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Stefano Delle Chiaie (1794-1860), a forerunner of osteoarticular paleopathology

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The term "paleopathology", from the Greek words παλαιός, πάθος and λόγος is referred to a discipline involving the study of diseases detected in archeological findings, such as mummies, skeletons and single bones (1). It was coined at the end of the 19th century by the American physician and naturalist Robert Wilson Shufeldt (1850-1934) (2) and it was made popular by Sir Marc Armand Ruffer (1859-1917), professor of pathology and bacteriology at the Cairo Medical School (3), who, in the early 20th century, carried out basic research on Egyptian mummies, as proved by a series of written articles collected after his death by Roy Lee Moodie (1880-1934) (4). Research on ancient skeletal remains had already been carried out much earlier in the 18th century and, at that time, they referred to prehistoric animal remains and, in small part, to human remains (5). Given that the material available mainly consisted of skeletons, the first precise paleopathological diagnoses were referred to diseases of the bones and joints. The first correct diagnosis traditionally quoted (6) is that of the German paleopathologist, Johann Friedrich Esper (1732-1781) who, in 1774, identified an osteosarcoma in the femur of a cave bear (7). But, even earlier, in 1691, the Irishman Bernard O' Connor (1666-1698) had described a skeleton found in a cemetery in Reims in France, whose vertebra, ribs and pelvis were "welded" together (8), depicting what was later to be recognised as ankylosing spondylitis.

In the 19th century, the proliferation of archeological digs made available to researchers an ever increasing number of skeletons from the past, but this material was mainly used by anthropologists, who, by taking cranial measurements, were interested in characterising the different races of people and the historical evolution of their migration. The remains with pathological skeletal anomalies were considered as the object of curiosity rather than a source of scientific knowledge (9). It was only the extension of this research to mummified human remains, Wilhelm Conrad Röntgen's discovery of X-rays in 1895 (10), and the application to paleopathological studies of physical-chemical and radioisotopical analyses and the new techniques of "imaging", that enabled paleopathologists to reach the present level of sophistication and precision (11).

However, the first systematic study of a homogeneous series of remains rather than of isolated cases, thus giving paleopathology the dignity of a new science, is attributed to Ruffer (12).

Under this profile, we thought it would be interesting to describe the pioneer contribution, practically unknown to date (6), of an Italian researcher, Stefano Delle Chiaie (1794-1860) (Fig. 1), who, half a century before Ruffer, had the opportunity to carry out a systematic paleopathological study on the human bones unearthed in Pompei, the city which, in 79 AD, was buried, together with Ercolano, under the lava of Vesuvius. Delle Chiaie's research obviously suffers as a consequence of the scarse knowledge of the time and especially because of the extremely limited means available then: as we will see, his research does not include images except for a drawing which reproduces some bones (vertebra, phalanges). However, the text contains many very interesting observations.

Before going on to illustrate some of these observations, it would be appropriate to mention some bibliographical aspects of Delle Chiaie (13). He was born in 1794 in Teano, in the province of Caserta, graduated in medicine at the university of Naples in 1818, but never really practised the profession of medical doctor. In 1822 he joined the "Regio Istituto di Incoraggiamento alle Scienze Naturali" (Royal Institute for the Promotion of Natural Sciences), initially dealing with comparative anatomy, particularly of invertibrates (echinoderms, helminths), parassitology (14) and botany, with a particular interest in medicinal plants. It was only late in life that he concentrated on pathological anatomy. His research on the skeletons in Pompei dates back to 1853 - even if the material was published a year later (15) - and only slightly precedes the start of a serious illness, perhaps a form of progressive paralysis, which led to his death in July

Fig. 1. Stefano Delle Chiaie (1794-1860).

1860, a few weeks before Garibaldi's troops reached Naples.

Delle Chiaie's research is entitled "Cenno notomico-patologico sulle ossa umane scavate in Pompei" ("An anatomical-pathological account of the human remains unearthed in Pompei") and refers to a lecture given on 15 September 1853 at the "Regio Istituto" of which he was an ordinary member. It is divided into two parts: the first, dedicated to normal anatomy ("Osteo-notomia") and the second to pathological anatomy ("Osteo-patologia"), and is concluded in a rather abrupt way, almost as if the text itself were incomplete, with the last page containing just simple notes. Delle Chiaie's observations are illustrated in a plate (Fig. 2) which, however, is part of another book on the subject of pathological anatomy by the same author, published in Naples a few years before (16) (Fig. 3).

The first part is influenced by the prevalently anthropological influence which characterised the study of ancient skeletons in that period. At the time of the eruption of Vesuvius, there was a great number of slaves in Roman families, who not only came from the furthest corners of the Empire, but often from raids made by slave traders outside the Empire, especially in Africa. Delle Chiaie emphasises the "triple form of the Pompeian skulls" (round, oval and elongated) and the fact that many of them bore a resemblance to tropical populations, both Arab and Negro, even though most of the skulls turned out to belong to people of a Caucasian race. However, an "occipital protuberance" was quite frequent, with "notable prominence of the *crista*", as can be observed amongst Ethiopean people. But there were also skulls similar to those of "the present intertropical populations" and also, amongst the Caucasian types, there was one of an adult man "of Greek shape" and of several young men "with a perfect round figure like the Turks"

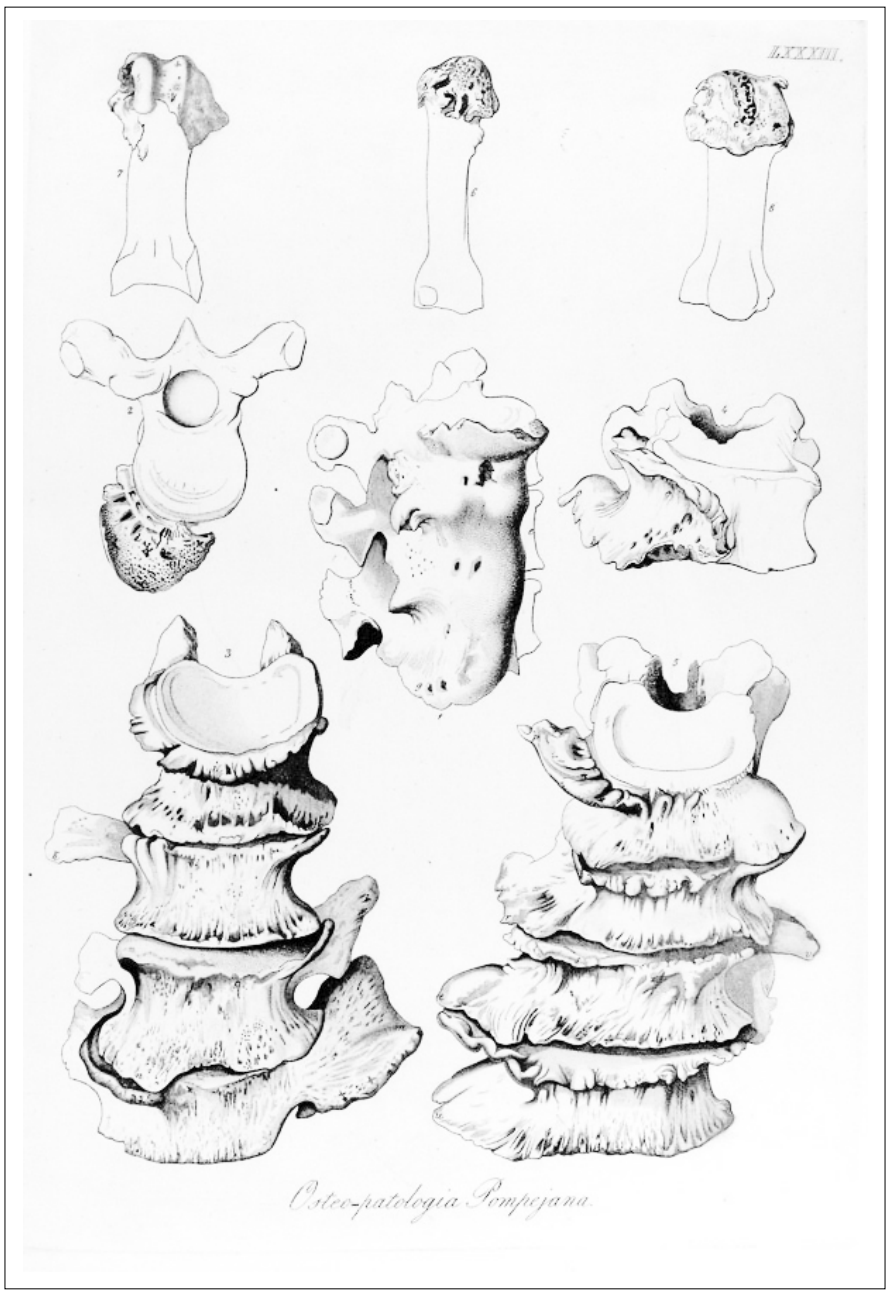

Fig. 2. "Osteo-patologia Pompeiana" (Stefano Delle Chiaie, 1847).

A decidedly innovative aspect for that time was a chemical analysis of the bone tissue, which Delle Chiaie had done in Germany by Carl Gotthelf Lehmann (1812-1863), a professor of physiological chemistry at the University of Lipsia. In his results, he pointed out that the composition of the "Pompeian" bones did not appear to be particularly different from "modern" bones. The only significant difference was the presence of a higher content of calcium "fluorate": this difference was so great that it could not be attributed to

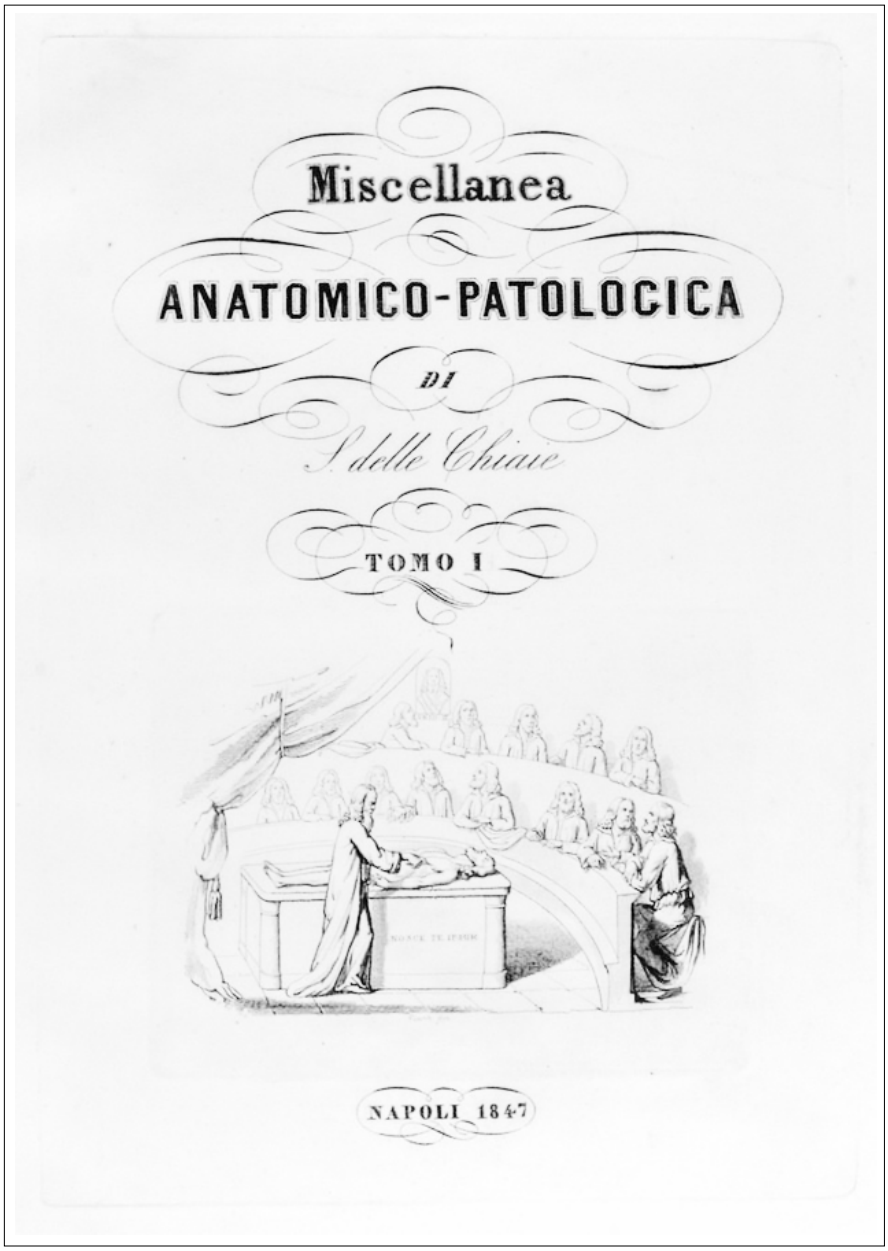

Fig. 3. Title-page of "Miscellanea anatomico-patologica" (Stefano Delle Chiaie, 1847).

an elevated sensitivity of the testing method. And since the German chemist considered that it was improbable that the matter had "penetrated into the bones from the outside, i.e. from the volcanic ash", he was inclined to believe it was due to their diet ("the food of the ancients could be an explanation").

The second part of Delle Chiaie's research, dedicated to the pathological alterations observed in the Pompeian bones, is more interesting from a paleopathological point of view. After remembering that Phillip Franz von Walther (1782-1849), who had studied the bone pathology of cave bears (17), a now extinct species of animal, had already augured the possibility of extending this type of research also to human skeletons, Delle Chiaie reports a series of cases. In reality, he gave a rather brief description of the remains examined and always anticipated a diagnosis which could sometimes be challenged, and considering the state of the nosologic knowledge at that time, today these diagnoses could not be accepted as "evidence-based".

Even the first example offers interesting points for reflection. Delle Chiaie reports that many Pompeian skulls "were affected by hypertrophia of the frontal, parietal and occipital bones" and that "the only diploid enlarged whereas the two bone walls are decreased or disappeared". Considering the geographical location of Pompei and the presence of slaves of African origin, one could suggest the hypothesis that hemoglobinopathies such as thalassemia (18) and drepanocytosis (19) may account for the hyperplasia of the bone marrow and the alterations of the cranial bones.

Some observations also regarding the cranial bones refer to skeletal anomalies such as a case of atresia of the internal auditory canal as a consequence of exostosis, a case of epactal sutures and bones, and another with a single nasal bone. A certain number of skulls presented maxillary bone decay which, in some cases, had perforated the wall of the antrum of Highmore: Delle Chiaie believed he could not attribute this alteration "as far as today is concerned" to "a rheumatic and scorbutic malformation", nor does it seem that he connected this with a paradental pathology. On the contrary, he then pointed out that "most of the maxillary bones have teeth which are conserved as well as, if not better than, teeth today". In addition, a case of a well-healed transversal fracture of the humeral diaphysis led him to remark on the ability the ancients had in dealing with fractures.

Obviously, in the Pompeian case studies, Delle Chiaie reports a discrete number of skeletal alterations referable to gout and points out that in Pompei the people eat and drank very well (with particular enphasis on "the tender meat of the Pompeian oxen"), and also the fact that many gout sufferers went to Pompei for thermal spa treatment in the nearby Stabia. However, it must also be taken into account that in Delle Chiaie's day, the concept of gout was even more widespread: for example, the author reports that in the cases he studied, there were "bones (…) of the spinal column affected by podagra", a statement which is clearly doubtful. Regarding this, and also keeping to the

subject of paleopathology, it must be stressed that at the end of the 19th century, the same Rudolf Virchow (1821-1902) used the term "Höhlengicht" (cave gout) to indicate alterations of a probable osteoarthritic nature, found in the skeletons of prehistoric animals (20).

The diagnosis of "rachitide" (rickets) is also doubtful. Delle Chiaie begins by stating that even though it was described in the 17th century, this disease had already been known "to Greek and Latin poets and physicians", which is rather improbable. Then he goes on emphasising that the Pompeian skeletons presented very little evidence of rickets, even though it was a fairly widespread disease in that region "due to the spread of (…) syphilitic and scrofulous vices", the role of which in the origin of the disease is even more doubtful.

In his concluding pages, those which he probably never finished, there is finally a very general and unclear allusion to osteophytes, and another, even briefer, to the presence of anchylosis between the left iliac bone and the sacrum, which could be a sacro-iliitis and consequently, a possible spondyloarthritis, albeit in the initial stage.

Stefano Delle Chiaie certainly did not make a particularly great contribution to osteoarticular paleopathology, of which he was, however, a pioneer. As far as we know, no other systematic research had been done then, before Ruffer's work in Egypt, on a sufficiently large series of human skeletal remains.

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