## APPENDIX

## THE LIFE AND TIMES OF COMMANDEUR DÉODAT DE GRATET DE DOLOMIEU (1750-1801)

In a monograph devoted to the formation of the mineral dolomite, a few words should be devoted to the life of the man, who gave the mineral his name. This appendix is based mainly on the account given in volume 11 of the *Biographie Universelle* (1814) and especially on the books by Lacroix (1921). Recently several informative books have appeared on De Dolomieu; written by Gardien (2002), Charles-Vallin (2003), Zanzi (2003), Gaudant (2005), and by Caminada (2006).

Most likely it is the fact, that Déodat de Gratet de Dolomieu was a member of the *Institut de France* (known after 1816 as the *Académie des Sciences*), that has ensured the conservation of a large mass of biographical information. Because it is one of the duties of a secretary of the *Académie* to prepare and publish the biography of one of their predecessors in the same *Compagnie*, in this case the *Section de Minéralogie de la Première Classe de l'Institut*, Lacroix (1921) undertook to reconstruct the life and times of *Commandeur* de Dolomieu. In a number of institutes and libraries letters written by De Dolomieu were found (including the University of Catania, libraries in Copenhagen, in Berlin, in Besançon, in Grenoble, in Nantes, in Florence, in Geneva, in Paris, and the archives of the Vatican and Malta). Even private archives containing information on De Dolomieu, for example those of the family De Saussure were consulted by Lacroix (1921). Most of the 575 pages of the two volumes published by Lacroix are filled with the correspondence of De Dolomieu sent to his contemporaries from various parts of Europe. Nevertheless some 80 pages of the first volume are devoted to the life of De Dolomieu (this biography had been published as a *Notice historique* by Lacroix in 1918 A).

Dieudonné - Guy - Sylvain - Tancrède, *dit* Déodat, de Gratet de Dolomieu was born on June, 23rd 1750 at the ancestral *château* near the town of La Tour-du-Pin<sup>1</sup> (Dauphiné, France) (Fig. 1). His father was François de Gratet<sup>2</sup>, *Chevalier, Marquis* de Dolomieu, *Comte* De Saint-Paul d'Izeau, *Seigneur* De Uelin, Saint-Didier-les-Champagnes, and other towns. His mother was Marie-Françoise De Béranger. Déodat was the youngest of ten children. (According to the *Armorial Général* of Rietstap, 1934 the family name is Gratet marquis de Dolomieu. For example the catalogue of the British Library lists most of the works of De Dolomieu under the full family name of Gratet de Dolomieu.)

As related by Charles-Vallin (2003) little Déodat received from age seven education at home, much like his sisters and brothers. Shortly after his twelfth birthday Déodat was sent for further education to a *maison d'éducation* in Paris, where during the next three years he received a classical education in combination with military training. Perhaps it was here that Déodat's interest in the natural sciences was awakened, or perhaps it had been previously at home, where he had read most of the books of his father's vast library. The scientific interests of young Dolomieu were not greatly appreciated by his parents (who visited Paris at least once a year). It must be remembered, that in those days the male members of a noble family were expected to devote themselves to military or clerical activities only. Therefore it took Déodat considerable effort to convince his father to let him study at the university of Paris. The price to be paid was Déodat's entry into the Order of the Knights of Malta (of which he had been a member by right of birth). The Order of the Knights



(Appendix) Fig.1 – Photograph of (part of) the ancestral *château* near La Tour-du-Pin (Dauphiné, France), where on 23 June 1750 Déodat de Dolomieu was born (photograph taken in 1982) (see note 1).

Hospitaller of St. John of Jerusalem had been instituted in the year 1113 by Pope Paschal II, and it still exists today. The Knights originally devoted themselves to the protection of pilgrims travelling to Jerusalem during the Crusades of early Medieval times. In fact the Knights Hospitallers formed the armed guard of the pilgrim's hostel in Jerusalem. After the fall of Jerusalem to the Saracens in 1187, the Order withdrew from Palestine to Cyprus, then to Rhodes, and in 1530 to Malta. The island of Malta was given to the order as sovereign state by the French Emperor Charles V. As Cavaliero (1960) explained, the Knights did not refrain from active participation in the battles of the Crusades. The numerous fights created the military aspect of the Order: the Knights of St. John became known as an élite cavalry corps.

On 2 October 1752, at the age of 10, Déodat de Dolomieu was introduced by his father into the Order of the Knights of Malta. The introduction as one of the *Chevaliers de Minorité* required three vows: obedience, poverty, and celibacy.<sup>3</sup> This vow of obedience was strictly maintained in the semi-military organization of the Order. But the "volcanic" character of De Dolomieu was responsible for numerous conflicts with various other members of the Order. Much less conflict was caused by the vow of poverty, which required most of his heritage to be turned over to the Order of the Knights of Malta. Moret (1950) remarked that in his later years De Dolomieu no longer attributed any significance to material wealth, not in the least because of the losses he had had to experience during the French Revolution. When in 1801 Déodat de Dolomieu died, all he left to his heirs were a number of scientific publications, a large number of books, and a vast collection of rocks and minerals.

It was expected of a Knight, that he would visit the headquarters of the Order in the monastry of Malta from time to time. As a second step in the introduction Déodat (on 15 April 1762) had to present his proofs of nobility. A further step was taken in 1763, when he volunteered for the régiment des Caribiniers of the Order. In 1766 he was made Sous-Lieutenant, and started his 3-year novitiate as a soldier on the galleys of the Order of St. John. During his first voyage on a galley of the Order (1768) Déodat became infuriated by a discussion with one of his fellow cadets and engaged him in a sword duel. After embarkation at the Italian port of Gaëta, the duel took place, and Déodat killed his rival. Strictly speaking the incident fell under the jurisdiction of the King of Naples, but the commander of his vessel sailed back to Malta without waiting for a verdict. Because the Order of Maltese Knights had strictly forbidden all duelling among its members, serious punishment awaited Déodat de Dolomieu. As De Lacépède (1802) relates, De Dolomieu received the death penalty for his offence from the Grand-Maître of the Order. Various influential contemporaries tried to change this verdict during the months of imprisonment that followed, among them the Duc de Choiseul, acting for the King of France. Ultimately the Grand-Maître pardoned De Dolomieu, and the verdict was changed into expulsion from the Order and life imprisonment. But this pardon had to be confirmed by Pope Clément XIII. On historical grounds the Pope was not greatly inclined to help one of the chevaliers of the Order of St. John; for long Pope Clément XIII refused to give pardon. A letter by De Dolomieu addressed directly to Cardinal Torrigiani proved to be effective, for in 1769 De Dolomieu was released after 9 months in prison and even restored to his previous position.

In 1771 Déodat, by now 21 years old, rejoined his regiment of *Carbiniers* at the garrison of Metz (France). The duelling incident and subsequent imprisonment had a severe influence on De Dolomieu's attitude toward life, because after the incident his interests were concentrated more and more on the sciences. In Metz he met one of the local learned men, the pharmaceutical chemist Thirion, and made the acquaintance of the *Duc* Alexandre de la Rouchefoucauld, colonel in the *Régiment de la Sarre* and a member of the *Académie Royale des Sciences*. This contact with the

Duke De la Rouchefoucauld influenced the young *marquis* De Dolomieu in many ways, not in the least by transmitting the Duke's enthusiasm for the science of mineralogy. While in Paris the Duke De la Rouchefoucauld introduced Déodat de Dolomieu into the *Académie des Sciences*, of which De Dolomieu had become a corresponding member. It was also the *Duc* De la Rouchefoucauld, who introduced De Dolomieu (in 1774) to the *salon* of the *Duchesse* d 'Enville, whose Parisian circle of philosopher friends held a considerable reputation. It must have been there, that De Dolomieu was introduced to Horace Benedicte de Saussure, the famous geologist.

In 1775, Déodat undertook his first field trip (to Anjou and Brittany), and also in that year his first scientific paper was published in the Observations de Physique, volume 6, pp.1-5 (Expériences sur la pesanteur des corps à différentes distances du centre de la terre, faites aux mines de Montrelay en Bretagne). By this time the young marquis had made comprehensive geological field studies and had performed a multitude of chemical tests. In 1776 he published a geological reconnaissance of Sicily, an account of a voyage through the Alps, and a description of the cave at Balme (France). In that year too Déodat traveled to Malta, from where Prince Camille de Rohan took him to the French embassy at Lisbon, Portugal. According to Moret (1950) De Dolomieu thought his geological studies of the surroundings of Lisbon of such great interest<sup>4</sup> that he forgot to return in time to his regiment at Metz. According to De Lacépède(1802) De Dolomieu had concluded in 1775, that his main interest was in the sciences and had decided to end his military career. (In the Biographie universelle of 1814 a slightly different statement is made: De Dolomieu would no longer have been interested in the Order of Maltese Knights and took his leave in 1777.) From Lisbon Déodat de Dolomieu sent a manuscript, dealing with evidence of extinct volcanism around that city, to the secretary of the Académie Royale des Sciences in Paris. The manuscript did reach the Marquis De Condorcet, secretary of the Académie for that year (as witnessed by the archives of the academy), but it was not published. Lacroix, himself one of the secretaries of the Académie in later years, published De Dolomieu's 1779 manuscript in the Comptes Rendus.<sup>5,6</sup> Despite the initial rejection of the manuscript on the local geology of Lisbon, Déodat de Dolomieu became on 19 August 1779 one of the corresponding members of the Académie Royale. In that year too Déodat de Dolomieu was made a full Knight of the Ordre des Chevaliers de Saint-Jean de Jérusalem à Malte during a ceremony in the cathedral of Lyon (France). In addition he was made a captain of his regiment of *carabiniers*, even though he was no longer on active duty and received his appointment by mail. In 1780 he was made Commandeur De Dolomieu: the section of the Maltese Knights under his actual command was located in the village of Sainte-Anne en Auvergne (France). The new position as Knight of the Order of Malta required regular visits to be made to the island of Malta. His first voyage as a Knight started in 1781, but only after a long trip had been completed to the volcanic islands near Sicily, followed in 1782 by a journey of two months through the Pyrenee Mountains with his friend Philippe Picot de La Peyrouse.

The quick career of De Dolomieu in the Order of the Knights of St. John and his scientific achievements must have made some of his contemporaries envious and jealous. It should have been no surprise for *Commandeur* De Dolomieu to experience from time to time non-cooperation or even outright opposition, especially after his arrival at Malta. In 1782 shortly before his departure for the Pyrenee Mountains De Dolomieu became involved in a scandal surrounding the appointment of an imposter to a high position within the Order of the Knights of St. John. Another serious conflict occurred in 1783 soon after Déodat's appointment to *Lieutenant du Maréchal*. This new position made De Dolomieu the actual head of the military force on Malta, since the Marshal of the Order was permanently absent (Cavaliero, 1960). De Dolomieu took his new task rather seriously and



(Appendix) Fig.2 – Portrait of Commandeur Déodat de Dolomieu painted by Angelica Kaufmann in Rome in 1789 (reproduction by courtesy of the *Musée* Dauphinois Grenoble, France).

498

soon became involved in a conflict with the colonel of the regiment at Malta, and ultimately with the Grand-Maître, Emmanuel de Rohan. In response to one of the decisions of the Grand-Maître, a decision that he considered to be wrong, De Dolomieu resigned with considerable clamour from his high post and went into voluntary exile into Italy (the details of this last of his many quarrels with members of the Order can be found in Chapter XIII of Cavaliero's book). Years spent traveling (including journeys through Italy, notably to the region of Calabria destroyed in 1783 by a serious earthquake and to the islands of Elba and Corsica) combined with geological field observations, followed. In 1786 De Dolomieu returned to Malta in order to convey to the Grand-Maître the rumor, that the King of Naples would have promised to hand over some of the ports of Malta to Russia. The King of Naples never forgave De Dolomieu this action, and henceforth became his greatest enemy. Opposition from within the Order made it necessary for De Dolomieu to flee from Malta to Rome. During the next 4 years he was involved in several court cases with the Order of the Maltese Knights. While in Rome De Dolomieu visited the salons of the clerical and cosmopolitan society.<sup>7</sup> By this time Commandeur Déodat de Gratet de Dolomieu enjoyed a well established reputation in the scientific world. As recorded in volume 11 of the Biographie universelle (1814) De Dolomieu was widely regarded as géologiste et minéralogiste célèbre; he had published for example Voyages aux îles de Lipari fait en 1781, ou notice sur les Iles Aeoliennes (1783)<sup>8</sup> Mémoire sur les tremblements de terre de Calabre (1784)<sup>9</sup> and Mémoire sur les volcans éteints du Val di Noto  $(1786)^{10}$ , and in Rome he completed his papers Mémoire sur les Iles Ponces and *Catalogue raisonné des produits de l'Etna* and published these two as one book (1788).<sup>11</sup> One year later the German edition of De Dolomieu's Mémoire sur les tremblements de terre de Calabre appeared under the title of Oryktologische Bemerkungen über Calabrien, während einer Reise durch einen Theil dieses Landes nach dem Erdbeben von 1783 (Ein Auszug aus dessen Beschreibung des Erdbebens von Calabrien).<sup>12,13</sup> During these years De Dolomieu travelled through almost all parts of Italy, from Tyrol to Sicily, and from Elba to Corsica. He visited the Vesuvius together with William Hamilton, the British Ambassador, and even introduced Sir James Hall, geologist of world renown, to parts of the regional geology of Italy. Not all of his time in Rome was spent on geology or mineralogy: during these years De Dolomieu is reputed to have become an outstanding collector of antique Roman sculpture. At the same time the court case against his expulsion from the Order of the Knights of Malta took up much of his time, and ultimately he prevailed: Déodat de Dolomieu was re-instated with help from the Pope and was allowed to visit the island of Malta again.

Lacroix (1921), judging from De Dolomieu's many letters to his friends and relatives, concluded that a marked change in De Dolomieu's political views took place there and then. More and more the *Commandeur* took a detached view of the intrigues of the absolutistic world he had known in France and at Malta. It seems that from a distance *Commandeur* de Dolomieu could follow the developments of the French Revolution (1789) without too much shock or personal attachment. In several letters De Dolomieu expressed his sympathy for the new liberal ideas, that emerged in France (to express his sympathy with the Revolution, De Dolomieu or *Chevalier* De Dolomieu, but after 1789 he signed with D. Dolomieu). These written expressions of sympathy for the French Revolution must have created the one chance his adversaries in the Order of the Knights of Malta had been waiting for, because he was now accused of conspiring to overthrow the Order. In his absence De Dolomieu was convicted to lifelong expulsion from the Order and from Malta



(Appendix) Fig.3 – First page of De Dolomieu's 1791 paper describing the discovery of the mineral, which would bear his name (reproduction by courtesy of the *Bibliothèque Nationale et Universitaire*, Strasbourg, France).

this time for good. Notwithstanding the official expulsion De Dolomieu has later visited the island many times, mainly because his vast collection of rocks and minerals was kept there. Although the collection formed in his own words ".. at the same time my joy of life, but also my main source of sorrow", De Dolomieu sold parts of it in 1791 to the universities of Augsburg and Berlin (the collections sold have been described by Nose, 1797).

Even though De Dolomieu had expressed sympathy for the goals of the Revolution, its catastrophic effects on France also took its toll from him personally. In Rome messages reached De Dolomieu, that nearly all of his relatives and many of his friends had been murdered. Overcome with grief, De Dolomieu tried to escape by devoting himself completely to his mineralogical work. In this mood, during a journey through northern Italy (the region we now know as the Dolomite Mountains), De Dolomieu discovered the "great quantities" of the mineral, which would bear his name. The voyage through Northern Italy brought De Dolomieu to one of the Alpine passes, the Brenner Pass. It was there, that he recognized the rock he had seen before in buildings in the city of Rome; first near the pass itself and later also more to the South, for example on the Seisser Alm near Bolzano. The letter announcing the discovery (dated 30 January 1790) was printed in Volume 34 of the *Journal de Physique* (July 1791) (see also the annotated translation of this letter published by Carozzi & Zenger, 1981). The letter as such was addressed to Picot De La Peyrouse, member of the *Académie des Sciences*, well-known botanist and friend of De Dolomieu, with whom he had travelled through the Pyrenée Mountains, to Sicily and Lipari (Fig. 3).

The name *dolomie*<sup>14</sup> for the mineral found in the mountains of Northern Italy was given in 1792 by Monsieur De Saussure le fils, in a paper printed in Volume 40 of the Journal de Physique. With Monsieur De Saussure le fils is meant Nicolas Théodore de Saussure, the son of Horace Benedicte de Saussure. A letter of thanks directed to De Saussure jr. was written by De Dolomieu on 31 October 1791 (reproduced on pp.24-29, Vol.II of Lacroix, 1921). In that letter De Dolomieu frankly expressed his doubts as to the results of the chemical analyses of the mineral; he had the impression that the oxygen content was far less than that measured by De Saussure. That conviction found its origin in De Dolomieu's own experiments on heating the mineral, whereby he had found, that dolomite would loose considerably less of its initial weight than most other carbonate rocks. Apart from sending young De Saussure a number of volcanic rocks, De Dolomieu explained in his letter, where he had collected the four different samples of the new mineral. The samples had come from two locations, one very near the summit of the Brenner Pass and the other from the Seisser Alm, between Bolzano and Trente. Samples of the carbonate rock from the latter locality contained, according to De Dolomieu, clear "imprints of shells". The sample from the Brenner Pass was of a rock type, which was known among the sculptors of Italy as marmo graeco duro, and it was universally claimed to be among the very best rocks suited for sculpture.

Although De Dolomieu, in his 1791 paper in the *Journal de Physique*, had rather stressed the capacity of the new rock to sparkle upon collision ("*phosphoresecente par la collision*"), he took most of that statement back in his second letter: some species of the new rock would not show the phenomenon, while other carbonate rocks did show the same phenomenon. In De Dolomieu's own words: "... *cette phosphorescente est donc accidentelle, qui appartient à des pierres calcaires de beaucoup d'espèces*" (De Dolomieu, 1791; reproduced in Lacroix, 1921, Vol.II, p.26).

After several years in Rome, Déodat de Dolomieu travelled by boat to Marseille in June 1791, and from there overland to his home in the Dauphiné. After a few weeks he departed for Paris, only to land in the middle of the considerable political turmoil. In the numerous letters sent to his friend the *Chevalier* De Fay, who had remained at Malta, De Dolomieu gave a virtual day-to-day account of the changes in the French government. From his letters it becomes clear, that even though he was

a convinced admirer of the monarchy, De Dolomieu also admired the new constitution of France. He even took actively part in the discussions in the *Assemblée nationale*, as well as the parliamentary intrigues to prevent the abolition of the Order of the Knights of St. John at Malta; to little avail however. [ Desgenettes, 1836 stated that De Dolomieu had become a volunteer in the newly founded *garde nationale*.] The abolition of the Order of the Maltese Knights by the French government (and confiscation of all its properties) on 17 September 1792 meant an end to all income for Déodat de Dolomieu. From this time onward his enthusiasm for the achievements of the Revolution declined rapidly. His attitude changed even more rapidly after witnessing (on 4 September 1792) the murder of his close friend and mentor in science, the *Duc* De la Rouchefoucauld. On that occasion De Dolomieu escaped the same fate only by a narrow margin. (De Dolomieu had initially taken up the enthusiasm of the Duke De la Rouchefoucauld for the French Revolution of 1792.) To escape from the executions, pillages and arson in the city of Paris, De Dolomieu took refuge in the town of La Roche-Guyon (a village to the north-west of Paris), where he lived at the estate of the wife and the mother of the *Duc* De la Rouchefoucauld.

In these years at La Roche-Guyon De Dolomieu had the time to devote himself entirely to the sciences, and his publications *Mémoires sur les pierres composées et les roches*  $(1792-1794)^{15}$ Briefe zweyer ausländischer Mineralogen über den Basalt (1792)<sup>16</sup>, Mémoire sur la constitution physique de l'Egypte (1793)<sup>17</sup>, Sur les pierres figurées de Florence (1793)<sup>18</sup> and Distribution méthodique des matières volcaniques (1794), appeared in print. Because the Revolution had robbed De Dolomieu of all of his fortune, he was obliged to teach at the newly formed École Centrale. In 1795 De Dolomieu became a member of the Corps des Mines and in subsequent papers published in the Journal des Mines he described himself as an Ingenieur des Mines; in the same year he was elected member of the (newly formed) Institut national des Sciences et des Arts. Déodat de Dolomieu's growing fame culminated in an appointment to professor in the department of physical geography at the *École des Mines*, Paris (the department included geology and mineralogy). For several years De Dolomieu taught mineralogy to students at the *École des Mines* during autumn and winter, and devoted his days during spring and summer to extensive field trips and to geological investigations of mines and quarries. (A comprehensive account on his field work in 1797 and 1798 was published by De Dolomieu, 1798 C in the Journal des Mines.)

In 1798, during one of the meetings of the Académie, Berthollet asked De Dolomieu to join him on a long voyage. Berthollet insisted that the destination of this trip should remain secret. In reaction De Dolomieu asked, whether there would be rocks and minerals to be studied in this mysterious country. Berthollet's confirmation, that this would certainly be the case, was sufficient for De Dolomieu to decide to join him on the mysterious journey. During their embarkation at the port of Toulon De Dolomieu had a sudden suspicion, that the voyage might be intended against the island of Malta. That destination seemed likely, because Napoleon Bonaparte, by now ruler of France, personally commanded the fleet of some 300 ships of war. De Dolomieu threatened to disembark, if their destination would be Malta. Only after receiving word from Napoleon, that Malta was under no circumstance their destination, De Dolomieu agreed to leave the port of Toulon on board ship. However by some inexplicable coincidence the fleet sailed towards Malta, and in sight of the island Napoleon showed De Dolomieu a letter from the Grand-Maître of the Order of the Knights of Malta, requesting consideration from the esteemed military leader Napoleon Bonaparte with the inhabitants of the island. Napoleon ordered Déodat de Dolomieu to negotiate the conditions of surrender with the Grand-Maître. De Dolomieu brought the negotiations to a reasonable conclusion; that is to say, his former colleagues of the Order would not have to suffer too many sacrifices upon their surrender. [ Malta was captured by the French troops under Napoleon in order to prevent possible Russian influence, but the actual occupation was short-lived. As a result of the Treaty of Amiens the island was returned to the Knights of St. John in 1802. ]

After the fall of Malta, Napoleon's fleet left for its next destination - Egypt. On one of the war ships was Déodat de Dolomieu. Like 47 other French scientists, De Dolomieu had been asked to join Napoleon Bonaparte on the expedition into Egypt. Possibly De Dolomieu was only too anxious to check the data he had compiled into his paper on the Nile delta (1793). On 30 June 1798 the port of Alexandria was reached. De Dolomieu, and all other scientists were placed under the direct command of general Kléber, aide to Napoleon. In the deserted town of Alexandria De Dolomieu had ample opportunity to study the ancient monuments and the soil of the fields outside the town. But inevitably De Dolomieu had to witness several battles during Napoleon's Egyptian Campaign, and he was shocked by the many wounded and the dead. On 16 September 1798 De Dolomieu barely survived an exchange of fire near Chabas Emeir. After returning to Caïro, De Dolomieu was asked to join the Institut de l'Egypte, instituted there and then by Napoleon to investigate in a scientific manner the country, he had invaded. In October 1798 the Egyptians finally revolted against the French occupation; De Dolomieu and his fellow scientists came under direct attack at Aboukir. After this battle De Dolomieu distances himself from the actions of Napoleon Bonaparte in Egypt, much like the generals Kléber and Dumas. In november 1798 De Dolomieu joined the other scientists in a visit to Damiette and Péluse; in Damiette the famous monolithic temple was studied. On 5 January 1799 the scientists and several army officers visited the pyramids. On 6 February 1799 De Dolomieu returned to Caïro, and on 7 March 1799 he left Egypt by boat from the port of Rosette. (De Dolomieu's notes on his journey to Egypt were recorded in the booklet Dolomieu en Egypte, which was edited and published by Lacroix & Daressy in 1922.<sup>19</sup>) Travelling home with him were the generals Dumas and Manscourt, and his pupil in science Cordier. Their ship managed to escape from English ships of war, but a heavy storm succeeded in doing serious damage to the ship and it started making water. Even so his ship reached the Italian port of Tarento. The escape to this Italian port proved to be ill fated. Calabria, the region around Tarento, was part of the Kingdom of Naples, now at war with France. Like all others on board De Dolomieu was taken prisoner of war. For several months he remained in prison in Tarento (where the populace several times tried to lynch all French prisoners), but was then transferred to the prison of Messina. In Messina De Dolomieu was recognized by his adversaries and accused by certain members of the Order of having betrayed the Order of the Maltese Knights. As a result of this accusation De Dolomieu was condemned to life imprisonment in solitary confinement. De Dolomieu was tortured during his stay in the prison of Messina. (Briquet, 1802 revealed, how most prisoners usually left this prison within 3 days, dead or alive. De Dolomieu had to stay there for 9 months.) In the prison of Messina De Dolomieu wrote his opusculum magnum, a booklet to appear in print in 1801 on La Philosophie minéralogique.<sup>20</sup> (The paper De l'espèce minéralogique, 1799 A is in fact a pre-print of one of the chapters from this book.)

Shortly after their conviction by the Court of Justice at Palermo De Dolomieu's student Cordier managed to escape to France. There he was able to organize official requests for the release of De Dolomieu. The *Académie des Sciences* backed up the request for his release, and the French Secretary for Foreign Affairs prepared a note, requesting De Dolomieu's release from prison. The director of the *Académie des Sciences* of Paris wrote to Sir Joseph Banks, the President of the Royal Society of London, who on several occasions had helped scientists from other countries. The President of the Royal Society contacted his government, and as a result the British Ambassador to the King of Naples (Sir William Hamilton, whom Déodat de Dolomieu had once guided to the Vesuvius crater), as well as the Commander of the British fleet in the Mediterranean, Lord Nelson,

intervened in favour of De Dolomieu. In the meantime the French government under Talleyrand suggested, to exchange De Dolomieu for a number of Italian convicts held in French prisons. But most likely, in the view of Lacroix (1921) at least, the intervention on behalf of De Dolomieu by the French Ambassador to the Court of the Spanish King Charles IV was the most successful. Charles IV, in a personal letter to the King of Sicily, asked for the release of De Dolomieu. Although the Prime Minister of Naples refused to free De Dolomieu from prison, the action meant a change from torture and solitary confinement to more normal conditions of imprisonment. In the end it was however the attack of Napoleon's fleet of war ships on Sicily, that made De Dolomieu a free man again after 21 months in prison: article VII of the peace treaty of Foligno (6 February 1801) stipulated, that De Dolomieu had to be released ("VII: *Le citoyen Dolomieu, le general Dumas et le general Manscourt, tous les Français faits prisonniers à leur retour de l'Egypte seront rendus sur-les-champs*"). This release formally stipulated in the peace treaty, must have been Napoleon's reward for De Dolomieu's help in the capture of Malta in 1798. Two letters written by Napoleon - one dated 26 September 1800 to *Baron* De Thugut, Foreign Secretary of Austria, and one dated 2 February 1801, to Talleyrand - document his intention to have De Dolomieu released.

After his release from prison on 15 March 1801 and a happy return to France, Déodat de Dolomieu took up again his task of lecturing as professeur de minéralogie at the École des Mines in Paris. While in prison at Messina De Dolomieu had been appointed to professor in mineralogy. De Lacépède (1802) recounted how the tenure held originally by Daubenton at the Musée d'Histoire naturelle had become vacant, and how both Haüy and De Dolomieu had been considered for that position. Patriotism amongst his colleagues decided in favour of De Dolomieu. After only 3 months in Paris, De Dolomieu had to travel to Switzerland. As Bruun-Neergaard (1802) explained, this voyage was made at the request of the French government: the need for a good Alpine road near Simplon called for a geological survey. After the geological study had been completed, several of the highest Swiss mountains (Montblanc, St. Bernhard, and St. Gotthard) were toured. Bruun-Neergaard (1802) recounts, how De Dolomieu had become so very fond of drinking coffee, that he always carried an amount of ground coffee with him. But there really was no need to, because coffee had meanwhile become a household product in even the most remote mountain cabin. From Switzerland De Dolomieu returned to France and re-visited La Tour-du-Pin, where he had been born. Little remained of the ancestral *château*; it had been largely destroyed during the Revolution. According Bruun-Neergaard (1802) De Dolomieu had developed a serious lung disease during his imprisonment in the dungeons of Messina. The illness would prove to be fatal. Déodat de Dolomieu's last journey ended in Châteauneuf en Charollais, in the home of the only sister left to him, Alexandrine de Drée, née De Dolomieu. There on 16 November 1801 Déodat de Dolomieu died, 51 years old.

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FOOTNOTE: <sup>1</sup> From Bruun-Neergaard's (1802) account it becomes clear, that De Dolomieu visited in 1801 for the first time since the French Revolution his birthplace again. Serious damage had been done to the castle that had once belonged to his father. As Denier (1948, p.157) observed: "*Pendant la période révolutionaire, les quatre tours du chateau furent démolies, les écussons grattés*".

FOOTNOTE: <sup>2</sup> In his paper Á propos d'un bicentenaire: La vie aventureuse du géologue Dauphinois Déodat De Dolomieu (1750-1801), Père des dolomites (Bull. de l'Académie Delphinale, 1989, Sér.10, Année 2, no.5, pp.101-106) Debelmas relates, how the family name Gratet can be traced back to 1445. According to the records François Gratet lived at that time near La Tour-du-Pin. Another François Gratet was in 1550 Lord of the Castle at Dolomieu. His brother Antoine Gratet was administrator to the consistory at Grenoble, and bought himself in 1556 the seigniory of Granieu. In 1689 the Dolomieu estate was proclaimed a marquisate in behalf of François, the great-grandfather of Déodat de Dolomieu. The Dolomieu family has served France with National Treasurers and Presidents to the national audit office. With the death of Déodat de Dolomieu in 1801 the family name died out, but the titles of nobility went by way of his only sister to the family De Drée. The castle at Dolomieu was sold in 1853 to Baron Jean-Jacques Lombarde de Buffières, as Denier (1948) recounted.

FOOTNOTE: <sup>3</sup> De Dolomieu did not fail to impress many a woman, if only by his stature. Desgenettes (1835, p.354) relates a story told to him by P. Jacquier, concerning De Dolomieu's preference for women smaller in length than himself: "J'ignore par quelle fatalité les hommages du commandeur, qui est fort galant, s'adressent presque exclusivement à des femmes d'une petite stature; et comme il a plus de six pieds, ces dames n'arrivent qu'aux poches de son habit." But in most instances De Dolomieu was not exactly faithful to his conquests: "Le commandeur de Dolomieu plus fidèle encore à l'histoire naturelle qu'à ses nouvelles amours, partit pour les montagnes ..." (Desgenettes, 1835, p.401).

FOOTNOTE: <sup>4</sup> De Dolomieu's interest in the regional geology of the Lisbon area must have been inspired by his eagerness to explain on a scientific basis the catastrophy of November, 1st 1755. On that day an earthquake, followed by an enormous fire, had killed more than 30,000 people and had destroyed most of that city. In his 1779 paper (published by Lacroix, 1918 B) the following account of De Dolomieu's own words can be found: "Il ajoute que la rencontre d'anciens volcans, dans l'emplacement même de Lisbonne et dans ses environs, pourrait servir à expliquer les tremblements de terre qui ont ébranlé et renversé la ville à différentes époques presque périodiques, et à trouver une cause aux mouvements souterrains et très violents qu'on y ressent très souvent" (p.443 in Lacroix, 1918 B).

FOOTNOTE: <sup>5</sup> Lacroix (1918 B) related, how De Dolomieu had traveled in 1778 in the function of secretary to Prince Camille De Rohan to the French embassy in Lisbon. During 3 months De Dolomieu studied the geology of the area, and was the first to recognize basalt in the soil of Lisbon. The main conclusion reached by De Dolomieu in this particular paper, concerns the

volcanic origin of this basalt. After his return from Portugal De Dolomieu must have read his paper before the *Académie* on 19 August 1778. During his life De Dolomieu has collected a great quantity of rocks and minerals. After his death De Dolomieu's collection was inherited by his brother-in-law, *Marquis* Étienne de Drée, who donated most of it to the *Musée d'Histoire naturelle* (Paris). There Lacroix (1918) re-discovered the basalt samples from the Lisbon area, still bearing the labels in De Dolomieu's handwriting.

FOOTNOTE: <sup>6</sup> Several manuscripts of De Dolomieu not printed during his life time have been published by Lacroix, who had obtained the manuscripts from the *Comte* de Drée, heir to the grand-nephew of De Dolomieu. For example De Dolomieu's *Un voyage géologique en Sicile* (1781) and *L'exploration géologique des Pyrénées* (1782) have been published by Lacroix.

FOOTNOTE: <sup>7</sup> In 1789 the portrait of De Dolomieu (aged 40) featured here as Fig.2 was painted by Angelica Kaufman in Rome. This is the painting referred to by Lacroix (1921, Vol.I, p.LXVII). According to Briquet (1802) the painting belonged originally to De Dolomieu's close friend J. C. Delamétherie. The oil painting is now in the possession of the Musée Dauphinois, Grenoble (France). Reproduced by permission.

FOOTNOTE: <sup>8</sup> In his book *Voyages aux îles de Lipari* De Dolomieu described his 1781 trip to the small, mostly uninhabited islands near Sicily. From the islands Volcano, Volcanello, Lipari, Ile des Salines, Alicuda, Felicuda, Panarie, Ustica, Penetellaria and Stromboli, De Dolomieu described the "productions volcaniques" he had found, and added three essays on "les substances qui forment la base des laves de Lipari", on the possible "communications des volcans de Lipari avec l'Etna et la Vésuve", and on a new type of volcano ("Observations sur le phénomène que présente la montagne dite Macalube en Sicile").

FOOTNOTE: <sup>9</sup> In the booklet *Mémoire sur les tremblements de terre de la Calabre* the devastating earthquake of 5 February 1783 in southern Italy (Calabria and Sicily) was described by De Dolomieu. The almost complete destruction of the town of Messina was attributed by De Dolomieu to the wooden construction typical of most houses; a monastry made from stone in the center of town was not affected at all. Although he made it not quite clear whether or not recounting from personal experience, De Dolomieu described in vivid images the sounds and movement of this earthquake. A thunderous sound preceded each shock wave. Three different movements of the earth could be distinguished: the first type consisted of up and downward movements; the second of circular or whirling movements, and the third type of movement definitely were like the "waves of the sea".

FOOTNOTE: <sup>10</sup> The paper *Val di Noto, Iles de Lipari, etc.* forms Chapter 14, pp.336-346 in the Abbé Saint-Non's monumental *Voyage pittoresque de Naples et de Sicile*, and describes the extinct volcanism of Sicily. In his 1776 paper De Dolomieu had described, how he had recognized extinct volcanos in Portugal, and how several authors had described extinct volcanos from

Germany. In Sicily the extinct volcanos are found concentrated in the Noto Valley, especially in between the towns of Syracuse and Sortino. The Santa Venere is the highest of these extinct volcanos, and from here De Dolomieu reported finding "... des laves poreuses & compactes, en blocs isolés & en fragmens, des cendres, des scories" (p.338). De Dolomieu expressed his astonishment over finding most regular and even small scale, intercalations of volcanic ashes in between limestones and clays (in particular near Vizini). On pp.347-358 of this same volume of Saint-Non's *Voyage pittoresque* follows De Dolomieu's *Description des Isles de Lipari (Extraite d'un Voyage fait en 1781 par M. le Commandeur De Dolomieu*).

FOOTNOTE: <sup>11</sup> In his *Mémoire sur les Iles Ponces* De Dolomieu published excerpts from his diary kept in March 1786 during his voyage to the (Italian) islands of Ventotiene (= Isola Ventotene), San Stephano (= Santo Stefano), Palmarola, Ponza (= Isola di Ponza) and Zanona (= Zanone). Each description of one of the islands is followed by an enumeration of the "matières volcaniques" found. The second part of the 1788 edition of De Dolomieu's *Mémoire sur les îles Ponces et Catalogue raisonnée des produits de l'Etna* (pp.144-473) consists of a "Catalogue des Laves de l'Etna", and classifies the volcanic products in such terms as "laves compactes, laves spathiques, laves porphyriques, laves qui contiennent des cristaux de Schorl noir, laves qui contiennent des grains de chrysotiles" etc. The third part of this book contains a "Description de l'Etna" of July 1787 (pp.475-501) and the last part of it gives a description of the "Produits de l'Eruption" (pp.502-515).

FOOTNOTE: <sup>12</sup> The German text of De Dolomieu's *Oryktologische Bemerkungen über Calabrien, während einer Reise durch einen Theil dieses Landes nach dem Erdbeben von 1783 (Ein Auszug aus dessen Beschreibung des Erdbebens von Calabrien)* is in fact but a selection from De Dolomieu's Abhandlung über das Erdbeben in Calabrien im Jahr 1783 (1789, In der Joh. Gottfr. Müllerschen Buchhandlung, Leipzig, 80 p.).

FOOTNOTE: <sup>13</sup> To illustrate De Dolomieu's scientific reputation with one example, a quotation from Playfair (1822, p.508): "But Dolomieu makes a still nearer advance to the Huttonian theory; for he supposes, that under the solid and hard crust of the globe, there is a sphere of melted stone, from which this basaltic lava was thrown up."

FOOTNOTE: <sup>14</sup> The name "dolomite" was first used in Kirwan's textbook on mineralogy (1794).

FOOTNOTE: <sup>15</sup> The series of papers on *les pierres composées* was abruptly halted by De Dolomieu in 1794. The reason is to be found in the politics of the day; De Dolomieu wanted to help restore the King of France. As recorded in volume 40 (1792, p.481) of the journal *Observations sur la Physique*, De Dolomieu was at that time no longer in the mood to devote himself to the sciences: "Je suis trop sensible, Monsieur, aux malheurs de ma patrie, je suis trop indigné des attentats des factieux; je suis trop occupé des dangers qui environnent le Représentant héréditaire de la Nation,

pour avoir la disposition d'esprit nécessaire pour cultiver les sciences. Mon devoir & ma volonté consacrent mon tems & mon bras à la sûreté du Roi: je suspends donc mon Mémoire sur les Pierres composées jusqu'au moment où ma patrie sera délivrée des ennemis qui conjurent sa ruine ...".

FOOTNOTE: <sup>16</sup> In this booklet De Dolomieu's letter to Carl Ulysses von Salis Marchlin on the origin of basalt has been embodied. Especially amongst German mineralogists "the basalt question" (concerning a volcanic or a "neptunic" origin of basalt) was being hotly discussed. De Dolomieu started out with observing, that there should be consensus as to the concept of basalt at the outset. The definition of basalt given by Plinius and Ptolomeus as a rock with the colour and the hardness of iron, was quite informative. But De Dolomieu preferred to describe basalt as a "black compact lava", which would have formed its well-known regular prisms upon flowing into the sea and congealing under water. (In his own words: "Ich glaube jedermann überzeugt zu haben, daß alle Ströme von dichter Lava, die in einer gewissen Mächtigkeit bis ins Meer fliessen, daselbst eine mehr oder weniger regelmäßige prismatische Bildung annehmen": Gratet de Dolomieu, 1792, p.19).

FOOTNOTE: <sup>17</sup> When reading his *Mémoire sur la constitution de l'Egypte* (1793 A) one may well wonder how De Dolomieu could have ever prepared such an extensive paper (of 60 pages) without any first-hand knowledge. Observations published by Greek philosophers such as Seneca, Ptolemaeus and Herodotus were used as the basis for speculations on the future behaviour of the Nile river. Several aspects of the physical geography of Egypt were discussed by De Dolomieu. For example there would really be no point in preventing the annual flooding of the Nile, because these contributed significantly to soil fertility. Not the possible gradual upheaval of the areas subjected to these periodical flooding, but a possible reduction in the amount of water supplied by the Nile, would constitute a real danger. In the long term, at least according to De Dolomieu, the Nile delta would not be diminished, but would continuously be enlarged.

FOOTNOTE: <sup>18</sup> Sur les pierres figurées de Florence (1793 B) is a paper on two kinds of remarkable "stones" to be found in the surroundings of Florence. The first kind is a clayey limestone or marl ("... du genre des mixtes argillo-calcaires, comme celles nommées pierres marneuses"), locally known as "Arbarèse", exhibiting dendrites resembling (in some cases) trees. The second kind was known as "Marmor Florentinum" or "Lapis Florentinus" and could be found especially in Rimago, near Florence. The latter consists of clear calcium carbonate, often colored by iron oxides. Upon desiccation these crystals would contract to such a degree, that a multitude of tiny cracks formed. Optical refraction phenomena would render the crystals a multitude of color hues.

FOOTNOTE: <sup>19</sup> The account given in *Dolomieu en Egypte* was published by Lacroix & Daressy in 1922 from De Dolomieu's original notes that had been left to his sister, Alexandrine De Drée. In it many details concerning the activities of the French scientists accompanying Napoleon Bonaparte on his expedition into Egypt, are given. The booklet consists of five different accounts by De Dolomieu on: 1) the city of Alexandria; 2) the soil of the surroundings of Alexandria; 3) an investigation into the weathering of monuments in Alexandria; 4) a study on the agriculture of Lower Egypt; and 5) a description of the "Nilometer" on the Island of Rodah.

FOOTNOTE: <sup>20</sup> In *La Philosophie mineralogique* especially the methods of the science of mineralogy were studied, in particular the available means of distinction between the different *species*. The leading principle being the importance of the *molecules intégrantes*: "... je crois pouvoir dire que l'espèce minéralogique dépend uniquement de la constitution de la *molecule intégrante*": De Dolomieu (1801, p.38) (compare Haüy's, 1801 definition as given in note 3.26).