SCUOLA SUPERIORE PER MEDIATORI LINGUISTICI DI PISA

Abilitata con Decreto del Ministero dell'Istruzione, dell'Università e della Ricerca del 31.07.2003

TESI DI DIPLOMA

DI

MEDIATORE LINGUISTICO

equipollente ai Diplomi di Laurea rilasciati dalle Università al termine dei corsi afferenti alla classe delle Lauree universitarie in Scienze della Mediazione Linguistica (classe 3)

THE WORLD OF MARBLE AND MARBLE IN THE WORLD

An overview of Carrara marble history and trading trends throughout centuries

Candidato:

Serena Incerti

Relatore:

Prof. Massimiliano Mazzi

Anno accademico 2008- 2009

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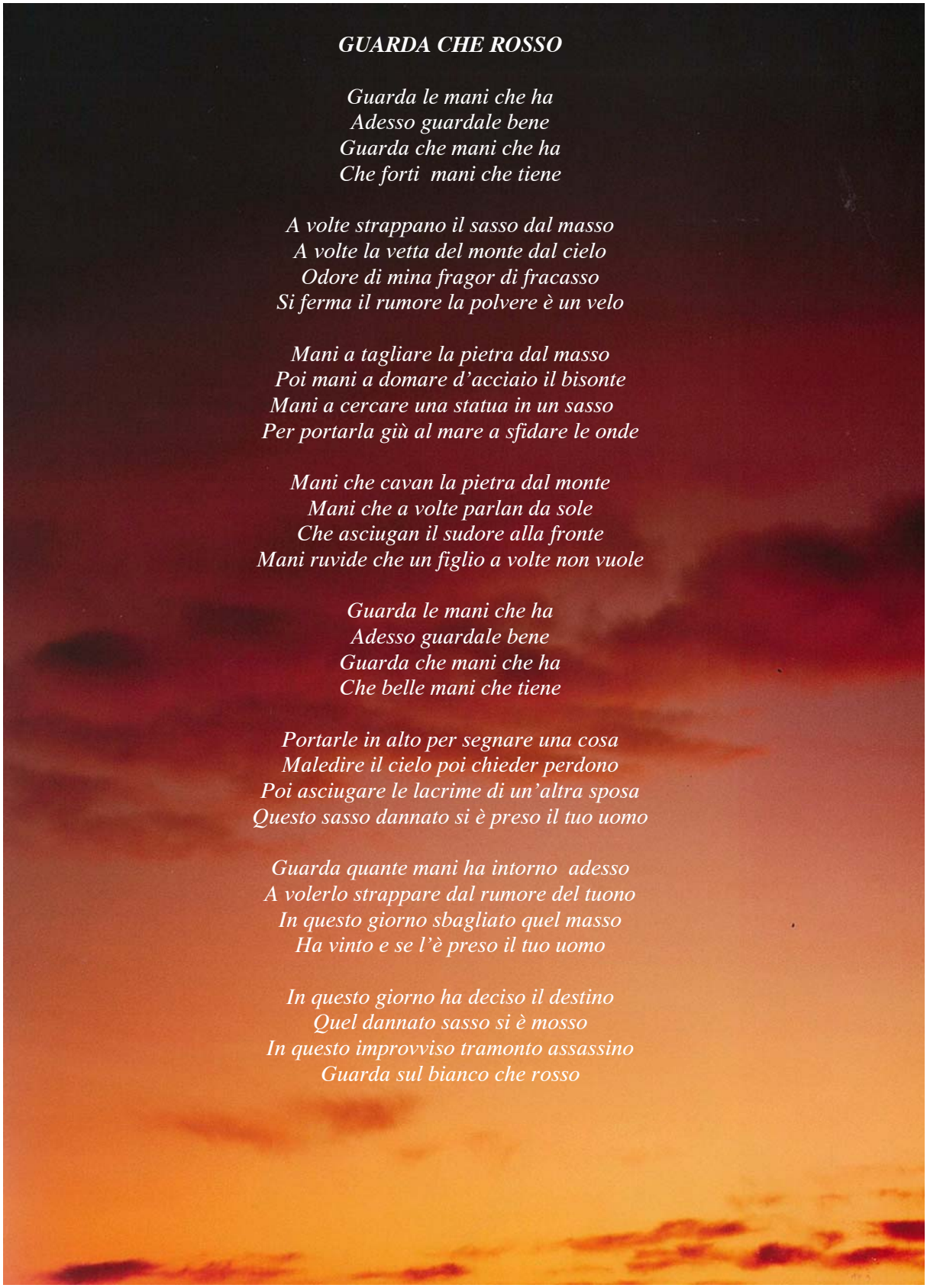
Alla mia famiglia che mi ha aiutato e guidato,
agli Amici e ai Compagni, quelli veri,
a coloro che per questa Pietra hanno dato la vita,
a Lei, la mia città.



Tramontana,S. "Guarda che rosso – look at that red", ***LE FACCE DI MARMO DI CARRARA/ THE MARBLE FACES OF CARRARA***

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INTRODUCTION

The following thesis will focus on one of the main industry worldwide, that is the stone industry.

There are many kinds of stones and rocks throughout the world: granite, onyx, travertine, volcanic tufas, sand stone and marble (especially in the Mediterranean region) are only few examples. They are mainly used in building, architecture (public or private) and sculpture (religious or funeral).

As the title suggests, the thesis will analyse the world of marble and, in particular, the exporting trend of Italian marble abroad.

In Italy, there are two major cities where marble is extracted, processed and then exported: Verona and Carrara. Both of them are well known thanks to the deposits of stone they exploit; but only Carrara has that particular ***white marble*** *which has brought an international fame to the city during the last centuries and is, still today, one of the major economic resources of the city.*

The subject has been therefore chosen mainly for this reason and for the importance white marble trade has fort he business and tourism of the city, both at national and international level.

After starting with a description of the excavation, transportation and finishing techniques, the core theme of the text are trade trends throughout centuries, from 1926 (the date commonly taken as the beginning of stone trade worldwide), up to the 2000's.

The aim is to show if in a fluctuating market such as the stone one, with periods of financials and economic crisis worldwide, the demand for Carrara marble is higher compared to other Italian stones.

As shown by the index, the first step towards a fully understanding of this industry, one of the most ancient in the world, is a general understanding of the place where this "treasure is kept".

Carrara is one of the two cities forming the Massa-Carrara province, situated at he Northest point of Tuscany, just ten kilometres far from the Liguria border. Its landscape is dominated by the Apuan Alps. Many documents attest that the city was already popular under the Romans, together with the city of Luni, for the stone of those mountains.

Then, a general overview of Carrara history will be given, starting from Roman times, passing from the Cybo Malaspina family and Maria Teresa, the first who gave a set of regulations to exploit quarries territory, to finish in the 1990s and 2000s innovations brought by the present city council.

Once the geographic and historical sides have been covered, it is almost a duty approaching what is the "real world of marble": an explanation of the definition of the word ***marble*** *and the different kinds of marble quarried in Carrara mountains; a general overview of the excavation, sawing and finishing techniques; the localization of the three main basins of* ***Torano****,* ***Miseglia*** *and* ***Colonnata*** *and a general overview about the rules regulating quarries property. This part will be supported with photographs in order to give to the reader a visual confirmation of what is written, because during more than a century many things have changed radically, from tools and skills to quarry-men figures themselves.*

Regarding the transportation, there will be a brief focus on the ***"Lizzatura"*** *and on the* ***"Ferrovia Marmifera"*** *two milestones in the history of marble and Carrara itself.*

The "Lizzatura" was a unique process through which blocks of marble were carried from the quarries, alongside the hills down to the harbour in Marina di Carrara, simply using a rudimentary wood railroad, wagons driven by oxen and, most of all, quarry-men fatigue.

Then, in 1876, the "Ferrovia Marmifera" appeared, in the form of a marble railway with a train expressly created for the purpose, and it replaced the old "Lizza" system.

With the improvement in excavation and transportation methods, also trade saw an increase in the first twenty-thirty years of 1900 bringing to the name of Carrara and white marble an international label of quality.

*All the system experienced a crisis during the Second World War, (Ferrovia Marmifera being partly destroyed by bombs), but it succeeded in giving new life and impulse in 1980s. That period was the "golden age" for marble trading; since then, the municipality of Carrara has given different opportunities to other countries to experience its core product, first of all the annual exhibition of "****Carrara Fiere****" complex in Marina di Carrara, the "* ***Internazionale Marmi e Macchine****", an imperative meeting for the experts of the sector. Since it has been first set up in 1978, the IMM has gathered thousands of people every year coming from several parts of the world: historical partners countries such as Southern America, but also new ones such as China and Arabian countries.*

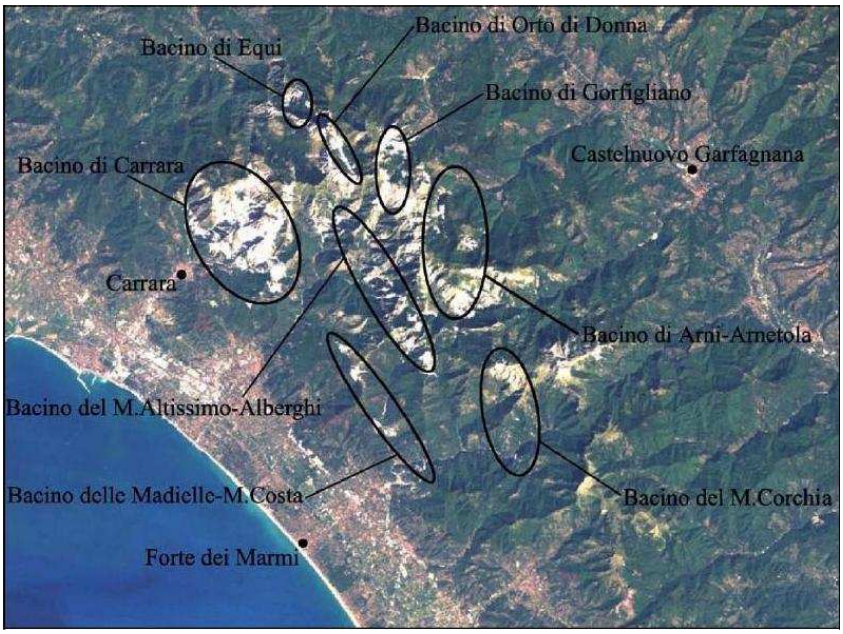
During 1990s the market trends for export fluctuated, though not worsened.
We will pay major attention to the present situation and trends (the latest data concerning 2008), taking into account the economic crisis Italy is facing, and we will conclude the dissertation trying to explore future expectations and hopes regarding marble industry.

1. THE CITY OF CARRARA: LANDSCAPE AND HISTORY

THE LANDSCAPE

Carrara, in the North of Tuscany, 100 m.a.s.l and with a population of 65,760 residents[1] , is situated at the core of the Apuan region, at the foot of the Apuan Alps, sheltered by hills and approximately 7 km from the coast. The variety and excellent geographical position of the territory makes it an ideal destination for all types of tourism.

The Apuan Alps cover an area of 400 square kilometres, between the river *Magra* (province of La Spezia) and the estuary of the river *Serchio* (province of Pisa), the highest point represented by *Monte Pisanino* at 1946 m.a.s.l.



The whole area is divided into 8 extraction basins: Carrara; Equi; Orto di Donna; Gorfigliano; Arni-Arnetola; Monte Corchia; Madielle – Monte Costa; Monte Altissimo – Alberghi.

Inside every area it is possible to point out

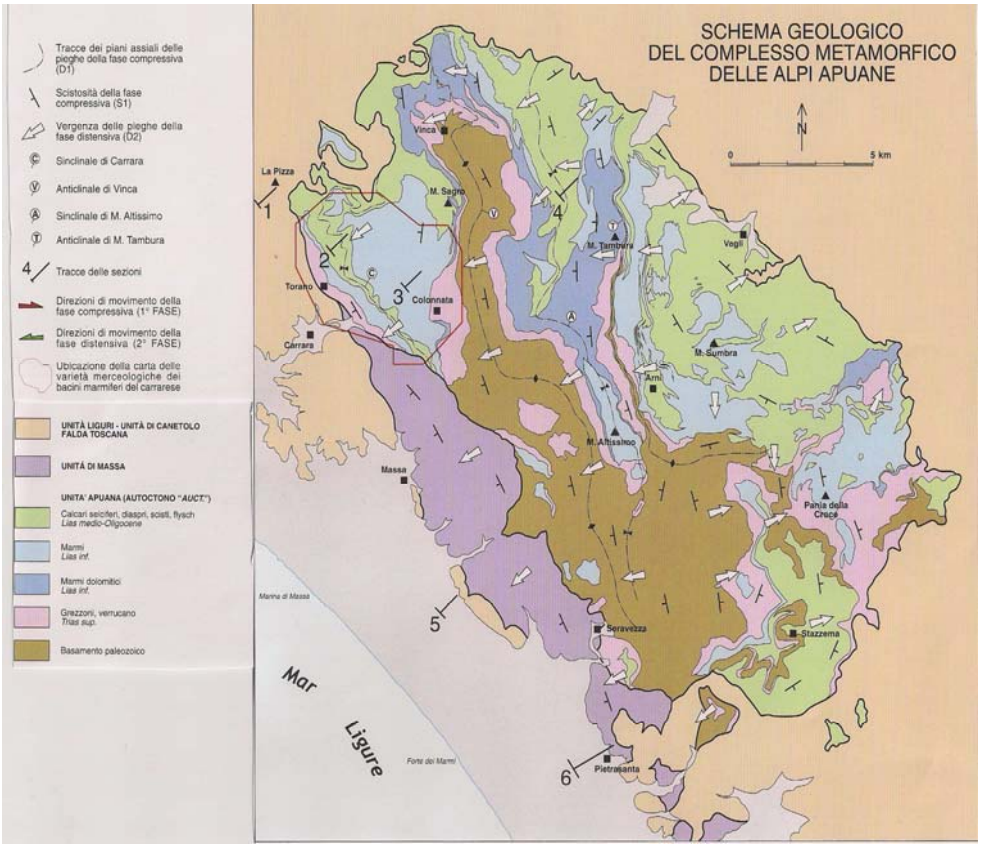
Immagine Landsat dei principali bacini marmiferi delle Alpi Apuane, *Carta giacimentologica dei marmi delle Alpi Apuane* pp. 24

[1] According to the 31/12/2008 ISTAT data.

further division on the base of geological criteria.

The history of this mountain chain goes back 200 million years, when most of what is now Northern Tuscany was covered by a vast sea and its deposit began to create a carbonate platform. After the tectonic upheaval forming the Apennine chain, this platform emerged from the sea and the limestone already deposited transformed into marble, maintaining the original shape of the mountains except for the Apuan area: here heavy variations in pressure modified its structure, forming two huge folds right near the Carrara territory. Going approximately from North-West to South-East, the first fold is a syncline fold, the " *Sinclinale di Carrara ",* with the youngest strata of rock at the core of it, and the second one, the " *Anticlinale di Pianza",* is an anticline fold with the ancient rock at the core. It is right here that the most productive marble basins are set and exploited.

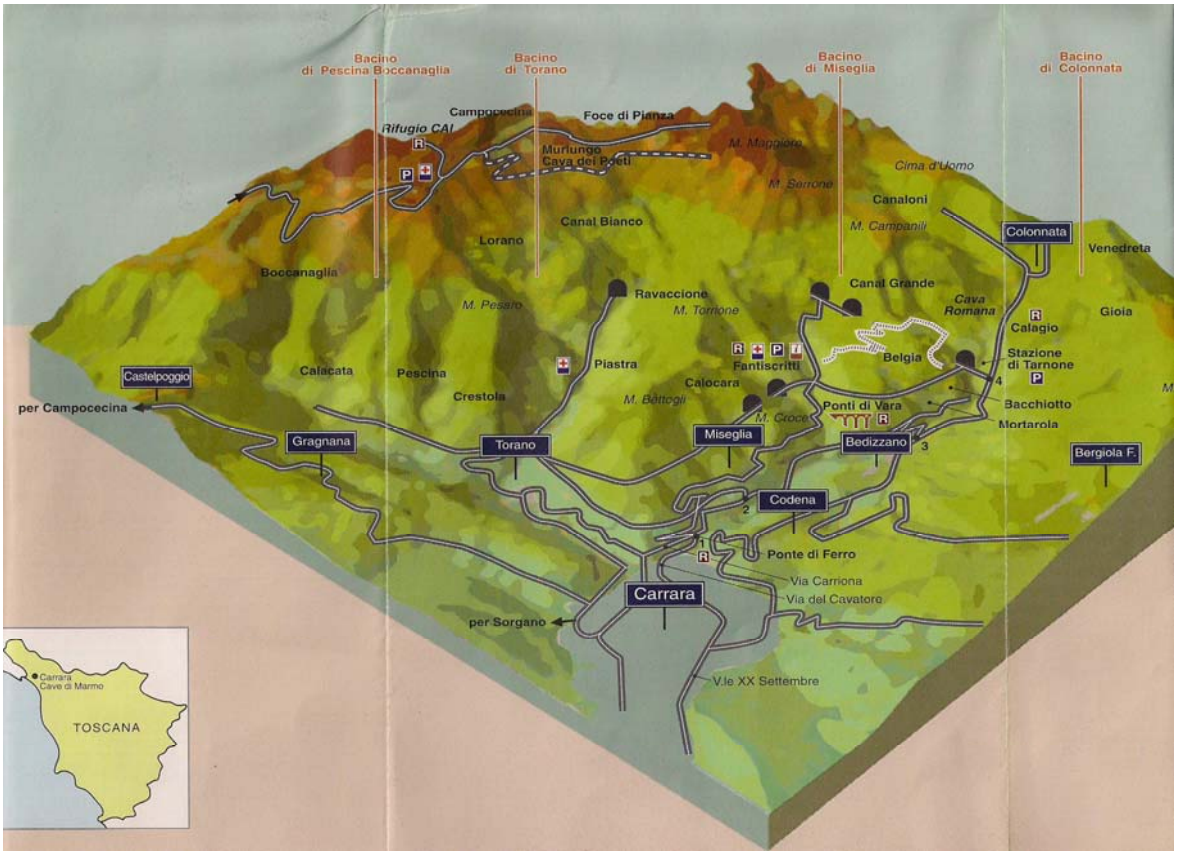
Schema geologico del complesso metamorfico delle Alpi Apuane. Cartina



It is important to underline though, that marble is not the only rock outcropping from the Apuan Alps. In the lower part of the slopes, we can also find dolomite, a light coloured mineral consisting of calcium magnesium carbonate, or formations of *"grezzoni"*, grey or white limestone very rich in magnesium but none of them is suitable for ornamental purposes. The marble bed is however easily recognizable, running up the hills and mountains, by forming a compact unique grey mass.

Nowadays the area of Carrara marble deposit stretches to 1,500 hectares, and it is protected by the regional Apuan Alps Park. It is made up of three main valleys that correspond to as many extraction basins, each of them with particular productive, historical and geomorphologic features.

From left to right, the three basins are:

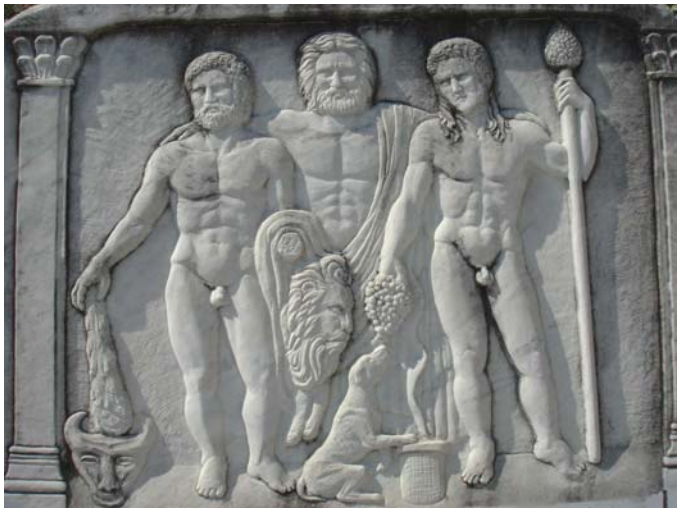


Guida delle Cave di Marmo di Carrara e dei paesi a monte, ***Carrara box – Carrara book*****. Cartina**

1) The **Torano** basin, which takes its name from the village located at its foot, stretches up to *Monte Borla,* between *Campocecina* and *Monte Sagro*. It represents the broadest basin in Carrara district, and even though it has a great importance for production, is the less exploited in terms of tourism.

2) the **Miseglia** basin dominates the homonymous town, and is considered the heart of the extraction district, once being the hub for the quarrying system of the whole area.

The basin is also known as **Fantiscritti,** thanks to a bas-relief found there in 1864 dating back to Roman times (203 – 210 b.C.) representing Jupiter, Hercules and Bacchus as a representation of Septimius Severus and his sons Caracalla and Geta, which quarry-men called *"fanti"* – kids.



The bas-relief of *Fantiscritti*

The famous *Ponti di Vara*

One of the key element of the landscape here, is the network of access roads to the quarries with its series of bridges, named *Ponti di Vara*, and tunnels inside the mountains that connect the three basins. It had a significant role for the history and development of the town and for marble transport, and today it is the remaining of the ancient *"Ferrovia Marmifera";*

3) the **Colonnata** basin, where we can find the biggest quarry of the entire district: the **Gioia quarry,** famous not only for its dimensions but also for the *Venatino* and the *Bianco Gioa* marble here extracted; it marks the eastern limit for marble excavation but not for human settlement, and, in fact, the town of Colonnata rises right there. Traces of quarrying activity from Roman times are numerous in the valley and include *Fossacava*, the most important quarry from Roman period in all Carrara territory. The site has been abandoned for many years – despite being a protected site since 1911 – but it has recently become a tourist site, in order to give importance once more to a place of archaeological relevance where there are finds such as the "*caesurae",* typical marks graved in the stone surface, derived from the cutting of the rock with a sort of pickaxe, or other typical tools and epigraphs on walls.

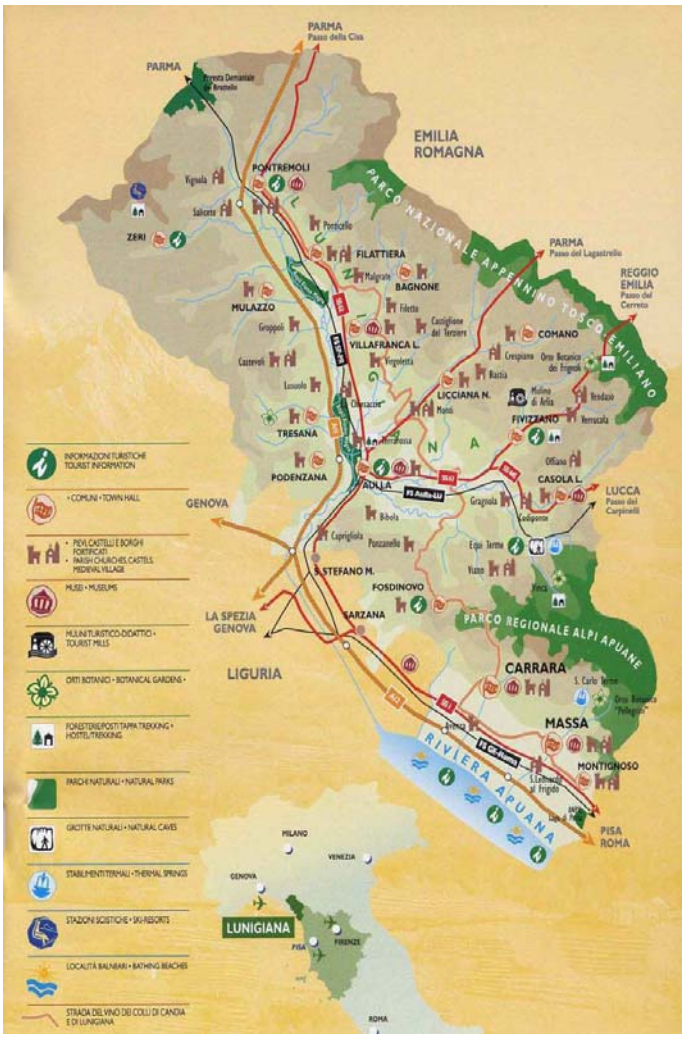
There is also another basin named **Boccanaglia**, formed by two minor valleys, hosting a limited number of active quarries. It is the least productive and exploited, even if it contains several varieties of high commercial valued marble.

From an urban demographic point of view, in the Apuan province live a total of 203,686 inhabitants (that is 146,897→72% in the coastal area, and 56,789→ 28% in the Lunigiana), 33% representing foreigners.[2]

It is divided into two areas: the Lunigiana area and the coastal area, both of them made up of many municipalities. In the Lunigiana area we can find *Aulla, Bagnone, Casola di Lunigiana, Comano, Filattiera, Fivizzano, Fosdinovo, Licciana Nardi, Mulazzo, Podenzana, Pontremoli, Tresana, Villafranca Lunigiana* and *Zeri*; while along the coastal area there are the three main municipalities of Carrara, Massa – that together form the province itself – and Montignoso.

With a population of 65,760 people, the town is the second in order of number of inhabitants, preceded only by Massa (70,646 units) and followed by Montignoso (10,491 units).

The city is divided into different hamlets. Starting from the mountains and going down to the coast, there is *Colonnata,* one of the first Roman nucleus linked to quarry activity. The name probably comes from an ancient temple set up in the hills or from the huge production of marble columns created there; *Miseglia (1215)*[3], situated on one side of



Zona della Lunigiana, *Economia Apuana, Indicatori Statistici 2008*. Cartina

[2] See note 1)

[3] Dates into brackets refer to the first appearance in official documents of the municipality of Carrara.

Da Carrara al mare. *Carrara box – Carrara book*. Map

The river Carrione, it expands along the ancient main road; *Torano (1141),* with three main nuclei: the Roman one up the hills, the 1500-1600 expansion and the last one dating back to 1800-1900. It has always been linked to the world of sculpture, as showed by the annual "Torano notte e giorno" event where many visitors usually gather;

Bedizzano (1198), which Alberico Cybo-Malaspina chose as summer residence, situated on the other side of the river Carrione and characterized by three main communicating squares; *Castelpoggio (1178)*, included in the Byzantine defence system; *Noceto (1235); Gragnana (1078),* an excellent military outpost thanks to its strategic position; *Sorgnano (1141),* a little centre devoted to agricultural activities; *Codena* (*1198*), of Roman origin, was exploited by quarry-men of the Colonnata basin; *Bergiola (1215),* that together with *Gragnana* was a military outpost, devoted to agriculture. All these villages have a church dedicated to a different saint and they have always been linked to the quarry activity.

Moving along the main road of the city, the "Viale XX Settembre" we come across the medieval hamlets of *Santa Lucia, Fontia (1231)* and *Bonascola,* then the town of **Carrara**

itself, that represents one of the oldest towns in Italy, left untouched in its beauty and buildings of the 13th century; *Fossola*, on whose hills stands the *Moneta* castle; *Avenza (1180)*, an important urban junction point site of the ancient port of the town, where Carrara's station is located; and, finally, *Marina di Carrara* venue of the present town's harbour and the "*Carrara Fiere – Internazionale Marmi e Macchine*" [4]

The *Carrara Fiere* exhibition centre

complex which is one of Italy's most important exhibition centres, especially for marble exhibitions and the stone sector in general.

As far as the name of the city itself, there are many hypotheses about the origin of the name **Carrara**. The Danish glottologist Wilhelm Wanscher believes the name comes from the Egyptian word "*Kaer-Rha*" meaning "the temple of the sun", while a more historical interpretation sees Carrara linked to the word *"Kaer"* meaning "stone". The theory of Emanuele Repetti (1776- 1852), one of the best-known historian dealing with Carrara's history, proposes a classical solution from the Latin word "*carrariae*" meaning "quarry" ("*cava*" in Italian), deriving from the French word "*carrière*".

Heraldic emblem of the city of Carrara

For Ezio Dini,[5] though, the town takes its name from the Latin "*cararia*" meaning "place of carts" ("*luogo dei carri"* in Italian). It could therefore derive from the wheels of the carts used to carry the marble to the harbour, [6] and it could explain the reason why the Heraldic emblem of Carrara is the wheel, with the Latin inscription "*Fortitudo mea in rota"* – my strength lies in the wheel – that can be found as the decorative element of the cathedral and of many palaces of the nobility in the city, and in the local football team flag.

This is in fact, the most credited version.

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[4] From this time on, we will refer to the *Internazionale Marmi e Macchine* as "the IMM"

[5] Researcher and librarian of the *Accademia delle belle arti* of Carrara

[6] cfr SEA Società Editrice Apuana. *Carrara e le sue cave; Carrara and its quarries;* SEA, Carrara, 2002, pp: 13-16

THE HISTORY

The history and the fame of Carrara have always been linked to its precious mineral.

Dante Alighieri was the first who described the landscape of the Carrara marble basins, referring to Aronte, an Etruscan soothsayer who lived there. [7]

As written by Titus Livius, the most ancient human presence of the area is recorded with the *Liguri-Apuani* population, whose settlements (called *"castellari"*) were probably built along the low hills surrounding today's marble basins.[8] At that time marble extraction from the Apuan Alps was not considerable and it did not mark the landscape.

The history of Apuan marble began with the apogee of Roman civilization.

More or less in the first century Before Christ, Greek marbles, which had held until that moment the supremacy in trading throughout the Mediterranean sea, started to be replaced by Apuan ones due to their high quality. It was at that time that the town of Luni was set up (177 B.C.) to exploit the harbour for the loading of Apuan marble, (on the so-called *naves lapidariae)* since the sea was probably nearer the town than it is now, forming an estuary of the river Magra, wide enough to the installation of the equipment suitable for the ships in that period.

Thanks to the port of Luni, representing the reason why Apuan marbles were originally called "Luni marbles", Carrara's best product became well-known and widely used in

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[7] Cfr DC Alighieri, D. *Divina Commedia,* Inferno, canto XX *"Aronta è quel ch'al ventre li s'atterga, | che ne' monti di Luni, dove ronca| lo Carrarese che di sotto alberga,| ebbe tra' bianchi marmi la spelonca| per sua dimora;onde a guardar le stelle| e 'l mar non li era la veduta tronca."* These words have been graved in a block of marble placed in the city to celebrate the great author.

[8] Cfr Titus Livius – Livy , *Ab Urbe Condita*; book 39th, chapter 20th. / 39th book, 20th chapter.

Rome and in other important Italian and Mediterranean towns for temples, palaces, sculptures and funeral art.

The most celebrated marble masterpieces in Ancient Rome and during its 150-year prosperous Roman Empire came from Carrara's mountains: the Pantheon, built by Agrippa in 27 B.C., the Arch of Claudius, the Trajan Forum and the Arch of Domitian are only few examples.

Apuan marble trading has been at its highest level during the Roman era, but it inevitably suffered after the economic and political decline of the Roman Empire (476 B.C.), when also the building industry, its main field of usage, suffered and very few constructions were built using, in addition, raw materials and stone taken from other pre-existing buildings.

In the early Middle Ages, the civil and economic depression which hit all Europe, also knocked Luni marble industry down, but in the late Middle Ages it was picking up again, with the renewed taste for elegant and sumptuous buildings in the surrounding area and in Italy too, that confirmed the aristocratic nature of this material related to periods of splendour.

Following the Barbarian and Saracen invasions around the 10th century, Luni had become an unsafe place and was abandoned by the bishops who were ruling there, who took more or less permanent residence in Carrara raising, together with the newborn nobility, the status of the town. In this period many of the names of the hamlets and townships were created

Luni marble therefore became Carrara marble.

From the 11th century up to the 14th Carrara was governed by the bishops who established their right to demand the rent from the quarries and the control of the territory. Throughout all this period the extraction and working of marble enormously developed, with marble used for buildings and churches of the whole area near Carrara (Lucca, Genoa, Pisa, Orvieto and Florence).

During the 13th century and the Commune age, the most ancient quarter of the city known as *Vezzala (*once *"Vetti Sala")* situated on the river *Carrione* – the river of the city – was built, together with the area around the cathedral which was largely developed by marble transporters, and in 1215 the first city walls with six gates that gave the city its still recognisable shape, were built. In the same year Frederick II of the Hohenstaufen dynasty gave to Guglielmo Malaspina a part of the clerical power of the bishop on the city, and that

led from that time on, to real dualism: the Guelphs and the bishop on one hand controlling the *Vezzala*, and the Ghibellines under Guglielmo Malaspina, controlling the *Pieve* that is the cathedral part, on the other hand.

Finally in 1313, the clerical hegemony of the bishops came to the end, replaced by the lordship of Castruccio Castracani, sent by the principality of Lucca that governed the province.

Luni was only a faded memory and Carrara had its own small port, not yet in Marina di Carrara but near Avenza where there were moorings, specialised in the loading of blocks, slabs and statues.

The 15th century saw Carrara first governed by the Campofregoso family of Genoa, then by the Malaspina family who, with Jacopo Malaspina, created a principality with the two cities of the territory, Massa and Carrara.

The following century (1552-1623) witnessed the Cybo-Malaspina dynasty and, under the leadership of Alberico I, son of Lorenzo Cybo and Ricciarda Malaspina, in 1554 the principality of Massa-Carrara become a duchy and developed both in the marble trade field and in the flourishing of the arts. Over these centuries the city became the attraction point for celebrated artists: Nicola and Giovanni Pisano, the firsts, then Michelangelo himself who came personally to choose blocks from the Carrara basin and spent here part of his life, and Bernini too. New walls and more roads and squares were planned: Piazza Alberica is the main example. Between the 17th and the 18th centuries with the Este dynasty, Carrara enlarged and became a baroque town.

The Academy of Fine Arts

The Academy of Fine Arts was established in 1769 thanks to Maria Teresa Cybo-Malaspina, and it contributed to the formal transmission of the artistic traditions already passed from father to son in the many artisan workshops of the town. In 1741, Carrara passed under the French duchy of Modena, not without popular rebellion against foreign power of Charles V lasting until the Napoleon's period.

The urban territory witnessed a real development and, therefore, it needed the creation of a new port to

replace the by then overcome port of *Avenza.* The project of the Marina di Carrara port was signed by a French engineer, in 1751.

After the French Revolution until the middle of the 17th century Carrara witnessed another development with Elisa Baciocchi Bonaparte, Napoleon's sister, who brought many innovations such as the Elysian Bank, an institution originally dedicated to the helping of production and commerce of marble, and for a brief period it passed under the principality of Lucca.

In 1859 under the reign of Francesco V, Carrara is finally annexed to the Kingdom of Sardinia, in an attempt to calm down social troubles widespread throughout Europe, and on the 27th December of the same year, the Massa-Carrara province was established.

Throughout the second half of the 19th until the first decade of 20th century, several urban developments took place (the *Ferrovia Marmifera,* buildings, processing plants, sawmills and laboratories), but the threat of the two World War was near and it had natural consequences also in Carrara. During the II World War, the city was divided into fascists and communists, both aware of the strategic position of the city along the Gothic Line.

One episode in particular became famous, worthing many years later, in 1984 the name of a street in the historic centre and gravestone with these words graved into marble: *"DA QUESTA PIAZZA PARTÌ LA VITTORIOSA PROTESTA DELLE DONNE CARRARESI CHE IL 7 LUGLIO 1944 OSARONO SFIDARE L'INVASORE IMPEDENDO LO SFOLLAMENTO DELLA CITTÀ 1944"* .

The 07/07/1944 rebellion commemorative stamp

On 7th July 1944 the German army imposed the exodus of the population, but the women rebelled and organized what we now call "*la rivolta del 7 Luglio*" – the rebellion of 7th July, and the soldiers renounced to the action. This year to celebrate their courage, the local administration has released a special commemorative stamp.

Repressions and intestine fights between the local population and the army continued until April 1945 when the city was finally freed by the American allies.

American allies and Carrara partisans, *Città della Toscana. Carrara,* SAGEP Editrice, Genova, 1985

The province was one of the ten provinces awarded with the Godal Medal of Military Valor, for having fought against the common enemy of Nazi-Fascism.

The Second World War left a deep mark in Carrara, with the scars of the bombing and destruction of the port of Marina di Carrara, but the city managed to rise again in a few years time.

During the 1970s and 1980s the city experienced a regular urban development and saw a stable leftwing power at the top of the municipality ranks.

Nowadays the mayor of Carrara, Mr Angelo Zubbani, has promoted the project for a *ZTL* area – restricted traffic zone, in order to protect and re-evaluate the city centre, and other important evens such as the symposium " TEMPO DI SCOLPIRE-XVII SIMPOSIO INTERNAZIONALE DI SCULTURA" [9]occurred all along the month of August, that has gathered sculptors from every part of the world to work outdoor in front of passers-by.

[9] Source: http://www.interscultura.it/ita/simposio2009.asp the official sculpture website of Carrara sculptors.

Marble and the surrounding area, *LE FACCE DI MARMO DI CARRARA* / *THE MARBLE FACES OF CARRARA*, pp.61

2. THE MAIN PRODUCT: MARBLE

DEFINITION OF THE WORD AND KINDS OF MARBLE

The etymology of the noun “marble” reflects the history of its usage throughout the centuries.

It has indeed Greek roots, coming from the noun “*màrmaros”* meaning “shining stone” “crystalline stone”, the subsequent adjective “*marmàreos*” which means “shining” and the verb “*marmaìro”*, “ to shine, to sparkle” .

In petrology, the branch of geo-sciences devoted to the study of rocks, there are three main branches of stones on the basis of their origin: igneous rocks, such as granite or basalt which have crystallized from molten rock or magma; sedimentary rocks such as sandstone, or limestone which consist of pieces or particles derived from other rocks or biological or chemical deposits, and are usually bound together in a matrix of finer material; and metamorphic rocks, such as slate, marble, gneiss, or schist which started out as sedimentary or igneous rocks but which have undergone chemical, mineralogical or textural changes due to extreme pressure, temperature or both.

Following this science, marble is therefore identified as a limestone rock of metamorphic origin with a macro crystalline structure and granular texture, mainly made up of calcite (calcium carbonate) and dolomite (calcium magnesium carbonate).

Nowadays, in the world of trade and industry, this notion has been incorporated with another definition. Under the concept of "marble" we can group every kind of crystalline structured rock that can be polished and used for ornamental purposes (for example marble, granite, certain kinds of travertine, alabaster). But the possibility of being polished, finished or sculpted mainly depends on the new technologies available and it is linked more to an aesthetic point of view than to particular structural and textural features of the stone itself. However, it is possible to distinguish between "*marmora*" and "*lapides*" stones, the latter meaning all the stones that cannot be polished, such as tufas, sandstone and porphyry.

Beyond all differences in meaning, what has to be said is that marbles in the real strict sense are limestone rocks with metamorphic origin that share common natural and technical features. First of all the weight, that varies from two and a half tons to three tons per cubic metre; secondly the good mechanical resistance to weather conditions, that is the reason why they are used as building materials, not only for ornamental purposes inside or outside buildings but also as bearing structures; thirdly, the colour and the possible tints and splashes of the stone that are more evident after the process of polishing.

As reported by many books, Carrara marbles embody the core concept of marble, and in fact from this area some of the most beautiful and precious kinds of marble are extracted.

However, it is not easy to describe a natural mineral that has so many varieties: very often marbles from a single deposit are different in colour or in design, because of the *"verso"* that is the way they have been cut, so they are included in different commercial typologies[10]. For the Apuan region there are three main commercial typologies: Brecciaed marbles (*Arabescato, Calacatta*); White marbles (*Ordinario, Statuario, Venato*) and Grey marbles (*Bardiglio, Bardiglietto, Nuvolato*). As far as Carrara's basins, the most important kinds of marble [11]here are:

[10] The definition of "commercial typologies of marble" is very complex because many are the ways marble can be recorded into different categories. Following what has been written in the *International Stratigraphic Guide* and in the "*Carta giacimentologica dei Marmi delle Alpi Apuane"- Progetto Marmo,* we will refer to commercial typologies on the basis of the definition of stratigraphy as the science of Earth's rock strata and their organization into distinctive mappable units based on their inner properties (lithology) or other economic aspects (colour, design..).

[11] All the images of these kinds of marble are taken from Regione Toscana e Giunta Regionale toscana, *I marmi apuani,* ERTAG, Firenze, 1980.

- STATUARIO: it is the most precious and famous kind of marble.

It has a white ivory colour (it contains 98% of calcium carbonate) and a crystalline structure that make it a unique material used mostly for sculpture because of its easy processing.

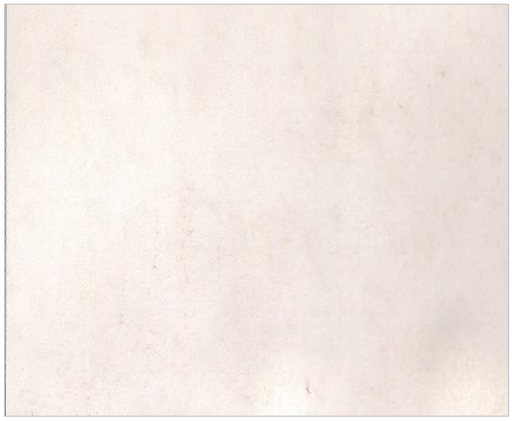
It can also be found in its variant of STATUARIO VENATO,

that is characterized by grey veins through the white stone. Due to these features and the subsequent over-exploitation, deposits of STATUARIO are more and more rare and this marble acquires greater value.

- CALACATTA or CALACATA: together with the STATUARIO, it represents another particular precious and rare kind of marble.

It is more known in its variety of CALACATTA MACCHIA ORO characterized by soft yellow-gold and grey veins on a white base.

- BIANCO CARRARA: with fine grain, it is the most common and excavated marble, it represents 90% of the total production of Carrara's basins. The main feature of this stone is the almost total absence of defects that makes it easier to work and process.



The basic colour is white, tending to grey – BIANCO CARRARA ORDINARIO or CLASSICO – but it has different varieties that are sought after worldwide, depending on:

the shade of white,
– BIANCO CARRARA C/D–

the zone of origin – BIANCO CARRARA CANALGRANDE, BIANCO CARRARA GIOA, BIANCO CARRARA LORANO – and the quantity or dimensions of grey veins stretching throughout the stone surface – BIANCO CARRARA VENATO.

This one is the second most excavated marble in the area, divided in other subcategories depending on the grey veins it has.

- BARDIGLIO and BARDIGLIETTO : they are marbles which show all shades of grey due to many imperfections; they are not high esteemed from an aesthetic point of view, but they have good mechanical features.

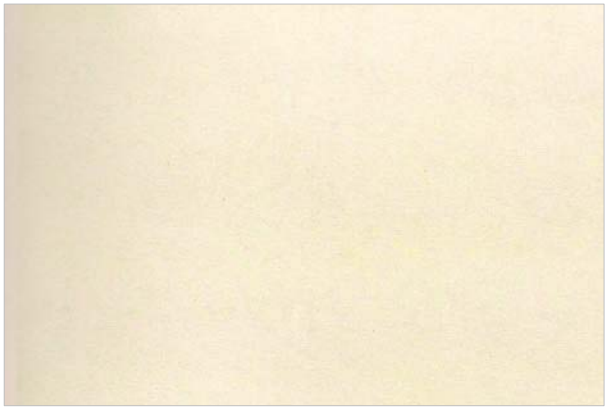
- ARABESCATO: is a kind of breccia [12] very similar to VENATO but with veins that draw real arabesques of different colours on a white base stone. The production in Carrara is not very high.

[12] "A Breccia is a rock composed of angular fragments of minerals or rocks in a matrix that may be similar in composition to the fragments." Source: http://en.wikipedia.org/wiki/Breccia 22/07/09 h: 18.15

- BIANCO BROUILLÉ: specific of the Gioa quarry, it is relevant for the presence of small grey ovulars, named *"riccioli"* on a white-grey base. The production does not reach that of the previous marbles, but it is satisfying.

- NUVOLATO: on a white-grey background, with darker shades which create elaborated designs.

- CREMO: the name is linked to the delicate beige-ivory colour, which is never completely uniform. The quantity excavated is not high and following the way of cutting the stone, the so called *"verso di taglio"*, this marble presents a different design.



CARRARA DISTRICT: THE THREE BASINS AND THEIR QUARRIES

As already mentioned in the first chapter, three valleys divide the mountains of Carrara into four basins of quarrying activity, hosting 189 numbered and named quarries[13]. According to the *"Regolamento per la concessione degli agri marmiferi comunali di Carrara"*, the municipal bylaw that regulates quarries properties, the Carrara quarries area is a *"bene patrimoniale indisponibile del comune"*[14], that is, the municipality has the property and grants the exploitation of quarries to different actors which have to pay an annual rent and keep the quarry active (*cava attiva* [15]): 80% belongs to private owners (single families running companies) of the so called *"beni stimati",* and to concessionaires of the *"agri marmiferi"*; [16]20% represented by big cooperatives of quarry-men, namely *Cooperativa Canalgrande, Cooperativa Lorano,* and *Cooperativa Gioia* that work on behalf of *Marmi Carrara,* a big society that owns a total of five quarries of the district.

[13] 79 active quarries; 71 non-active quarries; 39 joint quarries. The total number of quarries refers to the three basins and the Pescina-Boccanaglia one. Source "URBAN II-CITTA' DI CARRARA *« carta delle cave di Carrara »* " June 2008

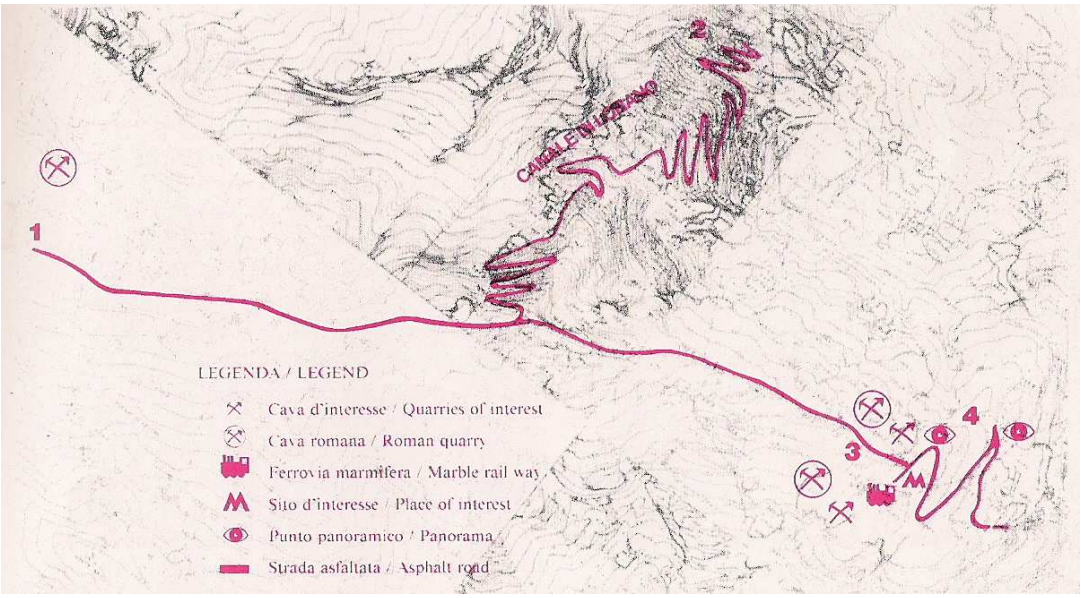
[14] *Regolamento per la concessione degli Agri Marmiferi Comunali di Carrara (allegato alla Delibera di consiglio Comunale no 61 del 21/07/2005);* first article, subparagraph 1-2-3-4.

[15] " il concessionario ha l'obbligo di tenere in attività la cava. Si considera inattiva la cava quando non sia stata lavorata con più operai per almeno otto mesi continui nel biennio" *Regolamento per la concessione degli Agri Marmiferi Comunali di Carrara (allegato alla Delibera di consiglio Comunale no 61 del 21/07/2005);* sixth article.

[16] "Bene stimato" and "agro marmifero" are the same thing, that is quarry field, the only thing that changes is the owner, in the first case private owners, in the second case concessionaires.

Road to the quarry, ***LE FACCE DI MARMO DI CARRARA/THE MARBLE FACES OF CARRARA, pp.23***

- **<u>Torano</u>** basin, the biggest of all three, is the most important thanks to the excellent quality of fine-grained marbles kept in its slopes. The homonymous village is situated at the foot of two different valleys, the Pescina-Boccanaglia on the north western side, and the main Torano valley on the east.



The Torano basin, *Guida alle cave di marmo di Carrara,* pp.18

It represents the most western basin of the whole quarrying area and it boasts 21 active quarries – more than thirty if we consider it together with the **Pescina – Boccanaglia** basin – covering an area of about 900 hectares.

Here the finest varieties of white marble such as the *Calacatta* and the *Statuario* or *Statuario venato* are quarried, mainly in the no46 **Polvaccio-Michelangelo** quarry, which is an open one, where Michelangelo himself came to personally choose marble for his sculptures, together with the *Bianco Ordinario* and the *Bianco Carrara* mostly in the quarries no 21/22 **Lorano I/II** (property of *Cooperativa Lorano*) and no 40 **La Facciata,** notable examples of open quarries laid out as an "amphitheatre".

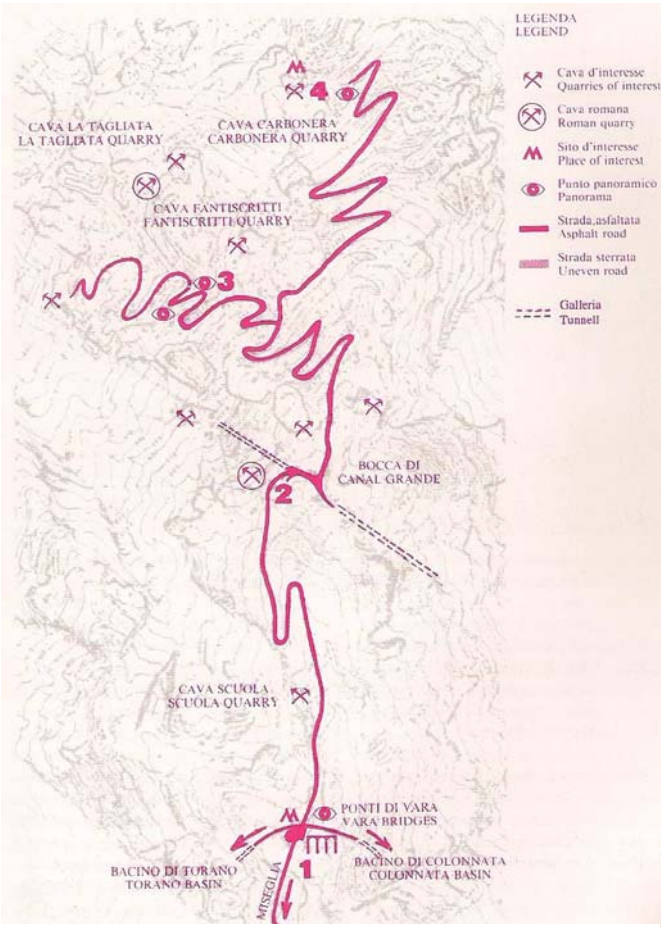
It is the "whitest" valley of the three, due to the huge amount of waste material deposited both along the slopes and at the bottom of the valley. These deposits of debris are called *ravaneti* and they are mainly used directly in the quarry to deaden the fall of benches,

View of the Torano *ravaneti*

but they are also used for the production of powder and grit destined to a particular market share, different from that of the blocks, which has recently developed.

Going up the hills, we can find the Canale di Lorano, site of important quarrying centres. Moving toward the **Ravaccione** site, there is a yard with abandoned houses and mechanical vehicles, reminder of what has been the Ravaccione Railway Station: a distribution point for blocks that were transported from the mountains downhill with the method of *Lizzatura.*

- **Miseglia** basin lies in the centre of the three valleys, with 26 active quarries stretching up to 300 hectares. The basin is also known as **Fantiscritti,** thanks to a bas-relief found there in 1864 dating back to Roman times (203 – 210 b.C.) representing Jupiter, Hercules and Bacchus as a representation of Septimius Severus and his sons Caracalla and Geta.



The Miseglia basin, *Guida alle cave di marmo di Carrara,* pp.19

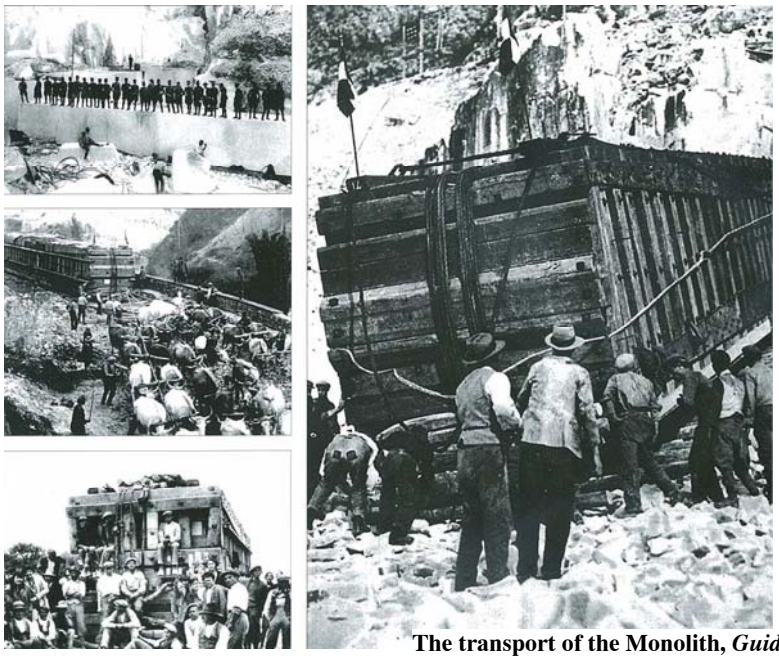
Cremo and *Zebrino* marbles are typical of this area, but there is also a remarkable production of *Bianco Ordinario.*

One of the key elements of the landscape here is the network of access roads to the quarries with its series of bridges from 1890, named *Ponti di Vara*, and tunnels inside the mountains that connect the three basins. It had a significant role for the history and development of the town and marble transport.

In this part of slope, ridges are extremely steep, particularly along *Monte Torrione*, and the result has been the creation of a distinctive kind of quarry, now outdated, namely the *"sotto tecchia"* quarry, with its most notable example represented by the no 95 **Canalgrande B.** quarry, property of *Cooperativa Canalgrande*. A magnificent example of

an underground quarry is the no 84 **Galleria Ravaccione** that goes inside a section of the tunnel of the former *Ferrovia Marmifera.*

In 1928, this basin witnessed an event that is still vivid in the memory of the city itself: the largest block ever extracted from the quarries was taken from no.74 Carbonera.



The transport of the Monolith, *Guida alle cave di marmo di Carrara,* pp.43

A single huge block of pure white marble called "The Monolith" because of its dimensions (metres 18x2,35x2,34) and its weight of 300 tons, destined for Mussolini's obelisk at the Foro Mussolini in Rome.

One of the most popular quarries here is the no 108 **La Para** quarry, also known as "**Cava Scuola**", owned by the Municipality of Carrara, used as a training centre for preparation and practise "on field" of new quarrymen.

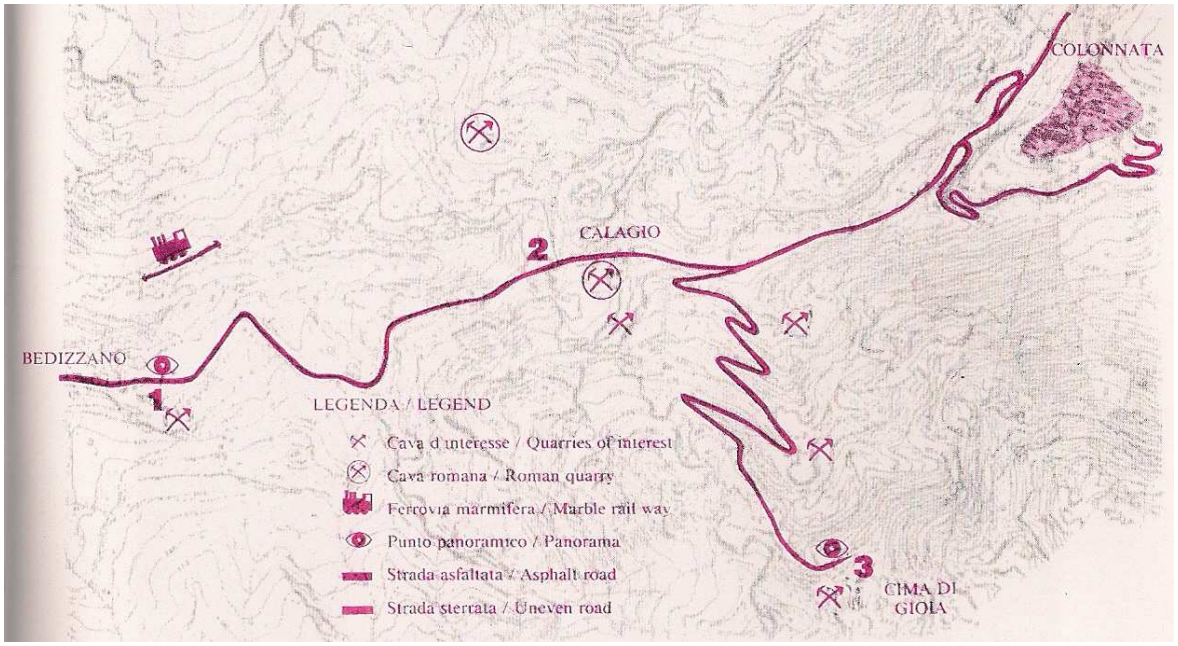
Cava Museo Walter Danesi, welcoming slab

Another distinctive element of the basin is the "**Cava Museo**" created by Mr. Walter Danesi in the no 100 **Bocca di Canalgrande** quarry, a wide yard used for the storage of blocks. It is a reconstruction of the different extraction techniques from the Roman period up to the present and it sells handmade marble souvenirs. The *Cooperativa Canalgrande* owns in this basin other two quarries, that

is no 148 **Cima Campanili** and no120 **Belgia C**.

- **<u>Colonnata</u>** basin marks the boundary with the quarrying region of Massa, while it is separated from the Miseglia basin by the no 148 **Campanili** quarry, situated at the highest point of the ridge.

The area stretches to 500 hectares with 25 active quarries.



The Colonnata basin, *Guida alle cave di marmo di Carrara,* pp. 22

Traces of quarrying activity from Roman times are numerous in the valley and include no155 **Fossacava**, the most important quarry from Roman period in all Carrara territory.

The Fossacava *"caesurae"*

The site has been abandoned for many years – despite being a protected site since 1911 – but it has recently become a tourist site, in order to give importance once more to a place of archaeological relevance where there are findings such as the "*caesurae",* typical marks derived from the cutting of the rock with a sort of pickaxe, or other typical tools and epigraphs on walls.

The principal marbles varieties here quarried are *Bianco Ordinario* and *Bianco Brouillè*, but in the no175 **La Piana A** quarry, a particular example of shaft quarry, *Bianco Venato* and *Bardiglio* are also extracted.

In the Colonnata basin we can find the biggest quarry area of the entire district: the ***CIMA DI GIOIA*****,** famous not only for its dimensions but also for the *Venatino* and the *Bianco Gioa* marble here quarried.

The entire area is divided into 5 main quarries, namely no168 **Cima di Gioia**, no169 **Gioia**, no171 **Gioia Cancelli**, which develops underground, no 172 **Gioia Pianello**, and no173 **Gioia Piastrone**, property of *Cooperativa Gioia*, an open surface quarry on the mountain peak where quarrying activity is made on slopes.

In 2008 the three basins covered a total annual production of 4,795,708 tons of blocks and other material (stones, marble dusts, stones for reefs,…).

Many of the quarries here listed, and many others, are worth a visit in order to better understand the quarrying activity and the methods and technologies nowadays used in this historic work. Another important step towards this strategy is a full understanding of what a quarry is and which kinds of quarries exist in the Carrara district.

According to the first article, subparagraph 5 of the *Regolamento degli agri marmiferi comunali di Carrara*, a quarry is an authorised open excavation or pit from which stone is obtained by digging, cutting, or blasting. Speaking generally, a quarry is a site that can be exploited by men in order to extract mineral stones forming the mountain itself.

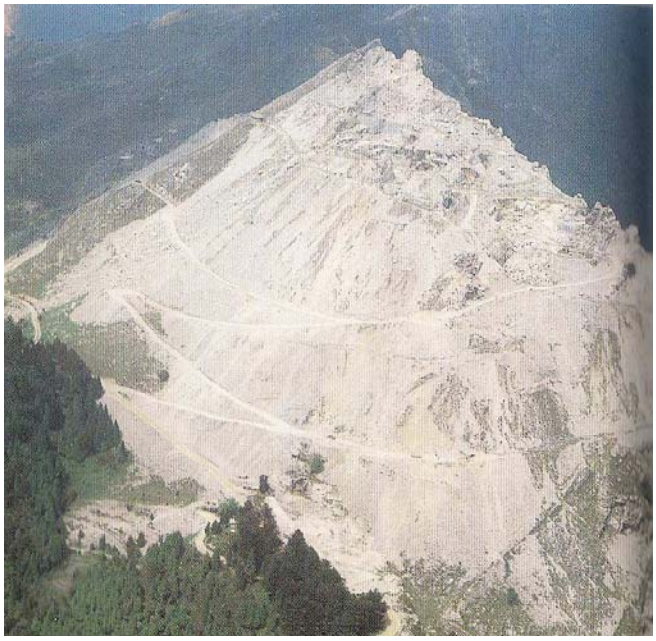
A first classification is based on where the quarry is situated: there are *"cave a cielo aperto"* – open surface quarries, where quarrying activity is visible;

View of the Gioia quarry, an example of open surface quarry

An example of an underground quarry

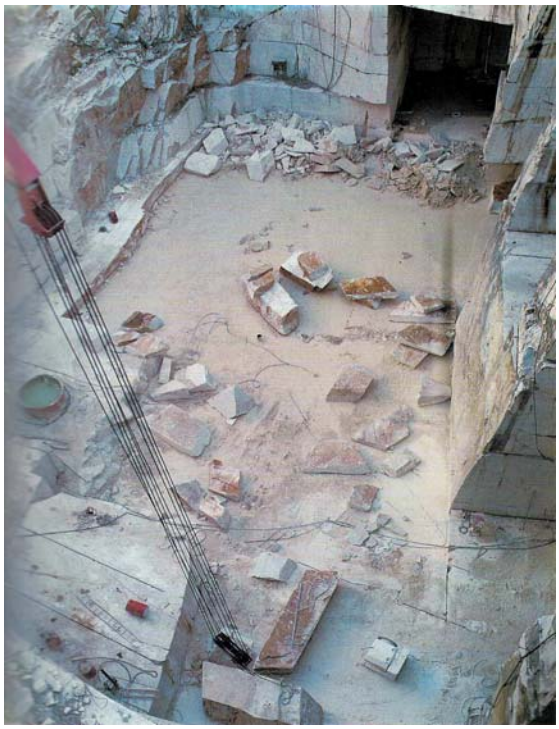
"cave in sotterraneo" – underground quarries, rather common, developing into underground tunnels inside the mountain.

They are often opened where surface quarrying is not possible because of the heavy steep of external slopes. Nevertheless, underground quarries are also opened to follow particular marble deposit developing under the surface.



Open surface quarries are divided into four types: *"culminali"*- peak quarry, on the summit of a mountain or hill from which the ridge is removed; *" di versante"* – slope quarry, concentrated on mountain side they generally have an amphitheatre form and a series of "steps" (*gradoni*) where quarrying is carried out from the highest step working downwards;

Monte Altissimo, an example of a peak quarry



"a fossa" or *"a pozzo"* – pit quarry and shaft quarry, less common in Carrara basins, where the development is essentially vertical often determined by the lack of space needed to the lateral excavation.

An example of shaft quarry

There is another particular kind of quarry, named *"cava sottotecchia"* that has marked the excavation history being one of the most dangerous quarries to be worked.

In the Carrara dialect, *tecchia* refers to the vertical wall of rock, and in fact *sottotecchia* quarrying is made by a cut into part of the vertical rock wall, creating a sort of large niche that marks the future entrance of an underground tunnel and, therefore, underground quarry.

A "tecchia"

THE QUARRYING AREA: PROPERTIES, CONCESSIONS AND MUNICIPAL BYLAWS

Throughout history, marble excavation has always been at the core of Massa-Carrara economy, but it has also concerned many issues on the property of the *agri marmiferi.* This is the reason why, starting from the very beginning, quarrying activity has been regulated by decrees, edicts and regulations.

The first traces of a sort of tax date back to Augustus times when private subjects could open a quarry by paying a tribute to the so-called *Edili*, people responsible for the control of every step of the working process.

Around the 13th century, the "*Pedaggio Marmi*", some sort of export fee that afterwards became the *"Tassa Marmi"*, was introduced as a tax to pay for blocks exported out of the province. In September 2004, following a verdict[17]of the European Court of Justice, the *Tassa Marmi* has been abolished because in conflict with communitarian laws (Shengen) of the ban of imposing customs duties inside a Member State.

During the Renaissance, thanks to Alberico I Cybo-Malaspina, marble became one of the most esteemed Italian products throughout Europe; this urged a reference law to be set and the first associations such as the *Ufficio Del Marmo* were established. It was founded in 1564 as an association of sixteen main actors of the sector, who could therefore control quarrying activity.

[17] *"Sentenza 09/09/2004 n. C-72/03 Corte di Giustizia Europea - Tasse di effetto equivalente ad un dazio doganale - Tassa riscossa sui marmi estratti nel territorio di un comune a seguito del loro trasporto oltre i confini comunali."*

It is in the middle of the 18th century, however, that a real legislation was issued.

Maria Teresa Cybo-Malaspina on the 1st February 1751 issued the *"Editto di Maria Teresa del 1° Febbraio 1751",* a edict concerning the right of exploitation of marble quarries. One of the most important innovations of the edict was the different property of quarries: those which in 1751, had been registered at the land registry office since at least twenty years, were considered as private and inheritable, whereas the others went back to the principality.

Other two laws followed the edict, namely the *"Notificazione Governatoriale"* of 14th July and 13th December 1846 by dukes of Modena and the *"Rescritto Sovrano"* of 25th June 1852 by Francis V duke of Modena.

This group of laws known as *"Legge Estense"* represented a real changeover in legislation matters at that time, and it is the reason why it has survived until 1994-95 when new regulations were issued.

With the edict of Maria Teresa, foreigners were prevented to hold a concession for any kind of quarry, but the interdiction could not stop foreign entrepreneurs to invest in the "white gold" any longer. Between the 18th and the 19th century, there were 338 active quarries owned by local families (such as Fabbricotti or Sarteschi) but also granted by external families such as Henreaux, Walton or Dervillé. They had to pay to the municipality and to the owners of the quarry the famous *"settimo"*, the forerunner of the future annual rent, consisting in 1/7 of the total production of the quarry.

The situation worsened at the beginning of the 20th century, when more than 4/5 of active quarries were sublet by concessionaires to other actors, creating a sort of monopoly of the so called "*baroni del marmo*" – marble barons, who could also buy marble from their subleases at a lower price and therefore benefit more.

These advantages, however, were limited to a small number of people while quarry-men were unsatisfied with very low salaries and dangerous workplaces causing many deaths. This led to different strikes and rebellions of workers in 1920, with no or little changes in salaries.

During the war and fascist period, many entrepreneurs fell into debt and marble companies shut down. Then, in 1930, the *Montecatini Edison S.p.a* company (lately called *Montedison*) together with the *Banca Nazionale del Lavoro*, formed the *Società Anonima Marmi* and bought 60% of quarries area paying "only" 22 million lira.

In 1974, the company split into two other companies, that is IMEG and SAM, and sold its shares to private owners and EGAM (*Ente Gestione Attività Minerarie*), a state-controlled enterprise responsible for the backing of marble industry.

In the late 1990s the company broke down and new cooperatives of associated quarry-men appeared on the scene and began to gain importance.

It is thus easy to understand that the issue of quarries property has always been complicated, mainly because people did not respect the Este regulations still in force at that time, and the municipality itself was not able to restore the situation, as it should.

A first attempt had already been made in 1959 with a municipal law claiming free property of quarries, but the Ministry of Industry strongly rejected it.

Finally in 1994, after deliberations no 88 of the municipal council and no 115 of the regional council, the *"**Regolamento per la concessione degli agri marmiferi comunali di Carrara**"* regulations were issued to effectively replace the old Maria Teresa edict and mark the end of years of contrasts and arbitrary interpretations.

It has been recently updated by municipal council resolution no 61 of 21/07/2005, and some articles have been changed.

Here listed some of the main important articles:

Article 1 defines the main concepts of *"agri marmiferi"* – quarry area, *"cava"* – quarry and *"concessioni amministrative"* – concessions. It underlines that quarries are *"patrimonio indisponibile del comune di Carrara"* so they belong to the municipality that cedes exploitation to others.

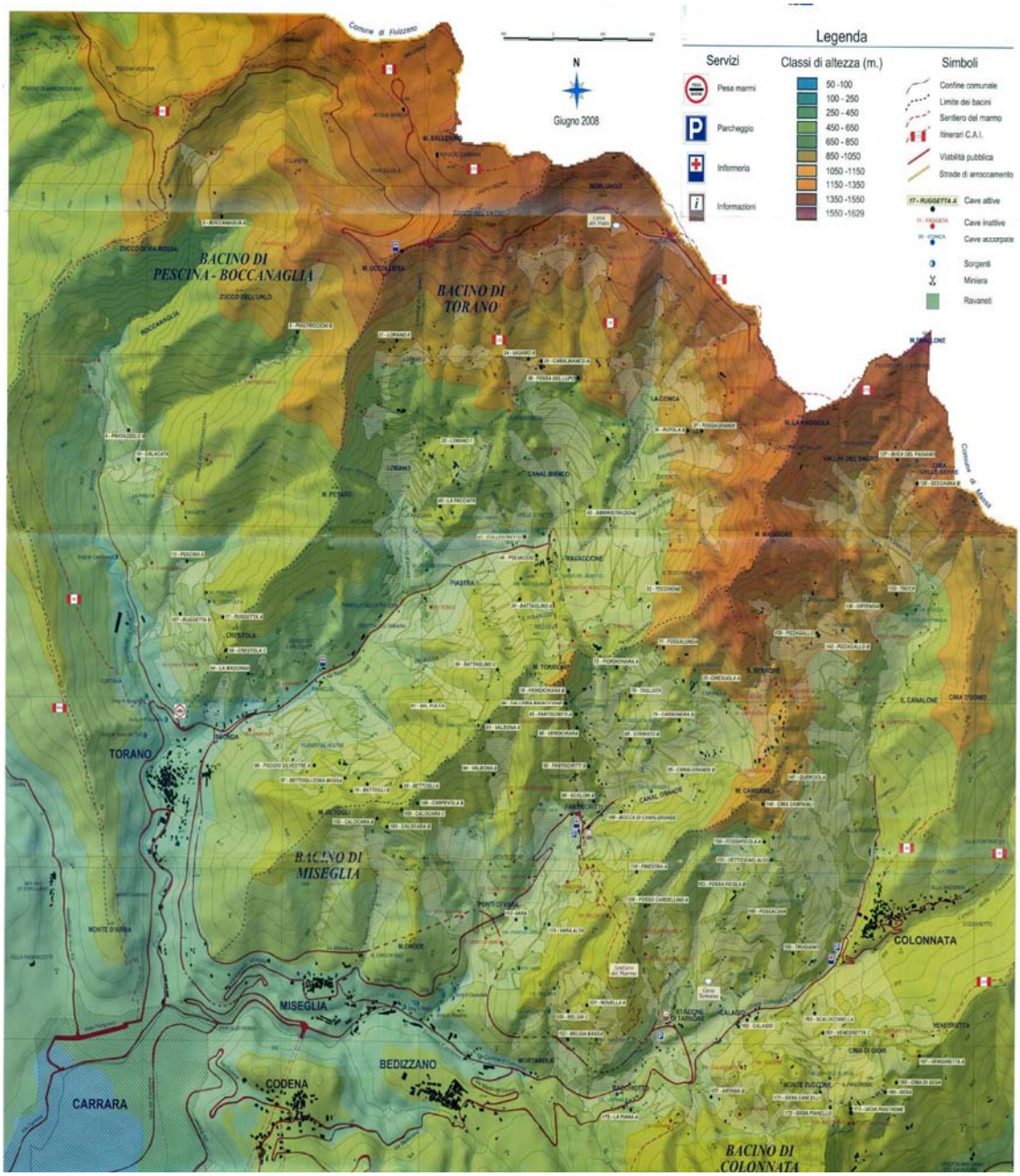
Article 6-7 set out concession conditions to be respected: duty towards municipality of keeping the quarry active; ban of any kind of lease or sublease.

With **article 9,** the 29-year long concession is established.

One of the most important is **article 10** divided into six parts. It specifies the annual rent regulation that concessionaries owe to the municipality to exploit the quarry. It varies according to external market prices, quality of products and the contribution for the regional law no 78 03/10/1998[18].

[18] *" Testo unico in materia di cave, torbiere, miniere, recupero di aree escavate e riutilizzo di residui recuperabili"* Legge Regionale 3 novembre 1998 n°78

To conclude, as mentioned in the regulations, quarries exploitation must respect several other national rules such as environmental law no 79/98 [19] and following, and security on the workplace laws no 624/96 and no 128/59[20].



Map of the quarry area of Carrara

[19] *" Norme per l'applicazione della valutazione di impatto ambientale"* Legge Regionale 3 novembre 1998 n°79

[20] *"Norme di polizia delle miniere e delle cave"* D.P.R. 09/04/1959; *"Miglioramento della sicurezza e salute dei lavoratori nelle industrie estrattive"* D.lgt. 25/11/1996

THE MOST ANCIENT INDUSTRY IN THE WORLD

When dealing with marble, a look at how marble industry has developed from a technical point of view is needed.

The first reliable traces of working activity of Carrara marble deposits date back to 1st century A.D. under Roman dominion. At that time marble was called *"marmor lunense"* because Apuan extraction was identified with the city of *Luna* – then called Luni – a Roman colony from whose port *"naves lapidariae"* sailed to Rome loaded with marble. Many of the earliest quarry workers were slaves sent by the Romans, perfectly organized into different groups for every step of the work: the *"marmoraii"* who actually quarried the marble; the *"quadratarii"* – afterwards called *"riquadratori",* who shaped the marble blocks into little transportable ones, and the *"sectores serrarii"* who cut the blocks into slabs using handsaws.

Typical tools used by *quadratarii*

In the oldest quarries of **Fossacava, Gioia-Oliceto, La Tagliata** and **Crestola** one can still find visible traces of the old method of *"tagliate romane"* – Roman cuts.

The rock was cut by hand using a mallet, *"mazzolo"*, and a chisel, *"subbia",* trying

to take advantage of its natural fractures[21], forming the *"caesurae"*, a sort of trenches for the first separation of the block from the hill; this part of the job consisted in the opening of V-shaped incisions along the surface of the stone, using the so-called the *"formelle",* into which iron plates and wedges were inserted and beaten with a maul, *"mazza",* to help the split of the block from the hill.

Quarrymen using the gad to cut blocks

The statue of a *riquadratore*

in the Cava Museo in Fantiscritti

Sometimes also wooden wedges were inserted and then wet so that with the increase in volume, they provided the necessary pressure to break the rock.

Once the block was completely split, it was roughly cut into small parts with hammers and chisels by *quadratarii* and *sectores serrarii.* In the end, *"maquinarii"* were responsible for the lifting and transport of the block down the valley. All the procedures were supervised by the *"magister ab marmoribus"* the present *capo cava* – quarry foreman.

The ancient and quickest method of block transportation was the so-called *"abbrivio"* –

[21] In Carrara slang these fractures are called *"pelo della roccia",* that is the same of *"verso e contro di taglio".* Stones have different fractures and experienced quarrymen know how to cut stones depending on the *"verso e contro del pelo"*, that is fractures parallel to the main direction of the stone, *verso*, and perpendicular ones, *contro.*

headway; it involved pushing the blocks down the slopes to the valley and leave them to stop on their own.

While manual excavation techniques remained the same for many years, this transportation method was soon abandoned because the blocks often broke or, in the end, became unusable.

The system was replaced by the famous and very dangerous transportation method of *Lizzatura.*[22]

The *carica* ready to be transported

It must be remembered, all the work was handmade with the help of simple wooden or iron tools and long ropes already used in ancient times.

The typical team of *lizzatori* was made up of 10-15 men supervised by the *"capolizza"* who gave orders through every step of the work. They usually got up early in the morning and woke up each other by calling their names from the streets, then reached the quarry on foot, bringing lunch into small boxes. Sometimes they did not come home during all the working week due to huge distance from home, so the huts where all the equipment was stored were transformed into real shelters, run by the *"capannare",* women or quarry-men wives who gave something to eat and offered them hospitality during the night.

The work started early in the morning with *lizzatori* holding all the equipment on their shoulders up to the quarry site. They had to lower the *"carica"* – large wooden sleds carrying marble blocks – down the valley. It could vary in weight from 15 to 20 tons. The sleds, called *"lizze",* were constituted of three big long trunks placed side by side carrying

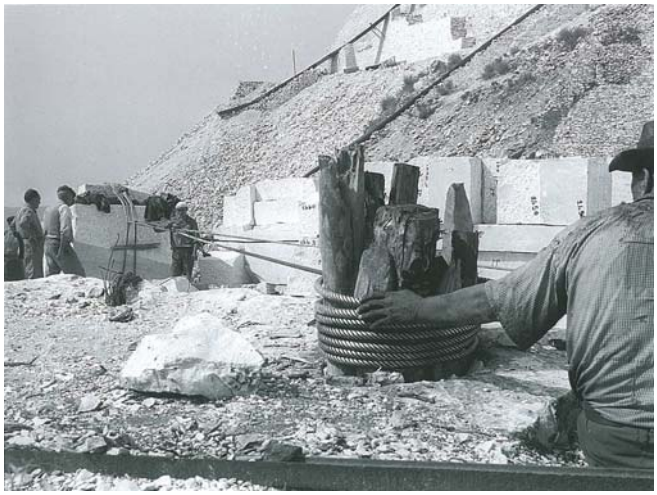
[22] This name comes from *"lizza"* that in Carrara dialect means *slitta* – sled, and in fact, sleds were used for the descent of marble blocks from the quarries.

the *"carica imbragata"* that is marble blocks bounded together with *"braghe"* – steel cables, usually in number of two.

For the descent some special ballast tracks were used, the so-called *"vie di lizza",* but very often the *carica* was directly lowered on the *"ravaneti"* – marble dumps covering mountain slopes.

This was the most dangerous moment. The descent was done exploiting gravity force and men strength.

A *piro* and a *mollatore*



There were wooden stocks made of pieces of wood tightly bound together, the *"piri"*, fixed into marble surface, around which three thick hemp ropes were wound and gradually released by the *"mollatori"* to control the *lizza* advance. The other *lizzatori* worked around the *lizza*: the *capolizza,* coordinating the whole job and the only man in charge of placing the *"parati"* – wooden sleepers, in front of the sled; others called *"ungini"* soaping the *parati* for an easier descent; others controlling the *piri* placed along the *lizza* truck and others, the *"legnaroli"* responsible for the rescue and the passage of the *parati* to the capolizza. The whole job was chanted by voices and screams of workers together forming a sole voice.

Less simple than it may seem, the *Lizzatura* has been one of the most difficult and dangerous activities of the past. The great number of accidents, often fatal, was caused by the breaking of *lizza* cables or because of lateral movements of the load or due to ballast tracks

The *Lizzatura*

subsidence, causing the squashing of workers.

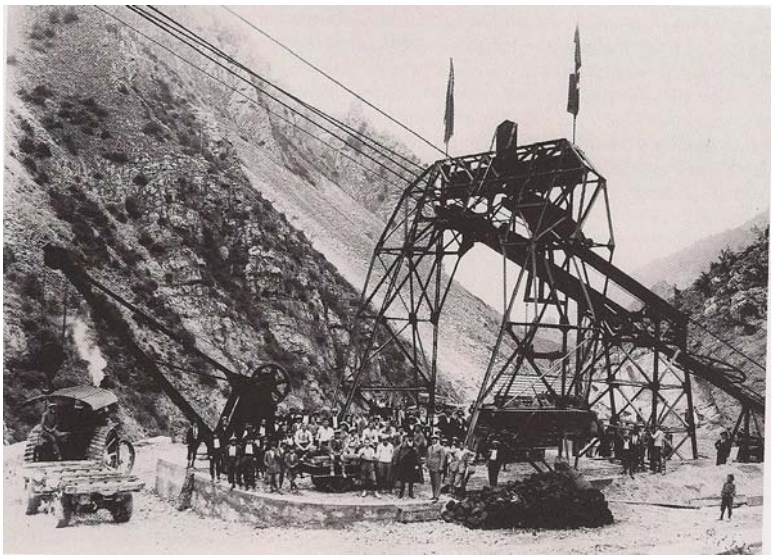
Once arrived at the *"poggio caricatore"* – the loading place, the point of arrival of the *carica,* blocks were transported to the harbour of Marina di Carrara or to sawmills and workshops through the famous *Via Carriona*, the road of carts, by the mean of carts driven by oxen.

Despite the many attempts made to mechanise the descent of blocks in order to eliminate risks, the old system of *Lizzatura* still survived until 1960s.

In 1910-20 Roman carts were gradually replaced by tractors called *"Ciabattoni"* because they were enormous black slow vehicles with solid tyres making a terrible noise and black smoke like someone who walks without rising his feet.

Another try was the *"piano inclinato"* – inclined plane, introduced by the **Cesare Frugoli** Company in 1925. A funicular where marble blocks inside trolleys could slide down and ascend again on a 1,250m line controlled by an electrical winch. Achieving 75% of slope dip, it was a revolutionary system, but unfortunately not lasting.

In 1930, the *Teleferica di Balzone* – a special cableway, by **Walton Goody Cripps**, was built for the transportation of marble coming from *Monte Sagro*. It could transport blocks up to 20 tons down 700m along a 1,500-metre line. It was used until 1957 when a cable broke, and the trolley fell to the ground from a 1,200m height.

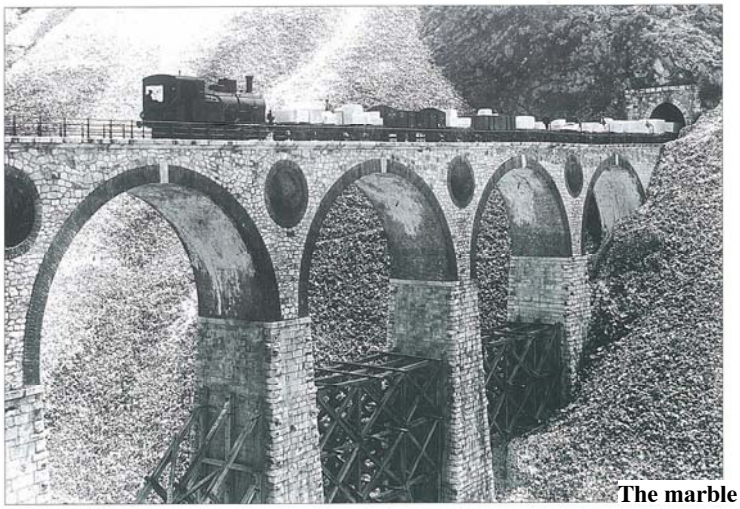


The Teleferica di Balzone, *Guida alle cave di marmo di Carrara*

Among all the efforts done to replace the *Lizza* system, however, the most important step forward was made with the building of the *Ferrovia Marmifera* [23] inaugurated on 19 August 1876.

[23] From this time on, we will refer to the *Ferrovia Marmifera* as "the marble railway".

The first trip was done 22 years later, in 1892. Once completed, the marble railway covered a distance of more than twenty kilometres, with a pendency of 45‰, with 16 bridges – *Ponti di Vara,* and a series of 15 tunnels. It had 10,500 more metres of secondary lines leading to sawmills and workshops.



The marble railway passing on the *Ponti di Vara*

It has been a real masterpiece of engineering that astonished Europe, but after the war the economy suffered a lot, the railway proved uneconomical and the municipality decided to stop it in 1963.

Now that the marble railway no longer exists, its track has been inherited by powerful modern trucks representing, at the moment, the only way of transport of marble blocks, directly loaded on the quarry yard. From the point of view of town planning, special roads have been built (La *strada dei Marmi*[24]) to facilitate drivers in order to avoid traffic problems, but also for environmental safeguard with special time bans that they have to respect. Thanks to this innovation, not only marble transport has become quicker and more economical, but also quarrying equipment transport is much easier.

As already mentioned, Roman manual extraction techniques survived until the 18th century, when the first explosives were used, gunpowder in particular, obtaining a great

The 1932 blasting, or *varata*

[24] Source http://www.progettocarraraspa.it/ and http://www.progettocarraraspa.it/sezione.php?id=La_Strada_dei_Marmi|0 and http://www.comune.carrara.ms.it/Allegati/Agora/Dicembre2005/totDicembre2005.pdf websites of Carrara municipality and specialised on urban projects.

approval thanks to the enormous amount of rock broken away in very short time.

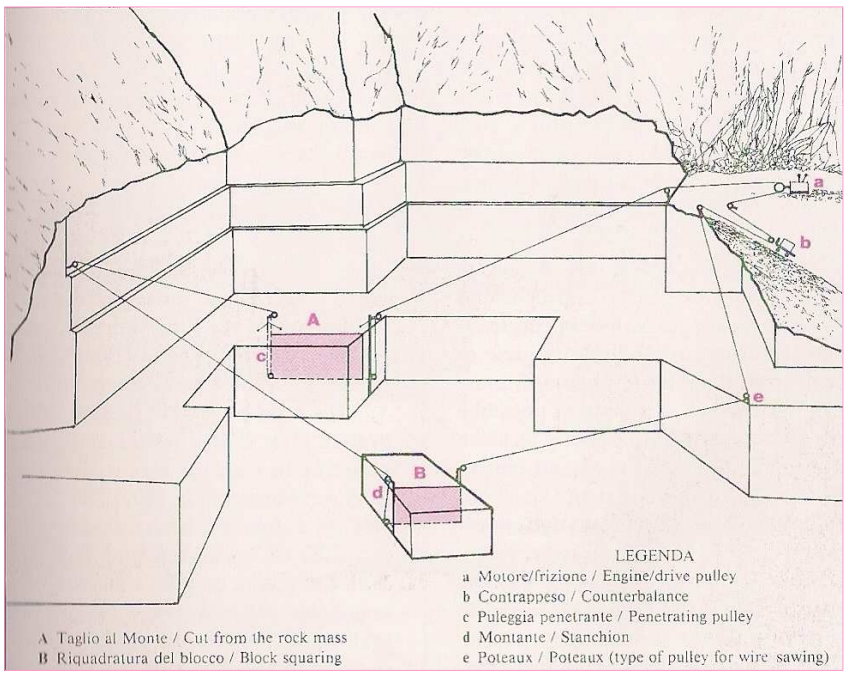
The *mugnone* announces a blasting

This method, called *"varata"*, involved a real blasting using French mines, i.e. holes dug into selected marble wall where gunpowder was put; but the explosion – announced by the *"mugnone"*, a person blowing a sort of rudimentary bugle – was not controlled, causing huge portions of rock to break away in irregular-shaped blocks to be cut down manually. Moreover, mountain faces were often so seriously damaged that subsequent exploitation of the quarry was jeopardised.

The two most important factors determining the abandon of the *varata* method were, however, the big amount of *ravaneti* created after the explosions that summed with other marble dumps already deposited along the slopes and in the quarries; and the fact that marble extracted was often unusable because it broke during the free fall down the slope.

Three are the main *varate* of the history of quarrying activity: the first in 1883 by F**abbricotti** family, the second and the most spectacular, in 1932 on *Monte Torrione*, and the last one being an intentional reproduction of old techniques, in 2000 in the **Corinno Cattani** quarry.

The helicoidal wire system



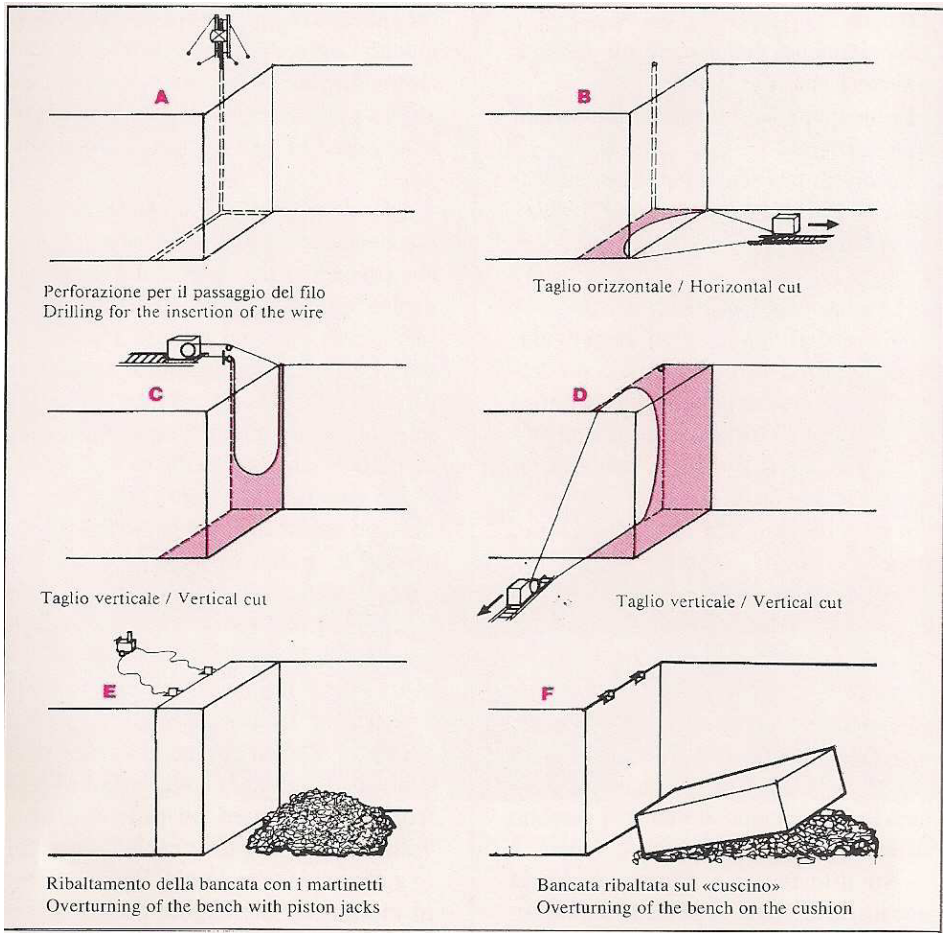
At the end of the 19th century, a revolutionary method came into use: at the *Exposition Universelle* in Paris in 1889, the helicoidal wire (*filo elicoidale*) was presented by the Belgian engineer E. Chevalier as a system to directly separate blocks from the rock

face.

The system consisted of a 5mm wire running between pulleys set on rods, threaded under the rock to be detached, and then cutting the rock on two sides with the help of an abrasive mixture of siliceous sand and water. Actually, this mixture was intended to cut the marble: by rubbing against the surface, it scraped off particles of rock immediately evacuated by the water. Afterwards the wire was moved to cut the other sides until the bench was completely detached and fell on a bed of debris already prepared to lessen the impact of the bench's fall.

In 1897 the local engineer A. Monticolo improved the system with the so-called *"puleggia penetrante Monticolo"* a drill capable of drilling large diameter holes into the rock up to several metres deep.

With the advent of the helicoidal wire, quarries began to shape with the typical "bench" appearance they still have today. Quarrying became more rational and extraction started to follow well-defined work patterns.



The diamond wire saw system

In the late 1970s the helicoidal wire scheme has been completely replaced by the diamond wire saw system (1978) thanks to its flexibility and manageability. The diamond wire is a steel cable with small diamond cylinders,

called *"perline"* – pearls, separated by springs. Cuts can be done in different directions, with the abrasive action of the synthetic diamonds of the pearls on marble and the polishing and cooling action of water.

Nowadays extraction and quarrying activity are made up of three main phases:

1) *Taglio al monte* – Primary cut on the quarry front: It is the first step of the production cycle consisting in the isolation of a portion of rock, the *"bancata"* – bench, from the mountain slope with diamond wire saws and drills.

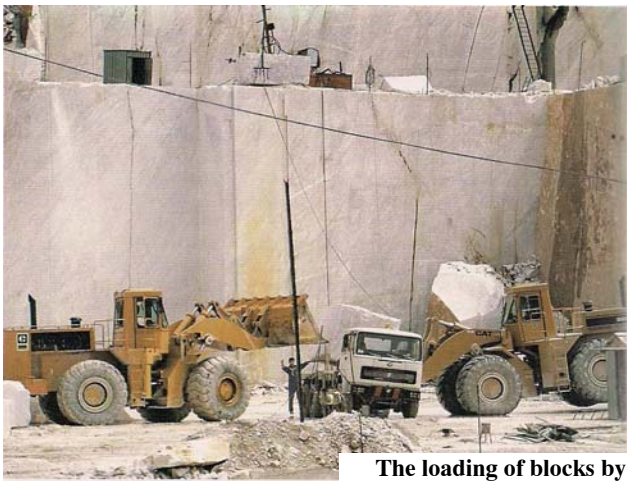
2) *Ribaltamento della bancata* – Overturning the bench: this is the most spectacular stage of the extraction process and one of the most dangerous for workers. The bench usually is a parallelepiped of 6-9 metres high and more than 10 metres long. It is detached from the mountain thanks to an excavator with the help of hydraulic jacks or straddle bearings filled with air or water inserted in the wire cuts, which exert pressure on the rock in order to let it fall on the already prepared *"cuscino"* on the yard, made up of marble debris and sludge taken from the cutting process.

3) *Riquadratura della bancata* – Squaring the bench: this final phase is the shaping of marble into commercial-sized blocks by means of diamond wire sawing machines. This is a crucial moment, a wrong shaping can lead to serious commercial consequences for the block itself and for the entire deposit. Block size is usually calculated according to the dimensions of sawmills frames that will be

used for the cutting of marble into slabs. One of the most common unit is 1,8x2,0x2,8m.

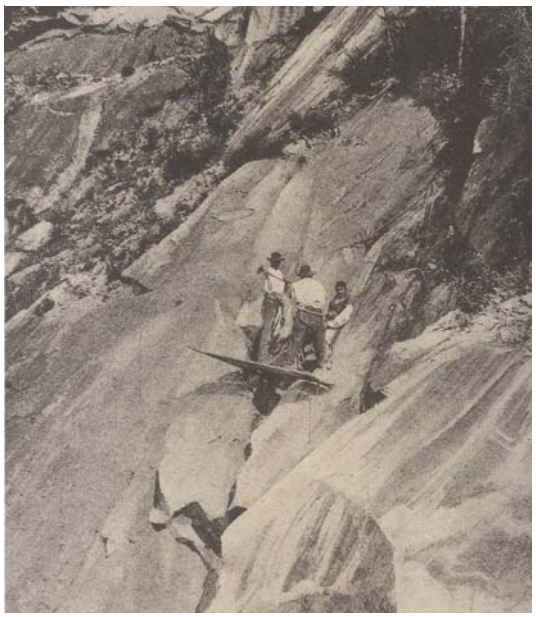
After being squared, blocks are ready to be transported on lorries to sawmills, workshops or directly to the harbour, after the so-called *"stagionatura"*[25]. Lorries normally used for the purpose do not require the aid of any other mechanical devices; behind the driving cab there is a winch linked to a steel cable used to secure blocks to be loaded. Workers then place it on two rails and make it slide on the lorry. Very often blocks are so heavy that the front part of the vehicle lifts more than a metre off the ground, as it cannot counterbalance the load at the rear. Only when the block moves towards the centre of the lorry, it gains its position again .

There is also another technique often preferred to the first one. In this case, one or two bulldozers working on the two sides of the block, lift it in the air to allow the lorry to position itself underneath, and load it on the lorry's loading platform.



The loading of blocks by means of two scrapers

***Tecchiaioli* at work**



Among all these innovations, however, an ancient figure survived to history, even if modernized; we are talking about the *"tecchiaiolo"*. These men are responsible for the cleaning and checking of steep walls above certain kinds of quarries (especially *sottotecchia* quarries) in order to avoid accidents on the workplace. Once, the equipment consisted in simple ropes and tools, the main element remaining men's strength.

[25] It is important to underline, though, that marble blocks must mature - *"stagionare"* for some time before being used. This means that for some days a block cannot be touched neither shaped, in order to achieve its major compactness and being more suitable for processing or sawing activities.

Tecchiaioli in fact, were secured to other men who were responsible for their descent or ascent, and it is not surprising that many accidents have occurred throughout centuries. Nowadays expert alpinists with special climbing equipment, called by the several quarrying firms when necessary, carry out this work.

Finally, it is worth to spend some words regarding marble sawing and finishing processes.

The first saw frames using water as driving power were introduced in sawmills by the end of 18th century. The mechanism was similar to a hydraulic mill, with wheels taking water from the *"gora",* a channel or watercourse flowing next to the factory, and using it together with siliceous sand to create an abrasive mixture to cut marble.

First frames had one blade only, but with the invention of a multiple-blade frame saw, by **Giuseppe Perugi**, and following improvements, sawing process became faster and more organized. Sometimes up to eighty slabs could be cut from a single block.

In 1870 there were forty sawmills of this kind in Carrara and fifteen in Massa.

Nevertheless, the productivity of such frames was reduced because strongly tied to the use of reciprocating machines that did not catch up with the speed improvements needed for the time moving on. [26]

A gang saw

Over the last few years many innovations and inventions have been introduced, such as electromechanical devices for lighting and safeguarding in case of blackouts, the use of lifting machines for marble blocks, and most of all diamond gang saw that have completely replaced traditional frames. This has led to a significant increase in productivity (ten times more than traditional frame saws).

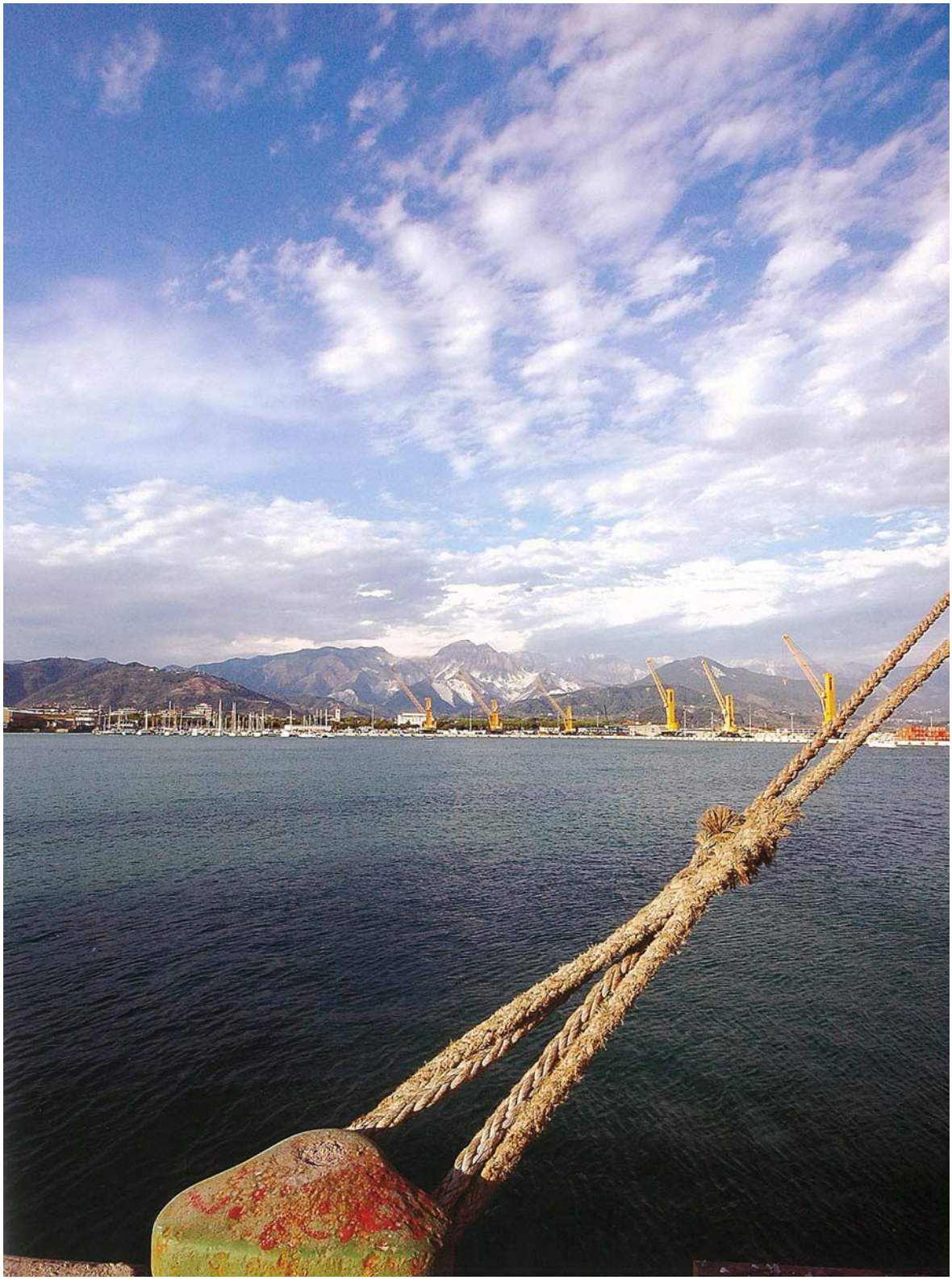
Once the block has been sawn, it moves on to workshops.

Here it is processed in order to create monuments, statues, floorings, wall coverings, funeral architecture, memorial works, etc…. Just like sawmills, workshops technology has

[26] We are referring to a 100-year time, from 1870 to the Second World War, when cutting speed increased from around one centimetre an hour to around two centimetres an hour. In other words, this means that a traditional frame saw took almost one hundred hours to cut a 2-metre block into numbered slabs.

undergone different stages and nowadays the most used systems concern numerically controlled machines for large volumes of material and diamond devices, such as diamond plates and crowns to cut and reshape slabs to specific thicknesses.
After being cut, stones are honed and polished. In ancient times, these jobs were handmade thanks to skilled workers, but today honing-polishing machines are widely used. They automatically apply pressure to the abrasive multi-disks on the slabs moving them from side to side in order to carry out the work.
Finally, other finishing operations are required. To facilitate the whole course of actions, all the machines are often placed side by side so that marble pieces can be continuously transferred from one processing line to the other, on a conveyer belt.
The future trend, however, sees multipurpose equipment that can manage to do the whole job alone, from slabs cutting to ready-to-use tiles.

To conclude this first part, it is worth to remember that in each phase of production cycle – extraction, working, sawing, finishing – what has a paramount importance is the **human element.**
Marble workers have a long old tradition made up of hard work, skills, experience and devotion which are primary features for the field.
Carrara marble travels around the world and makes its citizens proud of it, and it is above all thanks to these people and technical progress made that marble industry has changed to become even more cosmopolitan. Nowadays Carrara district is an exporter of local stones but also a great importer of appreciated stones from different part of the world that here are processed in order to be re-exported or used in the domestic market, thanks to the high specialisation of the district in the finishing process.



The port of Marina di Carrara, ***LE FACCE DI MARMO DI CARRARA / THE MARBLE FACES OF CARRARA*****, pp.85**

3. MARBLE TRADING

FROM THE BEGINNING TO THE 1980s

Reconstructing the history of Carrara marble export trends throughout centuries is not an easy task, and the same goes for general international trends. It is important, then, to fix some concepts, in order to better understand data, figures and outlooks recorded.

Firstly, one country cannot depend only on its own domestic market. That is the reason why countries are naturally inclined and concerned about external markets and their overall economic situations. In the stone sector, a domestic crisis in one part of the production cycle of one country, can lead to a *dominoes effect* and serious consequences on the economy of its commercial partners.

This concept is easily applicable in other fields of the economy, the latest example being the American bank crisis that has jeopardised the economies of many states in 2008.

Secondly, trade and economy are deeply influenced by national and international political balances. The two World Wars and the awful effects they have brought represent the main example: poverty, ruin, deaths, but also protectionism, recession and the closing down of many companies that went bankrupt because indebted or due to not enough profitable sales.

Thirdly, but not less important, especially in the Far Eastern countries, there was a general trend of import-export companies to not declare the real quantities of national production

and external exports. This, together with a lack of control by institutions and customs, has led to a general lack of official reliable data from around 1920s to at least 1980s.
Talking about Carrara, this situation of uncertainty was partly reduced thanks to the *Tassa Marmi*, the protectionist tax that must be paid for extraction and production, with whom people recorded the amount of marble extracted, and with the introduction in 2003 of the weighing-machine of Torano, the only one uphill, through which every lorry must pass as to weight and record the blocks descending from the mountain down the valley to be exported.

This last point must be taken into consideration especially in the following pages, where an analysis of the beginnings of world stone trade until 1980s will be recorded.
This has been the most uncertain but, at the same time, the most important period for stone sector; there have been growth peaks up to 70% on international scale thanks to European and American steady demand and to the "new" Eastern and Far Eastern countries.

We have already stated the apogee of Carrara marble being the Roman period; what has to be said now, is that **after the Fall of Roman Empire** (V century B.C.), marble and the stone quarrying[27] suffered a long period of decline.
Production was extremely limited and directed to internal markets of the five main European countries, namely Italy, France, Belgium, England and Spain.
Luni quarries, which had constituted the key centre of production, were abandoned from the V to the XI century.
It is thanks to the Industrial Revolution starting from England (1760-1830) that the stone quarrying system managed to restore and develop again.
Despite information and statistics available for the first half of the XIX century onward are scarce, it is possible to point out the gradual formation, starting from 1830, of an European and international stone market, whose main features are still visible today.
Stone market has reached its peak in the period immediately preceding the 1929 crisis.

[27] We cannot refer to an "industry" of marble, yet. That is a concept introduced after the Industrial Revolution of 1700.

Produzione mondiale del grezzo	tonn.	1.500.000
Produzione nazionale del grezzo	tonn.	600.000
Produzione nazionale su produzione mondiale (B/A)	%	40
Consumo nazionale (B—D)	tonn.	190.000
Consumo nazionale su consumo mondiale (C/A)	%	13
Consumo nazionale su produzione nazionale (C/B)	%	32
Export nazionale (riportato a grezzo)	tonn.	410.000
Export nazionale grezzo	tonn.	200.000
Export nazionale semi-lavorato (riportato a grezzo)	tonn.	138.000
Export nazionale lavorato (riportato a grezzo)	tonn.	72.000
Export nazionale grezzo su export totale	%	49
Export nazionale semi-lavorato su export totale	%	33
Export nazionale lavorato su export totale	%	18
Export nazionale su consumo resto del mondo (D/A—C)	%	31
Produzione di grezzo del resto del mondo (A—B)	tonn.	900.000
Consumo resto del mondo	tonn.	1.310.000
Produz. resto del mondo su consumo resto del mondo (E/F)	%	68
Importazioni italiane	tonn.	—
Grezzo trasformato in Italia (B—d)	tonn.	400.000
Grezzo trasformato nel resto del mondo (E + d)	tonn.	1.100.000
H/I + H	%	26

Quadro riassuntivo anno 1926, ***Sviluppo dell'Industria marmifera mondiale: anni 20-50-80*** **pp. 17**

In **1926** world stone production was recorded around 1,5 million tonnes; 80% of this figure was produced by the already mentioned countries – England, Italy, France, Belgium – together with USA and Germany, and Italy alone was responsible for 40%.

These countries dominated nearly all international trades, combining strong trading within the group and exports to the rest of the world. Each country had an individual role and Italy, played the role of the main country exporting raw material and finished and semi-finished works. In the first case, its main partner were the by then EEC countries (93,460 tonnes) followed by USA and Canada (64,516 tonnes), while for finished and semi-finished products the UK and South America excelled. The total Italian export in 1926 was 358,791 tonnes.

MERCE / PAESI	GREGGIO		LAVORATO E SEMILAVORATO		TOTALE	
	Tonn.	%	Tonn.	%	Tonn.	%
Inghilterra	9.783	5	34.890	22	44.673	12
Altri Paesi CEE	93.460	47	12.366	8	105.826	29
Resto d'Europa	14.623	7	11.617	7	26.240	7
Nord Africa	—	—	16.712	10	16.712	5
Resto d'Africa	—	—	—	—	—	—
Medio Oriente	—	—	1.577	1	1.577	—
Estremo Oriente	—	—	16.946	11	16.946	5
USA e Canada	64.516	33	10.086	6	74.602	21
Centro e Sud America	8.293	4	44.214	28	52.507	15
Australia	—	—	5.533	3	5.533	2
Altri Paesi	8.464	4	5.711	4	14.175	4
TOTALE	199.139	100	159.652	100	358.791	100
Suddivisione % tra greggio e lavorato		56		44		100

Export italiano per paesi di destinazione, anno 1926, ***Sviluppo dell'Industria marmifera mondiale: anni 20-50-80*** **pp. 18**

From the point of view of materials, Carrara white marble alone represented 35% of the entire world production, while the remaining 65% was shared among a great variety of other products each reaching a maximum of 5% of the total. Stones of the other five countries were qualitatively inferior compared to Italian ones, and the same was in the United States, with the Vermont white marble trying to imitate Carrara one, or in Uruguay where a marble-producing area was significantly called "Nueva Carrara".
The leadership of the Italian and Apuan stone sector derives from old traditions, human skills and improved technology applied to every phases of production cycle, from an unrivalled professional reliability and from a sort of monopoly of quality stones which have always met the constantly changing demand of the market.

In the 50s, after **the Second World War,** the international stone sector came to a standstill. This is easy understandable because after such a destructive war, the economic systems of five out of the six countries responsible for the major production and trade shares had been seriously hit; they could no longer afford expenditures for marble and stones, that represented non-essential products strictly linked to general levels of income.

Such a stagnant market should have hit Italian stone industry in particular, due to the unique "Carrara pattern" it follows, mainly based on external markets relationships.

Italian recovery in the sector, instead, has been less slow compared to other countries, bringing production figures back to 1926 levels, or even better, in a relatively shorter time.

In 1951 the official Italian production figures was recorded at around 600,000 tonnes, the same amount of 1926, and it continued to grow in the following years: 1955 →913,503 tonnes; 1961→ 1,367,000 tonnes etc… .

This recovery has been favoured by two innovative elements such as the growing importance of the national market and the increasing production of coloured marbles (outside the Apuan district) whose figures moved from 42.3% in 1951 to 55.3% in 1961 and 72.1% in 1966.

As for the Apuan district, production in 1951 was around 350,000 tonnes (almost the half of national production), to pass in 1961 to 607,000 tonnes.

Voci	Addetti		Resa-Uomo (Tonn.)		Produzione uff. (Tonn.)		Produzione stimata (Tonn.)		Ripartizione %	
Anni	Comprensorio	Italia	Comprensorio	Italia	Comprensorio	Italia	Comprensorio	Italia	Comprensorio	Resto d'Italia
1951	4.567	9.366	75,78	64,04	346.070	599.815	433.000	750.000	57,73	42,27
1955	6.097	13.197	74,71	69,22	455.523	913.503	570.000	1.100.000	51,82	48,18
1961	5.762	15.678	107,09	87,22	607.396	1.367.461	760.000	1.700.000	44,71	55,29
1965	4.619	15.759	114,72	121,21	529.901	1.910.147	670.000	2.400.000	27,92	72,08
1971	2.934	14.625	213,83	160,68	627.370	2.542.914	785.000	3.200.000	24,53	75,47
1975	2.665	13.455	258,14	274,62	687.940	3.694.989	860.000	4.600.000	18,70	81,30
1981	1.987		555,51		1.103.789		1.380.000	6.700.000	21,23	78,77

Produzione, addetti, produttività media in escavazione, ***Sviluppo dell'Industria marmifera mondiale: anni 20, 50,80.*** **pp 19**

Concerning export during the 1950s, however, Italian sales did not perform well, bringing 1926 figures down to 200,000 tonnes in 1950-55.

Only **In the second half of 1960s** we assisted to the creation both of a strong national stone industry that managed to diminish the Italian dependence from international trends, and a renewed boost for export that overcame past figures (593,671 tonnes in 1965).

voci / anni	Greggio		Semilavorato		Lavorato		Totale	
	Tonn.	%	Tonn.	%	Tonn.	%	Tonn.	%
1951	54.631	34,71	89.157	56,64	13.610	8,65	157.398	100,00
1955	66.072	32,73	111.324	55,15	24.459	12,12	201.855	100,00
1961	75.825	21,73	178.936	51,27	94.225	27,00	348.986	100,00
1965	99.257	16,72	222.265	37,44	272.149	45,84	593.671	100,00
1971	125.619	10,63	256.144	21,67	800.106	67,70	1.181.869	100,00
1975	161.312	12,12	247.820	18,62	921.650	69,26	1.330.782	100,00
1981	256.331	12,47	304.412	14,81	1.494.940	72,72	2.055.683	100,00

Export nazionale: quantità riportate a blocchi e ripartizione in percentuale, *Sviluppo dell'Industria marmifera mondiale: anni 20, 50, 80* pp. 22

During the 80s Italy was considered, indeed, the leading marble producing – consuming – processing and exporting country worldwide, in a phase when other key actors came on the international scene, such as far Eastern countries. Concerning commercial partners, in 1981, we assisted to the great improvement of Italy – Middle East trade, both on raw and finished products for a total amount of 490,427 tonnes, that is 32% of Italian export as a whole.

Paesi / Merce	Greggio		Semilavorato		Lavorato		Totale	
	Tonn.	%	Tonn.	%	Tonn.	%	Tonn.	%
Inghilterra	1.383	—	4.310	2	15.908	2	21.601	1
Altri Paesi CEE	45.033	18	70.641	29	465.540	45	581.214	38
Resto d'Europa	35.185	14	51.811	21	59.084	6	146.080	10
Nord Africa	31.325	12	16.572	7	24.066	2	71.963	5
Resto d'Africa	2.339	1	2.690	1	12.323	1	17.352	1
Medio Oriente	95.334	37	70.022	29	325.071	32	490.427	32
Estremo Oriente	28.265	11	11.050	4	30.731	3	70.046	4
USA e Canada	4.927	2	11.610	5	89.160	9	105.797	7
Centro e Sud America	9.414	4	2.038	1	3.591	—	15.043	1
Australia	1.659	1	1.947	1	3.026	—	6.632	0
Altri Paesi	—	—	—	—	—	—	—	—
TOTALE	254.864	100	242.691	100	1.028.500	100	1.526.055	100
Suddivisione % tra greggio e lavorato		17		16		67		100

Export italiano per paesi di destinazione, anno 1981, *Sviluppo dell'Industria marmifera mondiale: anni 20, 50, 80* pp.26

This was the second main market, preceded only by the EEC countries representing 38% of Italian export, with 581,214 tonnes. In 1981, Italian stone export reached 2,055,000 tonnes.

Italian stone export represented ⅔ of world export until 1983-1984, but it then fell during 1985-87 due to the fall of Middle East demand. It grew again in 1988-89 with 31%

increase in volumes and 50% in value. This great development was strictly linked to the considerable increase in Far East imports (from 430 million dollars in 1987 to 800 million dollars in 1989), both of raw and finished stone.
This situation of leadership had been jeopardised by the two-year Persian Gulf War and by the economic crisis of North America in **1990-1991**, that caused the reduction of Italian exports both in quantities and value, to those countries that represented its main outlet markets. Italy managed, however, to come out from the difficult period.

Talking about Carrara, it is important to underline that the term "*industria **lapidea** apuana"* - Apuan "stone" industry, has been introduced lately in the 1960s to replace the old "*industria **marmifera** apuana"* – Apuan "marble" industry, that reflected the tendency of the sector to deal almost exclusively with marble, the major resource of the territory.
This change in meaning followed the new reality of a more dynamic national system where the availability of white marble was no longer a guarantee of leadership, despite being a fundamental feature for the traditional role of Italy in the stone sector.
The *stone* industry era began with the introduction on the territory of sawmills and workshops to the processing of marble and other Italian and foreign materials – especially granites.
During this period, the Apuan stone industry got shaped with the features that still characterize it today:

- It is based on small enterprises with reduced capitalization and current financing-oriented;
- It works better on short-term investments;
- The production follows the model of medium size work orders (which needed finer stone), instead of preferring serial works and stockpiles; this leading to an increase in production costs.

These features represented the key elements for the Apuan district leadership in the sector **during the 80s**, when under the name of "Italian" marble export we referred mainly to "Carrara" white marble.
At the beginning of the 1980s in the whole Apuan district – that is Massa Carrara and Lucca provinces – the million tons record of production was beaten, (1,014,000 tonnes)

and the district's rise in production continued to grow in the 1990s reaching almost 1,5 million tonnes in 1992.

Carrara production, in particular, passed from 675,000 tonnes in 1980 to 1,027,300 tonnes in 1992 compared to the very reduced figures of Massa, 160,700 tonnes, and Lucca, 191,500 tonnes.

Parameters	YEARS	P. MASSA/CARRARA			PROV. OF LUCCA			DISTRICT		
		Carrara	Massa	Total	Versilia	Garfagnana	Total	Total	± △%	Indices
Production (000 tonnes)	1980	675.0	130.7	805.7	123.7	84.6	208.3	1.014.0	—	100.0
	1984	844.5	143.5	988.0	160.0	87.0	247.0	1.235.0	+ 5.5	121.8
	1988	881.9	131.8	1.013.7	89.8	71.4	161.2	1.174.9	— 1.2	115.9
	1992	1.027.3	160.7	1.188.0	123.1	68.4	191.5	1.379.5	+ 4.4	136.0
Workers (Units)	1980	1.046	259	1.305	292	390	682	1.987	—	100.0
	1984	1.106	203	1.309	256	295	551	1.860	— 1.6	93.6
	1988	848	169	1.017	131	196	327	1.344	— 6.9	67.6
	1992	808	143	951	134	183	317	1.268	— 1.4	63.8
Productivity (ton./worker)	1980	645.3	504.6	617.4	423.6	216.9	305.4	510.3	—	100.0
	1984	763.6	706.9	754.8	625.0	294.9	448.3	664.0	+ 7.5	130.1
	1988	1.040.0	779.9	996.5	685.5	364.3	493.0	874.2	+ 7.9	171.3
	1992	1.271.4	1.123.8	1.249.2	918.7	373.8	604.1	1.087.9	+ 6.1	213.2

Production and productivity in the Apuan district, *Marble in the World* pp.126

At that time, Apuan district went through a new season of development that saw the specialisation of the two sections – marble and granite – into different models. Marble followed the already mentioned features, (small enterprises, short-term investments, work orders) while for the granite the prevailing tendency was that of big works, leaving the other Italian districts free to enter the market of more specialised works.

It is the case of **Verona** district, that started to gain importance and it is now become the best-known counterpart of Carrara district in the granite sector.

THE 1990s

At the **beginnings of the 1990s**, 88% of the entire world stone production was based on more than 20 countries, of whom the ten most important stone producers accounted for 70%; only 12% of the total could be attributed to the 50 remaining countries where stone quarrying is practised.

PAESI	ANNO 1981	ANNO 1991	ANNO 1992
BELGIO	2.070.000	350.000	364.000
DANIMARCA	N\D	N\D	N\D
GERMANIA	N\D	150.000	175.000
GRECIA	900.000	1.800.000	1.800.000
SPAGNA	2.730.000	3.528.000	2.980.000
FRANCIA	734.000	1.051.000	1.018.300
IRLANDA	N\D	N\D	N\D
ITALIA	6.700.000	7.200.000	7.250.000
LUSSEMBURGO	N\D	N\D	N\D
OLANDA	N\D	N\D	N\D
PORTOGALLO	400.850	1.062.000	1.144.200
REGNO UNITO	N\D	1.075.000	1.100.000
UNIONE EUROPEA	13.534.850	16.216.000	15.831.500
Ex COMECON	1.000.000		
RUSSIA		675.000	680.000
BULGARIA		72.600	132.700
SVEZIA	91.500	100.000	96.800
FINLANDIA	200.000	165.000	431.360
NORVEGIA	177.000	100.000	160.000
AUSTRIA	25.000	27.000	22.100
TURCHIA	150.000	700.000	650.000
USA*	875.000	1.200.000	1.120.000
BRASILE*	850.000	1.200.000	1.200.000
MESSICO	165.000	525.000	712.000
SUD AFRICA	330.000	750.000	592.200
INDIA	400.000	2.700.000	2.955.500
CINA	N\D	1.100.000	2.545.000
SUD COREA	N\D	1.000.000	1.445.000
ALTRI	2.000.000	3.500.000	2.859.360
TOTALE	19.798.350	30.030.600	31.433.520

Produzione internazionale di grezzi, *Stone Sector 1993*, pp. 89

More precise evaluations see world stone production in 1989 reaching 28,7 million tonnes, 29,2 million tonnes in 1990 and 30 million tonnes in 1991.

By comparing **1990s** world rating with that estimated for the period following the II World War – 1,5 million tonnes – it is clear that there has been a twenty-two times increase in production in a relatively short time; this

constitutes an evidence of the rapidity of progress achieved by this industry, that is no longer focused on Mediterranean basins and Europe as before, but it has spread to new centres especially in the Far East. This progress is also a consequence of the acquired importance of siliceous stones whose production in the rest of the world, excluding Italy, has increased fifty-three times (from 200,000 tonnes to 11,7 million tonnes), compared to marble one that increased by twenty times (from 680,000 tonnes to 14 million tonnes).

The total raw production actives a global exchange of 20% of the production itself, moving part of the production of countries such as India, Brazil and North European ones towards in demand countries such as Italy, Japan or Spain.

Against this background, in **1991,** Italy represents the first raw producer country, with ¼ of the world production; the first raw importer country, with 31% of world imports and the first exporter of finished products, with 58% of the total representing also one of the greater domestic market for them, with 17% of consumption.

	PRODUZ.	IMPORTAZ.	ESPORTAZ.	DISPON.
ITALIA	7.250	1.700	430	8.520
SPAGNA	3.250	370	565	3.055
GRECIA	1.850	—	34	1.816
CINA	1.700	—	362	1.338
USA	1.700	140	70	1.770
COREA DEL SUD	1.300	—	284	1.016
REPUBBL. EX URSS	1.200	—	—	1.200
FRANCIA	1.100	290	190	1.200
BRASILE	900	—	440	460
PORTOGALLO	750	30	270	510
INDIA	700	—	610	90
SUD AFRICA	650	—	610	40
TURCHIA	550	—	40	510
GERMANIA	500	480	—	980
BENELUX	450	270	—	720
SVIZZERA	200	90	—	290
GIAPPONE	250	1.440	—	1.690
TAIWAN	300	150	10	440
PAESI NORDICI	1.000	—	616	384
ALTRI	3.600	474	903	3.171
TOTALE	29.200	5.434	5.434	29.200

Produzione ed interscambio di lapidei grezzi al 1990 in tonnellate, *Rapporto Economia 1992,* pp.70

This positive trend went through a dramatic, but not lasting, stop when exports of finished marble for the Middle East and North America diminished by 4% due to the two-year Persian Gulf War and North America economic crisis.

	DISPONIB. POTENZ.	IMPORT.	EXPORT.	IMPIEGHI INTERNI
ITALIA	4.260	36	1.773	2.523
SPAGNA	1.528	89	167	1.450
GRECIA	908	—	168	740
CINA	669	—	136	533
USA	885	340	14	1.211
COREA DEL SUD	508	—	180	328
REPUBBL. EX URSS	600	—	—	600
FRANCIA	600	186	83	703
BRASILE	230	—	—	230
PORTOGALLO	255	—	180	75
INDIA	45	—	20	25
SUD AFRICA	20	—	—	20
TURCHIA	255	—	18	237
GERMANIA	490	501	63	928
BENELUX	360	170	—	530
SVIZZERA	145	112	—	257
GIAPPONE	845	529	—	1.374
TAIWAN	220	—	40	180
PAESI NORDICI	192	—	—	192
MEDIO ORIENTE	—	250	—	250
SINGAPORE E HONG KONG	—	138	—	138
ALTRI	1.585	710	219	2.076
TOTALE	14.600	3.061	3.061	14.600

Produzione e interscambio di lapidei lavorati al 1990 in tonnellate, *Rapporto Economia 1992,* pp. 71

In this context, the Apuan district still had a primary role thanks to raw marble sales, even if it was the first area to suffer from the crisis due to its relationships with these main partners.

	COMPRENSORIO APUANO					
	QUANTITÀ			VALORI		
	1989	1990	1991	1989	1990	1991
GRANITO BLOCCHI E LASTRE	27,2	25,4	25,3	22,14	18,65	17,07
GRANITO LAVORATO	148,7	161,4	159,6	243,06	252,05	254,97
MARMO BLOCCHI E LASTRE	196,4	174,5	199,2	82,94	74,19	79,58
MARMO LAVORATO	532,9	500,5	479,6	531,39	520,21	523,52
TOTALE	905,2	861,8	863,6	879,53	864,10	875,14

Esportazioni di granito e marmo 1989-1991 tonn/lire, *Rapporto Economia 1992,* pp. 81

For the year 1991**,** we recorded at the Marina di Carrara port 1,258,000 tonnes of imported raw granites coming from all over the world and 92,000 tonnes of raw marble , which is 30% of world granite imports and 10% of marble one.

	COMPRENSORIO APUANO					
	QUANTITÀ			VALORI		
	1989	1990	1991	1989	1990	1991
GRANITO	1.171,8	1.242,2	1.258,1	346,29	346,31	366,26
MARMO	96,9	88,3	92,2	38,58	35,34	39,50

	RESTO DEL PAESE					
	QUANTITÀ			VALORI		
	1989	1990	1991	1989	1990	1991
GRANITO	101,0	242,8	269,4	24,09	40,98	59,89
MARMO	97,7	125,8	109,4	25,22	40,70	37,91

Importazioni di granito e marmo in blocchi e lastre, anni 1989-1991 tonn/lire, *Rapporto Economia 1992,* pp.85

As far as export is concerned, we recorded 47.2% out of the total Italian export, divided into: raw marble and slabs 60%, raw granite less than 40%, finished granite 42.9% and finished marble 45.5%.

	COMP. APUANO		RESTO DEL PAESE		ITALIA	
	Q.	V.	Q.	V.	Q.	V.
MARMO IN BLOCCHI E LASTRE	199,1	79,6	135,9	101,4	335,0	181,0
GRANITO IN BLOCCHI E LASTRE	25,3	17,1	41,7	32,9	67,0	50,0
MARMO LAVORATO	479,6	523,5	575,4	613,5	1055,0	1137,0
GRANITO LAVORATO	159,6	255,0	212,4	271,0	371,0	526,0
TOTALE	863,6	875,2	965,4	1018,8	1829,0	1894,0

Esportazioni di marmi e graniti nel 1991, tonnellate/lire, *Rapporto Economia 1992,* pp.74

As of export partners, it is important to underline that the Apuan district has always had a different structure compared to the rest of Italy. Italy has always been inclined to European markets, whereas Carrara and the rest of the area, was more interested in other markets such as Middle and Far East and USA.

We can easily refer to the following charts[28].

[28] The figures refer to 1990 instead of 1991, because the latter has been troubled due to the Persian Gulf War's consequences.

	COMPREN. APUANO			RESTO DEL PAESE		
	QUANT.	VAL.	DISTR. %	QUANT.	VAL.	DISTR. %
COMUNITÀ EUROPEA	66,7	26,94	36,3	60,5	39,72	40,4
ALTRI PAESI EUROPEI	1,3	1,00	1,3	14,5	9,73	9,9
PAESI AFRICANI	24,3	6,45	8,7	1,7	1,07	1,1
NORD AMERICA	4,2	5,18	7,0	10,5	15,10	15,4
CENTRO E SUD AMERICA	3,4	2,52	3,4	7,1	0,63	0,6
VICINO E MEDIO ORIENTE	21,7	6,01	8,1	20,0	10,62	10,8
ESTREMO ORIENTE	49,5	22,67	30,6	20,3	18,26	18,6
CONTINENTE AUSTRALE	2,9	4,39	5,9	1,5	2,24	2,3
TOTALE	174,5	74,19		135,6	98,35	

Esportazioni di marmo in blocchi ed in lastre 1990, tonnellate/lire, *Rapporto Economia 1992,* pp.78

	COMPREN. APUANO			RESTO DEL PAESE		
	QUANT.	VAL.	DISTR. %	QUANT.	VAL.	DISTR. %
COMUNITÀ EUROPEA	57,8	51,35	9,9	409,5	406,10	48,0
ALTRI PAESI EUROPEI	2,2	2,17	0,4	84,4	93,13	11,0
PAESI AFRICANI	24,4	17,33	3,3	9,5	8,40	1,0
NORD AMERICA	131,5	215,46	41,4	65,8	110,13	13,0
CENTRO E SUD AMERICA	8,9	7,44	1,4	2,7	2,46	0,3
VICINO E MEDIO ORIENTE	163,3	93,73	18,0	106,0	57,20	6,8
ESTREMO ORIENTE	101,3	113,53	21,8	124,1	159,21	18,8
CONTINENTE AUSTRALE	11,1	19,17	3,7	5,9	9,00	1,1
TOTALE	500,5	520,21		807,6	854,59	

Esportazioni di marmo lavorato 1990 tonnellate/lire, *Rapporto Economia 1992,* pp.79

¼ of world raw marble export comes from Carrara, that is 30% in tonnes but 20-25% in terms of value out of world total (this due to the average price marble is sold, almost 425,000 £/tonne, very low compared to the other regions price of 725,000 £/tonne).

Carrara best export partners, in 1990, were Middle and Far Eastern countries, with 38.7% - compared to 29.4% of the rest of Italy – but it also did well in Europe with 37.6%, even if Italy dominated the market with 50%. As far as America, raw marble sales recorded only 10.4%, against 16% of Italy.

This percentage was overturned with finished marble sales, which in America reached 42.8% compared to Italy's 13.3%. Middle and Far Eastern sales were confirmed for Carrara with 39.8% compared to 25.6% of Italy. The same was for Europe where Carrara exports still followed Italian ones with 10.3% and 59% respectively.

In both cases, raw and finished marble, the worst markets both for Carrara and for Italy, were Africa and Australia with percentages not reaching 10%.

Regarding economy, for the year 1991, we recorded the total Apuan turnover for raw stone to be about 1,600-1,800 billion Lira, representing for Massa-Carrara province at least ⅓ of the general income.

The world stone industry in **1992** saw a little change in percentages. Exchange of finished products, in fact, increased by 20% – 623,000 tonnes – while raw figures were more or less unchanged.

VOCI	ANNI	CALCAREI GREZZI	SILICEI GREZZI	LAVORATI	TOTALE
000 tons.	1989	988	4.140	2.904	8.032
	1990	915	4.519	3.025	8.459
	1991	1.050	4.968	3.035	9.053
	1992	1.000	5.043	3.668	9.711
%	1989	12,3	51,5	36,2	100,0
	1990	10,8	53,4	35,8	100,0
	1991	11,6	54,9	33,5	100,0
	1992	10,3	51,9	37,8	100,0
±Δ %	90:89	− 7,4	+ 9,2	+ 4,2	+ 5,3
	91:90	+ 14,8	+ 9,9	+ 0,3	+ 6,6
	92:91	− 4,8	+ 1,5	+ 20,8	+ 7,2
	92:89	+ 1,2	+ 21,8	+ 26,3	+ 20,9

Evoluzione dell'interscambio quantitativo mondiale 1989-1992, ***Rapporto Economia 1993,*** **pp.74**

	1991	1992	VARIAZIONI VALORE ASSOLUTO	Δ %
GERMANIA	556	610	+ 54	9,7
FRANCIA	199	190	− 9	− 4,5
BENELUX	205	218	+ 13	6,3
INGHILTERRA	80	63	− 17	− 21,3
SPAGNA	119	115	− 4	− 3,4
AUSTRIA	78	80	− 2	− 2,6
SVIZZERA	109	95	− 14	− 12,8
USA	270	273	+ 3	11
CANADA	62	45	− 17	− 27,4
ARABIA SAUDITA	255	340	+ 85	33,3
EMIRATI ARABI	54	60	+ 4	7,4
GIAPPONE	517	560	+ 43	8,3
HONG KONG	86	116	+ 30	34,9
SINGAPORE	50	91	+ 41	82,0
ALTRI	395	802	+ 407	103,0
TOTALE	3.035	3.658	+ 623	20,5

Interscambio quantitativo mondiale dei prodotti finiti: Importazioni tonnellate, ***Rapporto Economia 1993,*** **pp.74**

The major actors of this increase in exports were countries like China, India, Turkey and USA while Italy set itself at low ranks with only 4.4% increase, passing from 1,752,000 tonnes in ’91 to 1,830,000 tonnes in ’92.

	1991	1992	VARIAZIONI VALORE ASSOLUTO	Δ %
ITALIA	1.752	1.830	+ 78	4,4
FRANCIA	80	81	+ 1	—
GERMANIA	61	57	− 4	—
SPAGNA	149	186	+ 37	24,8
PORTOGALLO	198	210	+ 12	6,0
GRECIA	159	186	+ 27	17,0
TURCHIA	150	209	+ 59	39,3
COREA DEL SUD	165	152	− 13	− 8,0
CINA	160	306	+ 146	91,2
USA	42	53	+ 11	26,2
INDIA	32	55	+ 23	71,9
ALTRI	87	323	+ 236	271,0
TOTALE	3.035	3.658	+ 623	20,5

Interscambio quantitativo mondiale dei prodotti finiti: Esportazioni. tonnellate, *Rapporto Economia 1993,* pp.75

It is therefore clear that for Italy, 1992 was not a good year. From the charts below we can state how national production has decreased (-3.3%), together with general import of raw stone both calcareous and siliceous and the general stationariness of exports.

	1991	1992	Δ %
PRODUZIONE NAZIONALE	7.500	7.250	− 3,3
IMPORT CALCAREI GREZZI	199	194	− 2,5
IMPORT SILICEI GREZZI	1.525	1.331	− 12,7
IMPORT LAVORATI	28	31	+ 11,6
IMPORT LAVORATI (RIPORT. A GREZZO)	28	31	
TOTALE INPUT	9.280	8.837	
EXPORT CALCAREI GREZZI	(340)	(349)	+ 2,6
EXPORT SILICEI GREZZI	(126)	(116)	− 8,0
EXPORT LAVORATI	(1.752)	(1.830)	+ 4,4
EXPORT LAVORATI (RIPORT. A GREZZO)	(1.752)	(1.830)	
CONSUMO NAZIONALE	5.310	4.712	− 11,3

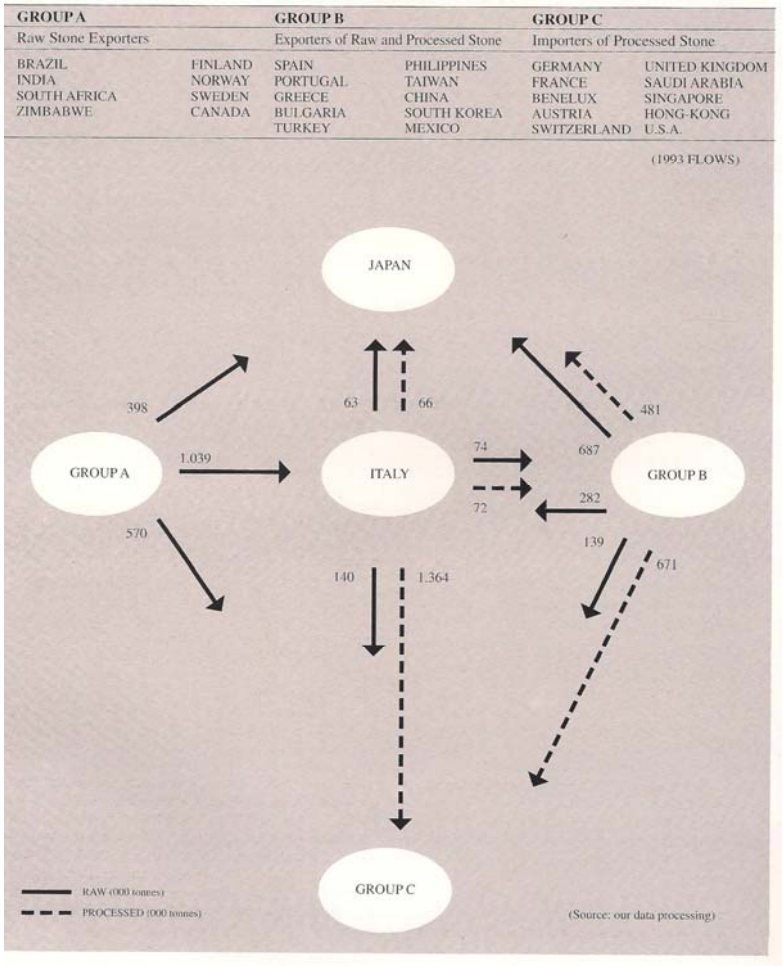
Italia: produzione, ex-import, consumi 1991-1992, *Rapporto Economia 1993,* pp.76

In this negative context, the pre-existing difference between Italy and Apuan district became more evident. Italy went well with finished products, but fell with raw both siliceous and calcareous; Apuan area decreased with siliceous but improved exports of raw and processed calcareous.

Italy has exported the same quantities of ’91 but at higher prices, so that it has earned more; the Apuan district has exported more in quantity, but at lower prices causing the decrease of its turnover.

Export per tipologie di prodotti: variazioni percentuali 1991-1992, *Rapporto Economia 1993,* pp.79

TIPOLOGIE DEI PRODOTTI	MS + SP + LI Δ %	RESTO D'ITALIA Δ %
CALCAREI GREZZI:		
QUANTITÀ	+ 10,1	− 10,9
VALORE	+ 1,0	− 13,6
PREZZO MEDIO	− 8,2	− 2,5
SILICEI GREZZI:		
QUANTITÀ	− 36,0	− 11,4
VALORE	− 37,6	− 6,6
PREZZO MEDIO	− 2,6	+ 5,5
CALCAREI LAVORATI:		
QUANTITÀ	+ 17,3	—
VALORE	+ 9,5	+ 3,2
PREZZO MEDIO	− 6,7	+ 2,8
SILICEI LAVORATI:		
QUANTITÀ	− 15,1	+ 2,8
VALORE	− 17,5	+ 5,6
PREZZO MEDIO	− 2,9	+ 2,7
TOTALE:		
QUANTITÀ	+ 8,1	− 1,2
VALORE	− 0,4	+ 2,0
PREZZO MEDIO	− 7,6	+ 3,1



Principal directions of world stone exchange, *Marble in the world*, pp.58

In **1993**, while the international building industry and consequently finished stone exports experienced a general fall, there was the increase in trade of raw stone, especially marble.

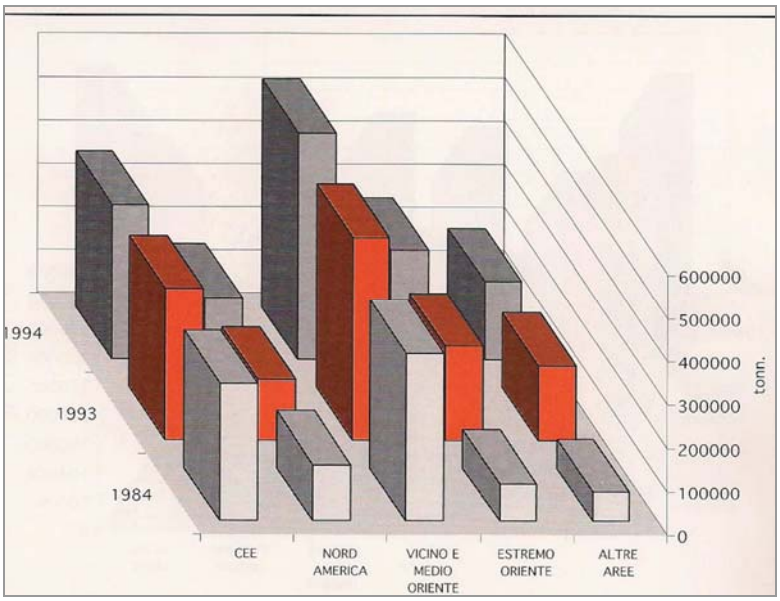
If we examine import and export trends, their destinations are clear. Italy was "the centre" of world exchange, embodying the role of leader partner for important consumer countries (also having a certain processing capacity) such as Middle and Far East,

Europe and the United States.

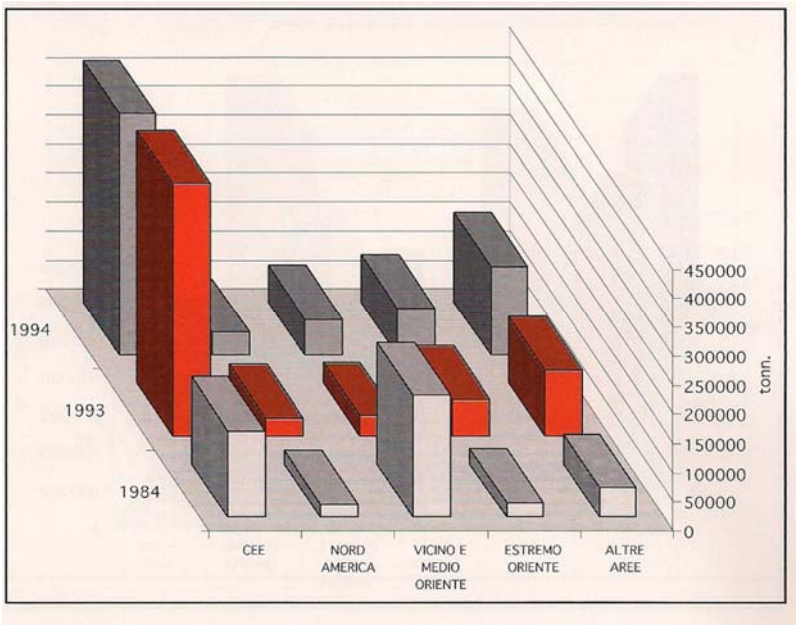
Italian import/export constituted 40% of the total world stone trade, considering imports of raw blocks (31% of the total) to be used in the import-processing-export cycle.

In **1994**, at international level, the negative trend started the previous year, started to recover. World raw production increased by 6% and finished products by 10%.

Italy went well on export of processed stone that has overcome past levels, (1,924,000 tonnes in 93 2,225,000 tonnes in 94) and it confirmed its best relationships with EEC states, Near and Middle East and Far East countries.



Italia – tutti i paesi, export marmo e granito lavorati anni 1984-93-94 tonnellate, *Stone Sector 1994,* pp. 123, 125



However, internal production remained unchanged and domestic consumption fell from 1,854,000 tonnes of 1993 to 1,641,000 in 1994.

PAESI	1991	1992	1993	1994	94 : 93
PRODUZIONE GREZZA	7.250	7.250	7.500	7.500	–
IMPORT GREZZO	1.724	1.525	1.440	1.660	15,2
DISPONIBILITÀ GREZZA	8.974	8.775	8.940	9.160	2,5
EXPORT GREZZO	466	465	623	667	7,0
CARICO DI SEGHERIA	8.508	8.310	8.317	8.493	2,1
SFRIDI DI LAVORO	4.680	4.570	4.574	4.671	2,1
PRODUZIONE MANUFATTI	3.828	3.740	3.743	3.822	2,1
IMPORT LAOVRATI	28	31	35	44	25,7
DISPONIBILITÀ MANUFATTI	3.856	3.771	3.778	3.866	2,3
EXPORT LAVORATI	1.752	1.830	1.924	2.225	15,6
CONSUMO INTERNO	2.104	1.941	1.854	1.641	– 11,5

Consumo lapideo italiano in tonnellate, *Rapporto Economia 1995,* pp. 95

As far as the Apuan province is concerned, a +9% in production was recorded, passing from 1,200,882 tonnes in 93 to 1,306,642 tonnes.

Raw export confirmed 1993 figures with USA and Far East, especially Japan, as major partners and a total of 1,130,406 tonnes exported worldwide.

ANNI	USA	GERMANIA	GIAPPONE	ARABIA	R. UNITO	FRANCIA	ALTRI	TOTALE
1985	22,9	1,5	5,1	16,2	4,0	2,6	47,7	100,0
1986	34,8	3,5	4,9	10,2	4,1	2,8	39,7	100,0
1987	32,9	3,6	8,6	7,0	6,3	3,1	38,5	100,0
1988	27,6	4,0	15,9	5,8	4,3	3,5	38,9	100,0
1989	25,0	3,6	2&,3	3,8	5,6	3,4	37,3	100,0
1990	22,0	4,3	17,3	4,5	6,5	3,7	40,7	100,0
1991	18,7	4,6	20,7	4,2	5,0	3,6	43,2	100,0
1992	12,3	7,1	15,1	8,8	4,4	5,3	47,0	100,0
1993	13,0	10,6	10,1	6,5	3,2	4,0	52,6	100,0
1994	11,8	11,4	8,2	7,0	3,2	3,4	55,0	100,0
ITALIA '94	11,0	26,6	4,7	6,1	1,5	3,8	40,3	100,0

Indici di concentrazione dell'export lapideo della provincia di MS verso i mercati di consumo, *Rapporto Economia 1995,* pp.96

However, the sector of finished both granite and marble, and big works suffered from a crisis that saw only 25% of the local production being processed in Apuan factories. That was the evidence of a general lack of investments on technology and equipment pointing out a great below production-capacity exploitation of plants.

Regarding granite sector, is right in these years that the **Verona** province consolidated its role to the detriment of Carrara. The main reasons are: a better and more solid company organization, more advanced technology, a more complete and specialized production chain and a production pattern based on serial productions and stockpiles, instead of orders.

Moreover, the district was favoured by the positive German market that absorbed 70% of Veronese export. This was the beginning of another shift between the two districts: Verona, more focused on European market, whereas Carrara on the Eastern states.

In **1995,** the scenario changed just a little with a small increase in export figures (only considering the Carrara municipality there were 1,194,581 tonnes compared to 1,130,406 tonnes of 1994) but, what it is to say is that in those years, Apuan district was far away from 1980s development based on companies successes with big works orders.

ANNO	PRODUZIONE LOCALE	COLORATI	SIMILARI	TOTALE	N. INDICI BASE 1970 = 100	VARIAZ. PERCENT. RISPETTO ANNO PRECED.
1970	411.099	62.939	31.578	**505.616**	100,00	0,43
1971	377.960	49.580	35.212	**462.752**	91,52	-8,48
1972	374.204	46.049	36.067	**456.320**	90,25	-1,39
1973	442.851	42.270	34.534	**524.655**	103,77	14,98
1974	492.825	46.671	40.399	**579.895**	114,69	10,53
1975	448.226	34.083	28.313	**510.622**	100,99	-11,95
1976	515.289	33.473	29.282	**578.044**	114,32	13,20
1977	561.638	32.725	37.227	**631.590**	124,91	9,26
1978	598.082	26.351	35.444	**659.877**	130,51	4,48
1979	589.494	26.531	32.813	**648.838**	128,33	-1,67
1978	656.060	22.876	41.644	**720.580**	142,52	11,06
1981	692.832	24.738	41.789	**759.359**	150,18	5,38
1982	645.383	16.317	44.906	**706.606**	139,75	-6,95
1983	740.127	13.783	45.668	**799.578**	158,14	13,16
1984	838.484	11.431	45.606	**895.521**	177,11	12,00
1985	801.985	11.321	52.253	**865.559**	171,19	-3,35
1986	659.335	53.757	17.086	**730.178**	144,41	-15,64
1987	689.271	52.195	5.047	**746.513**	147,64	2,24
1988	781.695	60.938	4.760	**847.393**	167,60	13,51
1989	884.232	74.396	3.654	**962.282**	190,32	13,56
1990	875.740	65.523	2.295	**943.558**	186,62	-1,95
1991	881.424	1.510	70.854	**953.788**	188,64	1,08
1992	845.856	1.540	77.753	**925.149**	182,97	-3,00
1993	889.064	402	86.330	**975.796**	192,99	5,47
1994	1.011.972	35.021	83.413	**1.130.406**	223,57	15,84
1995	1.029.652	24.457	140.472	**1.194.581**	236,26	5,68

Marmi spediti dal Comune di Carrara, tonnellate, ***Rapporto Economia 1996,*** **pp.196**

1996 was the year of the recovery of the local industry.

In an international dynamic frame, with the entrance of new producers and consumer actors on the market and the huge phenomenon of China – that had become the first world producer of raw material, followed by Italy – Apuan industry seemed to reach new important percentages in raw stone and, for the first time, with semi-raw products such as marble dust and flakes for different usage.

Best export figures were recorded for Near Middle and Far East (+1.2% and +2.4% compared to 1995) and for USA (+22.2% for South and Centre America, +8.6% for North America), while statistics for Europe were marked by negative signs.

TAV 8.17 A IMPORT MASSA CARRARA - ESTREMO ORIENTE	ANNO 1995		ANNO 1996		DIFFERENZA IN %	
	Tonn.	Valore £ x 1000	Tonn.	Valore £ x 1000	Q.tà	Valore
MARMO BLOCCHI E LASTRE	5.084	2.979.723	6.250	2.822.443	22,9	-5,3
GRANITO BLOCCHI E LASTRE	108.244	46.362.523	95.537	37.640.371	-11,7	-18,8
MARMO LAVORATI	244	473.733	278	428.258	13,9	-9,6
GRANITO LAVORATI	27	37.055	98	88.107	263,0	137,8
ALTRE PIETRE LAVORATI	-	-	-	-	0,0	0,0
GRANULATI E POLVERI	20	9.865	21	8.596	5,0	-12,9
ARDESIA GREZZA	-	-	24	16.038	0,0	0,0
TOTALE GENERALE	113.619	49.862.899	102.208	41.003.813	-10,0	-17,8

TAV 8.17 B EXPORT MASSA CARRARA - ESTREMO ORIENTE	ANNO 1995		ANNO 1996		DIFFERENZA IN %	
	Tonn.	Valore £ x 1000	Tonn.	Valore £ x 1000	Q.tà	Valore
MARMO BLOCCHI E LASTRE	49.874	29.912.609	42.018	23.490.013	-15,8	-21,5
GRANITO BLOCCHI E LASTRE	5.282	3.489.072	7.344	6.990.271	39,0	100,3
MARMO LAVORATI	94.928	139.425.789	90.986	131.573.116	-4,2	-5,6
GRANITO LAVORATI	36.827	65.806.207	55.064	94.879.138	49,5	44,2
ALTRE PIETRE LAVORATI	2.781	5.651.738	605	1.206.519	-78,2	-78,7
GRANULATI E POLVERI	1.877	130.918	155	26.712	-91,7	-79,6
ARDESIA GREZZA	-	-	-	-	0,0	0,0
TOTALE GENERALE	191.569	244.416.333	196.172	258.165.769	2,4	5,6

Imp/Exp MS – Estremo Oriente e Nord America, 1995-1996, ***Rapporto Economia 1997,*** **pp.100,101**

TAV 8.19 A IMPORT MASSA CARRARA - NORD AMERICA	ANNO 1995		ANNO 1996		DIFFERENZA IN %	
	Tonn.	Valore £ x 1000	Tonn.	Valore £ x 1000	Q.tà	Valore
MARMO BLOCCHI E LASTRE	1.691	993.761	1.541	756.191	-8,9	-23,9
GRANITO BLOCCHI E LASTRE	22.639	14.329.087	19.842	11.538.065	-12,4	-19,5
MARMO LAVORATI	1	25.642	-	1.556	-100,0	-93,9
GRANITO LAVORATI	-	-	-	7.633	0,0	0,0
ALTRE PIETRE LAVORATI	-	-	-	-	0,0	0,0
GRANULATI E POLVERI	-	-	-	-	0,0	0,0
ARDESIA LAVORATA	-	-	-	-	0,0	0,0
TOTALE GENERALE	24.331	15.348.490	21.383	12.303.445	-12,1	-19,8

TAV 8.19 B EXPORT MASSA CARRARA- NORD AMERICA	ANNO 1995		ANNO 1996		DIFFERENZA IN %	
	Tonn.	Valore £ x 1000	Tonn.	Valore £ x 1000	Q.tà	Valore
MARMO BLOCCHI E LASTRE	2.866	4.892.429	1.691	3.244.895	-41,0	-33,7
GRANITO BLOCCHI E LASTRE	829	1.750.730	749	1.030.121	-9,7	-41,2
MARMO LAVORATI	32.034	56.866.872	35.660	60.237.722	11,3	5,9
GRANITO LAVORATI	15.141	28.484.821	18.066	33.183.612	19,3	16,5
ALTRE PIETRE LAVORATI	1.304	2.544.545	538	971.330	-58,7	-61,8
GRANULATI E POLVERI	104	17.149	63	12.196	-39,4	-28,9
ARDESIA LAVORATA	-	-	1	2.291	0,0	0,0
TOTALE GENERALE	52.278	94.556.546	56.768	98.682.167	8,6	4,4

During **1997** and **1998,** the importance of the Apuan district on Italian economy fell to 32% (22% if we consider the only Massa-Carrara province). The reason has to be sought in the Southeast Asian financial crisis.

It was a period, beginning in July 1997, which gripped much of Asia, and raised fears of a worldwide economic meltdown due to financial contagion. The crisis started in Thailand with the financial collapse of the *Thai baht*, the national currency. Once Thailand's *baht* plummeted, investor's confidence in all similarly developing markets began to wane. Capital flows to Southeast Asia reversed as western investors sought to remove their capital before losing it.

Some countries halted outflows of investment altogether (e.g., Malaysia) in an attempt to stabilize the currency. However, as the SE Asian currencies continued to devalue and, consequently, demand for many goods from other countries quickly declined.

The spread of the crisis meant it could not be contained to those few developing economies and in fact, it hit other Asian developed states, such as Japan and South Korea.

The lower oil prices of the time and the financial fragility of Russia soon saw the spread of this crisis into this state. Since much of Russia's debt (i.e., most of which was leftover from the Soviet Union era) was foreign, it too fell victim to defaulting on its loans.

Trade slowdowns, loan defaults and low oil prices affected all developed countries.

As the effect wore on, a global recession seemed imminent.

However, the developed countries responded by cutting interest rates by late 1998 in hopes of injecting some financial stability into the world economy[29].

TAVOLA 7.17 (A)	IMPORT		Diff. % 98/97	
	ANNO 1998			
MASSA CARRARA - ESTREMO ORIENTE	Tonn.	Valore £ X 1000	Q.tà	Val.
MARMO BLOCCHI E LASTRE	5.808	2.640.442	24,5	28,3
GRANITO BLOCCHI E LASTRE	74.017	30.356.456	-27,6	-25,4
MARMO LAVORATI	575	780.494	9,7	-5,8
GRANITO LAVORATI	62	40.574	-65,0	-80,8
ALTRE PIETRE LAVORATI	0	0	0,0	0,0
GRANULATI E POLVERI	0	0	0,0	0,0
ARDESIA LAVORATA	18	13.395	0,0	0,0
PIETRA POMICE	0	0	0,0	0,0
TOTALE GENERALE	80.480	33.831.361	-25,2	-22,7

TAV. 7.17 (B)	EXPORT		Diff. % 98/97	
	ANNO 1998			
MASSA CARRARA - ESTREMO ORIENTE	Tonn.	Valore £ X 1000	Q.tà	Val.
MARMO BLOCCHI E LASTRE	24.704	17.494.350	-19,7	-11,3
GRANITO BLOCCHI E LASTRE	2.642	3.545.914	-54,8	-51,2
MARMO LAVORATI	66.156	91.397.600	-35,4	-40,9
GRANITO LAVORATI	36.180	63.172.438	-32,0	-36,0
ALTRE PIETRE LAVORATI	60	71.615	5,3	-63,3
GRANULATI E POLVERI	20	13.740	-97,8	-62,3
ARDESIA LAVORATA	0	0	0,0	0,0
PIETRA POMICE	0	0	-100,0	-100,0
TOTALE GENERALE	129.762	175.695.657	-32,9	-37,4

Imp/Exp MS - Estremo Oriente 1998, ***Rapporto Economia 1999*****, pp.200**

[29] Source "Effect%20of%20Crises%20and%20Disasters%20on%20Economies[1]" file of BUCORIM Inc, Canadian consulting organization. (website http://www.bucorim.com/index.html# consulted on 15.09.2009 h: 17.44)

More than Italy, the Apuan province suffered from this crisis because it saw its import-export relationships almost cancelled in those who were its major trade partners (Italy was much more into the European market).

TAVOLA 7.22 (A)	IMPORT		Diff. % 98/97	
	ANNO 1998			
MASSA CARRARA - RESTO D'EUROPA	Tonn.	Valore £ X 1000	Q.tà	Val.
MARMO BLOCCHI E LASTRE	20.029	9.894.399	17,9	14,6
GRANITO BLOCCHI E LASTRE	26.548	16.592.018	11,7	5,4
MARMO LAVORATI	330	353.415	-22,0	-36,0
GRANITO LAVORATI	212	205.953	207,2	36,6
ALTRE PIETRE LAVORATI	0	0	0,0	0,0
GRANULATI E POLVERI	67	21.913	0,0	0,0
ARDESIA LAVORATA	0	0	0,0	0,0
TOTALE GENERALE	47.186	27.067.698	14,4	7,9

TAV. 7.22 (B)	EXPORT		Diff. % 98/97	
	ANNO 1998			
MASSA CARRARA - RESTO D'EUROPA	Tonn.	Valore £ X 1000	Q.tà	Val.
MARMO BLOCCHI E LASTRE	4.676	3.201.107	-45,3	-28,5
GRANITO BLOCCHI E LASTRE	6.347	4.890.842	49,1	39,9
MARMO LAVORATI	11.145	15.035.482	1,6	8,7
GRANITO LAVORATI	18.742	31.224.479	-4,9	3,3
ALTRE PIETRE LAVORATI	54	55.550	45,9	-45,4
GRANULATI E POLVERI	16.509	2.828.031	-23,4	27,1
ARDESIA LAVORATA	44	24.979	0,0	0,0
TOTALE GENERALE	57.517	57.260.470	-11,6	5,3

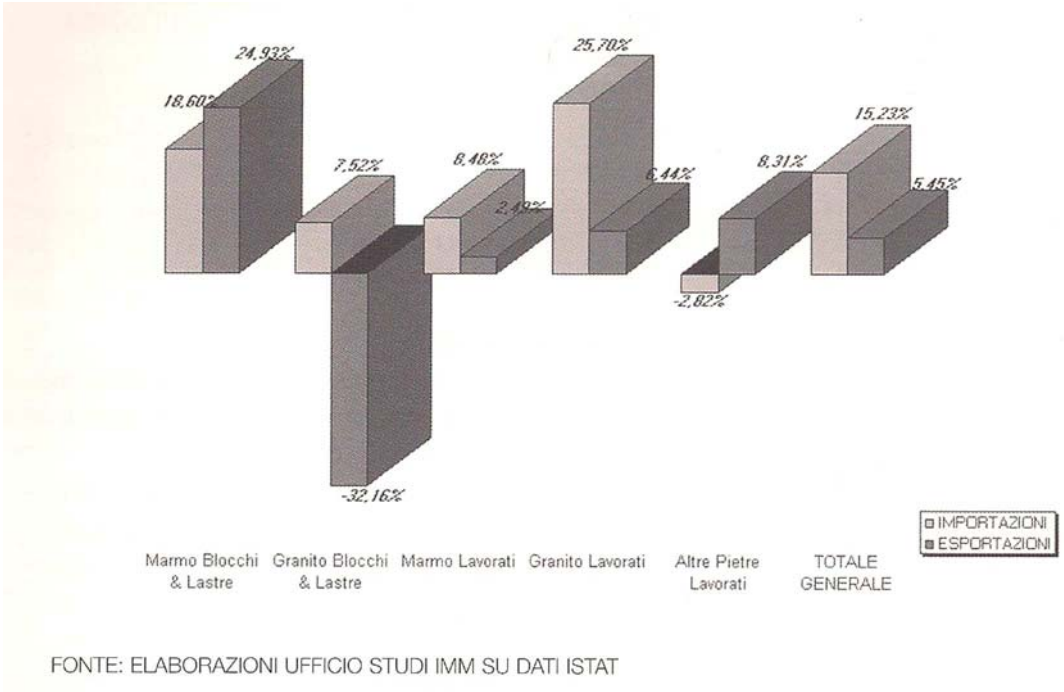
Imp/Exp MS - Resto d'Europa, ***Rapporto Economia 1999,*** **pp.205**

As by coincidence, the 1990's ended with a year, **1999**, that for the first six months followed the same negative track of previous years, but when approaching to the new millennium, it improved in figures thanks to a renewed export rush.

THE 2000s

With the beginning of the new millennium, a renewed boost for trade began, together with a newborn sense of international competitiveness.

In **2000,** Italian imports grew for finished granite (25.70%) in Europe – except German stagnant market – and North America, and in some Middle East countries such as Saudi Arabia and the United Arabian Emirates. As often occurred, in the Apuan district the tendency was overturned.



Varazioni % imp/exp nazionali espressi in termini di quantità per branche produttive (2000-1999), ***Rapporto Economia 2001*** **pp. 62**

Concerning export, in two years time, Massa-Carrara province recorded 1,646,018 [30] tonnes, with a huge increase in raw marble export to the detriment of the finished one.

The local statistic journal of Massa-Carrara, the "*Rapporto Economia 2001*", referred to 2000 as "the year of the historic overtaking of raw on finished material". [31]

Marble export of blocks and slabs recorded 26.1% in volumes (corresponding to 433,278 tonnes) and 23% in values, whereas finished marble figures touched a negative -5.4% in volumes compared to 1999. This happened because for finished products, a more quality-oriented path was followed, instead of focusing on quantity (finished marble values reached 10.8%).

ESPORTAZIONI	ANNO 1999		ANNO 2000		D% 00/99		VALORI MEDI UNITARI		
	Tonn.	Valori (in mila lire correnti)	Tonn.	Valori (in mila lire correnti)	Q.tà	Val.	1999	2000	Δ% 00/99
Marmo Blocchi & Lastre	343.613	90.373.247	433.278	111.192.024	26,1	23,0	263.009	256.630	-2,43%
Granito Blocchi & Lastre	16.616	7.909.043	14.622	13.613.598	-12,0	72,1	475.990	931.035	95,60%
Marmo Lavorati	353.516	373.114.935	334.346	413.320.664	-5,4	10,8	1.055.440	1.236.206	17,13%
Granito Lavorati	181.475	288.845.910	190.510	347.502.097	5,0	20,3	1.591.657	1.824.062	14,60%
I° Totale relativo	**895.220**	**760.243.135**	**972.756**	**885.628.383**	**8,7**	**16,5**	**849.225**	**910.432**	**7,21%**
Granulati & Polveri	689.779	41.168.422	673.262	39.017.975	-2,4	-5,2	59.683	57.954	-2,90%
II° Totale relativo	**1.584.999**	**801.411.557**	**1.646.018**	**924.646.358**	**3,8**	**15,4**	**505.623**	**561.747**	**11,10%**
Ardesia Grezza	1.753	2.329.680	8.738	13.499.062	n.d.	n.d.	1.328.967	1.544.869	16,25%
Ardesia Lavorata	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	/	/	/
Pietra Pomice	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	/	/	/
TOTALE GENERALE	**1.586.752**	**803.741.237**	**1.654.756**	**938.145.420**	**4,3**	**16,7**	**506.532**	**566.939**	**11,93%**

FONTE: UFFICIO STUDI IMM SU DATI ISTAT

Esportazioni in quantità e valore secondo le varie tipologie dei prodotti lapidei per la provincia di MS (2000-1999), *Rapporto Economia 2001* pp.63

As it can be seen in the following chart taken from the *"Carrara port year book 2001"*, in 2000, the major importing countries of Carrara stones were, for the first time, South-Eastern Mediterranean and North African countries – Algeria, Egypt, Lebanon and Syria.

[30] This and all the following figures include bulk and stone dust production and export.
[31] Source *"Rapporto Economia 2001 – SETTORE LAPIDEO"* pp. 63

This was the evidence of the new international balance that saw the appearance on the market of countries that in the 1990s had been completely left out from the trade scenario.

PAESE DI DESTINAZIONE *IMPORTING COUNTRY*	1999		2000		Differenza
	TONN.	%	TONN.	%	%(+ o -)
ALGERIA	16.078	4,18	22.431	4,84	39,51
ARABIA SAUDITA	3.093	0,80	7.629	1,65	146,65
BELGIO	1.375	0,36	0	0,00	-100,00
CANADA	942	0,24	0	0,00	-100,00
CROAZIA	2.395	0,62	0	0,00	-100,00
EGITTO	99.761	25,94	89.553	19,34	-10,23
FINLANDIA	717	0,19	78	0,02	-89,12
FRANCIA	3.364	0,87	6.393	1,38	90,04
GERMANIA	3.013	0,78	0	0,00	-100,00
GIORDANIA	1.098	0,29	1.000	0,22	-8,93
GRECIA	0	0,00	410	0,09	100,00
INGHILTERRA	0	0,00	3.480	0,75	100,00
ISRAELE	4.632	1,20	0	0,00	-100,00
ITALIA	4.268	1,11	1.526	0,33	-64,25
LIBANO	132.159	34,37	141.240	30,49	6,87
LIBYA	10.630	2,76	1.500	0,32	-85,89
MALTA	133	0,03	842	0,18	533,08
MAROCCO	3.743	0,97	211	0,05	-94,36
PORTOGALLO	1.411	0,37	0	0,00	-100,00
SIRIA	971	0,25	75.849	16,38	7711,43
SPAGNA	34.197	8,89	41.076	8,87	20,12
TUNISIA	59.357	15,44	67.588	14,59	13,87
TURCHIA	1.177	0,31	2.357	0,51	100,25
TOTALI	*384.514*	*100,00*	*463.163*	*100,00*	*20,45*

Imbarco marmo/granito in blocchi, *Carrara port year book 2001,* pp. 43

2001 was the year of a "chronological turning point"[32] when, as known, the New York tragedy and the Twin Towers attack occurred.

Consequences on global import-export trends were large, and they worsened the already slowing down American market. [33]

Italian export to America marked -20% at the end of the year, but this slowdown was distributed in a three-month time, so that none of the already arranged orders had been cancelled.

[32] Source *"Rapporto Economia 2002 – SETTORE LAPIDEO"* pp. 87
[33] The American recession already started in June 2001.

As mentioned in the first lines, the 2000s were a period of hard competition in the stone sector, due to relatively recent comers on the international scenario, which could easily replace traditional producers, by low-cost, cheaper productions. The first of these, no doubt about it, was China – followed by India and Turkey – that started to enter the American and German markets, damaging most of all Veronese export, very linked to this slice of the market.

The Apuan district [34]and Massa-Carrara exports suffered a lot from Chinese competition, especially on granite finished and semi-finished products. In this field, the district recorded -32.94% on total granite export, while Massa-Carrara recorded -23.76% .
As far as the general export figures, the district recorded -5.8% decreasing to 2,083,357 tonnes, while Massa-Carrara province reached 1,626,163 tonnes (-4.85%).

COMPRENSORIO-TUTTI I PAESI	ANNO 2000		ANNO 2001		VAR% 2001/2000	
	Tonn.	Valori in Euro	Tonn.	Valori in Euro	Tonn.	Valori (Euro)
MARMO BLOCCHI E LASTRE	514.518	72.798.044	507.025	75.060.374	-1,46	3,11
GRANITO BLOCCHI E LASTRE	27.481	10.175.661	21.640	8.901.716	-21,25	-12,52
MARMO LAVORATI	489.609	329.174.816	453.984	330.074.243	-7,28	0,27
GRANITO LAVORATI	262.022	240.424.447	231.384	220.362.128	-11,69	-8,34
SubTOT Blocchi, Lastre e Lavorati	**1.293.630**	**652.572.968**	**1.214.033**	**634.398.461**	**-6,15**	**-2,79**
GRANULATI E POLVERI	916.815	27.831.358	869.324	25.961.228	-5,18	-6,72
TOTALE GENERALE	**2.210.445**	**680.404.326**	**2.083.357**	**660.359.689**	**-5,75**	**-2,95**

FONTE: ELABORAZIONI UFFICIO STUDI IMM

Esportazioni comprensorio-tutti i paesi. Valori assoluti e variazioni. Anni 2000-2001, *Rapporto Economia 2002* pp.92

MASSA-CARRARA -TUTTI I PAESI	ANNO 2000		ANNO 2001		VAR% 2001/2000	
	Tonn.	Valori in Euro	Tonn.	Valori in Euro	Tonn.	Valori in Euro
MARMO BLOCCHI E LASTRE	438.617	58.898.292	441.657	62.714.005	0,69	6,48
GRANITO BLOCCHI E LASTRE	19.189	8.171.412	16.104	7.359.175	-16,08	-9,94
MARMO LAVORATI	341.890	218.297.611	325.321	221.932.249	-4,85	1,66
GRANITO LAVORATI	195.017	183.304.043	180.038	173.518.041	-7,68	-5,34
SubTOT Blocchi, Lastre e Lavorati	**994.713**	**468.671.358**	**963.120**	**465.523.470**	**-3,18**	**-0,67**
GRANULATI E POLVERI	705.573	21.005.915	659.180	19.080.583	-6,58	-9,17
TOTALE GENERALE	**1.709.027**	**496.650.740**	**1.626.163**	**487.581.247**	**-4,85**	**-1,83**

FONTE: ELABORAZIONI UFFICIO STUDI IMM

Esportazioni provincia di MS-tutti i paesi. Valori assoluti e variazioni. Anni 2000-2001, *Rapporto Economia 2002* pp. 94

[34] Apuan district: Massa - Carrara province + Lunigiana area + Lucca province

As in 2000, some of the major importing countries were African countries, with 277,143 tonnes in 2001.

MASSA-CARRARA - AFRICA	ANNO 2000		ANNO 2001		VAR% 2001/2000	
	Tonn.	Valori in Euro	Tonn.	Valori in Euro	Tonn.	Valori in Euro
MARMO BLOCCHI E LASTRE	163.461	15.817.500	151.338	15.043.493	-7,42	-4,89
GRANITO BLOCCHI E LASTRE	984	277.684	2.166	593.820	120,12	113,85
MARMO LAVORATI	21.763	6.752.485	28.005	10.388.995	28,68	53,85
GRANITO LAVORATI	4.060	2.161.199	4.361	1.785.886	7,41	-17,37
SubTOT Blocchi, Lastre e Lavorati	**190.268**	**25.008.868**	**185.870**	**27.812.194**	**-2,31**	**11,21**
GRANULATI E POLVERI	63.246	2.249.407	91.273	2.829.512	44,31	25,79
TOTALE GENERALE	**253.514**	**27.258.275**	**277.143**	**30.641.706**	**9,32**	**12,41**

FONTE: ELABORAZIONI UFFICIO STUDI IMM

Esportazioni MS-Africa. Valori assoluti e variazioni. Anno 2000-2001 ***Rapporto Economia 2002*** **pp. 98**

The European Union and the Middle East confirmed themselves as the two main partners of the Massa-Carrara province, respectively with 630,401 tonnes and 368,049 tonnes.

As mentioned, North America imports decreased a bit, from 137,574 tonnes of 2000 to 132,796 tonnes in 2001, together with Far Eastern exports (almost 132,000 tonnes in 2000, 120,786 tonnes in 2001).

2002 was not a good year, for both Italy and the Apuan district. The latter recorded another -2.13% on general export figures passing to 2,038,933 tonnes.

Negative data concerning all export sectors: -22.50% raw granite; -11.90% finished granite; -10.38% finished marble; with -3.55%, raw marble was the more positive one. The only sector that recorded a growth was the one of bulk and marble dust, with +6.10% in quantities.

COMPRENSORIO MS - LU - SP TUTTI I PAESI GENNAIO DICEMBRE 2002	IMPORT				EXPORT			
	2002		DIFF.% '02/'01		DIFF.% '02/'01		DIFF.% '02/'01	
	Tonnellate	Euro	Quantità	Valore	Tonnellate	Euro	q.tà	val.
MARMO BLOCCHI E LASTRE	185.418	38.480.927	-16,71	-21,82	489.045	74.973.591	-3,55	-0,12
GRANITO BLOCCHI E LASTRE	425.179	108.167.681	-10,01	-11,08	16.772	7.441.335	-22,50	-16,41
MARMO LAVORATI	18.432	10.321.213	-10,92	-21,06	406.861	290.831.695	-10,38	-11,89
GRANITO LAVORATI	1.988	1.477.228	-17,10	-22,28	203.852	192.364.462	-11,90	-12,71
ALTRE PIETRE LAVORATI	165	10.917	283,72	-23,87	18	34.140	0,00	0,00
SubTOT Blocchi, Lastre e Lavorati	**631.182**	**158.457.966**	**-12,12**	**-14,74**	**1.116.548**	**565.645.223**	**-8,03**	**-10,84**
GRANULATI E POLVERI	194	146.624	-45,81	-18,48	922.385	26.899.808	6,10	3,62
SubTOT con Granulati e Polveri	**631.376**	**158.604.590**	**-12,13**	**-14,75**	**2.038.933**	**592.545.031**	**-2,13**	**-10,27**
ARDESIA GREZZA	380	99.632	-63,04	-74,88	2.452	1.860.239	-36,53	-37,52
ARDESIA LAVORATA	3.709	1.057.473	22,17	-23,06	26.575	19.423.735	-8,07	-13,19
PIETRA POMICE	125	12.135	1288,89	1467,83	46	22.946	27,78	53,64
_ TOTALE	635.590	159.773.830	-12,04	-14,93	2.068.006	613.851.951	-2,28	-10,48

Fonte: Elaborazioni I.M.M. su dati Istat

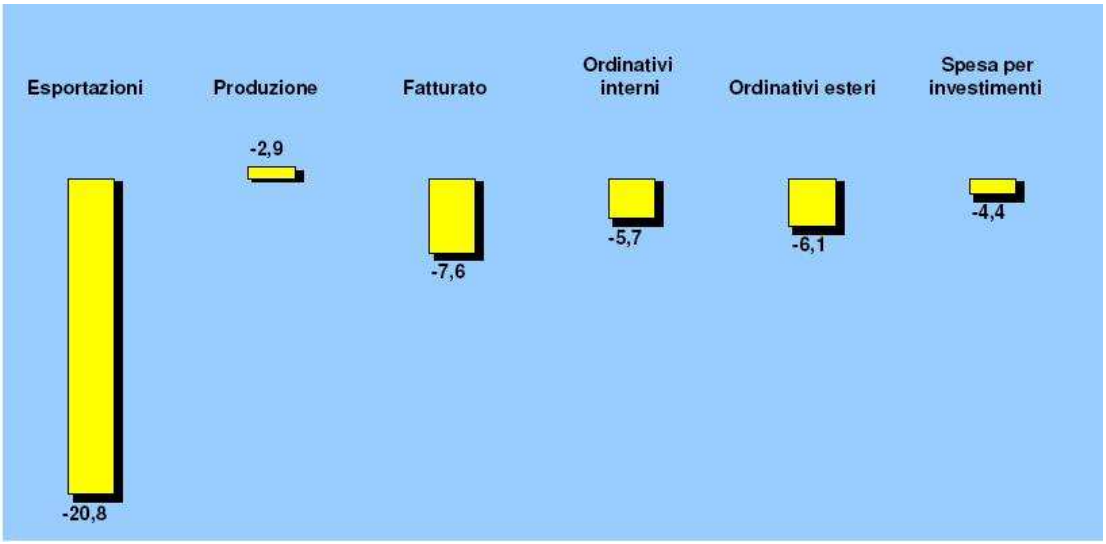
Import/Export mondiale del comprensorio, distinto per quantità valori e relative variazioni, ***Rapporto Economia 2003 - Sezione 5***

At an international level, **2003** was considered "the year of Turkey"[35]. It exported marble towards the Middle East, Europe, and Northern America jeopardizing the old traditional stone producers, which saw their exports steadily decreasing, primarily Italy, but also Spain, Portugal and others.

2003 represented a particular year for Massa-Carrara too. First, the introduction of the Torano weighing-machine that secured more reliable data on the quantities of stone extracted, secondly for the flood that hit the municipality in September, causing big troubles to the entire system.

In 2003, Massa-Carrara industry production marked a negative sign, touching -0.3%, being in any case the best of Tuscany ones (-3.4% on the average).

Local stone sector continued to suffer from a structural crisis: -2.9% in production, -7.6% in turnover, -5.7% in internal demand, -6.2% in external demand, -4.4% of investments, -20% in value of general export.



I numeri della crisi del settore lapideo on provincia di MS nel 2003, *Rapporto Economia 2004* pp. 20

Export of raw stone fell by 19.3% in terms of value mainly due to a decrease in imports from countries such as Spain (-48%) and the European Union (-47.9%), Tunisia (-17%) Lebanon, Syria and Egypt. Traditional partners such as China and the USA still went well.

The worst data, however, concerned exports of finished stones more or less in every area of interest, from the USA to Japan and the EU in general (-54.9% in value).

[35] Source: *"STONE SECTOR 2003- THE INTERNATIONAL STONE MARKET"* pp. 25

Positive signs only came from the United Arabian Emirates (+62% in value) and Indonesia (+42% in value).

In **2004** on the international level, the stone industry has once again witnessed a good growth rate within imp-export field in the whole, but not at the same rate as in the previous years. China, India and the Far East together with North African countries continued to grow in importance, whereas Europe faced competition from external manufacturers.

Italy was almost replaced by Turkey in the American market, and despite exports had grown from the previous year, (4,355,512 tonnes in 2003, 4,721,171 tonnes in 2004), the nation was still far from a full recovery of the industry as it was before the crisis started.

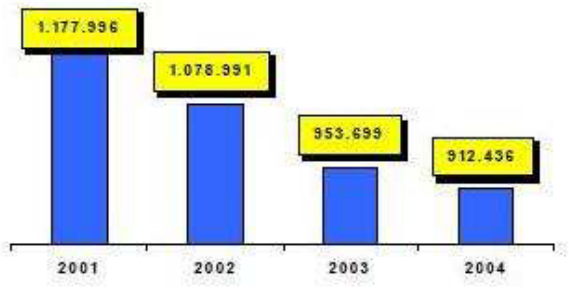
That year confirmed for Massa-Carrara province the structural crisis: -8.7% in production, -7.8% in the turnover, -6% in internal demand, -8.9% in external demand, -11.8% for investments.

Compared with the Lucca province, in 2004, the Massa-Carrara province lost -3.9% of total stone sector turnover compared to 2003, that is a loss of 14 million Euro, whereas Lucca recorded -2.6%. Nevertheless, if the comparison enlarges to the last five years (2000-2004), a better performance for Carrara can be seen, with -27% loss in values compared to -30% of Lucca.

By analysing the two main branches of export, a very different trend can be observed.

Concerning raw stone, there was an increase of export turnover of about 6 million Euro, that is +10.1% compared to 2003, passing from 58,5 to 64,4 million Euro.

This increase, however, was not related to an increase in production, it was indeed, the result of a general inflation of the period.



Fonte: Elaborazioni ISR su dati Ufficio Tassa Marmi del Comune di Carrara

Trend 2001-2004 della produzione di blocchi del Comune di Carrara (ton), *Rapporto Economia 2005* pp. 110

According to the Carrara's port handling and the Tassa Marmi data, in fact, there was a huge fall of volumes of production in Carrara quarries: -4.3% (- 41,000 tonnes) compared to 2003, (-22.5% compared to 2001 figures) reaching 912,436 tonnes.

Lapideo grezzo		
AREE	Var ass	Var %
America settentrionale	3.914.539	45,2
Africa settentrionale	1.572.420	13,2
Asia centrale	746.922	12,7
Asia orientale	412.707	3,1
UE15	409.828	5,8
Europa centro orientale	246.808	14,6
Altri paesi africani	126.467	238,7
America centro meridionale	103.482	18,9
Oceania	35.525	27,6
Altri paesi europei	-151.940	-39,0
Medio oriente	-1.513.304	-16,5

Fonte: Elaborazioni ISR su dati ISTAT

Best partners of the province, were again, the USA – North America, North Africa and Asia, while the Middle East (Jordan, United Arabian Emirates) imports fell sharply.

The USA and China represented together 30% of local raw exports, followed by India, Spain and Mediterranean countries.

Le aree più virtuose. Variazioni assolute e % rispetto al 2003, *Rapporto Economia 2005*, pp. 111

If we look at the medium-long term trend of raw stone export, from 2000 to 2004, it is clear that the Massa-Carrara province scored the best results, even though negative, in values (-3.5%) compared to the Lucca province (-17.2%) and the whole Apuan district (-5.8%). Verona was the only province that reported positive results (+9.5%).

Lapideo grezzo					
	2000	2001	2002	2003	2004
			valori in Euro		
Massa Carrara	66.735.975	70.099.662	70.331.176	58.493.385	64.396.839
Lucca	13.324.552	12.118.248	11.035.982	11.587.823	11.030.843
Distretto apuo-versil	80.060.527	82.217.910	81.367.158	70.081.208	75.427.682
Verona	26.271.329	24.992.582	28.264.666	28.926.513	28.773.045
Italia	248.775.672	235.586.917	231.621.321	204.714.530	230.174.815
			numeri indici - base 2000=100		
Massa Carrara	100,00	105,04	105,39	87,65	96,49
Lucca	100,00	90,95	82,82	86,97	82,79
Distretto apuo-versil	100,00	102,69	101,63	87,54	94,21
Verona	100,00	95,13	107,59	110,11	109,52
Italia	100,00	94,70	93,10	82,29	92,52

Fonte: Elaborazioni ISR su dati ISTAT

Trend delle esportazioni del lapideo grezzo nell'ultimo lustro. Valori e numeri indici - base 2000=100, *Rapporto Economia 2005*, pp. 113

In the other branch, that of processed stone, the crisis was still heavy. From 2001 to 2004, Massa-Carrara province lost 31.3% on values of exports, almost 120 million Euro.

Passing from 2003 to 2004, the Massa-Carrara province lost 6.7% of sales, decreasing to 275,326,000 Euro.

LAPIDEO LAVORATO					
	2000	2001	2002	2003	2004
			valori in Euro		
Massa Carrara	400.645.150	394.848.189	355.703.026	295.182.289	275.325.997
Lucca	146.975.444	135.944.018	114.216.332	103.491.538	101.091.988
Distretto apuo-versil	547.620.594	530.792.207	469.919.358	398.673.827	376.417.985
Verona	556.243.202	528.943.170	498.545.363	480.669.333	500.502.555
Italia	1.883.620.493	1.843.827.933	1.707.878.562	1.523.956.974	1.505.376.842
			numeri indici - base 2000=100		
Massa Carrara	100,00	98,55	88,78	73,68	68,72
Lucca	100,00	92,49	77,71	70,41	68,78
Distretto apuo-versil	100,00	96,93	85,81	72,80	68,74
Verona	100,00	95,09	89,63	86,41	89,98
Italia	100,00	97,89	90,67	80,91	79,92

Fonte: Elaborazioni ISR su dati ISTAT

Trend delle esportazioni del lapideo lavorato nell'ultimo lustro. Valori e numeri indici - base 2000=100, *Rapporto Economia 2005,* pp.115

Concerning partners, Central Asia doubled its purchases (+82%) and Northern Africa and America continued to do well.

A big contraction in European Union imports (-11.1% that is 5 million Euro), and the worst was recorded for Middle East countries with 34.5%, that is more than 18 million Euro.

The USA strengthened the leadership as main market of distribution with 137,6 million Euro imports, that is the right half of processed stone export destined to the world market, while the second market became the United Kingdom, followed by United Arabian Emirates and Saudi Arabia.

Also on the side of import, the province suffered from a crisis, losing 4.1% in values from 2003, and decreasing to 86,8 million Euro.

Le aree più virtuose. Variazioni assolute e % rispetto al 2003, *Rapporto Economia 2005*, pp.113

Lapideo lavorato		
AREE	Var ass	Var %
America settentrionale	8.993.498	6,8
Asia centrale	1.724.759	82,9
Africa settentrionale	687.840	11,6
Altri paesi africani	295.429	16,7
Oceania	-242.143	-4,6
Europa centro orientale	-281.898	-3,1
Altri paesi europei	-324.213	-4,7
America centro meridionale	-894.759	-12,3
UE15	-5.082.133	-11,1
Asia orientale	-6.183.259	-25,0
Medio oriente	-18.549.413	-34,5

Fonte: Elaborazioni ISR su dati ISTAT

2005 imp-exports followed the path of the preceding year for Italy, with just a few negative differences in the four main items and small rises for chips, bulk and dust materials.

For the Massa-Carrara province it was an important, though, *double face* year, difficult to understand, with a negative start following 2004 closure (first six months: -3.3% in production, -3% in the turnover, almost

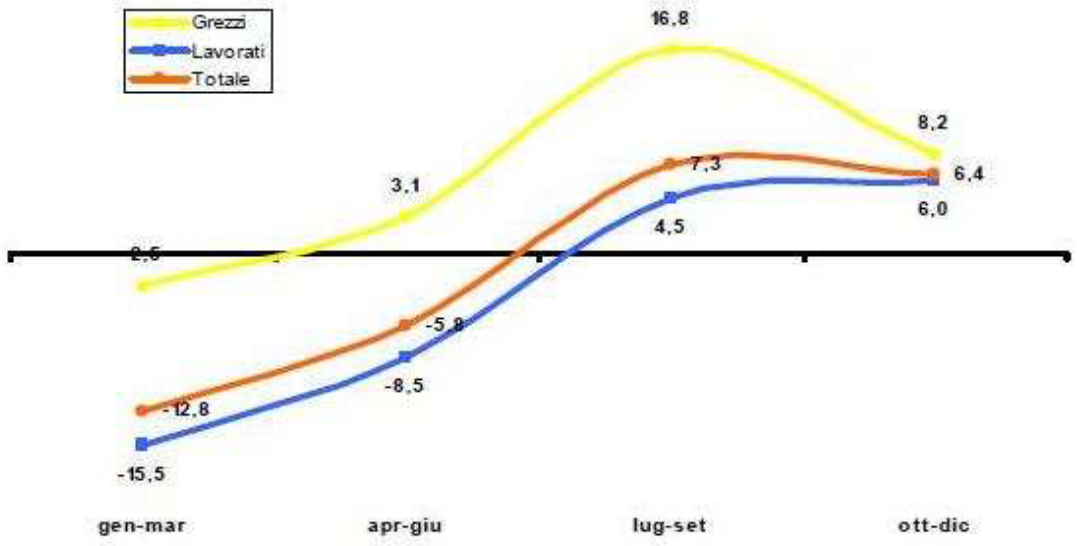
-10% in export) but with a gradual recover after the spring (+2.3% in production, +1.7% in the turnover compared to the same period of the preceding year) to end with a reduced, but still, negativity.

Variabili economiche	I° sem	II° sem	Media annua
Produzione	-3,3	2,3	-0,5
Fatturato	-3,0	1,7	-0,6
Export totale	-9,1	6,9	-1,3
Export grezzi	0,6	12,5	6,5
Export lavorati	-11,9	5,2	-3,4
Ordini interni	5,8	2,1	3,9
Ordini esteri	7,9	0,2	4,1
Grado di utilizzo impianti produttivi	75,0	77,9	76,5
Prezzi alla produzione	2,1	8,9	2,0

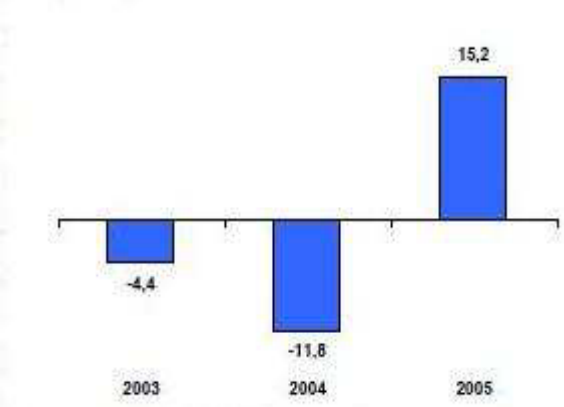
Fonte: Elaborazioni ISR su dati Unioncamere Toscana-Istituto G. Tagliacarne e ISTAT

I numeri del settore lapideo in provincia di Massa - Carrara nel 2005, *Rapporto Economia 2006,* pp. 118

As for exports, after the first six months of huge losses (first 3 months -12.8%, the last period -5.8%), the second half of the year saw a positive trend with +7.3%, ending with 6.4%.



Andamento tendenziale trimestrale delle esportazioni lapidee di Massa - Carrara nel 2005, *Rapporto Economia 2006,* pp. 119



Fonte: Elaborazioni ISR su dati Unioncamere Toscana-Istituto G. Tagliacarne

This positive trend also reflected on investments expenditure that increased up to 15.2%, while in the two previous years it recorded -4.4% and -11.8%.

Trend della spesa per investimenti del settore lapideo provinciale. Variazioni % tendenziali, *Rapporto Economia 2006,* pp.119

Distinzione per paese di destinazione dei primi 5 prodotti maggiormente esportati da Massa - Carrara nel 2005, *Ricerca industria 2007,* pp.139

I primi 5 prodotti	Export	%			
Pietra estratta	61.137.856	6,5	Stati Uniti	8.375.393	13,7
			Cina	7.551.731	12,4
			Libia	5.023.655	8,2
			India	4.399.168	7,2
			Algeria	4.036.268	6,6
Pietre da taglio o da costruzione, modellate e finite	267.441.814	28,3	Stati Uniti	134.141.232	50,2
			Emirati Arabi Uniti	13.044.869	4,9
			Regno Unito	12.953.942	4,8
			Arabia Saudita	12.809.316	4,8
			Francia	9.686.157	3,6
Macchine e apparecchi per la produzione e l'impiego di energia meccanica	192.770.420	20,4	Guinea equatoriale	62.604.176	32,5
			Russia	29.441.550	15,3
			Norvegia	21.503.966	11,2
			Egitto	20.239.536	10,5
			Qatar	14.610.004	7,6
Macchine utensili	71.871.466	7,6	Iran	8.491.847	11,8
			India	7.856.069	10,9
			Spagna	6.594.241	9,2
			Brasile	5.614.482	7,8
			Stati Uniti	3.332.819	4,6
Apparecchi trasmittenti per la radiodiffusione e la televisione e di apparecchi per la telefonia	94.441.147	9,9	Spagna	72.397.321	76,7
			Francia	14.005.619	14,8
			Lussemburgo	6.435.782	6,8
			Svizzera	508.360	0,5
			Hong Kong	460.124	0,5

If we look at commercial partners it is easily recognizable that the USA were the first country both for raw (13.7% in terms of value) and processed stone (50.2%), followed by China (12.4%) in the first branch, and the United Arabian Emirates (4.9%) in the second one.

The apparent favourable situation of 2005, however, did not represent the total exit of the sector from the crisis of the last period; the province weight on Italian export figures diminished from 27.4% in volumes to 23%. What suffered most, was, again export of finished products (-3.4% at the end of the year), but also the processing of stone material on the territory itself, mined by developing countries where workforce costs were cut down

– first and foremost China – that preferred to import raw blocks and process them "at home".

With **2006** the negative situation seemed to improve and Massa-Carrara province witnessed an increase in the four main traditional sector of its economy, as it can be seen in the following chart: at the end of the year the production recorded +1.8%, the turnover +2.6%, the total export 10.2% reaching 429,434,927 million Euro – the highest value since 2001.

I numeri del settore lapideo in provincia di Massa - Carrara nel 2006, *Rapporto Economia 2007,* pp.128

Variabili economiche	I° trim	II° trim	III° trim	IV° trim	Media annua
Produzione	3,0	2,9	-1,0	2,3	1,8
Fatturato	3,0	3,5	0,4	3,3	2,6
Export totale	21,0	13,5	1,3	6,9	10,2
Export grezzi	19,6	12,7	0,3	0,6	7,8
Export lavorati	21,4	13,7	1,6	8,8	10,9
Ordini interni	-0,7	2,2	-1,7	0,7	0,1
Ordini esteri	2,1	4,1	4,1	4,6	3,7
Grado di utilizzo impianti produttivi	78,6	79,0	74,5	78,3	77,6
Prezzi alla produzione	1,3	3,3	0,5	3,1	2,0

Fonte: Elaborazioni ISR su dati Unioncamere Toscana-Istituto G. Tagliacarne e ISTAT

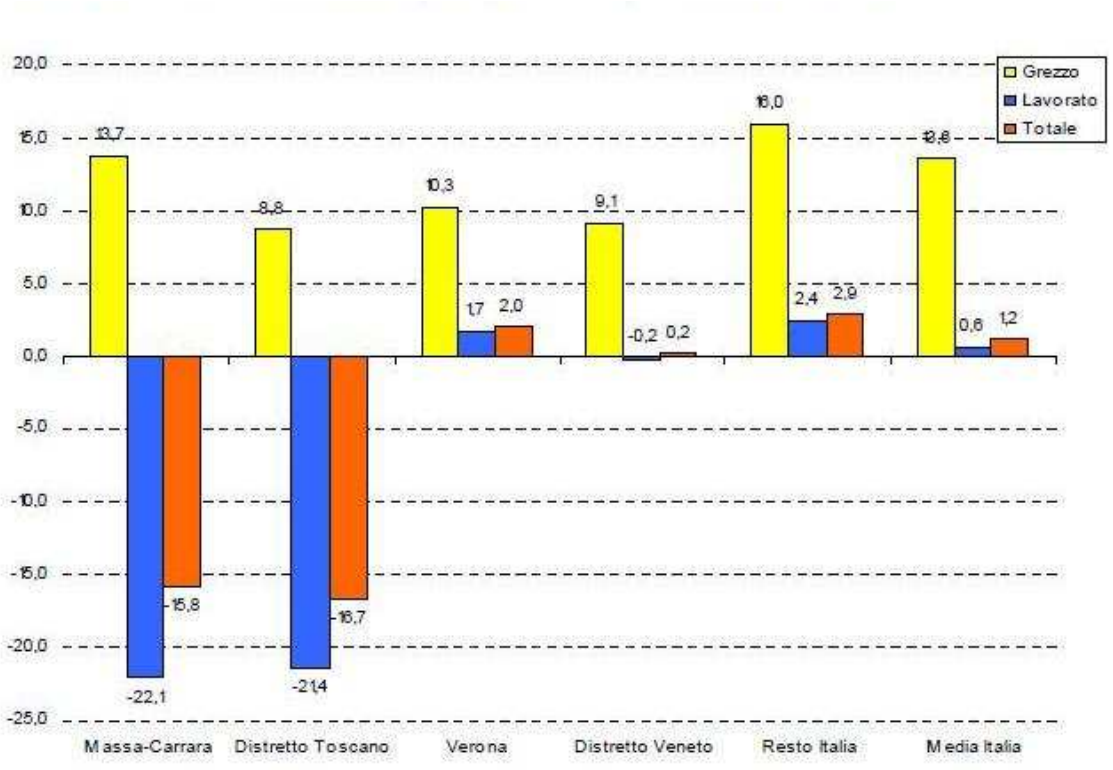
It is worth to notice that the recover was the result of great exports not only of raw material (7.8%) that overcame the 100 million Euro threshold, but also of longer suffering processed stone (10.9%), which touched the record of 327 million Euro selling, and the always more important bulk, chips and stone dust.

Aree		EXPORT		
		Grezzo	Lavorato	Totale
MASSA-CARRARA	2006	101.690.773	327.744.154	429.434.927
	var %	7,8%	10,9%	10,2%
DISTRETTO TOSCANO	2006	118.911.994	462.246.179	581.158.173
	var %	6,9%	8,0%	7,8%
VERONA	2006	32.726.257	742.494.804	775.221.061
	var %	-5,7%	8,4%	7,8%
DISTRETTO VENETO	2006	39.219.228	949.754.158	988.973.386
	var %	-0,3%	3,6%	3,5%
RESTO ITALIA	2006	329.079.160	8.054.720.898	8.383.800.058
	var %	2,6%	7,0%	6,8%
ITALIA	2006	487.210.382	9.466.721.235	9.953.931.617
	var %	3,4%	6,7%	6,5%

Fonte: Elaborazioni ISR su dati ISTAT

Evoluzione media annua (2006-2005) delle esportazioni lapidee, in termini di valori correnti esportati. Confronto principali aree di produzione nazionali, *Rapporto Economia 2007,* pp.131

Despite this renewed boost of Carrara economy, the export performance of the province was still negative, -15.8% in values, compared to the Verona's and Italy's ones where in the last 5-year period, export increased respectively by 2% and 1.2%.



Evoluzione quinquennale delle esportazioni lapidee, in termini di valori correnti esportati. (2001-2006). Confronto tra le principali aree di produzione nazionali, *Rapporto Economia 2007,* pp. 132

The new year **2007** was, as 2005, a very fluctuating year.

After a positive start, inherit of 2006 growing trend, in the period between April and June it moved towards a very negative performance then recovered in the summer, to end again with a negative inclination. [36]

Concerning exports, there was an increase of only 3.3%, compared to 10% of the previous year, leading to a decrease to 443,5 million Euro of stone exported. This was the result of a reduction of raw export (blocks, slabs, together with bulk), -1.9%, [37] but a good holding of processed one, 4.9%.

As seen in 2006, the local system tried to exit from the crisis and, in the short term, it succeeded in this aim, (Carrara and Apuan export figures overcame those of Verona and

[36] The production reached 1.0% and the turnover reached 3.0%, according to "*Rapporto Economia 2008 – SETTORE LAPIDEO"* pp. 157

[37] This was due to the building industry and real estate crisis of the USA, Apuan principal outlet market of raw material that started right in the 2007.

the Veronese district for the single year 2007) but if we look at the medium – long term, Massa-Carrara still recorded negative figures compared to Veronese or Italian ones. From 2002 to 2007, Carrara lost 6.2% of export values, whereas Verona recorded +9.4% and Italy 6%.

		EXPORT		
Aree		Grezzo	Lavorato	Totale
MASSA-CARRARA	2007	99.938.725	343.565.224	443.503.949
	var %	-1,9%	4,9%	3,3%
DISTRETTO TOSCANO	2007	118.850.305	483.959.267	602.809.572
	var %	-0,2%	4,6%	3,6%
VERONA	2007	34.428.840	762.385.908	796.814.748
	var %	2,1%	2,4%	2,4%
DISTRETTO VENETO	2007	40.915.415	974.768.044	1.015.683.459
	var %	-0,2%	-1,4%	-1,4%
RESTO D'ITALIA	var %	-2,3%	2,8%	2,6%
ITALIA	var %	-1,6%	2,4%	2,2%

Evoluzione media annua (2007 su 2006) delle esportazioni lapidee, in termini di valori correnti esportati. Confronto tra le principali aree di produzione nazionali, *Rapporto Economia 2008,* pp. 161

I primi 10 paesi per valore esportato totale dei lapidei della provincia di Massa - Carrara. Anni 2002, 2006, 2007, *Rapporto Economia 2008,* pp.165

Paesi	2002		2006		2007
Stati Uniti	160.831.002	Stati Uniti	151.720.729	Stati Uniti	139.286.346
Regno Unito	29.923.021	Emirati Arabi Uniti	26.964.442	Emirati Arabi Uniti	29.552.662
Emirati Arabi Uniti	19.510.847	Regno Unito	21.840.538	Regno Unito	21.164.639
Francia	18.695.652	Francia	19.437.785	Cina	16.158.385
Arabia Saudita	17.823.954	Cina	13.352.523	Francia	13.670.834
Spagna	16.996.215	Germania	12.499.320	Tunisia	13.315.146
Germania	15.283.555	Arabia Saudita	12.477.251	Arabia Saudita	12.561.939
Giappone	13.856.506	Tunisia	10.398.265	Germania	11.750.413
Belgio	12.034.891	Svezia	9.994.922	Federazione russa	10.956.015
Cina	11.580.674	Belgio	9.943.206	India	10.715.815
Primi 10 Paesi	316.536.317	Primi 10 Paesi	288.628.981	Primi 10 Paesi	279.132.194
Incid % Primi 10 Paesi su Totale	66,9%	Incid % Primi 10 Paesi su Totale	67,2%	Incid % Primi 10 Paesi su Totale	62,9%

From the point of view of commercial partners, China represented the first importer of raw stone, followed by Tunisia and India, while USA imports in this field literally collapsed, -50%, as an evidence of the productive crisis of the nation. The crisis reflected also on processed stone, even if in a minor extent, and American weight on local export decreased from 44.4% of 2006 to 39.5%. United Arabian Emirates (10%), together with the UK (10.5%) and Russia (76%) performed the best results. Finally, regarding the whole of Carrara export, the best outlet markets were,

despite the crisis, the USA with 139 million Euros, followed by the United Arabian Emirates, the UK and China. Negative results concerned Saudi Arabia and other European countries.

Finally **2008**, the last year taken into consideration before getting to the conclusion of the dissertation by analysing the first period [38]of the current year, 2009.
2008 has been a real difficult year for many countries worldwide. People will remember it for the changes it has brought, which are not over yet, into the frame of international economies and important power assets.
The crisis started at the end of 2007 in the USA and spread worldwide with the bankrupt of *Lehman Brothers* bank on 15th September 2008, bringing consequences also on the subprime mortgages crisis, on the Stock Exchange and on other economy fields. Unemployment rate started to grow, mining citizens' possibility of social expenditure and therefore their savings, leading to a common consumer's uncertainty.
The governments of the major countries and economies took responsive measures to the unprecedented crisis, proportionally to their involvement, trying to act as homogeneously and coordinated as possible. China, in particular, demonstrated its strength of new developing economy with high management capacity being able to adapt to any changes.

Concerning the stone sector, the building industry has always been a component and the primary market for stones from every country worldwide – coming before funeral and religious art, monuments, statues and furnishing – so, any phenomenon regarding this trade, naturally involves the stone sector even if at different extents depending on the country. In 2008, the most suffering markets were those of the USA, Germany, some EU countries, but also Far Eastern countries that, in 2007, had succeeded to close the year in a positive way.

[38] Our data concerning the first five – six months of the year, based on general figures, outlooks and perspectives made by the *Port Authority* of Marina di Carrara and stated into the IMM's *2008 Stone Sector* and the Camera di Commercio, Industria, Artigianato e Agricoltura *Rapporto Economia 2009*.

Export Italia - Tutti i paesi, *Stone Sector 2008 - allegato statistico,* pp.14

ITALIA - TUTTI PAESI	Export					
	2007		2008		diff.% 2008/2007	
Gennaio-Dicembre 2007/2008	tonn.	Euro	tonn.	Euro	% Qt.à	% Val.
MARMO BLOCCHI E LASTRE	971.486	188.330.940	1.006.939	198.416.277	3,65	5,36
GRANITO BLOCCHI E LASTRE	196.343	46.462.067	170.022	45.276.830	-13,41	-2,55
MARMO LAVORATI	1.073.266	800.918.490	1.026.510	796.424.380	-4,36	-0,56
GRANITO LAVORATI	874.961	763.457.187	757.006	651.269.407	-13,48	-14,70
ALTRE PIETRE LAVORATI	208.389	40.759.835	179.571	35.473.459	-13,83	-12,97
SubTOT Blocchi, Lastre e Lavorati	**3.324.445**	**1.839.928.519**	**3.140.048**	**1.726.860.353**	-5,55	-6,15
GRANULATI E POLVERI	1.024.322	61.195.790	1.070.461	54.907.145	4,50	-10,28
SubTOT con Granulati e Polveri	**4.348.767**	**1.901.124.309**	**4.210.509**	**1.781.767.498**	-3,18	-6,28
ARDESIA GREZZA	3.353	1.745.866	2.890	1.342.215	-13,81	-23,12
ARDESIA LAVORATA	17.755	11.101.034	13.282	8.664.317	-25,19	-21,95
PIETRA POMICE	101.198	3.093.930	1.000	445.034	-99,01	-85,62
TOTALE	**4.471.073**	**1.917.065.139**	**4.227.681**	**1.792.219.064**	-5,44	-6,51

Fonte: Istat, elaborazione IMM

As for Italy, the 2008 crisis was felt differently zone-by-zone; Italian exports came to a standstill in all the typologies of stone trade, both in volumes and values, compared to the already slowing down 2007. The worst performance regarded exports of granite, both raw and finished, which lost almost 27% in volumes passing from about 1,070,000 tonnes of 2007, to 927,000 tonnes in 2008, whereas raw marble recorded +3.65% in volumes and -4.36% for processed products, for a total figure of -0.71% passing from 2,044,000 tonnes of 2007 to 2,033,000 in 2008.

As for commercial partners, as predictable, almost every country witnessed a decrease in its import from Italy and the most suffering was North American one (-24.20% in volumes compared to 2007), followed by the EU of 27 that recorded a loss in imports by 11% (mainly Spain and the UK). Positive figures concerned the Middle East (2.89% vol) and Africa (9.76% vol), especially in the North.

Esportazioni italiane di lapidei per macro aree geografiche, 2007-2008, *Stone Sector 2008*, pp.18

Italia - Tutti I Paesi	Export/Valori assoluti e variazioni					
	2007		2008		diff.% 2008/2007	
Gennaio-Dicembre 2006/2007	tonn.	Euro	tonn.	Euro	% Qt.à	% Val.
Unione Europea	1.744.539	679.492.154	1.552.699	612.000.867	-11,00	-9,93
Resto d'Europa	400.512	215.997.629	388.342	229.250.551	-3,04	6,14
Africa	739.379	101.613.721	811.520	111.596.064	9,76	9,82
Nord America	478.599	523.620.123	362.800	419.732.248	-24,20	-19,84
Centro e Sud America	74.254	41.037.797	66.963	38.768.965	-9,82	-5,53
Medio Oriente	429.366	158.978.082	441.757	181.228.130	2,89	14,00
Estremo Oriente	581.341	167.608.916	580.873	171.038.863	-0,08	2,05
Oceania	23.076	28.226.367	22.725	28.516.571	-1,52	1,03
TOTALE	**4.471.066**	**1.916.574.789**	**4.227.679**	**1.792.132.259**	-5,44	-6,49

Fonte: Istat, elaborazione IMM

	Export					
ITALIA - GERMANIA	2007		2008		diff.% 2008/2007	
Gennaio-Dicembre 2007/2008	tonn.	Euro	tonn.	Euro	% Qt.à	% Val.
MARMO BLOCCHI E LASTRE	4.696	3.568.744	3.129	2.779.997	-33,37	-22,10
GRANITO BLOCCHI E LASTRE	20.220	6.169.329	16.662	5.765.092	-17,60	-6,55
MARMO LAVORATI	44.417	38.884.736	43.695	40.922.524	-1,63	5,24
GRANITO LAVORATI	185.884	146.366.833	145.163	117.566.145	-21,91	-19,68
ALTRE PIETRE LAVORATI	91.609	14.283.923	75.886	12.359.751	-17,16	-13,47
SubTOT Blocchi, Lastre e Lavorati	**346.826**	**209.273.565**	**284.535**	**179.393.509**	-17,96	-14,28
GRANULATI E POLVERI	229.482	16.343.716	339.682	17.294.806	48,02	5,82
SubTOT con Granulati e Polveri	**576.308**	**225.617.281**	**624.217**	**196.688.315**	**8,31**	-12,82
ARDESIA GREZZA	114	76.367	115	73.070	0,88	-4,32
ARDESIA LAVORATA	1.033	727.254	711	508.194	-31,17	-30,12
PIETRA POMICE	836	293.031	10	6.641	-98,80	-97,73
TOTALE	**578.291**	**226.713.933**	**625.053**	**197.276.220**	**8,09**	-12,99

Fonte: Istat, elaborazione IMM

Esportazioni italiane di lapidei verso la Germania, 2007-2008, *Stone Sector 2008*, pp.14

Germany in particular reduced its imports of raw marble by 33.37% in volumes compared to 2007, and recorded a negative trend also for its major imported product that is granite, both raw and finished, with a total loss of 39.51% in volumes (- 44,279 tonnes 07/08).

As far as imports are concerned, there was a remarkable decrease in internal stone market, particularly for raw stone both marble and granite, the latter being most hit on volumes rather than values, following the already mentioned pattern of “quality instead of quantity” used in the early 2000s.

The Apuan stone sector was completely invested by the crisis.

Unlike past years, when some even little change could be seen among the months of a single year, 2008 has been as clear as evident from the very beginning: the economic performance influenced by the global scenario reached record negative peaks, never touched before.

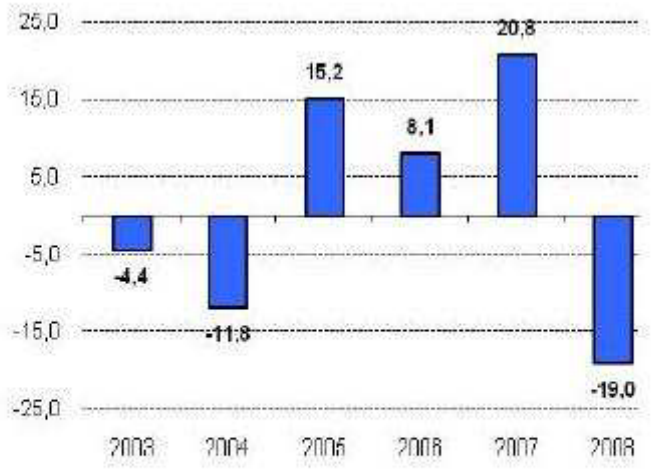
It ended with -8.7% in the production, -7.8% in the turnover, -4.1% in the internal demand and -10.2% in the external demand (of whom 8.04% concerning stone).

I numeri del settore lapideo in provincia di Massa - Carrara nel 2008, *Rapporto Economia 2009*, pp.182

Variabili economiche	I°trim	II°trim	III°trim	IV°trim	Media 2008	Media 2007
Produzione	-8,2	-6,4	-4,3	-16,0	-8,7	1,0
Fatturato	-4,8	-5,8	-4,6	-16,3	-7,8	3,0
Ordini interni	-4,9	-1,1	0,2	-10,5	-4,1	3,4
Ordini esteri	-4,9	-6,9	-8,0	-21,2	-10,2	1,8
Grado di utilizzo impianti produttivi	73,9	78,3	79,7	67,9	74,9	76,7
Prezzi alla produzione	2,1	1,0	1,9	-1,0	1,0	2,1

Fonte: Elaborazioni ISR su dati Unioncamere Toscana-Istituto G. Tagliacarne

Investment expenditure also collapsed, after two years of relatively recover, to -19%, even worst than 2004 (-11.8%).



Fonte: Elaborazioni ISR su dati Unioncamere Toscana-Istituto G. Tagliacarne

Andamento delle spese per investimento nel lapideo provinciale. Anni 2003-2008, *Rapporto Economia 2009,* pp.185

As far as export is concerned, we have already stated the total decrease by 8.4% of Massa-Carrara province, for a total loss of 32 million Euro, reaching 354,984,949 Euro. This was the result of a further decrease of processed stone, -13.6%, that reached 273,5 million Euro, but a strong holding of raw, 15.2% , reaching 81,5 million Euro.

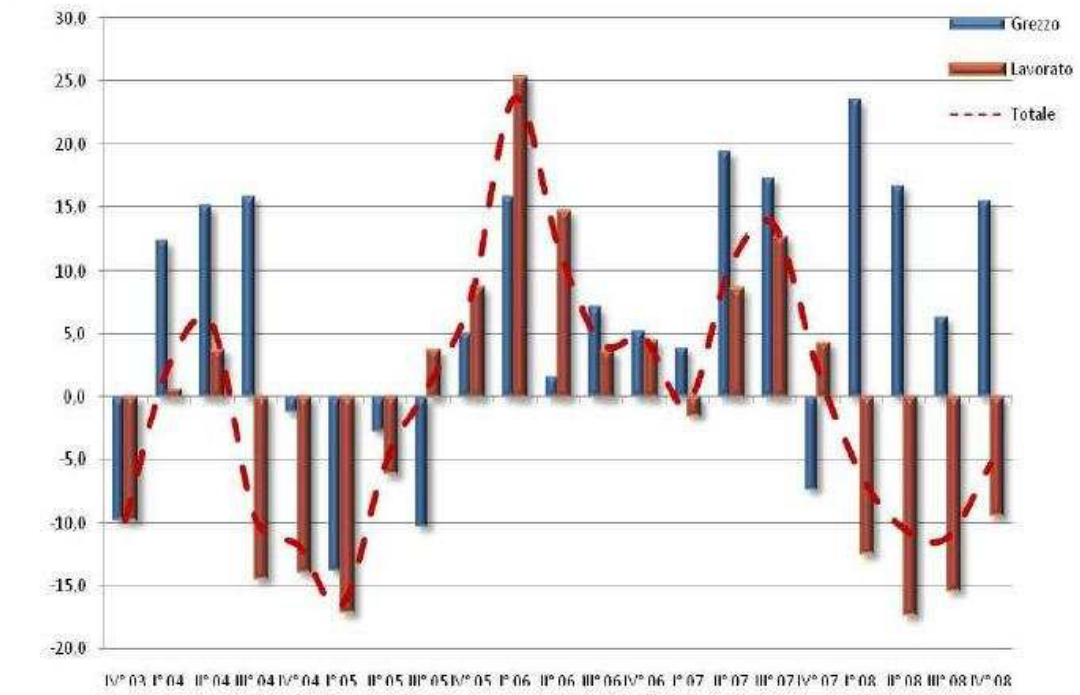
Aree		EXPORT		
		Grezzo	Lavorato	Totale
MASSA-CARRARA	2008	81.530.178	273.454.771	354.984.949
	var %	15,2%	-13,6%	-8,4%
DISTRETTO TOSCANO	2008	94.674.813	383.792.088	478.466.901
	var %	13,9%	-10,4%	-6,5%
VERONA	2008	27.762.682	442.293.115	470.055.797
	var %	0,8%	-17,3%	-16,4%
DISTRETTO VENETO	2008	31.425.593	496.321.112	527.746.705
	var %	-4,3%	-17,0%	-16,4%
RESTO D'ITALIA	var %	-3,7%	-1,2%	-1,6%
ITALIA	var %	2,1%	-9,4%	-7,8%

Fonte: Elaborazioni ISR su dati ISTAT

Evoluzione media annua (2008-2007) delle esportazioni lapidee, in termini di valori correnti esportati. Confronto tra le principali aree di produzione nazionali, *Rapporto Economia 2009,* pp.186

Despite these great losses on processed stone, even in 2008 Massa-Carrara global performance was greater than the Verona one (-16.4%), and the same goes for the two districts at issue. [39]

Anyway, to better understand the reach of the latest Massa-Carrara trends, it is useful to look at the last five-year time (2003 – 2008). The negative period of 2004/05 both for raw and processed stone, is easily recognizable and the same goes for the even worst period of 2008 when total stone export fell dramatically.

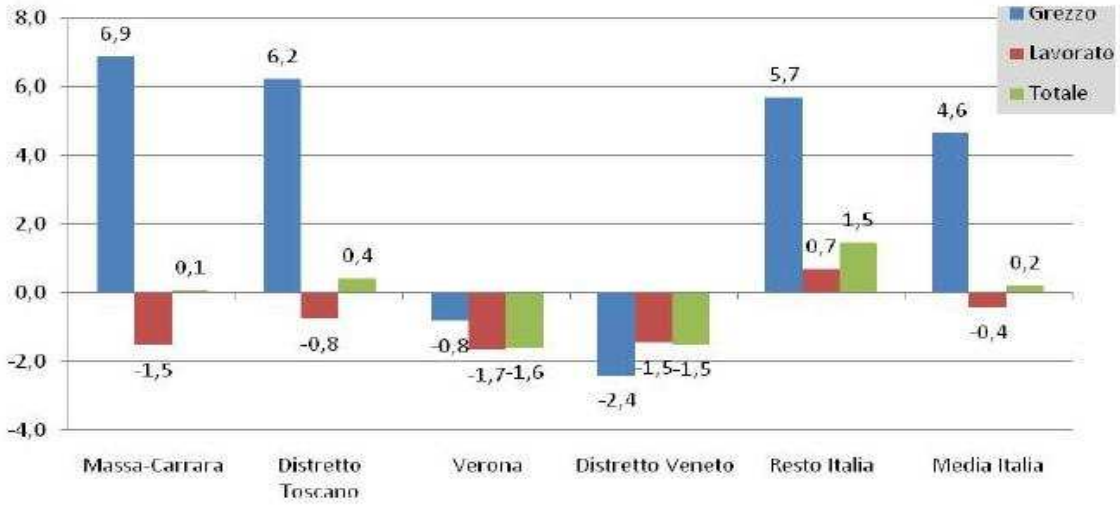


Andamento tendenziale trimestrale delle esportazioni lapidee di Massa - Carrara nell'ultimo quinquennio, *Rapporto Economia 2009,* pp.186

In the average values, the Massa-Carrara province recorded an annual loss of -1.5% in processed stone, an increase by 6.9% in raw stone, and a simple +0.1% increase regarding the two branches of exports together. Verona recorded respectively, -1.7%, -0.8% and 1.6%. Italian figures (made up by other Italian stone districts) marked respectively 0.7%, 5.7% and 1.5%.

[39] That is the Apuan district and the Veronese district as a whole. It must be remembered that during 2008, the granite sector too witnessed a crisis and Verona, the main exporter, suffered a lot especially due to halved German imports.

Evoluzione media annua delle esportazioni lapidee, in termini di valori correnti esportati, periodo 2003-2008. Confronto tra le principali aree di produzione nazionali, *Rapporto Economia 2009*, pp. 187



Fonte: Elaborazioni ISR su dati ISTAT

As usual, it is fair to mention Carrara main commercial partnerships, according to the *Rapporto Economia 2009* and the Carrara *Port Authority* data.

I primi 10 paesi per valore esportato di lapidei grezzi della provincia di Massa - Carrara. Anni 2003-2007-2008, *Rapporto Economia 2009*, pp.189

Grezzi					
Paesi	2003	Paesi	2007	Paesi	2008
Stati Uniti	8.607.607	Cina	13.752.274	Cina	20.359.583
Cina	8.540.229	India	8.353.363	India	9.457.334
India	5.256.456	Tunisia	6.932.893	Algeria	8.557.196
Spagna	4.526.468	Algeria	6.534.387	Tunisia	6.906.604
Tunisia	3.670.227	Libia	5.559.456	Libia	6.412.593
Algeria	3.348.084	Spagna	3.542.958	Stati Uniti	5.350.871
Libano	2.779.718	Stati Uniti	2.679.827	Arabia Saudita	3.389.871
Siria	2.427.048	Egitto	2.265.325	Siria	2.376.829
Egitto	2.196.929	Siria	2.209.995	Spagna	2.283.903
Libia	2.181.761	Arabia Saudita	2.135.884	Libano	2.040.675
Primi 10 Paesi	43.534.527	Primi 10 Paesi	53.966.362	Primi 10 Paesi	67.135.459
Incid % primi 10 su Tot	74,4%	Incid % primi 10 su Tot	76,2%	Incid % primi 10 su Tot	82,3%

Fonte: Elaborazioni ISR su dati ISTAT

China represented the best partner in 2008 for raw stone imports, especially white marble, with more than 20 million Euro (48% increase compared to 2007); it was followed by India, increased by 13%, reaching almost 10 million Euro, and Algeria with +31%.

Other markets started to consolidate as important partners such as Tunisia, Libya, Lebanon, Syria and South-Eastern Mediterranean countries.

Despite having doubled its imports since 2007, the USA dropped to the 6th place in the list of the 10 main partners, followed by Spain with a loss of -35.5%.

As for export of processed stone, the USA still represented the main market, even if with a great loss in values, (from 134 million Euro in 2007 to 104 million in 2008), followed by the UK (18,6 million Euro) increased by 4% and the United Arabian Emirates, even if their loss of -37% from 2007 to 2008 (passing from 28 million Euro to 17,5 million).

I primi 10 paesi per valore esportato di lapidei lavorati della provincia di Massa- Carrara. Anni 2003-2007-2008, *Rapporto Economia 2009*, pp.189

Lavorati					
Paesi	2003	Paesi	2007	Paesi	2008
Stati Uniti	129.671.357	Stati Uniti	134.112.019	Stati Uniti	104.213.124
Emirati Arabi Uniti	28.364.901	Emirati Arabi Uniti	28.160.941	Regno Unito	18.611.647
Regno Unito	16.704.662	Regno Unito	17.864.739	Emirati Arabi Uniti	17.563.362
Arabia Saudita	15.395.184	Russia	10.494.735	Arabia Saudita	14.127.727
Giappone	8.067.236	Arabia Saudita	9.474.095	Russia	10.785.522
Germania	7.187.947	Marocco	8.440.997	Marocco	8.769.813
Francia	6.853.536	Kuwait	7.771.337	Kuwait	7.960.368
Indonesia	6.216.779	Australia	7.612.482	Australia	7.742.388
Kuwait	6.018.512	Indonesia	5.859.970	Indonesia	7.326.150
Spagna	5.037.671	Canada	5.572.613	Canada	6.607.320
Primi 10 Paesi	229.517.785	Primi 10 Paesi	235.363.928	Primi 10 Paesi	203.707.421
Incid % primi 10 su Tot	77,8%	Incid % primi 10 su Tot	74,3%	Incid % primi 10 su Tot	74,5%

Fonte: Elaborazioni ISR su dati ISTAT

Countries from the Persian Gulf such as Saudi Arabia, and Kuwait still performed well, together with the escalation of Indonesia (+25%) and Canada (+18.6%).

Looking at the global figures, Massa-Carrara first main export market still remained the American one with 109,6 million Euro, even if with a decrease by -20% in values only in a year time (more than 27 million Euro). It was directly followed by the Chinese market thanks to its huge import of raw marble, recording almost 22 million Euro, and the European market of the UK with 19,3 million Euro export.

The UAE[40] consolidated their fall, passing from 29 million Euro export in 2007 to 18 million Euro in 2008, ranking the fourth position in the list of the 10 main partners.

[40] Common abbreviation for the United Arabian Emirates

At European level, Spain was the most suffering country with a -50% loss in processed stone export, that turns into -34.6% on total export, due to the hard crisis of the construction and building industry through which it was passing.

I primi 10 paesi per valore esportato totale di lapidei della provincia di Massa - Carrara. Anni 2003-2007-2008, *Rapporto Economia 2009*, pp. 190

Totale					
Paesi	2003	Paesi	2007	Paesi	2008
Stati Uniti	138.278.964	Stati Uniti	136.791.846	Stati Uniti	109.563.995
Emirati Arabi Uniti	29.802.928	Emirati Arabi Uniti	29.088.653	Cina	21.782.936
Regno Unito	18.063.672	Regno Unito	18.651.650	Regno Unito	19.342.313
Arabia Saudita	15.902.663	Cina	16.129.988	Emirati Arabi Uniti	18.313.836
Cina	11.198.569	Arabia Saudita	11.609.979	Arabia Saudita	17.517.598
Spagna	9.564.139	Russia	10.662.050	India	12.768.739
Giappone	9.408.685	India	10.312.699	Russia	11.397.731
Germania	7.361.214	Tunisia	9.432.972	Algeria	10.306.016
Francia	7.106.799	Algeria	9.314.487	Tunisia	9.988.105
Indonesia	6.826.187	Marocco	9.117.729	Marocco	9.488.944
Primi 10 Paesi	**253.513.820**	**Primi 10 Paesi**	**261.112.053**	**Primi 10 Paesi**	**240.470.213**
Incid % primi 10 su Tot	**71,7%**	**Incid % primi 10 su Tot**	**67,4%**	**Incid % primi 10 su Tot**	**67,7%**

Fonte: Elaborazioni ISR su dati ISTAT

Speaking generally, the incidence of the 10th main markets on the total Massa-Carrara economy decreased by almost 10% from 2003 to 2008, passing from 71.7% to 67.7%. This is because Massa-Carrara export trends shifted, in the period concerned, to other less traditional areas (Northern Africa[41], the Red See and the Persian Gulf area) in addition to the already long-established partnerships (the USA, European countries, the Middle and Far East).

[41] This country, together with the UK and Northern Europe, is an important market for the particular field of the stone sector related to the bulk marble, chips and marble dust that had recently gained a huge important on the international level (thanks to their multiple usages). According to the local *"Rapporto Economia 2008 – TRAFFICI DEL PORTO DI MARINA DI CARRARA"* data, in 2008 this sector recorded 381,881 tonnes of export for bulk marble (-33.8% compared to 2007 576,727 tonnes) and 5,406 tonnes for marble chips (-55% compared to 12,000 tonnes of 2007).

Regarding volumes of exports, we can refer to the data of the Massa-Carrara port handling data.

In 2008, raw stone loading recorded 317,596 tonnes that is +15.5% compared to 2007 274,912 tonnes; processed stone loading, instead, recorded a loss by -28.7% passing from 2007 1,244 tonnes to only 887 tonnes. The total stone loading, however, amounted to 318,483 tonnes, with +15.3% more than 2007 276,156 tonnes.

The unloading data, however, were not so encouraging and, in fact, a decrease by -15.6% was recorded, as a evidence of the decrease in Italian import of -20% in values[42].

SETTORE MERCEOLOGICO	IMBARCHI			SBARCHI			TOTALE		
	2008	2007	Var %	2008	2007	Var %	2008	2007	Var %
Lapidei lavorati	887	1.244	-28,7	0	9	-100,0	887	1.253	-29,2
Lapidei in blocchi	317.596	274.912	15,5	1.125.639	1.334.386	-15,6	1.443.235	1.609.298	-10,3
Totale Prodotti lapidei	**318.483**	**276.156**	**15,3**	**1.125.639**	**1.334.395**	**-15,6**	**1.444.122**	**1.610.551**	**-10,3**
Merci in pallets	**18.119**	**5.226**	**246,7**	**1.015**	**10**	**10.050,0**	**19.134**	**5.236**	**265,4**
Sacconi altre merci	0	0	0,0	0	2.323	-100,0	0	2.323	-100,0
Sacconi granulato	10.309	8.750	17,8	0	0	0,0	10.309	8.750	17,8
Totale Sacconi	**10.309**	**8.750**	**17,8**	**0**	**2.323**	**-100,0**	**10.309**	**11.073**	**-6,9**
Tubi di ferro	171.469	138.733	23,6	40.122	56.797	-29,4	211.591	195.530	8,2
Altri prod. metallurgici	25.131	26.159	-3,9	125.531	140.806	-10,8	150.662	166.965	-9,8
Totale Prodotti siderurgici	**196.600**	**164.892**	**19,2**	**165.653**	**197.603**	**-16,2**	**362.253**	**362.495**	**-0,1**
Rinfuse solide	39.713	0	100,0	121.188	130.873	-7,4	160.901	130.873	22,9
Granulato di marmo	381.881	576.727	-33,8	0	0	0,0	381.881	576.727	-33,8
Scaglie marmo	5.406	12.001	-55,0	0	0	0,0	5.406	12.001	-55,0
Totale Rinfuse solide	**427.000**	**588.728**	**-27,5**	**121.188**	**130.873**	**-7,4**	**548.188**	**719.601**	**-23,8**

Movimentazione del porto di Marina di Carrara, per settore merceologico. Anni 2007,2008, *Rapporto Economia 2008, sez Traffici del porto di Marina di Carrara* pp.232

Regarding the Apuan district as a whole, we can refer to the chart issued from the *IMM-NEWSLETTER* no 03 of May 2009 that gives global figures of import and export trend recorded in 2008 comparing them with 2007 ones.

[42] Total stone import figures: 65,274,782 Euro. Source *"Rapporto Economia 2009- SETTORE LAPIDEO"* pp. 182

COMPRENSORIO MS - LU - SP - TUTTI I PAESI	Export					
	2007		2008		diff.% 2008/2007	
Gennaio - Dicembre 2007/2008	tonn.	Euro	tonn.	Euro	% Qt.à	% Val.
MARMO BLOCCHI E LASTRE	512.493	78.805.628	597.462	90.820.241	16,58	15,25
GRANITO BLOCCHI E LASTRE	12.130	4.771.062	10.116	5.266.907	-16,60	10,39
MARMO LAVORATI	357.712	289.182.423	336.715	287.173.265	-5,87	-0,70
GRANITO LAVORATI	153.700	150.216.602	112.744	113.404.701	-26,65	-24,51
SubTOT Blocchi, Lastre e Lavorati	**1.036.035**	**522.975.715**	**1.057.037**	**496.665.114**	**2,03**	**-5,03**
GRANULATI E POLVERI	714.444	32.268.917	662.496	27.062.919	-7,27	-16,13
SubTOT con Granulati e Polveri	**1.750.479**	**555.244.632**	**1.719.533**	**523.728.033**	**-1,77**	**-5,68**

COMPRENSORIO MS - LU - SP - TUTTI I PAESI	Import					
	2007		2008		diff.% 2008/2007	
Gennaio - Dicembre 2007/2008	tonn.	Euro	tonn.	Euro	% Qt.à	% Val.
MARMO BLOCCHI E LASTRE	171.007	38.425.213	150.447	37.424.472	-12,02	-2,60
GRANITO BLOCCHI E LASTRE	284.460	69.869.810	201.172	50.841.248	-29,28	-27,23
MARMO LAVORATI	26.250	10.882.629	21.176	10.085.069	-19,33	-7,33
GRANITO LAVORATI	11.299	4.464.092	9.679	4.467.543	-14,34	0,08
SubTOT Blocchi, Lastre e Lavorati	**493.016**	**123.641.744**	**382.474**	**102.818.332**	**-22,42**	**-16,84**
GRANULATI E POLVERI	67	4.694	1.311	188.617	1856,72	3918,26
SubTOT con Granulati e Polveri	**493.083**	**123.646.438**	**383.785**	**103.006.949**	**-22,17**	**-16,69**

Imp/Exp comprensorio apuano- tutti i paesi. Variazioni in volumi e valori. Anni 2007-2008, ***IMM NEWSLETTER n° 03*** **pp.16**

In 2008, the Apuan district exported almost 600,000 tonnes of raw marble and almost 400,000 tonnes of processed marble, performing better than 2007 only in the first branch (+16.58% raw quantity; -5.87% processed quantity). Granite sector was the most suffering with a total decrease of -43.35% in quantity).

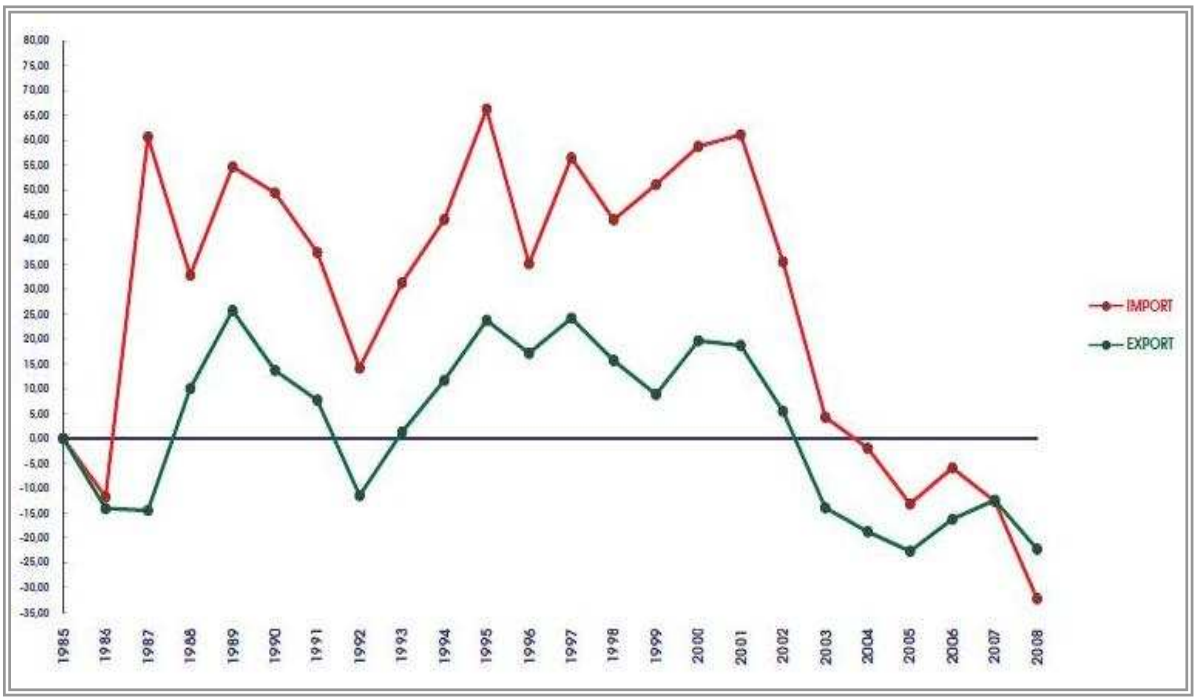
Bulk stone also lost a percentage in 2008, -7.27% in quantity.

Imports followed the negative pattern of exports with -22.42% as total figure, recording the worst performance in raw granite and processed marble.

To conclude, and together sum up this last chapter and the core aim of the thesis itself, the following graph taken by the "*Economia Apuana – Indicatori statistici 2008"*, regarding the 1985 – 2000s import export marble trends of Massa-Carrara province, will be useful.

The first thing to say is that not always import trends follows export ones. This is recognizable during 1986-87 figures: when export was under the positive threshold, import peaked.

Then, the “Golden Era” of marble is easily identifiable in the late 1980s (1989 was the best year) and first 1990s (even with some breakdowns, common in a fluctuating market, as 1992), whereas the negative situation concentrated during the 2000s, starting from 2004 to the ever negative results in 2008.



Provincia di Massa - Carrara. Import/Export marmo, valori in Euro 2008 - Variazioni % rispetto all'anno base 1985=100, *Economia Apuana - Indicatori Statistici 2008* pp. 74

Marble, culture and tourism, ***LE FACCE DI MARMO DI CARRARA / THE MARBLE FACES OF CARRARA, pp.53***

CONCLUSIONS

At the end of 2008, then, perspectives and outlooks for the following year were very discouraging.

The negative data concerning internal and external orders, production and the turnover, particularly of the last four months, did not let space to any hope of recovery for the period to come. In December, entrepreneurs' expectations for the future continued to worsen compared to those of the preceding year, and pessimists overcame optimists by 50% and more.

The international crisis affected Carrara competitiveness on work productivity in the sector. According to *INPS – Istituto Nazionale di Previdenza Sociale* data, the national organization responsible for social security and welfare, the 630 companies of the extractive and manufacturing sector of the province, employed almost 3,500 workers of whom 730 on the quarry site and 2,750 in factories.

In the last pages of the *Rapporto Economia 2009,* according to the *Prometeia* [43]data, in two-year time, a decrease in the province GPD by -1.6% is expected, (-1.7% in Tuscany and -1.6% in Italy) together with an increase in unemployment rate by 1.6%.

Concerning exports, they will be determinant for the economy recover by 2010, when their weight on the province economy will increase up to 27.7%, i.e. two points more than the regional average.

To sum up, always according to the above-mentioned sources, only since 2011 the province will concretely recover from the 2008 crisis and the following two years.

This was the frame at the end of what has been one of the most negative years, maybe the worst, together with 2004 for global and therefore local economies.

Does this trend continue at present time?

We do not have any official data, yet, since the several *Rapporto Economia* and *Stone Sector* journals are usually published after the year at issue is ended. We will then have to

[43] *Prometeia* being one of the largest companies in Italy for financial and economic research and consulting. Website: http://www.prometeia.it/en-US.aspx?LN=en-US&idC=61642

wait for 2010, for 2009 statistics and, now, we will base on what is reported by local journals (Il *Tirreno*) and by IMM online news service[44].

In the first six months of 2009, Italian export of marble and granite, raw and processed, reached 1,728,000 tonnes for a value of 688,3 million Euros. In particular, the Apuan district exports recorded around 732,000 tonnes for a total value of 220,290,000 Euros, outstripping the 183,440,000 Euros of the Veronese district (Verona + Vicenza).

A positive trend emerges only for one typology of goods: the **white marble**, especially in blocks. It represents the most sought-after stone product, on which Carrara has always and continues to count on as a real *passepartout* to enter emerging and traditional markets. In a period of crisis, it brings the Apuan district to re-gain its status of major national exporter.

Despite export of raw marble mark a positive trend, for the other main items negative figures still remain, with -12.8% in volumes and -13.7% in values. Anyway, the district performed better than the Italian average where there has been a loss of -22.2% in volumes and -19.4% in values.

As for outlet markets, Apuan companies suffer from a hard contraction mainly in the USA market, with -35% in volumes and -26% in values compared to the same period of 2008. This area still faces a difficult moment and recovering times will be long, even if some positive signals are already visible. Against this background, competitiveness for Italian products is higher and higher: there are other producer countries, which sell their goods at a lesser price due to a minor value of the stone itself, a cheaper workforce and to the Euro-Dollar relation that sees the European currency stronger than the American one, conditioning American purchases.

Countries such as China, India, Turkey and Brazil are trying to take advantage of this situation and, therefore, their quotas on North American market are growing.

Concerning the EU, the drop by 40% is not very surprising, if we remember that Apuan export on the area of the 27 has never recorded outstanding results. On the contrary, the Veronese district held its losses within -17%, mainly composed of granite destined to Germany, its major outlet market.

Negative results in the Middle East were limited, as volumes decreased but the average values for single tonne sold increased, as an evidence of the quality-oriented pattern followed.

[44] Website: http://www.immcarrara.com/news/newsall.asp?880&1

Positive results for Northern African countries such as Algeria, Morocco and Libya both for raw marble and bulk, and in the Far East where, together with the always well sold raw marble, processed stone recorded +9.4% in volumes compared to 2008.

China and India, in particular, are the major importer of raw white marble preferring it to the processed one , because it can be finished "at home", exploiting their own workforce.

As reported in an article of the Carrara local journal, *Il Tirreno*, of May 2009, this situation is seriously mining the valorisation of the finishing process system *in loco*, that is in Carrara laboratories and workshops. First of all, it reduces the importance of one of the main field of the stone sector that has always represented the image of Carrara products worldwide (especially at the beginning of the 1960s when export were mostly made up by finished products created by skilled artisans and sculptors thanks to the introduction of innovative equipment); secondly, it increases competitiveness from external actors that sell their products at a lesser price, jeopardising local import/export trends.

What has to be expected then?

In this period of deep crisis, the already mentioned influence that the international balances have on local economies, is evident. In a always more globalised world, where different sectors come to be linked in different ways, even the smallest reality must be update, must keep on improving and changing for profit.

We can take the example of China. This great power rose in the late 80s as an importer country of raw and processed stone, acquired importance to, in the end, transform in one of the biggest stone producers. This, thanks to the capacity it has to emulate other systems, together with an advanced technology and initiative in order to be placed at the first places in the international scenario.

Can we affirm the same for Italy, and in this case, for the Apuan district and Carrara province?

In the latest years, Carrara has seen its supremacy eroded by many factors, external, but most of all structural. Some are common industrial macro-economic factors (competitiveness, fiscal pressure etc…) but others are specific of the sector and for Massa-Carrara in particular.

There is a general tendency to the fragmentation of the industry. First of all, between companies working in the quarry area (committed to extraction and production) and companies related to the processing of the stone at the valley (committed to sawing,

finishing and other processes to transform the stone); secondly, among the several companies on the territory – with a reduced dimension compared to other Italian districts – that do not turn to melting and concentration strategies, sometimes necessary to face the global competition.

This fragmentation weights on the other main feature of the local sector, that is the work orders. It is well known that the Carrara district fortune has always been linked to this particular way of working that prefers a sort of "personalisation" of the product instead of stockpiles work, which guarantees unique materials and unique output. In this sense, a good relationship between quarry work and processing firms, must be preserved.

Carrara companies prefer to focus on short term investments and, therefore, minimum risk choices, but very often this results in being a wrong decision. Actually, it provides the image of a little innovative and dynamic district too much linked to its history and tradition to try new ways and methods.

All these features result in a decrease in general investments, already limited because bounded to several laws regarding stone sector and mining sector (authorisations, limitations to the circulation of the means of transport, bans for the Apuan Alps park, environmental problems etc…).

After such considerations, a question is often frequent for the stone sector: What has to be done, then?

Starting from the present situation where bulk and chips marble export is growing, raw marble export perform well, but the processed visibly decreases, the first thing to do should be a valorisation of the "*prodotto marmo*".

This strategy has already been adopted with the creation of the "Marmo di Carrara – estratto/ estratto e lavorato nel distretto di Carrara" brand. This is a geographical brand that sees the collaboration of the Massa-Carrara Chamber of Commerce (CCIAA), IMM Carrara and the municipalities of Carrara and Massa, aiming to a safeguard of the local product at regional and national level, but most of all worldwide.

Moreover, an investment in innovation processes is essential. Products innovations, marketing and logistic strategies, specialised human resources and IT are needed to the creation of an advanced service industry that could assure that quality leap indispensible for the stone sector. This process cannot be individual and isolated, but it must be thought

in a perspective of an open "sistema *d'imprese*" that is, with that kind of collaboration that often lack among Carrara companies.

The final point, then, is to clarify that external demand for Carrara marble (the most esteemed typologies *Bianco Carrara, Calacatta* and *Statuario* in particular) is still high, together with the quantities exported, but the problem is that export is mainly made up of raw blocks, thus privileging the trade and profit aspects instead of the local production and processing cycles.

The Carrara district must seize the opportunity of a renewal of its intrinsic characteristics, in order to overcome problems and limits and re-gain the ancient status of the leader producer and exporter country worldwide.

Marble and the fog, ***LE FACCE DI MARMO DI CARRARA/ THE MARBLE FACES OF CARRARA*****, pp. 39**

GLOSSARY and RECORD SHEETS

NI	ITALIANO	ENGLISH
001	Abbrivio; abbrivo	Headway; seaway
002	Agro marmifero	*Scheda monolingue*
003	Bancata	Bench
004	Blocco	Quarry block; block
005	Braca; braga	Cable; steel cable; wire line; strand
006	Cava	Quarry
007	Cava a cielo aperto	Open surface quarry; open cast quarry
008	Cava a fossa; cava a pozzo	Pit quarry; shaft quarry
009	Cava culminale	Peak quarry
010	Cava di versante	Slope quarry
011	Cava in sotterraneo	Underground quarry
012	Cava sottotecchia	*Scheda monolingue*
013	Coltivare	To quarry; to exploit
014	Contro; contro di taglio	Hard way
015	Formella; punciotto	Gad
016	Granito	Granite
017	Grezzo; greggio	Raw
018	Lastra	Slab
019	Lavorato	Processed; finished
020	Levigatura; lisciatura; lapidatura	Honing
021	Lizza	Sledge (Brit); sled (Ame); stone boat
022	Lizzatura	*Scheda monolingue*
023	Lucidatura; pulimentatura	Polishing
024	Marmo	Marble
025	Mazza	Maul; striking hammer; bucking hammer; sledge hammer
026	Mazzuolo; mazzolo; maglio	Mallet
027	Pietra	Stone
028	Ravaneti	Marble debris; marble dump
029	Ribaltamento	Overturning; to overturn
030	Riquadratura	Squaring; to square
031	Segagione	Sawing
032	Stagionatura	Seasoning; air seasoned
033	Subbia; sciubbia; scalpello	Chisel
034	Tagliatrice a filo diamantato; sega diamantata	Diamond saw; diamond wire
035	Tagliatrice a filo elicoidale; impianto a filo elicoidale; filo elicoidale	Wire saw; helicoidal wire
036	Varata	Blast; blasting
037	Vena; venatura	Vein; veining
038	Verso; verso di taglio	Grain

BE SSML
AU Serena Incerti
TY MEM 09
NI 001
CF 4
CM TRC; MIJ; MI6
IT
VE abbrivio (1); abbrivo (2)
DF Spinta iniziale impressa ad un'imbarcazione, un veicolo o a un altro corpo per metterlo in movimento. Nel settore lapideo, il più antico metodo di trasporto del marmo: i marmi non riquadrati (informi) venivano fatti rotolare sui ravaneti fino al loro completo arresto a valle.
RF VE(1)(2), DF: Duro, A. *Vocabolario della lingua italiana,* Istituto della Enciclopedia italiana, Milano, 1994; VE(1): *L'uomo e il marmo – memorie di un mestiere antico,* Massa, Associazione culturale Alta Tambura, 2009; VE(2): http://dizionari.hoepli.it sito internet del dizionario HOEPLI monolingue italiano
EN
VE headway (1); seaway (2)
DF Forward motion of a ship, especially when difficult; a ship's headway. In the stone sector, the most ancient method of transportation of marble from the mountain to the valley, exploiting an initial rush to move the blocks forward.
RF VE(1)(2), DF: http://www.macmillandictionary.com/ website of the MacMillan Dictionary of English; VE(2): http://www.yourdictionary.com/seaway ; VE(1): *L'uomo e il marmo – memorie di un mestiere antico,* Massa, Associazione culturale Alta Tambura, 2009

BE SSML
AU Serena Incerti
TY MEM 09
NI 002
CF 5
CM MIJ; MIO; TS5
IT
VE agro marmifero
DF "Con la denominazione 'Agri Marmiferi Comunali' si indicano tutte le zone montane del Comune di Carrara intestate a quest'ultimo come piena proprietà, o come dominio diretto, nel Catasto Estense approvato con editto sovrano del 27 novembre 1824".
RF VE, DF: Regolamento per la concessione degli agri marmiferi comunali, allegato alla delibera n° 61 del 21-07-2005, art 1, comma 1

BE SSML
AU Serena Incerti
TY MEM 09
NI 003
CF 3
CM MIJ; MI5
IT
VE bancata
DF Zona della cava formata da un'alzata compresa tra una o due pedate dalla quale vengono estratti i blocchi.
RF VE, DF: Bradley, F. *Glossario tecnico del settore lapideo - italiano, inglese, cinese,* Milano, Panorama, 2003
EN
VE bench
DF The zone of a quarry composed of a riser between two treads, from which work is carried out.
RF VE, DF : Bradley, F. *Stone Industry Technical Glossary- Italian, English, Chinese* Milano, Panorama, 2003;

BE SSML
AU Serena Incerti
TY MEM 09
NI 004
CF 3
CM MIJ; MI5
IT
VE blocco
PH blocco informe; blocco riquadrato; blocco semisquadrato
DF Massa compatta di qualsiasi pietra – marmo, tufo, calcestruzzo; nella tecnica delle costruzioni s'intende genericamente un elemento di materiale lapideo, cementizio o laterizio di notevoli dimensioni; parte estratta dalla parete della cava in seguito al processo di escavazione.
RF VE, DF: Duro, A. *Vocabolario della lingua italiana,* Istituto della Enciclopedia italiana, Milano, 1994
EN
VE quarry block (1); block (2)
DF Generally, a rectangular piece of rough stone as it comes from a quarry, frequently dressed (scabbed) or wire-sawed for shipmen.
RF VE(1), DF: http://ligurianmarble.com/glossary.html Stone sector web glossary; VE(2): http://www.marblefromitaly.com/glossary.asp Stone sector web glossary

BE SSML
AU Serena Incerti
TY MEM 09
NI 005
CF 3
CM EL5; MIJ; MI6; MIN
IT
VE braca (1), braga (2)
DF Cavo o catena, di solito in acciaio, con cui si legano oggetti che si devono sollevare o trasportare. Nel processo di Lizzatura, speciali cavi con cui viene assicurata la carica.
NT REG: (2) variante regionale, soprattutto settentrionale. Nelle accezioni tecniche, talvolta più comune di braca
RF VE(1), DF: Duro, A. *Vocabolario della lingua italiana,* Istituto della Enciclopedia italiana, Milano, 1994; VE(2): *L'uomo e il marmo – memorie di un mestiere antico,* Massa, Associazione culturale Alta Tambura, 2009;
EN
VE steel cable (1); wire line (2); strand (3)
DF Kind of strong, thick rope, made up of steel wires twisted together to form the strands. In the *Lizzatura* process cables, usual in number of two, with 25-30 mm of diameter that are wrapped around the load.
RF VE(1), DF: *L'uomo e il marmo – memorie di un mestiere antico,* Massa, Associaz culturale Alta Tambura, 2009; VE (2)(3): Collins H. *Collins Cobuild English Dictionary*, Londra, 1995; Mc-Grow H. *Dizionario enciclopedico scientifico e tecnico Inglese-Italiano, Italiano-Inglese*, Zanichelli, Bologna, 1991

BE SSML
AU Serena Incerti
TY MEM 09
NI 006
CF 4
CM MIJ; MI4; MI5
IT
VE cava
DF Scavo di materiale utile per costruzioni e, per estensione, il luogo di scavo stesso.
RF VE, DF: Duro, A. *Vocabolario della lingua italiana,* Istituto della Enciclopedia italiana, Milano, 1994
EN
VE quarry
DF An open or surface mineral working, usually for the extraction of minerals, building stone such as slate, limestone, etc. It is distinguished from a mine because it is usually open at the top and front, and, in ordinary use of the term, by the character of the material extracted.
RF VE, DF: http://www.webref.org/geology/q/quarry.htm Dictionary of mining, minerals and related terms;

BE SSML
AU Serena Incerti
TY MEM 09
NI 007
CF 3
CM MIJ;MI5
IT
VE cava a cielo aperto
DF Giacimento di roccia, ad uso ornamentale, affiorante o coperto da coperture sterili esposto all'azione di agenti atmosferici. Lo sfruttamento avviene per rimozione di strati superficiali della roccia stessa.
RF VE, DF: Conti G., Lisanti V., Mannoni T., Montani C., Pinzari M., Ragone M., Ricci A., Semel G. *Il marmo nel mondo, industria e commercio dei materiali lapidei*, Società Editrice Apuana, Carrara,1986
EN
VE open surface quarry (1); open cast quarry (2); open pit quarry (3)
DF Deposit of ornamental rock made up of outcrops or covered by thin layers of rock. Excavation is performed from the surface removing the strata of rock.
RF VE(1)(2) DF: Conti G., Cannoni T., Montani C., Pinzari M., Ricci A. *Marble in the World, the stone industry and its trade*, Società Editrice Apuana, Massa, 1994 VE(3): dictionary of mining, minerals and related terms http://www.maden.hacettepe.edu.tr/dmmrt/index.html

BE SSML
AU Serena Incerti
TY MEM 09
NI 008
CF 3
CM MIJ;MI4; MI5
IT
VE cava a fossa (1); cava a pozzo (2)
DF Cava delimitate da pareti verticali o subverticali su tutti i lati, con piazzale di cava accessibile ai mezzi di trasporto mediante rampe appositamente create utilizzando il materiale di scarto dell'estrazione.
RF VE(1), DF: Conti G., Lisanti V., Mannoni T., Montani C., Pinzari M., Ragone M., Ricci A., Semel G. *Il marmo nel mondo, industria e commercio dei materiali lapidei*, Società Editrice Apuana, Carrara,1986
VE(2): Bradley F. *Guida alle cave di marmo di Carrara – Guide to the Marble Quarries in Carrara*, Internazionale marmi e macchine Carrara, 2ª ed., Lucca, 1997
EN
VE pit quarry (1); shaft quarry (2)
DF A mine or quarry, limited by all-sides vertical walls where work is carried out by the open-cut method to obtain material of value.
RF VE(1), DF: http://www.maden.hacettepe.edu.tr/dmmrt/index.html dictionary of mining, minerals and related terms VE(2): Bradley F. *Guida alle cave di marmo di Carrara – Guide to the Marble Quarries in Carrara*, Internazionale marmi e macchine Carrara, 2ª ed., Lucca, 1997

BE SSML
AU Serena Incerti
TY MEM 09
NI 009
CF 3
CM MIJ; MI4; MI5
IT
VE cava culminale (1); cava per splateamento (2)
DF Cava aperta sulla cima di colline o montagne o lungo i crinali delle stesse, di cui se ne asporta letteralmente il culmine.
RF VE (1)(2) DF: Conti G., Lisanti V., Mannoni T., Montani C., Pinzari M., Ragone M., Ricci A., Semel G. *Il marmo nel mondo, industria e commercio dei materiali lapidei*, Società Editrice Apuana, Carrara, 1986
EN
VE peak quarry
DF Kind of hill or mountain quarry, located on the peak of hill or mountains, where working consist in literally cutting away the hill or mountains tops.
RF VE, DF: Conti G., Mannoni T., Montani C., Pinzari M., Pucci R., Ricci A. *Marble in the World, the stone industry and its trade*, Società Editrice Apuana, Massa, 1994

BE SSML
AU Serena Incerti
TY MEM 09
NI 010
CF 4
CM MIJ; MI4; MI5
IT
VE cava di versante
DF Il più comune tipo di cava, si sviluppa lungo i versanti della montagna dove disegna in genere una geometria a gradini, ognuno dei quali può costituire uno o più fronti di escavazione. La coltivazione avviene per arretramento dei gradini fino al limite dell'area sfruttabile, partendo dal più alto fino al più basso.
RF VE, DF: Bradley F. *Guida alle cave di marmo di Carrara – Guide to the Marble Quarries in Carrara*, Internazionale marmi e macchine Carrara, 2ª ed., Lucca, 1997
EN
VE slope quarry
DF Quarry developing along the slope of a mountain, normally with an appearance of "steps", corresponding to one or more quarry fronts. Exploitation consists in the removal of these "steps", from the highest and working downwards.
RF VE, DF: Bradley F. *Guida alle cave di marmo di Carrara – Guide to the Marble Quarries in Carrara*, Internazionale marmi e macchine Carrara, 2ª ed., Lucca, 1997

BE SSML
AU Serena Incerti
TY MEM 09
NI 011
CF 4
CM MIJ; MI4; MI5
IT
VE cava in sotterraneo
DF Coltivazione della roccia all'interno del monte, in cui si approfondisce il fronte di scavo fino all'apertura di una galleria sotterranea.
RF VE, DF: Bradley F. *Guida alle cave di marmo di Carrara – Guide to the Marble Quarries in Carrara*, Internazionale marmi e macchine Carrara, 2ª ed., Lucca, 1997
EN
VE underground quarry
DF Kind of quarry developing under the surface of rock to follow a particular marble body or when open cast exploitation is no longer possible
RF VE, DF: Bradley F. *Guida alle cave di marmo di Carrara – Guide to the Marble Quarries in Carrara*, Internazionale marmi e macchine Carrara, 2ª ed., Lucca, 1997

BE SSML
AU Serena Incerti
TY MEM 09
NI 012
CF 3
CM MIJ; MI4; MI5; MIN; LA4
IT
VE cava sottotecchia (1) cava sotto tecchia (2)
NT REG: Il termine “tecchia” nel dialetto carrarese (altrimenti detto carrarino) indica comunemente una “tegola”. Allorché utilizzato nell’ambito lapideo si riferisce alla parete verticale di una cava.
DF Cava in cui viene incisa parzialmente una parete rocciosa, determinando una sorta di grossa nicchia che potrà poi essere l’imbocco di una cava in sotterraneo.
RF VE (1)(2) DF : Bradley F. *Guida alle cave di marmo di Carrara – Guide to the Marble Quarries in Carrara*, Internazionale marmi e macchine Carrara, 2ª ed., Lucca, 1997

BE SSML
AU Serena Incerti
TY MEM 09
NI 013
CF 3
CM MIJ; MI5
IT
VE coltivare
DF Complesso di operazioni inerenti alla conduzione di una cava (estrazione, taglio al monte, ribaltamento di bancate, riquadratura di bancate, ...).
RF VE, DF: Bradley, F. *Glossario tecnico del settore lapideo - italiano, inglese, cinese,* Milano, Panorama, 2003
EN
VE to quarry (1), to exploit (2)
DF The process of removing stone or other minerals from an area by digging, drilling, or using explosives.
RF VE(1)DF : Collins H. *Collins Cobuild English Dictionary*, Londra, 1995; VE(2): Bradley, F. *Glossario tecnico del settore lapideo - italiano, inglese, cinese,* Milano, Panorama, 2003

BE SSML
AU Serena Incerti
TY MEM 09
NI 014
CF 2
CM MIJ; MI5; INC; IN4
IT
VE contro (1); contro di taglio (2)
DF Piano ortogonale al *verso* e al *secondo.* Può corrispondere a un sistema di fratturazione della roccia
RF VE(1)(2), DF: Bradley, F. *Glossario tecnico del settore lapideo - italiano, inglese, cinese,* Milano, Panorama, 2003
EN
VE hard way
DF The plane at right angles to the *grain* and the *easy way*. It may correspond to a natural fracture system in the rock
RF VE,DF: Bradley, F. *Glossario tecnico del settore lapideo - italiano, inglese, cinese,* Milano, Panorama, 2003

BE SSML
AU Serena Incerti
TY MEM 09
NI 015
CF 2
CM MIJ; MIB
IT
VE formella (1), punciotto (2)
DF Nella lavorazione della pietra, nome dei ferri piatti che s'interpongono tra i cunei e le facce del taglio praticato in un blocco di pietra, per spaccare il blocco battendo sui cunei. Quando il cuneo dev'essere introdotto in un foro, lo strumento ha sezione si segmento circolare con spessore crescente dall'alto in basso.
RF VE (1), DF: Duro, A. *Vocabolario della lingua italiana,* Istituto della Enciclopedia italiana, Milano, 1994; VE(2): Mc-Grow H. *Dizionario enciclopedico scientifico e tecnico Inglese-Italiano, Italiano-Inglese*, Zanichelli, Bologna, 1991, p. 613
EN
VE gad
DF A heavy steel wedge, 6 or 8 inches (15-20 centimetres) long, with a narrow chisel point used in mining to cut samples, break out pieces of loose rock, and so on.
RF VE,DF Mc-Grow H. *Dizionario enciclopedico scientifico e tecnico Inglese-Italiano, Italiano-Inglese*, Zanichelli, Bologna, 1991, p. 613

BE SSML
AU Serena Incerti
TY MEM 09
NI 016
CF 3
CM MIJ; CH9; MIM; LA4; GO6
IT
VE granito
DF Roccia magmatica intrusive formatasi da un magma a chimismo acido. Nel linguaggio commerciale, tutte le rocce magmatiche e parte delle metamorfiche di natura silicatica, lucidabili ed utilizzabili per usi ornamentali.
RF VE, DF: Bradley, F. *Glossario tecnico del settore lapideo - italiano, inglese, cinese,* Milano, Panorama, 2003
VE granite
DF A plutonic rock in which quartz constitutes 10% to 50% of the felsic components and in which the alkali feldspar/total feldspar ratio is generally restricted to the range of 65% to 90%. Rocks in this range of composition are scarce, and sentiment has been growing to expand the definition to include rocks designated as adamelite In commercial language, a very hard, crystalline, igneous rock, gray to pink in colour, composed of feldspar, quartz, and lesser amounts of dark ferromagnesium materials.
RF VE, DF: http://www.maden.hacettepe.edu.tr/dmmrt/index.html

BE SSML
AU Serena Incerti
TY MEM 09
NI 017
CF 2
CM MIJ; CH9
IT
VE grezzo (1), greggio (2)
DF Dicesi di materiali non lavorati, non raffinati o non purificati.
RF VE (1)(2), DF: Duro, A. *Vocabolario della lingua italiana,* Istituto della Enciclopedia italiana, Milano, 1994
EN
VE raw
DF Materials or substances in their natural state before being processed or used.
RF VE, DF: Collins H. *Collins Cobuild English Dictionary*, Londra, 1995

BE SSML
AU Serena Incerti
TY MEM 09
NI 018
CF 3
CM MIJ ; MI9
IT
VE lastra
DF Nel settore lapideo, semilavorato con due facce parallele e spessore compreso tra i 2cm e gli 8cm.
RF VE, DF: Bradley, F. *Glossario tecnico del settore lapideo - italiano, inglese, cinese,* Milano, Panorama, 2003
EN
VE slab
DF A thin piece of concrete or stone.
RF VE,DF: Mc-Grow H. *Dizionario enciclopedico scientifico e tecnico Inglese-Italiano, Italiano-Inglese*, Zanichelli, Bologna, 1991, p. 1371

BE SSML
AU Serena Incerti
TY MEM 09
NI 019
CF
CM MIJ; MI9; LAC; LA4
IT
VE lavorato
DF Riferito a pietre da taglio modellate o finite, che hanno quindi subito processi di trasformazione quali segagione, lucidatura, levigatura o altri, e sono quindi pronte per entrare sul mercato.
RF VE, DF: De Filippi G., Marcesini M., Mocchi D., Lagomarsini G., Gambassi R., Ravecca A. *Rapporto annuale economia '05*, Camera di Commercio di Massa-Carrara, Carrara, 2005, sezione SETTORE LAPIDEO
EN
VE processed
DF Chemical or industrial processes applied to raw material or food before selling it to the public.
RF VE,DF: Collins H. *Collins Cobuild English Dictionary*, Londra, 1995

BE SSML
AU Serena Incerti
TY MEM 09
NI 020
CF 3
CM MIJ; MI9;
IT
VE levigatura (1), lisciatura (2), lapidatura (3)
DF Lavorazione per rasamento della superficie di lastre ed elementi lapidei realizzata con abrasive più taglienti di quelli impiegati per la lucidatura, allo scopo di ottenere superfici planari.
RF VE(1),DF: Bradley, F. *Glossario tecnico del settore lapideo - italiano, inglese, cinese,* Milano, Panorama, 2003 VE(2)(3): Mc-Grow H. *Dizionario enciclopedico scientifico e tecnico Inglese-Italiano, Italiano-Inglese*, Zanichelli, Bologna, 1991, p. 613
EN
VE honing (1)
DF The process of removing a relatively small amount of material from a cylindrical surface by means of abrasive stones to obtain a desired finish or extremely close dimensional tolerance.
RF Mc-Grow H. *Dizionario enciclopedico scientifico e tecnico Inglese-Italiano, Italiano-Inglese*, Zanichelli, Bologna, 1991, p. 712

BE SSML
AU Serena Incerti
TY MEM 09
NI 021
CF 3
CM MIJ ; MI6 ; LA5 ; LAC
IT
VE lizza
NT REG: nel dialetto carrarese, slitta= *lizza* da qui il termine esteso alla slitta per Lizzatura
DF Slitta, generalmente costituita da tre tronchi di legno(faggio), sulla quale poggiano i blocchi di marmo per il processo di Lizzatura.
RF VE, DF: *L'uomo e il marmo. Memorie di un mestiere antico,* Associazione Culturale Alta Tambura insieme con regione Toscana e provincia di Massa-Carrara, Resceto (MS), 2009
EN
VE sledge (1), sled (2), stoneboat (3)
DF A flat runnerless sled for transporting heavy material.
NT REG: British English (1), American English (2)
RF VE(1)(2)(3), DF: Mc-Grow H. *Dizionario enciclopedico scientifico e tecnico Inglese-Italiano, Italiano-Inglese*, Zanichelli, Bologna, 1991, p. 1437

BE SSML
AU Serena Incerti
TY MEM 09
NI 022
CF 4
CM MIJ; MI6; MIN; LAC; LA5
IT
VE Lizzatura
NT REG: NI 021
DF Complesso di operazioni tramite cui si provvedeva, nel passato fino agli anni 60, al trasporto della *carica imbragata* dal *piazzale di cava* a valle tramite le cosiddette *vie di Lizza.* Il blocco di pietra veniva assicurato alla *lizza* tramite delle *braghe* dai *lizzatori* e veniva calata con la sola forza delle braccia dei *mollatori* che allentavano i cavi attorno ai *piri.* Gi altri uomini provvedevano a sistemare dei *parati insaponati* lungo l'asse di discesa della slitta per facilitane ma al contempo arrestarne la calata. Processo rischioso, coordinato nei suoi passaggi più delicati dalla figura del *capolizza.*
RF VE, DF: Bradley F. *Le cave di marmo di Carrara – Carrara Marble Quarries – Les carrières de marbre De Carrara*, GUI.PA Guide al Paesaggio d'Italia, Milano, 2008

BE SSML
AU Serena Incerti
TY MEM 09
NI 023
CF 3
CM MIJ; MI9; LAC
IT
VE lucidatura (1), pulimentatura (2)
DF Lavorazione di finitura delle superfici mediante abrasivi lucidanti (detti anche *gialli*) e l'impiego di sostanze quali l'acido ossalico, l'ossido di stagno o piombo.
RF VE, DF: Bradley, F. *Glossario tecnico del settore lapideo - italiano, inglese, cinese,* Milano, Panorama, 2003 VE(2): Mc-Grow H. *Dizionario enciclopedico scientifico e tecnico Inglese-Italiano, Italiano-Inglese*, Zanichelli, Bologna, 1991, p. 613
EN
VE polishing
DF Smoothing and brightening a surface such as a metal or rock through the use of abrasive materials.
RF Mc-Grow H. *Dizionario enciclopedico scientifico e tecnico Inglese-Italiano, Italiano-Inglese*, Zanichelli, Bologna, 1991, p. 1154

BE SSML
AU Serena Incerti
TY MEM 09
NI 024
CF 4
CM MIJ; MIM; MO6; LA4
IT
VE marmo
DF In petrografia, roccia calcarea di origine metamorfica composta in prevalenza da calcite(carbonato di calcio). Nel linguaggio commerciale, qualsiasi roccia compatta, a struttura cristallina, lucidabile per uso ornamentale; nella dicitura vengono dunque inseriti anche materiali lapidei di genesi e composizione diversa, quali i calcari di origine sedimentaria.
RF VE,DF : Bavastro R., Bellini L., Dolci E., Giumelli C., Laghi A., *Carrara e le sue cave – Carrara and its quarries*, Società Editrice Apuana, 2002
EN
VE marble
DF A metamorphic crystalline rock composed predominantly of crystalline grains of calcite, dolomite, or serpentine, and capable of taking a polish.
RF VE, DF: http://ligurianmarble.com/marblestones.html

BE SSML
AU Serena Incerti
TY MEM 09
NI 025
CF 3
CM MIJ ; MIB ; LAC
IT
VE mazza
DF Martello dal lungo manico con una testa piatta e l'altra cuneiforme, usato per battere I cunei nella formella, spaccare I sassi e togliere pezzi di marmo nella sgrossatura dei blocchi.
RF VE, DF: *L'uomo e il marmo. Memorie di un mestiere antico,* Associazione Culturale Alta Tambura insieme con regione Toscana e provincia di Massa - Carrara, Resceto (MS), 2009
EN
VE maul (1), striking hammer (2), bucking hammer (3), sledge hammer (4)
DF A large heavy hammer that is usually wielded with two hands; used for driving stakes or breaking stone.
RF VE(1)(2)(3)(4), DF: Mc-Grow H. *Dizionario enciclopedico scientifico e tecnico Inglese-Italiano, Italiano-Inglese*, Zanichelli, Bologna, 1991, p. 1372

BE SSML
AU Serena Incerti
TY MEM 09
NI 026
CF 3
CM MIJ; MIB; LAC
IT
VE mazzuolo (1), mazzolo (2); maglio (3)
DF Arnese simile ad un martello, con un manico corto, per battere sullo scalpello (subbia) o sulla pietra. Comunemente usato in cava per riquadrare i blocchi di marmo prima del trasporto a valle.
RF VE(1)(2), DF: *L'uomo e il marmo. Memorie di un mestiere antico,* Associazione Culturale Alta Tambura insieme con regione Toscana e provincia di Massa - Carrara, Resceto (MS), 2009 VE(3): Mc-Grow H. *Dizionario enciclopedico scientifico e tecnico Inglese-Italiano, Italiano-Inglese*, Zanichelli, Bologna, 1991, p. 613
EN
VE mallet
DF An implement with a barrel-shaped head made of wood, rubber, or other soft material; used for driving another tool, such as a chisel, or for striking a surface without causing damage.
RF VE,DF: Mc-Grow H. *Dizionario enciclopedico scientifico e tecnico Inglese-Italiano, Italiano-Inglese*, Zanichelli, Bologna, 1991, p. 904

BE SSML
AU Serena Incerti
TY MEM 09
NI 027
CF 3
CM MI ; MI1; MIJ ; GO6
IT
VE pietra
DF In geologia, materiali lapidei con superficie non lucidata. Categoria commerciale a cui appartengono rocce di norma non lucidabili di composizione mineralogica diversa quali: rocce dure e compatte quali ardesie, gneiss, trachiti, oppure rocce tenere e poco compatte quali arenarie, tufi etc.
RF VE, DF: Franzini M., Orlandi P. *I minerali del marmo di Carrara*, Cassa di Risparmio di Carrara, Carrara, 1994
EN
VE stone
DF A mineral or group of consolidated minerals either in mass or in a fragment of pebble or larger size.
RF VE, DF: http://www.maden.hacettepe.edu.tr/dmmrt/index.html

BE SSML
AU Serena Incerti
TY MEM 09
NI 028
CF 3
CM MIJ
IT
VE ravaneto
DF Spesso utilizzato nella forma plurale, *ravaneti*, indica gli scarti di produzione del marmo che venivano scaricati a colla oltre la zona di escavazione della cava. Col tempo sono stati utilizzati per creare i letti di caduta delle bancate durante l'azione di ribaltamento.
RF VE, DF: *L'uomo e il marmo. Memorie di un mestiere antico,* Associazione Culturale Alta Tambura insieme con regione Toscana e provincia di Massa-Carrara, Resceto (MS), 2009
EN
VE marble debris (1), marble dump (2)
DF Pieces of broken stone that are strew around because unwanted or not needed.
RF VE(1)(2), DF: Collins H. *Collins Cobuild English Dictionary*, London, 1995

BE SSML
AU Serena Incerti
TY MEM 09
NI 029
CF 4
CM MIJ; MI5;
IT
VE ribaltamento
DF Fase di completo distacco della bancata dal corpo marmifero che costituisce il giacimento. Si effettua con l'ausilio di un escavatore, coadiuvato o meno da cuscini metallici gonfiabili inserito nello spazio creato dal taglio del monte.
RF VE, DF: Bradley F. *Le cave di marmo di Carrara – Carrara Marble Quarries – Les carrières de marbre de Carrara*, GUI.PA Guide al Paesaggio d'Italia, Milano, 2008
EN
VE overturning (1), to overturn (2), to turn something upside down (3)
DF Process aimed to completely cut away the bench from the mountain side. Techniques used for the purpose improved during the time: detonating explosives, oleodynamic jacks and recently hydraulic plates and divaricating cushions helping the excavator to separate the bench from the mountainside.
RF VE(1)(2), DF: Conti G., Mannoni T., Montani C., Pinzari M., Pucci R., Ricci A. *Marble in the World, the stone industry and its trade*, Società Editrice Apuana, Massa, 1994 VE(3) Mc-Grow H. *Dizionario enciclopedico scientifico e tecnico Inglese-Italiano, Italiano-Inglese*, Zanichelli, Bologna, 1991, p. 613

BE SSML
AU Serena Incerti
TY MEM 09
NI 030
CF 3
CM MIJ; MI5
IT
VE riquadratura
DF Operazione che porta alla formazione di un blocco riquadrato da una massa rocciosa di grandi dimensioni. Il processo può essere effettuato in cava o in segheria.
RF VE, DF: Bradley, F. *Glossario tecnico del settore lapideo - italiano, inglese, cinese,* Milano, Panorama, 2003
EN
VE squaring (1), to square (2), to make something square (3)
DF The action of creating a square block from a big amount of rock detached from the mountain.
RF VE(1), DF: Bradley, F. *Glossario tecnico del settore lapideo - italiano, inglese, cinese,* Milano, Panorama, 2003 VE(2)(3): Marolli G. *Dizionario tecnico – Technical Dictionary*, Ulrico Hoepli Editore S.p.A., 3ª ed., Milano, 1996

BE SSML
AU Serena Incerti
TY MEM 09
NI 031
CF 3
CM MGE; MIB; MIJ; LAC
IT
VE segagione
DF Nel significato più generico, l'azione del segare, spesso con riferimento a fusti legnosi. Nel comparto lapideo, s'intende uno dei primi processi di lavorazione e trasformazione del blocco grezzo. L'operazione è data da diversi tipi di macchinari (tagliablocchi a disco diamantato, telaio multilame, filo elicoidale,…) per la creazione di lastre di diverso spessore e dimensione.
RF VE, DF: Conti G., Lisanti V., Mannoni T., Montani C., Pinzari M., Ragone M., Ricci A., Semel G. *Il marmo nel mondo, industria e commercio dei materiali lapidei*, Società Editrice Apuana, Carrara, 1986
EN
VE sawing
DF Block processing by means of frame-saws (or gangsaws) equipped with multi blades used to cut stone blocks to slabs of predetermined thickness, or by means of block-cutters a machine used for in-line drilling of small diameter holes.
RF VE, DF: http://ligurianmarble.com/marblestones.html

BE SSML
AU Serena Incerti
TY MEM 09
NI 032
CF 3
CM MIJ; CH9
IT
VE stagionatura
DF Tempo necessario affinché un blocco appena estratto rilasci eventuali tensioni interne che possono causare rotture in fase in trasformazione.
RF VE, DF: Bradley, F. *Glossario tecnico del settore lapideo - italiano, inglese, cinese,* Milano, Panorama, 2003
EN
VE seasoning (1), air-seasoned (2)
DF Treated by exposure to air to give a desired quality.
RF VE(1)(2), DF: Mc-Grow H. *Dizionario enciclopedico scientifico e tecnico Inglese-Italiano, Italiano-Inglese*, Zanichelli, Bologna, 1991, p. 41

BE SSML
AU Serena Incerti
TY MEM 09
NI 033
CF 3
CM MIJ; MIB; LAC
IT
VE subbia (1), sciubbia (2), scalpello (3), punta (4)
DF Sorta di scalpello con punta piramidale quadrangolare, usato per lavorazione a percussione di marmo e pietra.
RF VE(1)(2)(4), DF: *L'uomo e il marmo. Memorie di un mestiere antico,* Associazione Culturale Alta Tambura insieme con regione Toscana e provincia di Massa-Carrara, Resceto (MS), 2009 VE(3): Mc-Grow H. *Dizionario enciclopedico scientifico e tecnico Inglese-Italiano, Italiano-Inglese*, Zanichelli, Bologna, 1991, p. 613
EN
VE chisel
DF A tool for working the surface of various materials, consisting of a metal bar with a sharp edge at one end and often driven by a mallet.
RF Mc-Grow H. *Dizionario enciclopedico scientifico e tecnico Inglese-Italiano, Italiano-Inglese*, Zanichelli, Bologna, 1991, p. 265

BE SSML
AU Serena Incerti
TY MEM 09
NI 034
CF 3
CM MIB; MGE; MIJ
IT
VE tagliatrice a filo diamantato (1), sega diamantata (2)
DF Macchinario formato da un carrello semovente su binari composto da un motore elettrico connesso lateralmente a una grossa puleggia che imprime movimento al filo diamantato, il cavo d'acciaio su cui sono inserite le perline (anelli diamantati). Per effettuare il taglio il filo viene inserito nella massa rocciosa tramite una serie di perforazioni realizzate appositamente e quindi chiuso ad anello attorno alla puleggia. Il movimento del filo, mantenuto sempre in tensione, abrade il marmo fino a formare un taglio netto. Utilizzata maggiormente per tagli verticali.
RF VE, DF: Bradley F. *Le cave di marmo di Carrara – Carrara Marble Quarries – Les carrières de marbre de Carrara*, GUI.PA Guide al Paesaggio d'Italia, Milano, 2008
EN
VE diamond saw (1), diamond wire (2)
DF A circular, band, or frame saw inset with diamonds or diamond dust for cutting sections of rock and other brittle substances, particularly in vertical side.
RF VE(1)(2), DF: Mc-Grow H. *Dizionario enciclopedico scientifico e tecnico Inglese-Italiano, Italiano-Inglese*, Zanichelli, Bologna, 1991, p. 410

BE SSML
AU Serena Incerti
TY MEM 09
NI 035
CF 3
CM MIB; MGE; MIJ
IT
VE tagliatrice a filo elicoidale (1) impianto a filo elicoidale (2) filo elicoidale (3)
DF Impianto costituito da un filo di circa 5mm di diametro formato dall'avvolgimento a forma elicoidale di tre piccolo cavi d'acciaio, disteso per mezzo di una serie di pulegge nell'area di cava. Azionato per mezzo di un motore elettrico e collegato a due montanti che, tramite movimento discendente, permettono lo sfregamento del filo contro la parete rocciosa da tagliare. Nell'incisione del taglio viene fatta colare una miscela di acqua e sabbia silicea in modo che il filo in movimento sfregasse contro la superficie interessata, provocandone l'abrasione.
RF VE(1)(2)(3), DF: Bradley F. *Le cave di marmo di Carrara – Carrara Marble Quarries – Les carrières de marbre de Carrara*, GUI.PA Guide al Paesaggio d'Italia, Milano, 2008
EN
VE wire saw (1), helicoidal wire (2)
DF A machine employing one or three-strand wire cable, up to 5 millimetres of diameter, running over a pulley as a belt; used in quarries to cut rock by abrasion.
RF VE(1)(2), DF: Mc-Grow H. *Dizionario enciclopedico scientifico e tecnico Inglese-Italiano, Italiano-Inglese*, Zanichelli, Bologna, 1991, p. 1628

BE SSMLPI
AU Serena Incerti
TY MEM09
NI 036
CF 3
CM MIJ; MI5
IT
VE varata
DF Tecnica di abbattimento con esplosivo (*polvere nera*), ormai in disuso. Stabilita la parete da abbattere si procedeva allo scavo di un cunicolo nella massa rocciosa (*mina*), alla fine del quale si apriva una camera di dimensioni sufficienti a contenere la quantità necessaria di polvere. Al momento opportuno la mina veniva fatta esplodere, causando la rottura della parete in blocchi di dimensioni diverse, poi riquadrati a misura commerciabile.
RF Bradley F. *Le cave di marmo di Carrara – Carrara Marble Quarries – Les carrières de marbre de Carrara*, GUI.PA Guide al Paesaggio d'Italia, Milano, 2008
EN
VE blast (1), blasting (2)
DF The setting off of a heavy explosive charge in a hole, causing large portions of mountains to crumble into shapeless blocks, afterwards worked and shaped into commercial sizes.
RF VE(1), DF: Bradley F. *Le cave di marmo di Carrara – Carrara Marble Quarries – Les carrières de marbre de Carrara*, GUI.PA Guide al Paesaggio d'Italia, Milano, 2008 VE(2):Mc-Grow H. *Dizionario enciclopedico scientifico e tecnico Inglese-Italiano, Italiano-Inglese*, Zanichelli, Bologna, 1991, p. 173

BE SSML
AU Serena Incerti
TY MEM 09
NI 037
CF 2
CM MI; MIJ
IT
VE vena (1) venatura (2)
DF Linea o fascia di spessore e dimensioni varie che attraversa il fondo di un materiale lapideo ed è da questo cromaticamente distinguibile.
RF VE(1)(2), DF: Bradley, F. *Glossario tecnico del settore lapideo - italiano, inglese, cinese,* Milano, Panorama, 2003
EN
VE vein (1), veining (2)
DF A layer, seam, or narrow irregular body of mineral material different from the surrounding formation.
RF VE(1), DF: http://ligurianmarble.com/marblestones.html

BE SSML
AU Serena Incerti
TY MEM 09
NI 038
CF 3
CM MIJ
IT
VE verso (1), verso di taglio (2)
DF Direzione dell'orientazione principale del disegno e dei componenti di un materiale lapideo(parallela alla stratificazione della roccia).
RF VE(1), DF: Bradley, F. *Glossario tecnico del settore lapideo - italiano, inglese, cinese,* Milano, Panorama, 2003 VE(1)(2): Bruni Catia, *Il marmo ieri e oggi – Storia illustrata dell'industria più antica del mondo*, Società Editrice Apuana, Carrara, 5ª ed., Carrara, 2008
EN
VE grain
DF The direction of fibres in pieces of wood. In the stone sector, the pattern of lines on the surface of the material. The cutting of stone that follows this pattern results to be easier than the *contro di taglio.*
RF VE, DF: Collins H. *Collins Cobuild English Dictionary*, Londra, 1995

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BAV Bavastro R., Bellini L., Dolci E., Giumelli C., Laghi A., *Carrara e le sue cave – Carrara and its quarries*, Società Editrice Apuana, 2002

BER Bernieri A. *Città della Toscana. Carrara,* SAGEP Editrice, Genova, 1985

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BRU Bruni Catia, *Il marmo ieri e oggi – Storia illustrata dell'industria più antica del mondo*, Società Editrice Apuana, Carrara, 5ª ed., Carrara, 2008

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Experts of the sector

- Dott. Antonino Criscuolo, geologo presso Ufficio Cave del Comune di Carrara
- Dott. Daniele Mocchi, ricercatore presso Istituto di Sviluppo e Ricerca (ISR) della Camera di Commercio, dell'Industria, dell'Artigianato e dell'Agricoltura (CCIAA) di Carrara
- Dott.ssa Silvana Napoli, Ufficio Studi e Ricerche Internazionale Marmi e Macchine (IMM), Carrara

Multimedia

DVD *Il marmo, la materia e le idee. Storia e lavorazione del marmo dall'antichità ai giorni nostri,* Comune di Carrara e regione Toscana, MADAMASTUDIO, Carrara, 2008
DVD *L'uomo e il marmo. Memorie di un mestiere antico,* Associazione Culturale Alta Tambura insieme con regione Toscana e provincia di Massa - Carrara, Resceto (MS), 2009
TIR *"Ma che filiera, i blocchi vanno tutti in Cina",* articolo tratto da IL TIRRENO – Cronaca Carrara, sabato 9 Maggio 2009

TIR *"Il marmo bianco vola nell'export",* articolo tratto da IL TIRRENO – Carrara, martedi 31 Marzo 2009

Sector norms

NOT *Notificazione governatoriale del 3 dicembre 1846*, Massa, 1846
NOT *Notificazione governatoriale del 14 luglio 1846*, Massa, 1846
REG *Regolamento per la concessione degli agri marmiferi comunali*, Comune di Carrara, Carrara, 1995, emendamento allegato alla delibera n°61 del 21/07/2005
RES *Rescritto Sovrano del 25 giugno 1852*, Modena, 1852
TES *Testo coordinato della legge regionale 3 novembre 1998, n. 78 (Testo unico in materia di cave,*
SEN *Sentenza della Corte Costituzionale numero 488 del 1995*, Repubblica Italiana, 1995
torbiere, miniere, recupero di aree escavate e riutilizzo di residui recuperabili) e successiva modifica del 27 gennaio 2004, Regione Toscana, 1998
EDI *Editto di Maria Teresa del 1° febbraio 1751*, Massa, 1751

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