Bernardino Ramazzini

WORKS

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Dedication

This collection of Bernardino Ramazzini's Works is dedicated to the memory of another illustrious doctor of occupational medicine, Angelo Iannaccone, on the twenty-fifth anniversary of his death.

Professor Iannaccone was born in Avellino on 10.9.1925. He was awarded his degree in Medicine and Surgery at the University of Naples in 1948 and continued his studies, first at the Faculty of Medicine in Naples, then in the Institutes of Medical Pathology and Clinical Medicine, at the Faculty of Medicine in Florence as a tenured assistant, at the Institute of Occupational Medicine and finally, at the Faculty of Medicine – A. Gemelli at the Catholic University in Rome in 1968.

He also worked for prestigious Universities and Research Institutes abroad: the N.V. Organon Institute of Pharmacology and Clinical Endocrinology and Exchange of Leiden University (Holland); the section for research on Exchange at the “Wenner-Grens Institute” of the Faculty of Science; the Diabetology Clinic and Institute of Physiology at the “Karolinska Institut” in Stockholm; the departments of Endocrinology and Nuclear Medicine at the Mount Sinai School of Medicine, New York; the Medico-Therapeutic Clinic of Geneva University and Medical Clinic of the University of Lausanne; the most important institutes of Occupational medicine, Physiology, Industrial Hygiene and Psychology; Laboratories in the United States (NIOSH, EPA, Kettering Laboratory, American
Bernardino Ramazzini. Works


He was also member of the Scientific Board of the Higher Institute of Health, the Scientific Committee of the Epidemiological Observatory of the Lazio Region and a member of the National Health Council.

He was part of the Board of the Italian Society of Toxicology, the Board of the Italian Association of Industrial Hygienists, and in 1982 was appointed President of the Italian Society of Occupational Medicine and Industrial Hygiene.

He was Professor of Special Medical Pathology and Clinical Methodology in 1955, Occupational Medicine in 1958, and Preventive Medicine for Workers and Work psychology in 1963.

In 1968 he was Professor of Occupational Medicine at the Faculty of Medicine at the Catholic University of Rome, where he was appointed Institute Director in 1970, and was given a professorship, as well as being Head of the Postgraduate School.

He was the first researcher in Italy to systematically study the bio-transformation of industrial toxic substances; he furthered studies in the field of ergonomics as well as detailed studies on mercury and benzol poisoning in workers in Monte Amiata and Val d'Arno. He founded the Institute of Occupational Medicine of the Catholic University in 1968.

He was a researcher, a man whose seriousness, whose pragmatically formulated projects and whose unwavering, unceasing commitment until they had been completed all came together as one.

He was a stout believer that prevention was essential in Occupational Medicine, and from the very day it was founded, he strived to ensure his Institute was equipped with laboratories of hygiene and industrial toxicology.

He knew how to coordinate the growth of the Institute, placing emphasis on the fusion and integration of the respective skills and knowledge in the education and training of his “occupational medicine” and “hygienists and industrial toxicologists”.

For many of his pupils, his death has not diminished their sense
of being part of the Institute, which, quite simply, he was a Maestro at inspiring.

Today, in addition to the esteem, respect and admiration we feel for the Maestro, we must certainly also add the love and gratitude we feel towards him and for everything he managed to do.

*Antonio Bergamaschi*
BERNARDINI
RAMAZZINI.
Carpenfis Philofophi ac Medici,
OLIM IN MUTINENSI ACADEMIA
Primi Professors, poftremò in Paravino Lyceo Practicae
Medicinae Professoris Primarii

OPERA OMNIA,
MEDICA & PHYSIOLOGICA.

Accessit
VITA AUTORIS A BARTHOL. RAMAZZINO
Med. Doct. ejus ex Fratre Nepote scripta,
CUM FIGURIS, & INDICIBUS NECESSARIIS.

GENEVAE,
Sumptibus CRAMER & PERACHON.

M D C C X V I I .

2. Frontispiece of a Genevese edition of Opera Omnia, Geneva 1717
The high reputation of Bernardino Ramazzini’s works is demonstrated by the large number of editions, translations, emulations and quotations of the *De Morbis Artificum Diatriba* during the past centuries. Ramazzini’s works and his thinking have survived well during different periods of history, even in the times, when many other doctrines of medical theories and practices have totally disappeared. This successful survival has been based on what we can call the “Ramazzini method”, which was revolutionary in his time and is still extremely useful today. In the times when the medical discipline was still much dominated by traditions of the ancient and medieval humoral pathology, he generated a totally new paradigm concerning the impact of work and social conditions on workers’ health. In particular, he recognized occupational hazards, such as dangerous substances and unergonomic working postures and movements as causes of diseases. In addition to his clinical innovations, for example, for introduction of cinchona bark (source of quinine) as the treatment of malaria, Ramazzini was an early epidemiologist and public health scientist and he truly changed the paradigm of individual diseases of individual persons to an approach recognizing occupational, environmental and social factors as causes of diseases among groups of workers. Ramazzini’s thinking was based on his systematic studies and observations of workers’ health and their working and living conditions. He was a master in combining his clinical findings with his accurate observations in the workplace and community visits. He was simultaneously an academic, clinical scientist and grassroots doctor. He also called on his medical col-
leagues to add the questions on the patient's work to the traditional anamnesis. By introducing work as a key determinant of health, he opened new doors for proper etiological diagnosis and for appropriate treatment and prevention of diseases. These innovations have resulted in improved health and safety of workers and their families during all the different stages of industrialization and also made their impact on public health and community health.

In the 21st century Ramazzini's works are still highly relevant in both the developing and industrialized world. In fact, the globalization of the world economies has increased the relevance of the Ramazzinian paradigm. When companies and governments in search of competitiveness and cost control tend to down-prioritize the occupational health and safety programmes they simultaneously accept greater loss of health through increasing risks – and in fact – weaken their real competitiveness. Simultaneously, the situation of workers working under most adverse working conditions weakens and their negotiation power – if it ever has existed – disappears. But also in the most industrialized part of the world, where knowledge-based immaterial production is growing, Ramazzini's teaching is still relevant, especially in the management of new challenges facing the labour market, such as psychosocial hazards and problems related to new types of work organization and, for example, unphysiological working hours. New physical and chemical risks, such as nanotechnologies and nanomaterials, also need new approaches for risk management. The health, work ability and social conditions of aging workers and growing numbers of migrants need a very comprehensive Ramazzinian approach.

ICOH, by presenting the English translation of the collected main works of the Father of occupational medicine at the 29th ICOH International Congress on Occupational Health, calls on the occupational health and safety professionals to follow Ramazzini's example by looking at the real determinants of workers' health and also to consider the ethical message embedded in his paradigm. This is not the first time that the international scientific community has looked at Ramazzini's works with great interest: in 1928, the French translation of De Morbis Artificum Diatriba by F.C. Meyer was presented at the 5th International Congress of the "Commis-
The present collection of Ramazzini's main works recognizes the need to promote and continue the historical reflection process that started several years ago in ICOH. The first systematic activity for studying the ICOH history dates back to 1996, when the Working Group on History of Prevention and Occupational and Environmental Diseases was founded. In 1997 it was transformed into the Scientific Committee on History of Prevention of Occupational and Environmental Diseases. In the foundation of the activity the late Professor Antonio Grieco was a key person together with Professor Pier Alberto Bertazzi who, in all respects, has faithfully cultivated the Ramazzinian principles as key ethos for ICOH, particularly in the development of activities of the International Network on the History of Occupational and Environmental Health since 1993. In 1998 the First International Conference on the History of Occupational and Environmental Prevention was held in Rome, Italy, followed by the second in Norrköping, Sweden in 2001, and the third in Birmingham, UK in 2007. In addition to activities on history of prevention of work-related diseases, ICOH has also recognized the need to retrieve, collect, document and analyse its historical roots as an Association itself. This has been done through the recovery of sources and development of an interdisciplinary methodology of historical research, identification of criteria for analysis and transfer and for use of results.

The Ramazzinian heritage has always been important for ICOH. Retrieving the ICOH Archives from the different offices of the ICOH Secretaries Generals during the past ten decades, enabled ICOH to carry out a preliminary inventory project of available sources and to produce a directory of historiographic sources and their contents. Results of the project were collected on the CD ROM: ICOH Centennial Heritage, which was published and distributed in the ICOH Centennial Congress in Milan 2006.

As an Association with a history of more than 100 years, the International Commission on Occupational Health calls on the oc-
cupational health and safety community and also the public health and clinical medicine community at large to recognize the very principles of Bernardino Ramazzini: Look at people's work and living conditions while drawing conclusions on their health and on causes of their diseases. This lesson has been sometimes in need of re-emphasis as it is also today. The 2008 Report of the WHO Commission on Social Determinants of Health: Closing the gap in a generation. Health equity through action on the social determinants of health once again calls our efforts to follow the Ramazzinian principles.

After three hundred years since their creation, we are proud and honoured to present the English collection of the main works by Bernardino Ramazzini at the 29th ICOH International Congress on Occupational Health. We strongly believe that our Master's teachings still guide us to make occupational health and safety a basic right at work and an asset to the society.

Rome and Helsinki 15 December 2008

Professor Sergio Iavicoli, MD, PhD
Secretary General of ICOH

Professor Jorma Rantanen, MD, PhD
President of ICOH
Introduction
by Franco Carnevale, Maria Mendini, Gianni Moriani

I. The De Morbis Artificum Diatriba
Ramazzini's "method"

The "method" Ramazzini used in De Morbis Artificum Diatriba between the end of the Seventeenth and beginning of the Eighteenth century has never been invoked in vain, either in the past or present. Indeed, today Ramazzini's distinction in the "organization of his work" of the main factors that pose a risk to workers is still useful, the first consisting in the terrible characteristics of the substances they are handling and that are produced while working, and the second in identifying the movements the workers carry out, and their posture for extensive periods of time.

Furthermore, for each of the trades he deals with, Ramazzini used a relatively homogeneous method of study, more as regards the contents than the order in which he studied the subject:
1. description of the working cycle and the methods used by the workers to carry out their tasks;
2. detailed study of the techniques and the raw materials used in the work that was observed or described;
3. a clinical study of the workers in question and those who carried out that trade in the past;
4. a review of existing literature, including material from outside the medical field;
5. discussion of the self-protection measures the individual workers could adopt;
6. suggestions for individual protective measures;
7. essential therapeutic measures using medicines or generally "simple" remedies that the workers could afford;
3. Bernardino Ramazzini, Indian ink drawing by Salvatore Romano (Florence 2005)
8. analysis of the possible environmental surroundings, the workplace and the measures to be adopted;
9. proposals for good techniques and organization, personal and social behaviour from the perspective of improving or replacing traditional, unsuitable techniques;
10. identification of the various subjects and thus the decisive roles for all those affected by the work and its beneficial effects, without excluding princes and governors.

The associations between danger and illness that Ramazzini highlighted were based on intuition and logical deductions that, to a certain extent, were forerunners to epidemiological studies of an occupational nature. In some cases these were observations of the working masses. In this manner he highlighted differences in health that evoke concepts such as "sentinel events" or "relative risks", "attributable risks", "differential mortality" or pathology "prevalence" or "clusters", making it clear that they are the result of belonging to the same profession (Zocchetti, 2000).

I.I. Ramazzini's primacy: "prevention is better than cure"

Ramazzini was the very first to associate an individual profession and thus all or most workers who practised such a trade with one or more pathologies. What is more, fundamentally he was the first to seek the causes or possible causes of those illnesses in the working environment and to expound technically whether those causes might be removed or alleviated. Finally, he was also the first to theorise in full on the fact that removing or mitigating those causes of illness might be an advantage or even, and above all, a social duty. The view expressed by his contemporary Ludovico Antonio Muratori is of interest in this regard: "Signor Ramazzini is preparing his book on the Diseases of Trades, one that will be one of the most useful and interesting medicine has ever seen" (Letters, 1854).

Before Ramazzini, the loudest voice in describing the conditions of artisans was that of Jan Amos Komensky' (1592-1670), a prominent character in the Czech and European culture of the Seventeenth century. The author writes: "... there was a huge amount of salt everywhere, workshops, smelting furnaces, shops, booths, all full of unusual instruments: people with a strange bearing were
milling around, and it was a constant beating, dashing around, groaning, screeching, wailing, whistling, puffing, howling, chinking, and rubbing. I saw some people shuffling about – disembowelling it on the surface or digging tunnels in its bowels like moles. Others were sloshing around in water, in the rivers and seas, others were handling fire while yet others were staring in the air and others were fighting with wild animals. My interpreter said: 'Just look at all that lively, cheerful work. Which do you like best?' I replied: 'It is quite possible that there is a bit of cheerfulness here but I also see a lot of fatigue and can hear many sighs'. 'Not everything is difficult', he said. 'Let us look at some of these things a little closer'. He then led me around and I examined them all, one after the other, stopping here and there to try: but I can not describe it all here, and neither do I want to. However, I shall not hide what I experienced in general. First of all, I saw that all the men's trades are just suffering and fatigue; each and every one of them had his good share of discomfort and risk. Indeed, those who were working with fire were all burnt and black as Moors, with their ears constantly deafened by the hammers, their eyes blinded by the blaze of the fire and their skin cracked by burns. The companions of those working underground were gloom and terror – and more than once they were buried alive. Those working in water were freezing to the bone, shivering with cold like leaves, their bowels putrefying and the fate of no small number of them was in the abysses. Those working with wood, stone or other raw materials were covered in calluses, full of suffering and overcome with exhaustion. I observed that some of them were really working like beasts, so they would exhaust themselves and tax their strength until they had to stop, until they fell over, until they hurt themselves, until they snapped – and all this miserable fatigue was for little more than a slice of bread. Of course, I also saw much easier and more profitable trades – but on the other hand, the less the fatigue, the greater the injustice and the intrigue..." (Komensky', 2002).

It has also been pointed out that "Ramazzini's conception, which originated in the wake of the mechanical approach that had matured during the seventeenth century and then extended to the field of medicine as well, so that various scholars of that discipline were even called 'iatromechanics', actually heralded the 'century of light'. The fundamental culture of the latter was not so much based
on the relationship between Man and Nature or Man and God but rather on the relationship between men themselves, on the regulation of life together on the basis of the integral rationality of the triumphant experimental sciences and according to the interests of vaster human circles” (Premuda, 1983). With other words, when he speaks of the scientific and social “revolution” that began during Ramazzini’s lifetime, Panseri gets to the very heart of the problem when he observes that governing the health of craftsmen “has to become the appropriate technology to reach a specific aim, the preservation and development of these useful craftsmen” (Panseri, 1980). With his work, Ramazzini revealed a world of expert and “lower” workers that the intellectuals had previously ignored. Those who had once appeared as “miserable, filthy craftsmen” were illuminated in their misfortune and the fatigue that wracked their bodies and therefore no longer deserved contempt but compassion.

It is significant that Ramazzini himself wrote that he had the idea of writing *De Morbis* when he was having the latrine below his own house emptied. His curiosity was aroused so much by the haste with which the worker was trying to finish the task that he questioned the latrine cleaner. The latter replied that the only reason he was working so quickly was so he would be exposed to the fumes of the latrine as little as possible, since they caused both him and others in his trade such serious eye irritation. Ramazzini himself then went on to study this, thus highlighting the fact that workers who had cleaned latrines were forced to beg on the streets once they had become blind or half-blind.

The treatise begins with the miners of minerals and all those who use metals in their workshops. Ramazzini gives a concise description of metal poisoning, from mercury and lead in particular, that afflicts not only miners but also gilders, potters, tinsmiths, glassmakers and mirror makers.

He also pays attention to the countless workers who suffer from the consequences of being exposed to mineral or vegetable dust, for example those who work with gypsum and lime, tobacco workers, bakers and millers, stonemasons, and dressers of linen, hemp and silk noil. To counter this dust Ramazzini advises working in spacious rooms, having one’s back to the wind, frequently washing one’s mouth and face with water and vinegar and, last but not least, of giving up the trade if threatened by an incipient lung illness.