available also some information on their state of preservation. The file also includes visual information with enlargeable images (Fig. 2). The description is focused on lithologies employed in the external parts of buildings, because they are more easily observed. Lithologies employed in the internal parts of churches and other buildings are described in less detail, and as a rule only the most significant varieties are mentioned.

Menu “**litotipi**” lists the main ornamental stones employed in both historical and contemporary

buildings of Torino, grouped under “**rocce piemontesi**”, “**rocce di altre regioni italiane**”, “**rocce extra italiane**”. For each lithology, one “**scheda petrografica**” (petrographical file, e.g. Fig. 3) gives the petrographical definition, current and/or commercial name, the name of parent tectonic unit, place of quarrying, macroscopical description, microscopical description, chemical composition, physical and mechanical properties, a short lists of buildings in Torino where the stone was used, all arranged as text fields. Each file includes an image of the relevant geological map (1:50.000, 1:100.000) showing the quarry location, pictures of the quarry, macro- and microphotographs of the stone and images of buildings in Torino where the

Inquadramento geologico
Carte geologiche
Litotipi
Stato di conservazione
Bibliografia

**P Pietra di Luserna** chiudi scheda

**Definizione petrografica**  
Gneiss micro-occhiadino.

**Nome d'uso e/o commerciale**  
Pietra di Luserna, Pietra di Bagnolo, Pietra di Rorà, Granito Sant'Elena (Barisone et al., 1979; Sandrone et al., 1989; 2001).

**Unità tettonica di appartenenza**  
Massiccio Dora Maira (Fig. 1 e 2).

**Sito di estrazione**  
Bagnolo Piemonte (Cuneo), Luserna San Giovanni (Torino) (Fig. 3 e 4), Rorà (Torino).

**Descrizione macroscopica**  
Gneiss di colore grigio verdognolo localmente tendente all'azzurro a piccoli occhi chiari di feldspato, per lo più tabulare e perfettamente fissile (Fig. 5) (Fiora et al., 2000). Tessitura piano scistosa e struttura eteroblastica variabile, ma sempre con tendenza occhiadina per la presenza di porfiroblasti di microclino.

**Descrizione microscopica**  
E' caratterizzato da porfiroblasti di feldspato potassico mostranti deformazione intracristallina (geminazione a graticcio) immersi in una matrice foliata a grana fine definita dall'alternanza di livelli micacei con domini albitico-quarzosi.

**Fig. 1** Carta geologica schematica del Massiccio Dora-Maira (da SANDRONE et al., 1993). Il riquadro sulla carta indica l'area rappresentata in Fig. 2  
**Riquadro superiore:** schema tettonico semplificato delle Alpi Occidentali. Tratteggio obliquo Dominio Elvetico (RR: Riquilles Rouges; MB: Monte Bianco). Punteggiato Basamento Pennidico (MR: Monte Rosa; GP: Gran Paradiso; DM: Dora Maira). Grigio Zona Piemontese dei calcocisti con olioliti. Tratteggio orizzontale spaziato Sistema Austroalpino (DBL: Falda Dent Blanche; SL: Zona Sesia-Lanzo). Tratteggio orizzontale fitto Alpi Meridionali (SR).  
**Riquadro inferiore:** schema dei rapporti tra i litotipi del Massiccio (stessa simbologia della carta).

Pag. 1 2 3 4
Stampa 
chiudi scheda

Fig. 3 – Portion of a screen image showing the geological and petrographical description of “Pietra di Luserna”, and location of the quarry district (square) within the nappe stack of Western Alps (from Sandrone *et al.*, 1993).

stone was used; a few files also include portions of relevant large-scale geological maps and a SEM image of the stone.

The CD-ROM also includes a short note on the geological setting of Piedmont stones (“**Inquadramento geologico**”), a comprehensive

**bibliography**, and five maps (“**Carte geologiche**”): i) a geological map of Piedmont (Fiora *et al.*, 2002), ii) a geological map of Italy (Fiora *et al.*, 2003), iii) a geological map of the Valle di Susa, the oldest quarrying region for Torino stones (Fiora and Gambelli, 2003); to

these maps, in view of the presence in Torino of a world-class Egyptian Museum, we added a map (iv) depicting the distribution of Egyptian stones (Fiora and Alciati, 2005a) and a map of the main historical stones in the Mediterranean basin (Fiora and Alciati, 2005b).

#### CONCLUDING REMARKS

Lithologies that can be observed along the petrographical walk in Torino proposed here have by now a large spectrum of provenance and origins, encompassing the realms of metamorphic, magmatic and sedimentary rocks. Their presentation as a multimedia CD-ROM, and the wealth of images it allows, well show their features and visual impact.

Like in other towns of ancient origin, for many centuries also in Torino stones of local provenance were mainly used: Roman builders brought to Augusta Taurinorum marbles, gneisses and calc-micaschists from nearby Valle di Susa, a region well known for the abundance of beautiful stones that could be easily transported through the Dora river (Comoli Mandracci, 1983). During the XVII and especially XVIII centuries, marbles mainly came (not without much effort) by roads from other valleys of the Alps. This form of transportation was superseded during the second half of the XIX century by the development of local railways that strongly promoted the stones and quarrying areas close to a railway, like the Dora Maira granitic gneiss known as "Pietra di Luserna".

With further improvements in transportation, twentieth century buildings in Torino were decorated with a large variety of Italian stones, followed more recently, in a global market, by lithologies, at times quite unusual for an Alpine capital, coming from all over the world.

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