CENTAURUS JOURNAL OF THE EUROPEAN SOCIETY FOR THE HISTORY OF SCIENCE

MARCO EMANUELE OMES

"In aria sana"

Conceptualising Pathogenic Environments in the Popular Press: Northern Italy, 1820s–1840s

▼ **SPECIAL ISSUE ARTICLE** in *Pathogenic Environments*, ed. by Paul-Arthur Tortosa & Guillaume Linte

▼ **ABSTRACT** By the end of the 1820s, an innovative product was introduced in the northern Italian editorial market: technical and popular periodicals offering "useful knowledge" to a larger audience composed of members of the provincial middle-class, clergymen, and modestly educated craftsmen. By examining their medical content, this paper shows that popularisation did not merely entail disseminating a set of stable, unanimous, and trustworthy medical doctrines; rather, it represented a crucial step in the making of science during a period in which medical theories were still various and contradictory. Moreover, it demonstrates that the environmental and preventative approach to disease, which these medical contributors often employed, did reflect recent developments in chemical or physical knowledge and responded to pedagogical and informative goals; but it mostly served to affirm the social usefulness of medicine and the legitimacy of health professionals' participation in determining how to regulate more general epidemiologic, social, and political issues.

▼ **KEYWORDS** 19th Century, Environmental History, History of Science Publishing, Italy, Popularisation of Science, Social History of Sciences

▼ **ISSUE** Volume 65 (2023), issue 1

Two decades ago, Paola Govoni published a comprehensive historical study on science popularisation in Italy, focusing on the post-unitarian period between 1860 and the beginning of the 20th century. In less than 50 years, thousands of almanacs,

Marco Emanuele Omes 0000-0003-0390-3232 • Università Statale di Milano, Italy, correspondence: Marco Emanuele Omes, Università Statale di Milano, Via Festa del Perdono 7, 20122 Milano, Italy. marco.omes@sns.it

Cite this article: Marco Emanuele Omes, '"In aria sana"', *Centaurus*, 65.1 (2023), 91–120 <https://dx.doi.org/10.1484/J.CNT.5.134132>

DOI: 10.1484/J.CNT.5.134132

This is an open access article made available under a CC BY 4.0 International License.
© 2023, The Author(s). Published by Brepols Publishers.

BREPOLS

periodicals, pamphlets, and editorial collections were published thanks to printing innovations that caused prices to drop, thus broadening the audience. According to this historian, the success of positivism, together with the need to educate and nationalise the subaltern and lower-middle classes, determined a general stance in favour of popularisation, a phenomenon that reached its apex at that time. Its history, however, was in actuality longer, more precarious, and intimately more irregular; moreover, since the book's publication, the concept of popularisation itself has undergone major transformations, prompting scholars to rethink and revise past interpretative schemes.[1]

Indeed, as Govoni acknowledges, already between the end of the 18th and the first decades of the 19th century, an unsteady but innovative cultural and editorial universe took form. Thanks to low-price products, "to a certain degree it realised the Enlightenment dream of propagating science even among readers that were not members of traditional elites."[2] Between the 1820s and the 1840s, these popularising tendencies were made possible by the introduction of relatively cheap, non-specialised periodicals offering "useful knowledge," notably about medical issues: they increasingly contained contributions by learned physicians about how to live a healthy life and face the influence of potentially dangerous environments. Lorenzo Valerio's *Letture Popolari* (Turin, 1836–1841) and *Letture di Famiglia* (1842–1846) represented the most coherent and successful attempt to provide basic but "professionally approved" medical knowledge to non-specialised readers. Nonetheless, several further journals that did not target a specific professional audience followed a similar path. As this paper demonstrates, such periodicals varied in complexity, audience, and goals, but they all intended to provide both rudimentary scientific contributions and essential health advice to a modestly educated public. By doing so, their editors aimed to close the gap between two different kinds of cultural products: on the one hand, traditional books of remedies and almanacs, whose scientific reliability was becoming more and more contested; on the other hand, treatises, university textbooks, dictionaries, and scientific journals, whose number and complexity had been increasing continually since the end of the 18th century.[3]

Such a phenomenon, far from being unique to the Italian peninsula, concerned many European countries in the first half of the 19th century, and has already been partially examined by past historical studies. Until the first years of the 21st century, two main methodological and interpretative approaches were predominant, focusing respectively on the means of scientific communication (the media and their goals) and on the success of an environmental explanation of health issues (the medical culture). The first centred on the concept of scientific popularisation, to be interpreted as a long process of dissemination of shared, fixed, and trustable knowledge through the creation of cultural products suitable for a public with a modicum of

1 Nieto-Galan (2016).
2 Govoni (2002, p. 74).
3 Gentilcore (2009); Delpiano (1989).

education and literacy.[4] In this respect, the 19th century was considered a turning point: the establishment of specific scientific disciplines, together with their growing complexity and professionalisation, would "naturally" entail the need to make scientific knowledge accessible by means of strategies of adaptation.[5] The second approach questioned the persistence of a Hippocratic influence on the Enlightenment and post-Napoleonic medical thought, an interpretation that had traditionally been taken for granted due to the systematic references in most health publications to air, water, heat, insalubrity, and the need for personal or collective preventative measures to avoid disease. Roselyne Rey's seminal contribution first showed that a series of medical-epistemological innovations dating from the late 18th century were incompatible with the actual Hippocratic tradition (for example, the importance of anatomy and human cadaveric dissection, the rise of quantitative data collecting, and the abandonment of the concept of individual idiosyncrasy).[6] Further analyses have pointed out that Lavoisier's studies produced a change of material ontology by replacing the four basic elements (earth, air, water, and fire) with the three states of matter. Together with the principle of chemical purification of air and the development of a statistical approach to morbidity and mortality, it represented the precondition for the foundation of a new, multidisciplinary epistemic perspective based on hygiene.[7]

However relevant these two interpretations have been, they have been challenged or have left historical questions unanswered. By revealing that the scientific professionalisation caused neither the death of amateurism nor the disappearance of non-erudite agents in the production and circulation of scientific knowledge, recent studies have argued that opposing pairs such as amateur–professional, layman–scientist, and popular–academic should not be reified or employed uncritically. Rather, they should be acknowledged as a product of "conflicts, negotiation and compromise between categories of actors in a given context."[8] Indeed, medical pluralism was still very common during the 19th century: actual collaboration and theoretical convergence between professionals and non-academic practitioners were as common as competition and attempts at mutual marginalisation.[9] Thus, non-specialised medical contributions addressed to basically educated readers may not demonstrate the declining role played by unlearned practitioners and the consequent need to invent new ways of disseminating simplified, but trustworthy academic medical knowledge to an audience that was finally keen to accept it. Instead, this paper demonstrates that such a cultural operation could serve to define boundaries: that is, to establish the frontiers of legitimate (and sharable) knowledge and to identify its legitimate producers (not only academic professionals, but also amateurs who acknowledge the primacy of learned circles); as well as to denounce charlatans (itself a notion with "a

4 Porter (1992, pp. 2–8).
5 Bensaude-Vincent & Rasmussen (1997).
6 Rey (1992). On the constant re-invention of Hippocrates as a legitimating authority for early modern and modern medical doctrines, see Cantor (2001).
7 Jorland (2010, pp. 19–20).
8 Guillemain & Richard (2016, p. 210).
9 Ramsey (2013).

normative role to play") while aiming to match their ability to captivate the patients' imaginations, in order to secure professional physicians' incomes and social status.[10]

Likewise, studies on the early 19th-century environmental approach to health issues have failed to determine how unequivocal the "materialisation of the *circumfusa*" (that is, the presentation of environmental dangers as negative effects of physical and chemical phenomena on the human body) was in non-specialised publications. The importance of this question does not lie in the opportunity to measure the distance between reified "popular products" and academic knowledge, or to highlight the extent of top-down dynamics of dissemination. Rather, this issue confirms the need to analyse how deeply the medium (and the writers' agency) influenced the making, the characteristics, and the goals of a largely accepted medical discourse about unhealthy environments and their effects on human health.

This paper has two main purposes. First, to reinterpret the publication of elementary scientific literary products as a means of establishing boundaries in the process of knowledge-making and in the medical practice. Secondly, to show that the authors' primary aim was to persuade the readers and take a stance on current socio-economic health debates, rather than to disseminate innovative scientific paradigms. Both emerging diseases whose aetiology remained debated (for example, yellow fever and cholera) and the lower classes' generally poor health conditions allowed professional medical actors to claim a major role in defining dangers, establishing causes and priorities, and providing solutions with new methods of sanitation. In other words, the popularisation of pathogenic environments as a root cause of poor health in the periodical press was part (and the means) of a wider public process of affirmating the social usefulness of medicine.

A Critical Overview of Two Key Concepts: "Pathogenic Environment" and "Popularisation"

In the 1830–1840s, the term "*patogenico*" (that is, literally able to cause disease, morbific) was not regularly in use, and the related notion was still vague. According to a contemporary Italian medical dictionary, pathogeny was "the doctrine [that analysed] the laws regulating the development of and the relations between infirmities," that is, a simple synonym for "general pathology."[11] The word was a translation from the French *pathogénie*, whose entry had figured in Panckoucke's *Dictionnaire des sciences médicales* since 1819, indicating the branch of general pathology that dealt with the origin of diseases.[12] It comes as no surprise that such a neologism failed to gain

10 On the *savoir charlatan*, see Podgorny & Gethmann (2020); Vermeir (2020). According to Bucchi's (1998) theory of scientific communication, professionals may directly address the public through non-specialised media in "crisis situations" (that is, where there is a lack of consensus in a controversy that bolsters their desire for social recognition and scientific authority), and when scientific boundaries or professional competences are at stake. For a medical-historical example, see Nieto-Galan (2020).

11 *Dizionario Compendiato delle Scienze Mediche* (1829, p. 293).

12 *Dictionnaire des sciences médicales* (1819, p. 513).

currency in the non-specialised periodical press, because it could entail an innovative interest in disease aetiology but also be used merely as a synonym for the more common term of "pathological." Instead, the environment was generally described as "unhealthy," "noxious," or "insalubrious" when it was perceived as harmful to health. The use of such descriptive terms confirms that, until the birth of bacteriology (together with the search for the agents of disease), the predominant line of medical thought lacked an ontological approach to disease. Rather, physicians concentrated on the physiological manifestations of disease and on its multiple, overlapping determinants: not only the proximate causes (that is, "the process occurring in the diseased body"), but also more remote ones (atmospheric, environmental, behavioural, emotional, and so forth) usually identified as "predisposing causes" (begging the question: why do certain individuals get ill?) and "exciting causes" (offering potential explications of the duration, diffusion, and nature of the disease).[13] Therefore, it might seem misplaced to employ the category of "pathogenic environments" with regards to mid-19th-century medical thought. It was not clear to what extent a harmful environment caused the disease or simply affected its characteristics, and this issue was not even contemplated in such a straightforward way. Moreover, environmental factors were seldom viewed as the unique and sufficient cause of infirmities.

Nonetheless, the concept maintains a certain interpretative interest. Margaret Pelling has pointed out that different periods in the history of medical thought are distinguished less by their reference to specific types of causes of disease, than by the reframing of the hierarchy between them.[14] Furthermore, Christopher Hamlin has shown that any change in the dominant paradigm of medical interpretation is slow and depends on a transformation of the "social relations of medical practice" rather than on an explicit, intellectual rejection: the success of Chadwick's sanitary reformism should be read as a reaction against "a framework in which health was a product of the totality of social conditions …, one which provided no basis for singling out one particular problem as the most important one to attack."[15] In the Italian peninsula, the multifactorial, predispositionist interpretation of disease was attacked far less radically, but in some cases a reconfiguration of the hierarchy of causes did occur. In the Kingdom of Sardinia, for instance, Dr. Antonio Garbiglietti reinterpreted the notion of "pathogenic antagonism," which had been introduced in France by Dr. Jean-Christian Boudin, to advocate for a vast, state-funded medical campaign aiming to demonstrate through statistical and environmental enquiries (geological, hydrological, climatical, and so on) that scrofula and pellagra had different, specific causes.[16] Likewise, in 1845, King Carlo Alberto created an extraordinary geological-medical commission to examine the influence of the nature of soil on the origin of cretinism, which was endemic in the Ivrea province. Even civil authorities began to believe in the possibility of finally determining and tackling the environmental cause(s) of

13 Hamlin (1992, pp. 50–53).
14 Pelling (1993, p. 312).
15 Hamlin (1992, pp. 69–70).
16 Garbiglietti (1846).

public health issues.[17] Hence, the concept of pathogenic environment helps acknowledge such a (partial) reconfiguration.[18] The latter was undoubtedly contradictory, because both social and environmental features could be foregrounded (for example, scarcity, overcrowding, overwork, dirt, miasmas, chemical toxic exhalations, and so forth). However, it did mark a phase in which collective hygienic issues (related to specific regions, activities, or classes) began to be combined with the well-being of individuals as the core of preventative medicine in both academic medical literature and non-specialised periodicals.

Before delving into the conceptualisation of environmental dangers to health, another methodological issue must be considered: the question of popularisation of medical topics. Is it legitimate to use this notion with regard to the Italian context in the 1830s–1840s, when the pre-unitarian publishing markets were fragmented and the literacy rate very low? Moreover, is the category of popularisation itself still valid? If so, what precautions should be employed and how should it be interpreted? The first issue raises the need for minimum standards (for example, a solid editorial market, an audience that was large enough to secure profits, and so on) for defining such initiatives as "popular." The second questions the heuristic value of a category that in recent times has undergone innovative readjustments.[19]

Determining the historical appropriateness of the category of "popularisation" mostly with quantitative criteria (that is, the number of owners, readers, or users of popular publications) is not only difficult, but also often misleading. During the *Restaurazione*, literacy rates were extremely low in northern Italy (around 20% of the population, with remarkable differences between regions and between urban and rural environments).[20] Actual reading rates were yet lower: even in the 1880s, they did not exceed 3–5% of the population.[21] If scholars only consider quantitative factors, they would immediately have to conclude that any popularising initiative was unsuccessful or even meaningless; in other words, it could not be genuinely popular because the social and cultural conditions were not suitable. Nor can the importance of the category of "popularisation" for understanding the 1830s–1840s turning point only be acknowledged by pointing out that the meaning of the word "popular" had expanded since 1800s. When considering the sciences generally, it is true that "for the first time, 'popular' described cultural products intended *for* the people … in the sense of being adapted to their understanding, taste, or means."[22] Medical publications with these characteristics, however, had been very common for

17 List of the members and goals of the commission on cretinism (1845, Aug. 19), Box 1043, Category XVII (Sanità), fund "Intendenza di Ivrea," Archivio di Stato di Torino, Turin, Italy.

18 On the reshaping of the idea of environment in the first half of the 19th century and the success of notions such as "milieu" and "habitat," which stressed the dependence of living beings on what surrounds them, see Chansigaud (2019, pp. 105–116).

19 Daum (2009).

20 Mascilli Migliorini (1997, p. 105).

21 Pivato (1985); Govoni (2011); Delpiano (2013).

22 Topham (2009, p. 7).

centuries: books of remedies, herbals, and regimens of health had been circulating throughout the entire early modern era.[23]

The novelty that came into play in the first half of the 19th century can be better highlighted thanks to recent developments in book history. By studying books as material artefacts, scholars have shown that the category of popular print "is not determined exclusively by content, audiences, or genres."[24] Instead, it is primarily defined by its cost and, consequently, by particular printing practices (for example, the use of cheap materials, the reuse of the same image on the front page, large print runs, a preference for the *in-octavo* pocket size, and so on) as well as by particular editorial strategies. The appearance of innovative products such as relatively affordable periodicals addressed to "sectional interest groups" of readers was part of a general process of specialisation of scientific journals, made possible by the improvements in printing technologies.[25] Such "constant reinvention" of journals, which were gradually separated into precise categories (scientific or literary, popular or technical) in order to better match contents with audiences and maximise the publishers' incomes, marked a change between the traditional, vernacular medical literature (which, by the way, continued to enjoy great popularity) and a reality characterised by new means of communication and initiatives with which health professionals were often associated. In other words, these periodicals were "popular" not only (and not primarily) because of their simplified content or their potential success. Instead, they were "popular" because many were relatively cheap, with their basic printing quality. Furthermore, these journals were themselves instrumental in defining frontiers (which were not objective, but under construction) between different editorial products, audiences, and professional competences, as well as between what was widely discussed and what was not.[26]

Popularising Pathogenic Environments: Editorial Innovations, Content, and Goals

Whereas 18 popular medical journals were published in France between 1825 and 1858, in Italy popular scientific periodicals dedicated solely to developing medical themes remained rare.[27] Among almanacs, the *Almanacco di Sanità* by the Piedmontese physician Maurizio Pipino (1785–1789) and the *Almanacco per li Medici Chirurghi e Speziali* anonymously published in Bergamo (1788–1794) were quite

23 Martins (2019); Cavallo (2021).
24 Carnelos (2021, p. 8).
25 Topham (2016).
26 Rey (1991, p. 416). Daum (2009, p. 320) argues that "popularizing activities throughout history have often construed rhetorically a gap between expert knowledge and popular knowledge." In this sense, the making of (popular) science should be interpreted as a mode of publicity, as Hamlin (2005, p. 635) suggests. For further insights into the relationship between knowledge and communication ("how knowledge travels, to whom it is available, and how [an] agreement is achieved"), see Secord (2004).
27 Léonard (1980, p. 513); Sheets-Pyenson (1985, pp. 555–556).

unique.[28] Nor were there popular journals exclusively devoted to medicine. By the end of the 1820s, however, the model of French journals providing"useful" miscellaneous knowledge had crossed the Alps. No Italian periodical met with as much success as the *Journal des connaissances utiles* (132,000 subscribers in 1833, 60,000 one year later) due to the political fragmentation of the peninsula and the absence of such a large public of readers.[29] Nonetheless, its model influenced innovative editorial experiments by Giuseppe Pomba, like his *Propagatore* (1824–1826) and *Emporio di Utili Cognizioni* (1835–1836). Both were journals full of practical information, advice, technical announcements, and so forth, aimed at a large audience of farmers, landowners, and craftsmen. In a decade, however, these types of products underwent major adjustments: the length of each issue was halved, the cost of annual subscription dropped to 5 lire, and Pomba introduced an advantageous system of distribution by mail.[30] His initiative shows that a market for popular products would not result merely from an explicit demand for different cultural products arising from society. Instead, such a market had to be actively and incrementally created through new products and means of production (that is, the famous Cowper's Patent Machine, capable of printing at least 600 sheets per hour on both sides).[31] Due to the legal and political context, such an operation entailed many risks. The popular press did not fully enjoy an efficient legal protection, even after the introduction of the first international authors' copyright regulation between Piedmont and the Lombardo-Venetian Kingdom (1840), which was soon extended to Tuscany, the Duchies of Modena and Lucca, and the Papal States. As a consequence, popular magazines could hardly conquer larger portions of the editorial market in foreign regions; competitors were already there, often releasing similar—or identical—content due to the practice of translating, adapting, or shortening medical contributions that had originally appeared in Italian or French almanacs, journals, and health regimens.[32] At the same time, though, it was relatively easy to find enough popular medical contributions to fill up a periodical; this also explains the uniformity of the basic medical knowledge offered to lower- and middle-class readers.

The desire of health professionals to raise their voice in the public sphere enabled such editorial initiatives to be boosted and provided with fresh contents. Since the beginning of the 1830s, due to the threat of cholera, it seemed that the time had finally come for physicians to flood the book market with cheap products popularising preventative medicine. The editors of new journals of "useful knowledge" did not waste any time in seizing this opportunity, and gradually introduced original contributions about medical themes, as well. Their authors had to cope with editorial difficulties such as providing regular contributions, shortening them, simplifying the language,

28 Bianchini (2008, pp. 62–63, 81–83).
29 Bensaude-Vincent (1993, p. 50).
30 Firpo (1976, pp. 49, 108).
31 Soave (1976, pp. 125–128). Pomba, who became the publisher of the *Letture Popolari* in 1840, owned the biggest printing house in the Kingdom of Sardinia and counted among the three most active publishers on the Italian peninsula. See also Fissel (2007).
32 Ubertazzi (2000, pp. 38–40).

adopting a proper style, and fulfilling the readers' curiosity.[33] Translating did not simply mean converting between languages.[34] Likewise, popularising did not merely entail disseminating a set of stable, unanimous, and trustworthy medical doctrines through a process of reduction and enticement. Instead, it represented a crucial step in the making of science during a period in which, especially on the Italian peninsula, medical theories and therapies were still various and contradictory. In fact, several doctrinal schools conflicted with each other: the "new medical doctrine" by Giacomo Tommasini in Bologna, which advanced the proposition that the state of illness was a product of a hypersthenic excitability (inflammation) to be cured by means of a "counter-stimulus"; the vitalistic *teoria del misto organico* of Maurizio Bufalini in Florence; the inductive, iatro-philosophical approach by Francesco Puccinotti in Pisa; the "positive nosology" of Vincenzo Lanza in Naples, which reclassified diseases on the basis of clinical observations without theorising aetiologic explanations; and so on. All were theoretical doctrines that failed to adapt to the experimental, anatomopathological methods developed in France and Germany.[35] Nevertheless, even in the Italian peninsula, interest in statistical investigations and in physical and chemical effects on human organisms became stronger.

Therefore, it is not surprising that medical popularisation focused on preventative approaches and environmental dangers: they were the most immediate spheres to deal with to minimise hostile polemics and to let medicine acquire greater prestige in society. The multiplication of contributions about preventative medicine and hygiene sought to fulfil several intertwined objectives. Firstly, they permitted physician-writers to easily take a public stance against ignorance, historical remedies, and unofficial medical practitioners. Secondly, they prevented readers from accessing drug recipes and therapeutics, thus ensuring that they would seek treatment through professional doctors (at least in theory). Thirdly, they constituted a sort of common ground that allowed different doctrines to meet without clashing. Both contagionists and anti-contagionists drew attention to environmental factors and suggested similar remedies: the split between these groups, which historians have sometimes emphasised excessively, did not concern their interest in preventative measures or their focus on multifactorial determinants of the nature and effects of diseases.[36] Fourthly, they let physicians take part in crucial contemporary debates (for example, about pauperism, conditions among the working class, the relationship between health and morality): they could contact other scientists, social reformers, and state officials, thereby growing and proclaiming their social standing.[37] Medical

33 Hamlin (2005, pp. 639–640); Corsi (2016).
34 Conforti (2018); Castagnino (2020).
35 Cosmacini (1987, pp. 311–331).
36 Hamlin (1992, pp. 48–50). Such intellectual positions were far less absolute and straightforward among the majority of physicians and these groups themselves, as shown by Baldwin (1999). Moreover, Pelling (1993, pp. 320–323) demonstrates that many diseases could not be incontestably classified as either contagious or as "diseases of locality" (not infectious from person to person); therefore, such diseases were often considered "modifiable by circumstances one into another [and] intimately related to the environment."
37 Léonard (1981, pp. 67–95, 187–219); Betri (1984).

popularisation appears to be far less a strategy for disseminating ideas, than a matter of education in a very broad sense (even through instructive, entertaining stories in the popular press). Indeed, it should be interpreted as a process not only of scientific and moral education for the readers, but also of professional education for the physician-contributors, who could play a more prominent role in society and the scientific community.

If examined superficially, the medical-environmental content in popular and non-specialised journals appears homogeneous, if not repetitive. The articles generally enumerated a series of unhealthy places, such as marshes, paddy fields, sewers, slaughterhouses, hospitals, graveyards, and factories, that represented a threat to those living nearby. Neither the elements of this list, nor the basic features that determined the dangerousness of such places (for example, close proximity to dead bodies or lack of ventilation, which might cause miasmatic emanations), had significantly changed since the last decades of the 18th century.[38] Nonetheless, such a common, descriptive approach could hide a (partial) reconfiguration of the scientific explanation on which the stigmatisation of unhealthy places was based, a rejection of other physicians' theories, or even the intention to take a stance in more general economic and socio-political debates. It is worth highlighting how various the conceptualisation of pathogenic environments (and the authors' interpretation of their popularising mission) could be.

At least four different ways to analyse pathogenic should be considered. An article by Dr. Bartolomeo Rosnati, the main medical contributor to the *Ape delle Cognizioni Utili*, perfectly exemplifies the first approach, which can be described as pedagogical and authoritative. In this journal, contributions generally dealt with food adulteration, hygienic measures, and dangerous metallic exhalations, in addition to offering information about physiology and human diseases. They were rather long and the language technical, a sign that readers were intended to have at least basic knowledge of the topics discussed.[39] By contrast, in his article about the relationship between air and health, Rosnati decided not to focus on how respiration physiologically takes place; instead, he explained that readers only needed to know that breathing was crucial for life, and that an improper quantity of oxygen, nitrogen, or carbon in the air could make any environment pathogenic, if not fatal.[40] Only health professionals could determine the level of danger by means of scientific tools measuring both the composition of air and the variations in humidity, temperature, and pressure. The author illustrated neither how changes in the air concretely influenced the bodily functions, nor the reasons why they might produce miasmas in specific geographical contexts (for example, in tropical areas).[41] For Rosnati, popularising did not mean

38 Guillerme (1977).

39 Modelled on French journals of useful knowledge, this journal was first published in Capolago (in the Tessin canton, 1833–1836) and later in Milan (1836–1847); it had a circulation of 1,500–2,500 copies. Mena (2003, pp. 327–328).

40 Rosnati (1841, pp. 180–186).

41 On the allegedly climatic and miasmatic origin of Caribbean yellow fever and malaria, see McNeill (2010, pp. 22–81).

citing either sources or controversies; the medical science should appear robust and straightforward. At the same time, no place was left for past humoral or Hippocratic references. Even if the name of several illnesses had not changed since the 18th century and were still related to places (for example, nosocomial fevers, naval typhus, and so forth), measurable variations of physical or chemical agents constituted the core of this popularised approach to environmental medicine.[42]

The second method was based on prescriptive statements and a medico-topographical perspective, as demonstrated by an article by Dr. Isidore Bourdon ("General Precepts of Medical and Moral Hygiene") from the *Journal des connaissances utiles*, whose translation into Italian was first published in Pomba's *Emporio di Utili Cognizioni* and later reproduced in the Venitian *Manuale di Conversazione*.[43] Without citing Claude Lachaise's *Topographie médicale de Paris* (1822), the direct source of the article's statistical data, Bourdon affirmed that narrow, overcrowded neighbourhoods lacking ventilation were responsible for higher rates of mortality (for example, in Paris 1 death in 30 individuals in the common Maubert Square, 1 in 55 in the rich area of Chaussée d'Antin). He denounced places traditionally held as unhealthy for generating "infectious smells or noxious emanations," and proscribed living near them. In Bourdon's view, his task was to provide (or remind) practical, immediately applicable advice rather than expound complicated theoretical explanations. Yet, his approach was not neutral. By following a medico-topographical method, he implicitly rejected Louis-René Villermé's and the *Annales d'hygiène publique et de médecine légale*'s contemporary focus on the different factors behind health risk and high mortality, such as poverty, immorality, and bad living conditions.[44] Moreover, he failed to consider that chemists and hygienists had made elaborate claims about their ability to identify the real level of risk involved in each industrial activity, and even reducing it thanks to scientific advancements.[45] Such a stance had justified the introduction of a new law in 1810, regulating the proximity of manufacturing activities to towns and opposing the traditional idea that workplaces were dangerous for health due to the production of vapours or the handling of dead animals (for example, in breweries and candle factories); yet, Bourdon deliberately ignored it.[46] His analysis shows that past theories that had begun to receive criticism from professional networks maintained their validity in the non-specialised press. Popular medical contributions were seldom up to date. Instead, they preferred to confirm widely held medical convictions, by relying on inaccurate but immediate

42 Insalubrity continued to refer to the quality of air, but the latter (mostly) depended on its chemical components. On the success, limits, and transformations of eudiometry, see Golinski (2007, pp. 159–169).

43 Bourdon (1835). The author was a famous physiologist thanks to his popular-scientific epistolary work *Lettres à Camille sur la physiologie de l'homme* (1830). Like the *Emporio*, the *Manuale* (Venice, 1834–1837) was addressed to an audience consisting of "any person [who was] not uneducated and uncouth"; its circulation was about 1,000 copies, according to Vianello (1967, p. 80).

44 Lécuyer & Brian (2000).

45 Fressoz (2009, pp. 65–72); Le Roux (2016).

46 Barles, Guillerme, & Lestel (2009).

bodily perceptions (the smell of horrible stinks, the sight of invasive vapours, and so forth) rather than on scientific evaluations that were not easily explained.[47]

It should not be forgotten that such publications were primarily meant to be practical, useful, and readable. Therefore, there could be limited room for concretely demonstrating how allegedly pathogenic environments generated diseases: at best, their dangerousness was affirmed, rather than proved, through scarcely analysed statistical data. Instead, the choice of the environments under investigation was significant.[48] Referring to many unhealthy environments without delving into their specifics, like in Bourdon's case and in several other low-price periodicals, was often a way to offer rudimentary, barely applicable advice that was already current at the end of the 18th century, and paradoxically tended to make the lower classes responsible for the sanitary dangers they faced. Indeed, they could easily be accused of not following well-known instructions for healthy living.[49] Conversely, focusing on pathogenic working environments, as Dr. Andrea Bianchi did, served to stress employers' and the upper classes' duty to acknowledge and improve such unhealthy conditions, while nonetheless continuing to criticise the moral misbehaviour of the poor.

A physician without any connection to academic institutions, Bianchi wrote several articles for the *Annali Universali di Statistica* and the *Politecnico*, two journals that were particularly receptive to suggestions from France and England, such as the need to study the health consequences of industrial labour.[50] Although his arguments were not particularly original from a theoretical point of view, he stands out as one of the main advocates of a socially oriented approach to health issues.[51] Bianchi refused to consider specific environments as the unique cause of illness or high mortality rates: the climate, seasons, moral and hygienic misconduct, living and working conditions, and economic status, together with the progress of medicine and civilisation, could all influence personal and collective health. Similarly, especially when dealing with the health risks of the emerging factory system, he did not focus only on overwork or child exploitation, as if unpredictable accidents, the excess of physical activity, or a meagre diet sufficed to explain the working class's poor health conditions.[52] In other words, Bianchi did not identify peculiar pathogenic environments, nor did he conceive such a possibility, because too many intertwined factors were involved; indeed, he insisted that any place or activity could become pathogenic due to the chemical and physical modification of the air into "noxious" miasmas. Nonetheless, he increasingly pointed out the need to focus on specific, individual human environments, such as workplaces, to determine to what extent (and how) they affected

47 See Cantù (1845). The author simply suggested living in a salubrious environment ("in aria sana") not exposed to stinks or hazes.

48 Cavallo (2016).

49 Farge (1977, pp. 1000–1002).

50 Lacaita (1970). Geymonat (2018, pp. 13–14) calculates that in the first series of the *Politecnico* (1839–1844, max. 700 copies per issue), about 30 medical articles were published.

51 Baldasseroni & Carnevale (2015, pp. 179–190).

52 Bianchi (1839; 1840).

the occupants' health. Bianchi's goal was not only to make readers aware of the lower classes' worsening working conditions, nor to urge labourers and craftsmen to follow the precepts of personal, domestic, and moral hygiene; he also called for the intervention of social reformers, enlightened businessmen, and state officials.

This shows that popularising medical themes often meant taking a stance on sanitary issues that were deeply entangled with economic interests. Medical arguments could be developed to support or criticise economic activities, according to the editor's and the readership's stake in them. This economically oriented perspective constitutes the fourth and last popularising approach, which was typical of the Bolognese weekly *Il Felsineo*. Founded in 1840 as the journal of the local agricultural society by the liberal landlord Carlo Berti Pichat, it summarised a study about the best way to move stagnant waters in rice fields, originally published in the academic *Bullettino delle Scienze*, and the conclusions of an agrarian conference stating the harmlessness of the maceration of linen flax.[53] In both cases, the issue was to solve or minimise—if not deny—the environmental danger that such important local economic activities were accused of engendering due to the putrefaction of dead animal or vegetal matter in a low quantity of water, a supposed cause for the production of miasmas.[54] In such a brief, superficial recap of a lasting debate, the main goal was to preserve the reputation of a flourishing, local agricultural industry without totally ignoring potential environmental dangers. This highlights a fundamental feature of the conceptualisation of pathogenic threats. Such a reflection was not invariably socially progressive: physician-writers often defended the upper classes' interests and sensibilities by advocating for sanitary interventions through technological innovations, which tended to minimise the role played by other socio-environmental predisposing causes for diseases (malnutrition, poor living conditions, and so forth).[55] Yet, the authors were far from considering natural environmental factors as a unique, essential "exciting cause" of disease; indeed, without a clear ontological conception of disease, it was still hard to figure out a unifactorial, straightforward aetiology. The environment was not pathogenic in itself, but rather with regard to the presence and the activities of human beings (that is, for determined groups of people in an anthropic environment). In other words, in the popular press there was little or no trace of completely new interpretive paradigms about the origin of diseases; nevertheless, a deeper attention to environmental factors helped to conceive a more collective, socio-environmental predispositionism, thus mitigating the traditional medical focus on "the well-being of individuals" and fostering physicians' broader role in the public sphere.[56] Indeed, prevention could only be based on multiple forms of authority: not only that of the enlightened upper classes over ignorant workers, but also that of specialised experts (physicians devoted to social questions) over amateurs and lay people.

53 Berti Pichat (1842).
54 Faccini (1976); Snowden (2005, pp. 11–15).
55 Pickstone (1992).
56 Hamlin (1992, p. 70).

A Case Study: Conceptualising Pathogenic Environments in the *Letture Popolari* and *Letture di Famiglia*

Until the beginning of the 1840s, the weekly *Letture Popolari* barely differed from other contemporary popular publications. Founded in 1836, it was merely one of the first attempts to provide a variety of useful information to a larger audience. Its editor, Lorenzo Valerio, had been particularly influenced by Tuscan social and political reformers such as Giovan Pietro Vieusseux and Raffaello Lambruschini. Its costs (each issue was 10 cents, and a yearly subscription was 5 Sardinian lire) made it relatively affordable for craftsmen, skilled workers, and the petty bourgeoisie, whose daily salary amounted to 1.35–31.50 lire.[57] For a few years medical articles were pretty rare in its pages; in many cases they were not original, and sometimes not even written by professional physicians. They mainly concerned dietary prescriptions, precautions regarding the change of seasons, and smallpox vaccination, together with topics that had met with great success since the last decades of the 18th century (for example, spontaneous human combustion, near-death experiences, first aid for drowning, and so forth).[58] These themes cultivated the readers' curiosity about exceptional events while condemning moral and health misbehaviours such as overconsumption of alcohol.

In 1839, Valerio launched a new editorial line. In his third annual address to the readers of the *Letture Popolari*, he wrote:

> every weekly issue [of our newspaper] will include a lesson about either domestic economy, or chemistry, physics, popular geometry, in alternation with a course in hygiene for craftsmen, which will hopefully be very useful to such a vast and meritorious [social] class.[59]

Without abandoning the main aim of promoting social reform through popular education, this program marked a turning point for this periodical. The quality and consistency of the medical contributions in the *Letture* quickly improved, especially following the newspaper's suppression and rebirth under the title *Letture di Famiglia* (1842–1846).[60] Thanks to his brother Gioacchino (1809–1882), a physician who had been prominent during the 1835 cholera epidemic and co-founder of the periodical, Valerio managed to involve a few eminent doctors in his project. Among them were Bernardino Bertini (1786–1857) and Lorenzo Martini (1785–1844), respectively head of the faculty of medicine and professor of hygiene and forensic medicine at the University of Turin; Angelo Camillo Maffoni (1806–1878), who founded

57 Bravo (1968, p. 105); Viarengo (1988). The number of subscribers fluctuated between 700 and 1,200. They were mainly concentrated in Piedmont, but many were scattered across Lombardy, Liguria, and Tuscany. Copies of the journal also circulated in Geneva, Freiburg, Rome, and the Duchy of Parma.

58 Lynn (2019).

59 Valerio (1839, p. 3).

60 The newspaper was suppressed by order of the government because it had too openly criticised the Catholic Church's control over education. Its publication was allowed again in 1842, after Stefano Gallina's appointment as Minister of the Interior.

two small hospitals specialising in ophthalmology and paediatrics in Turin; and several other provincial doctors, such as Antonio Demeva (from Oneglia, in Liguria) and Giovanni Lanza. Lanza taught at the Agrarian Institute of Sandigliano (near Biella) with Alessandro Sella, the author of *Lezioni Popolari di Igiene Rurale e Privata* (1842), a cheap book full of hygienic prescriptions for basically educated farmers.[61] This shows that Valerio managed to create a solid provincial network that could cooperate on future initiatives in popular education. All these physicians shared a common cultural background and interpreted their profession as a pedagogical and philanthropic mission. Familiar and academic bonds probably played a major role in such a network. Sella's uncle, for instance, was Bartolomeo Sella, a famous "Jacobin" physician. Gioacchino Valerio was a disciple of Bertini and Martini: they respectively embodied the second and third intellectual generations of health professionals willing to promote preventative public health measures through stronger state intervention since the teaching experience of Michele Buniva during the French domination (1800–1814).[62] It comes as no surprise that these physicians welcomed Lorenzo Valerio's initiative, which helped them foster useful education and make themselves well-known among fellow scientists, social reformers, and prominent voices of public opinion. Bertini's contributions to the *Letture* were even mentioned in a famous book providing information on the participants in the first congresses of Italian scientists (1839–1847).[63] In other words, the role he played in popularising medicine did furnish him with greater visibility and credit.

Their active collaboration let the *Letture* become quite unique. In fact, from 1839 onwards the newspaper contained regular medical sections (the courses on "Craftsmen's Hygiene" by Gioacchino Valerio and "Popular Errors and Prejudices" by Bertini), which increased in number and complexity after the magazine's rebirth as *Letture di Famiglia*. In 1842, Bertini completed his "General Course about Popular Hygiene"; a second course on "Special Hygiene for Craftsmen" (much more detailed than the previous one) followed in 1843, while in 1845 Bertini launched his "Course of Popular Physiology." For the first time, medical popularisation did not contain only practical advice (Maffoni's "Suggestions to Mothers about Their Children's Diseases," 1842–1845) and hygiene (for example, "Sailors' Hygiene" by Demeva, 1844); on the contrary, it offered primary theoretical knowledge, as well.[64] At the same time, it is worth noting that a basic understanding of the physiological functioning of the human body followed the prescription of hygienic rules, whereas in journals addressed to more educated readers, like Vieusseux's *Antologia*, it constituted the fundamental

61 Nada (2004, pp. 295–296).

62 Carpanetto (2001, pp. 93–95).

63 Cantù (1844, pp. 51–52). On these congresses, see Casalena (2007, pp. 136–186).

64 Family medicine was the realm of self-medication; Maffoni's initiative tried both to gain women's trust and to relegate them to the role of mediator in the physician–patient relationship, a function that needed basic, supervised medical knowledge and great communication skills. For more details on the "reconsideration of patient power after the establishment of professionalization" and the defence of "subjective medicine" by non-academic healers, see Guillemain (2020, pp. 395–396).

basis of such precepts.[65] Medical popularisation in the *Letture* did not follow a logical path—that is, beginning with a description of the body's natural functioning and proceeding to the best means of preserving health. Instead, it was extended from the simplest features to the most complex ones. Readers should first remember and respect fundamental advice; if interested, they could then delve into more abstract contributions, which were intentionally divided into multiple, consecutive issues to maintain their conciseness and simplicity.

Traces of an environmental approach to medical questions appeared in numerous articles. Contemporary medical literature used to focus on four different aspects to investigate pathologies: the physical-environmental context that affected living things (climate, weather, heat, and so forth); the physiological effects of noxious substances from unhealthy places on the human body; the role that habits and culture played in the ways that different societies faced environmental dangers; and finally, the influence of artificial working environments, or moral and social living conditions, on human health.[66] All four topics were present in the *Letture*, although not equally. As they are deeply intertwined, the first two subjects will be examined together. Warnings against the potentially harmful consequences of air, wind, moisture, variations of temperature, and so forth were pervasive: they were at the core of any contributions about practical hygienic advice, environmental threats, or domestic or working milieux. Indeed, it is very clear that Lavoisier's epistemic revolution had not passed unnoticed. It was no longer the quality of the air (that is, the corruption of its essence) that was believed to provoke diseases. Instead, air became just "a vehicle for particles or for living micro-organisms which only reproduced in specific ecosystems."[67] For instance, Bertini explained that the "particles" causing epidemic diseases "[were] either fixed, that is to say stuck on the bodies on which they are located, and in this case are called contagions; or volatile, communicable through the air, which are named miasmas."[68] These pathogenic particles remained ill-defined in the *Letture*, as in the contemporary medical literature more generally: germs and bacteria had not yet been identified, and even the aetiology of cholera, the most threatening epidemic of the 1830s–1850s, was still a matter of debate. Nevertheless, it was a shared opinion that the environmental context could produce poisonous miasmas or influence the nature, duration, and dangerousness of a disease. Therefore, it was the authors' responsibility to identify such risks and inform readers.

A lot of different places were likely to be dangerous: as usual, swamps, rice fields, cemeteries, sewers, and so forth figured as the most insalubrious. Many pathogenic environments, however, mostly threatened specific groups of people, according to their age, sex, geographic origin, and especially job. Even marshes and paddy fields presented different levels of risk. According to Villermé, seasonal labourers moving

65 Basevi (1825; 1828). On medical topics in this journal, see Carletti (2000); Funaro (2015). On the relation between physiology and socio-political hygienic issues (for example, the management of prisons and asylums, the working classes' minimum dietary regimes, and so forth), see Turner (1982).

66 Jordanova (1997, pp. 127–130).

67 Donato (2017, pp. 171–172).

68 Bertini (1842, p. 29).

from the highlands to humid plains for harvesting were particularly vulnerable to marshy exhalations and the resultant intermittent fevers. Therefore, they should carefully choose to harvest the most salubrious fields at dawn and sunset, allegedly the most dangerous times of the workday with regard to noxious emissions.[69] Villermé's aetiology has been proven wrong: he did not know the role that anopheles mosquitoes play in causing malaria. But however ill-conceived it was, his theory was based on observation and did offer a useful admonition to labourers coming from malaria-free regions. More generally, all medical contributions in the *Letture* had practical-educational goals and aimed to minimise health dangers, however paternalistic or difficult to carry out they might be without the cooperation of landowners, entrepreneurs, and state officials. The authors' focus shows that the growing social, preventative role of medicine was stressed even in the popular press: it was the experts' duty to find solutions to sanitary issues, and the environmental context was the main factor on which to intervene. This could be done by suggesting either physical and chemical methods of sanitation (for example, land reclamation, chemical disinfection, and so forth) or more traditional methods of personal prevention (regimens). Prescriptions against environmental threats might still deal with diets, physical exercise, alcohol consumption, sexual restraint, and so forth (the so-called *private* or *domestic hygiene*), thus bearing the traces of the moralistic approach. Nonetheless, there was no room for the ancient, Hippocratic concept of idiosyncrasy anymore. Instead of focusing on the quality of air to provide specific health advice suitable for individual complexions, the authors intended to establish prescriptions that were either generally valid (because they were based on measurable criteria, with physiological effects on all human bodies—a matter for *medical police*, or *public hygiene*) or were at least suitable for particular categories (women, children, workers exposed to peculiar environmental threats, and so forth—the so-called *special hygiene*).[70]

By doing so, they followed Lorenzo Martini's lesson: he had openly advocated structuring hygiene into two branches—general and special—in his successful *Manuale d'Igiene* (1st edition 1829; revised 2nd edition 1832, later reprinted in 1835). With this book, Martini had also introduced into Piedmont Hallé's physiological interpretation of the Galenic doctrine of the six non-naturals.[71] Of the six variables potentially responsible for modifying health conditions through different organism–environment relationships (*circumfusa, applicata, ingesta, excreta, gesta,* and *percepta*), the first was the one that mainly led to the conceptualisation of pathogenic places.[72] According to Martini, air could influence organisms in six different ways: through its physical qualities (density, pressure, and so forth), chemical qualities (its composition), its movements, the level of humidity, the fluids it contains (moisture), and through bodily exhalations. Moreover, air was described as the vehicle of five kinds of emanations: miasmas, mephitis (toxic exhalations of metal minerals), smells,

69 Villermé (1842).
70 Donato (2017, p. 176).
71 On the lasting success of revisited versions of this doctrine, see Kennaway & Knoeff (2020).
72 Hallé (1798).

particles, and elements of contagion—even if the last was still a matter of controversy.[73] As already observed, at the core of the conceptualisation of pathogenic places in the medical discourse there were two principles: the measurable quantification of the physical and chemical properties of air, and their discernible effects on the body's physiology.[74] The contributions in the *Letture* universally respected these scientific perspectives, but could not develop them due to the need for brevity and simplicity. In this popular newspaper, for instance, there is no trace of Bertini's "nosological statistics" aiming to calculate the connection between mortality rates, seasonal climates, temperature, age, and occupation.[75] Nor did the authors exhaustively write about the body's malfunctioning when they focused on the dangerous consequences of unhealthy environments; these were still considered too complicated for readers with a basic educattion, if not openly controversial even in the academic setting. Only in 1843 did Bertini pave the way for the elaboration of a future popular explanation of the environment–organism relationship with his four-part course "Special Hygiene for Craftsmen"; each part focused on a body system (nervous, muscular, respiratory, and integumentary) and listed a series of jobs that were deemed potentially harmful.[76] The absence of statistical data and physiological details, which a descriptive approach to environmental issues and prescriptive hygienic statements usually replaced, was instrumental in popularisation: the *Letture*'s goal was to show and convince, rather than to explain or scientifically prove.

The third environmental perspective, which was entangled with an ethnological interest in foreign habits and with strategies to tackle environmental threats, was almost absent from Valerio's newspaper. This comes as no surprise: the medical articles mostly referred to a macro-regional area including Piedmont, the Po Valley in northern Italy, and Tuscany, which corresponded to the extent of the authors' scientific networks. There was, however, one significant exception in 1845: Abbot Giuseppe Baruffi's contributions championing a reduction of the quarantine system against plague. A naturalist, traveller, and professor of positive philosophy (that is, arithmetic and geometry) at the University of Turin, Baruffi was not a physician; yet he took part in a controversy that divided the international academic world, and even involved European governments. The gradual disappearance of plague from the northern coasts of the Mediterranean Sea had progressively weakened the terror that this epidemic had engendered during the centuries of the early modern age.[77] Meanwhile, due to controversies about the aetiology of relatively unknown diseases such as yellow fever and cholera, the usefulness of ancient institutions like lazarettos and quarantines had come under attack.[78] Moreover, relaxing anti-plague preventative measures in European ports could speed commercial exchanges, which new infrastructure and technologies like railways and steam navigation had already boosted.

73 Martini (1835, pp. 22–37).
74 Taylan (2018, pp. 47, 58).
75 Bertini (1835).
76 Bertini (1843).
77 Restifo (2005, p. 160).
78 Panzac (1998).

Therefore, calls for a reform of the quarantine system gained wide acceptance in France and the United Kingdom. The two main colonial powers could take advantage of their control of Northern African, Middle Eastern, and Ottoman seaports to impose European-style hygienic strategies of containment against epidemic threats in imperial spaces, while relaxing the precautionary institutions that regulated trade between the two sides of the Mediterranean.[79] The cities of Nice and Genoa, the main seaports in the Kingdom of Sardinia, were confronted with the risk of being excluded from international exchanges if they remained faithful to the "Italian anti-contagionist tradition."[80] For this reason, a scientific debate on quarantines arose in Piedmont, too, especially after Austria, France, and the United Kingdom had signally softened their regulations from 1841 onwards.

Baruffi was critical of the anti-plague quarantine system without sharing the openly anti-contagionist opinion of his sources of inspiration. Dr. A. Brayer and Dr. Antoine Clot-Bey had written *Neuf ans de séjour à Constantinople* (Paris, 1836) and *De la peste observée en Egypte* (Paris, 1840) after serving as medical officers in the capital of the Ottoman Empire and in Cairo, respectively; in both books, plague was said to originate from cosmic-telluric events and miasmas produced in the peculiar environmental context of the Levant. In his articles, Baruffi affirmed that plague was "an epidemic subject to temperature variations and a deterioration of the atmospheric air"; it affected human beings "according to their predispositions, the level of their wealth and cleanliness, their way of living, prejudices, and religious opinions, as well as their sex, age, and occupation."[81] In his view, the determinants of health were various, and cultural predisposition played a key role together with the environmental "exciting" causes that generated such a disease.[82] Baruffi did not completely reject the hypothesis of a morbific transmission of plague: following Dr Paolo Assalini's lesson, though, he limited the aerial transmission either to cases of close proximity to local causes or to places where many sick people gathered, like poorly ventilated hospitals and ships.[83] Therefore, "civilising the Levant" through commerce and hygienic interventions was the only appropriate strategy, as he had already argued at the Fifth Congress of the Italian scientists and in his dissertation *Dell'urgenza di Riformare il Sistema Presente delle Quarantene*.[84] Baruffi's thesis was largely condemned in the scientific community.[85] His choice to contribute to the *Letture* must be interpreted as an attempt to promote his views among a wider, non-academic audience. Indeed, in this case the conceptualisation of pathogenic places in the popular press was not

79 For further insights into the entanglement between biopolitics (strategies to confront epidemic threats) and imperial projects (with the key roles of the French and British Navies), see Rangel de Almeida (2015); Chase-Levenson (2020); Pouget (2020).

80 Bon (2018).

81 Baruffi (1845, p. 118).

82 Hamlin (1992).

83 Heaman (1995, pp. 4–5).

84 Baruffi (1844).

85 Strambio (1845). Clot-Bey regretted such a cold reception and promised to support Baruffi's scientific struggle: A. Clot-Bey to G. Baruffi [Letter] (1845, Jun. 7), II/25, Fondo Baruffi, Biblioteca di Storia e Cultura del Piemonte "Giuseppe Grosso," Turin, Italy.

related to educational goals. Instead, it was instrumental in turning the softening of quarantines into a matter of general debate, while providing medical justifications for a reform pushed by commercial and geopolitical interests.[86]

The fourth genre of medical contributions, which dealt with professional diseases and unhealthy working conditions, appeared frequently in the *Letture*. As the director of a silk factory located in Agliè, Valerio had published a study on this topic in 1840, which met with success.[87] It comes as no surprise that he welcomed articles combining medical and social approaches. Besides popularising basic health education among working-class readers, these sections urged business-owners to do their best to enlighten their employees, monitor their state of health, and discipline their behaviours, thus showing Valerio's trust in the power of reforms, education, and paternalistic self-improvement.[88] On the Italian peninsula, the process of industrialisation had only just begun (mostly in the pre-Alpine regions) and there were not yet heavy concentrations of poor workers in factories and urban slums; yet the lower classes did face poverty and terrible working conditions. For this reason, in his course "Special Hygiene for Craftsmen" Bertini chose to examine a wide range of different manual jobs that better matched with the social composition of the population, including bricklayers, laundry workers, carriers, bakers, butchers, cobblers, and so forth.[89] In his opinion, the occupation—and the place where it was performed—played a key role in determining the state of people's health:

> Few craft jobs are harmless to the health of those who perform them. The man that is always subject to the same feelings, movements, internal and external forces does contract a particular constitution that predisposes him to develop some special diseases. Everybody can be sure of this principle by simply observing the sameness that characterises certain categories' build and diseases.[90]

Bertini's conviction partly depended on the lasting success of Ramazzini's teachings in Italian medical thought: due to the combination of heat, lack of ventilation, vapours, overcrowding, poor posture, and the manipulation of mineral, vegetal, or animal matter, factories and workshops constituted a series of peculiar "micro-climates" that were said to affect the workers' health.[91] Whereas in the United Kingdom and France the environmental dangers of industrial and manual labour had been significantly downplayed through new medical paradigms insisting respectively on filth and on the

86 Cea (2019, pp. 242–248). After the First International Sanitary Conference (1851), Piedmont was the only country aside from France that ratified a convention relaxing anti-cholera quarantines (December 2 ,1852). Baruffi's attempt to repeal anti-plague measures, however, did not succeed.

87 Valerio (1840).

88 Viarengo (2019). Politically, Valerio represented a sort of "third way" between liberal-conservatism and democratic republicanism.

89 Bravo (1968, pp. 33–38). Around 1840, the Kingdom of Sardinia had about 4.1 million inhabitants, including at least 114,500 factory workers. Manual labourers numbered at least 213,000, if home-based textile workers, craftsmen, and miners were included.

90 Bertini (1843a, p. 45).

91 Vincent (2012, pp. 101–102).

combination of poverty and overwork as the main causes of health degradation, in the Italian peninsula workshops continued to be judged as harmful or deadly places.[92]

Even in a popular newspaper like the *Letture*, however, the relationship between health and environmental working conditions underwent a remarkable (yet only partial) intellectual reconfiguration. To be indisputable, the causal link between an occupation and a disease should have been proven either physiologically or, at least, statistically. The limits of scientific knowledge often prevented any physiological demonstration. The statistical method, instead, was based on calculating over-morbidity and over-mortality rates among the working classes by checking the occupations of hospital patients. As already observed regarding Bertini's "nosological statistics," it was obviously hard to establish whether the overriding reason for over-morbidity resided in the patients' specific jobs (the "micro-climate") or in their more general way of living (accommodation, diet, vices, filth, and so forth), a vast milieu that needed economic, urbanistic, and moral regulations to be made less and less harmful.[93] In his course in the *Letture*, Bertini simply decided not to deal with this methodological problem; the causal link between occupation and disease hardly ever rested on quantitative data, but was simply "observable" according to allegedly logical interpretations (for example, cobblers and tailors suffered from rickets and digestive troubles as a consequence of the compression of their gastrointestinal organs due to bad working posture and lack of air and light in their shops). Other authors, instead, began expanding their focus from micro-climatic working conditions to the more comprehensive issue of poor workers' living conditions. Lorenzo Valerio himself, in a sort of *vade mecum* for social reformers dedicated to Villermé, gave prominence to the "moral" aspects of the social question (salary, working hours, family life, religious practice, diet, and so forth), relegating the environmental concerns of industrial work (hygiene, morbidity, manipulation of dangerous matters, and so forth) to a few pages.[94] This perspective permitted the refutation or minimisation of traditional claims about the dangerousness of certain places and activities. In his article on rice farming, Dr. Costantino Cappa repeatedly warned against the miasmatic putrefaction of organic matter during the draining phases; yet he defended rice cultivation in humid plains and stigmatised the labourers' ignorance of hygienic prescriptions and their moral misconduct, defining it as "the cause … of a physical degradation of the masses."[95]

The only undeniable case of industrial harmfulness concerned chemical manufacturing employing toxic metals like lead and mercury. Translating an article by Dr. Auguste Gendrin that had originally appeared in the French newspaper *La presse*, Dr. Giovanni Lanza acknowledged that "more than forty industrial occupations" making use of white and red lead undermined the workers' health. Weakness, paralysis, epilepsy, and lead colic were among the most common effects of "the action of a

92 Lécuyer (1983); Brown (2008).

93 On the elaboration of a scientific knowledge aiming to encompass all the forces influencing human beings through their living environment (*milieu de vie*), see Taylan (2018).

94 Valerio (1841).

95 Cappa (1844, p. 85).

huge number of poisonous, volatile substances in the form of powder, vapours, or liquids."[96] According to Lanza, the physician's role was not only to acknowledge such a danger, as Ramazzini himself had already done, but also to recommend solutions like Gendrin's "sulphuric lemonade"; whereas entrepreneurs were responsible for quickly introducing preventative measures to protect their employees' health. In the *Letture* there was no room left for a passive attitude towards the environmental dangers of the workplace, which should instead be overcome through a combination of three factors: firstly, technological innovations to purify the air (for example, D'Arcet's system of ventilation, Guyton's application of muriatic acid, and so forth); secondly, utilitarian philanthropism from employers; and thirdly, workers' hygienic and moral self-improvement as summarised by the closing statement for Bertini's course ("all hygienic rules can be reduced to a single one: temperance in any actions").[97] To sum up, in a popular newspaper like the *Letture*, the environmental paradigm was still in use; yet faith in the scientific and technological progress, the need to defend the legitimacy of economically crucial manufacturing, and the focus on the generic *milieu de vie* (notably private or domestic hygiene, a matter of personal responsibility) gradually reconfigured the conceptualisation and the predominance of unhealthy working places as the main cause of disease. Insisting on the ability to study and control environmental factors, as well on paternalistic educational advice that partly freed business-owners from healthcare responsibilities, was the best option for an enlightened elite wishing to reconcile economic-industrial development with the social status of medicine and the basic improvement of the lower classes' living conditions.[98]

Conclusion

This article discusses medical contributions about unhealthy and pathogenic environments in the northern Italian popular press between the 1820s and the 1840s, a period in which they significantly increased in number and variety. In the first methodological section, this paper introduces two key interpretative categories (that is, "pathogenic environments" and "popularisation") and discusses their meaning and heuristic value. The paper argues that the notion of "pathogeny" was very recent and vague; therefore, it did not involve the rejection of the dominant medical thought, which lacked an ontological approach to disease and identified multiple, overlapping determinants of infirmity. Nevertheless, this concept helps to comprehend a partial intellectual reframing of the relation between places and health. Indeed, medical writings showed greater interest in collective hygienic issues: they began focusing on specific environments or human activities to finally determine their dangerousness through advancements in pneumatic chemistry. Such a process took place both in academic publications and in a new kind of non-specialised, relatively affordable

96 Lanza (1845, p. 142). On this topic, see Rainhorn (2019, pp. 43–81).
97 Bertini (1843b, p. 360).
98 Chiosso (2007).

journal that has been generally classified as "popular." Following the most recent studies on book history, this paper argues that popular journals were the outcome of editors' and publishers' attempts to reinvent periodicals through printing innovations, reduced costs, and the cooperation with new contributors such as learned physicians. Thus, popularisation cannot be understood without referring to editorial initiatives aimed at creating separate cultural products for sectional audiences; rather than being a process of dissemination of fixed, objective, and trustable knowledge to a reified popular public through strategies of reduction and enticement, popularisation entailed the definition of new, variable frontiers between what could be publicly debated and what could not (and by whom). In other words, it served not only to define what legitimate and sharable (medical) knowledge was, but also to identify its legitimate producers.

This paper further develops and demonstrates these argumentations in the second section. An analysis of the popular press's editorial model through the study of Giuseppe Pomba's initiatives furthers the argument that, in the northern Italian political and legal context, a suitable market that would ensure the success of popular journals barely existed. Therefore, it comes as no surprise that most of these periodicals only survived for a few years. Nonetheless, Pomba's investment in modern printing machines and a profitable system of distribution by mail allowed him to launch the model of the French journal of useful knowledge in the Italian peninsula. Eager to be heard and strengthen their social position (either against non-academic healers, or by cooperating with reformers and state officials), several professional physicians began providing contributions concerning the relation between health and pathogenic environments. The medical content was rather uniform. It was often the result of copying, translations, abridgments, and adjustments; the lack of rules protecting authorship paradoxically helped to create a larger and more coherent corpus depicting a series of anthropic ecosystems as insalubrious, noxious, and predisposed to disease. The identified list of such places had not changed since the 18th century: marshes, rice fields, slaughterhouses, and any crowded building lacking light and ventilation were supposed to represent a danger for health. Neither the brevity nor the simplicity of contributions allowed their authors to focus on the physical-chemical origins of such a danger or scientifically delve into the consequences of unhealthy environments over bodily functions, which represented the great implicit difference from the ancient, Hippocratic way of considering the *circumfusa*. However, at least four different approaches to the conceptualisation and popularisation of pathogenic environments may be enumerated. First, a pedagogical-authoritative approach, claiming an exclusive right of professional physicians to define the level of danger by means of scientific tools. Secondly, a prescriptive, medico-topographical perspective, relying not only on statistical data but also on immediate bodily perceptions, and providing practical (yet often inapplicable) advice on avoiding unhealthy places allegedly characterised by higher mortality rates. Thirdly, a socially oriented approach, focusing on manufacturing workplaces and advocating for the intervention of employers and state officials to deal with the environmental factors that affected the workers' health. Finally, an

economically oriented perspective, denying traditional environmental dangers and promoting technological innovations to protect local economic stakes.

The primary objectives of such articles were always to warn, persuade, and intervene in lasting public debates. Indeed, rather than demonstrate the rapid diffusion of theories on pathogenic environments to a new, limited public for scientific purposes, the popularisation of preventative medicine based on such a conceptualisation sought to make central the medical point of view with regard to numerous matters of debate (for example, the frontiers between laymen's, amateurs', and professionals' knowledge and responsibilities; the incipient phenomenon of industrialisation; pauperism; and the moral responsibility for poor living conditions). An analysis of the *Letture Popolari* (later *Letture di Famiglia*) and its network of professional medical contributors, in the third section, supports the argument that neither the making of science nor the process of acknowledging its usefulness can be separated from contemporary society and mediatic forms of communication. Like their non-academic competitors in the medical market (that is, healthcare actors such as unlearned practitioners, charlatans, lay healers, and so forth), physicians were economic actors, who took part in theoretical, social, and political controversies, and played the role of "cultural agents" responding to the patients' (and the readers') expectations while defending their professional interests.[99] By delving into the conceptualisation and popularisation of pathogenic environments in the popular press, this paper not only shows the transformations of the medical doctrine in non-academic publications (for example, the materialisation of the *circumfusa*, the focus on more specific workplaces or sanitary methods, and so forth); but also, and most importantly, demonstrates that new media and strategies of acculturation were deeply involved in establishing boundaries in the process of knowledge-making and in the social evolution of medical practice.

Acknowledgements

I am grateful to my colleagues and friends Adam T. Yonkers, Tatheer Ali, and Christine Randall for proofreading the text.

Funding Statement

The author received no specific funding for this study.

References

Baldasseroni, A., & Carnevale, F. (2015). *Malati di lavoro: Artigiani e lavoratori, medicina e medici da Bernardino Ramazzini a Luigi Devoto (1700–1900)*. Florence, Italy: Polistampa.

Baldwin, P. (1999). *Contagion and the state in Europe, 1830–1900*. Cambridge, UK: Cambridge University Press.

99 Guillemain (2020, pp. 400–401).

Barles, S., Guillerme, A., & Lestel, L. (2009). Pollution industrielle et réglementation des manufactures et ateliers en France au XIXe siècle: Les textes fondateurs. *Documents pour l'histoire des techniques, 17*, 174–218.

Baruffi, G. (1844). *Dell'urgenza di riformare il presente sistema delle quarantene*. Milan, Italy: Silvestri.

Baruffi, G. (1845). Cenni sulla peste orientale e sulle quarantene. *Letture di Famiglia, 4*(13), 99–101; *4*(15), 118–119.

Basevi, E. (1825). De l'influence des agens phisiques sur la vie par W. F. Edwards. Paris 1824. Ragionamento del D. E. Basevi. *Antologia: Giornale di Scienze, Lettere e Arti, 17*(50), 52–61.

Basevi, E. (1828). Fisiologia dell'uomo di N. P. Adelon, volgarizzata, e corredata di annotazioni dal D. G. B. Thaon, Vol. I, e II. Firenze Pezzati. 1826–1827. Lezioni di fisiologia di Lorenzo Martini. Vol. I–IV. Torino 1826–1827. *Antologia: Giornale di Scienze, Lettere e Arti, 29*(86), 78–89.

Bensaude-Vincent, B. (1993). Un public pour la science: L'essor de la vulgarisation au XIXe siècle. *Réseaux, 11*(59), 47–66.

Bensaude-Vincent, B., & Rasmussen, A. (Eds.). (1997). *La science populaire dans la presse et l'édition: XIX^e^ et XX^e^ siècles*. Paris, France: CNRS.

Bertini, B. (1835). *Statistica nosologica dal 1821 al 1833 … del Venerando Spedale Maggiore*. Turin, Italy: Pomba.

Bertini, B. (1842). Malattie epidemiche. *Letture di Famiglia, 1*(4), 29–30.

Bertini, B. (1843). Igiene speciale. *Letture di Famiglia, 2*(6), 45–46.

Bertini, B. (1843b). Professioni e mestieri nel di cui esercizio gli artieri sono sottoposti ad affezioni di pelle. *Letture di Famiglia, 2*(45), 359–360.

Berti Pichat, C. (1842). Conferenza agraria (25 novembre 1842). *Il Felsineo, 3*(27), 210–211.

Betri, M. L. (1984). Il medico e il paziente: I mutamenti di un rapporto e le premesse di un'ascesa professionale, 1814–1859. In F. Della Peruta (Ed.), *Storia d'Italia, Annali 7: Malattia e medicina* (pp. 207–232). Turin, Italy: Einaudi.

Bianchi, A. (1839). Sulle malattie conseguenti all'esercizio delle varie professioni e sulla relativa igiene. *Politecnico, 2*(9), 209–224.

Bianchi, A. (1840). Delle varie leggi e tavole della mortalità e dell'uso di esse nelle società di previdenza. *Annali Universali di Statistica, 63*(189), 253–271.

Bianchini, P. (2008). *Educare all'obbedienza: Pedagogia e politica in Piemonte tra Antico Regime e Restaurazione*. Turin, Italy: SEI.

Bon, D. (2018). Cholera epidemics, local politics and nationalism in the province of Nice during the first half of the nineteenth century. In J. Chircop & F. J. Martínez (Eds.), *Mediterranean quarantines, 1750–1914: Space, identity and power* (pp. 47–65). Manchester, UK: Manchester University Press.

Bourdon, I. (1835). Precetti generali d'igiene medico-morale. *Emporio di Utili Cognizioni, 1*(1), 14–22.

Bravo, G. M. (1968). *Torino operaia: Mondo del lavoro e idee sociali nell'età di Carlo Alberto*. Turin, Italy: Fondazione Luigi Einaudi.

Brown, M. (2008). From foetid air to filth: The cultural transformation of British epidemiological thought, ca. 1780–1848. *Bulletin of the History of Medicine, 82*(3), 515–544.

Bucchi, M. (1998). *Science and the media: Alternative routes to scientific communication*. Abingdon, UK: Routledge.

Cantor, D. (Ed.). (2001). *Reinventing Hippocrates*. Aldershot, UK: Ashgate.

Cantù, I. (1844). *L'Italia scientifica contemporanea*. Milan, Italy: Vedova di A. F. Stella e Giacomo figlio.

Cantù, C. (1845). Consigli per far senza il medico. *L'Artigianello, 1*(5), 45–47.

Cappa, C. (1844). Igiene dei coltivatori delle risaie. *Letture di Famiglia, 3*(11), 45–46.

Carletti, G. (2000). L'interesse per la medicina al Gabinetto Scientifico Letterario di Giovan Pietro Vieusseux. *Antologia Vieusseux, 16–17*, 5–37.

Carnelos, L. (2021). Popular print under the press: Strategies, practices and materials. *Quærendo, 51*, 8–35.

Carpanetto, D. (2001). La politica e la professione: La scuola di medicina a Torino nell'età francese. *Annali di Storia delle Università Italiane, 5*, 83–100.

Casalena, M. P. (2007). *Per lo stato, per la nazione: I congressi degli scienziati in Francia e in Italia (1830–1914)*. Rome, Italy: Carocci.

Castagnino, A. (2020). "Affinché le possano intendere anche i contadini": Tradurre la scienza per il popolo nella Repubblica di Venezia (1760–1790). In A. M. Rao (Ed.), *Il popolo nel Settecento* (pp. 191–202). Rome, Italy: Edizioni di Storia e Letteratura.

Cavallo, S. (2016). Health, air and material culture in the early modern Italian domestic environment. *Social History of Medicine, 29*(4), 695–716.

Cavallo, S. (2021). Early vernacular medical advice books and their popular appeal in early modern Italy. *Nuncius, 36*, 264–303.

Cea, R. (2019). *Il governo della salute nell'Italia liberale: Stato, igiene e politiche sanitarie*. Milan, Italy: FrancoAngeli.

Chansigaud, V. (2019). The construction of thinking on the environment: The words, their meanings, and their uses from 1790 to 1970. In F. Bretelle-Establet, M. Gaille & M. Katouzian-Safadi (Eds.), *Making sense of health, disease, and the environment in cross-cultural history: The Arabic Islamic world, China, Europe, and North America* (pp. 105–123). Cham, Switzerland: Springer.

Chase-Levenson, A. (2020). *The yellow flag: Quarantine and the British Mediterranean world, 1780–1860*. Cambridge, UK: Cambridge University Press.

Chiosso, G. (2007). *Carità educatrice e istruzione in Piemonte. Aristocratici, filantropi, e preti di fronte all'educazione del popolo nel primo '800*. Turin, Italy: SEI.

Conforti, M. (2018). Creating Italian medicine: Language, politics and the Venetian translation of three French medical dictionaries in the early 19th century. *La Révolution française, 13*. https://doi.org/10.4000/lrf.1964

Corsi, P. (2016). What do you mean by a periodical? Forms and functions. *Notes and Records, 70*(4), 325–341.

Cosmacini, G. (1987). *Storia della medicina e della sanità in Italia.* Rome, Italy: Laterza.

Daum, A. W. (2009). Varieties of popular science and the transformations of public knowledge. *Isis, 100*(2), 319–332.

Delpiano, P. (1989). I periodici scientifici nel Nord Italia alla fine del Settecento: Studi e ipotesi di ricerca. *Studi Storici, 30*(2), 457–482.

Delpiano, P. (2013). Lire les sciences dans l'Italie du XVIIIe siècle. *Archives internationales d'histoire des sciences, 63*(170–171), 287–300.

Dictionnaire des sciences médicales (Vol. 39). (1819). Paris, France: Panckoucke.

Dizionario compendiato delle scienze mediche (Vol. 13). (1829). Venice, Italy: Antonelli.

Donato, M. P. (2017). The afterlife of the non-naturals in early eighteenth-century hippocratism: From the healthy individual to a healthy population. In S. Cavallo & T. Storey (Eds.), *Conserving health in early modern culture: Bodies and environments in Italy and England* (pp. 158–182). Manchester, UK: Manchester University Press.

Faccini, L. (1976). *Uomini e lavoro in risaia: Il dibattito sulla risicoltura nel '700 e nell'800*. Milan, Italy: FrancoAngeli.

Farge, A. (1977). Les artisans malades de leur travail. *Annales: Economies, sociétés, civilisations, 32*(5), 993–1006.

Firpo, L. (1976). *Vita di Giuseppe Pomba da Torino: Libraio, tipografo, editore*. Turin, Italy: UTET.

Fissel, M. (2007). The marketplace of print. In M. Jenner & P. Wallis (Eds.), *Medicine and the market in England and its colonies, c. 1450–c. 1850* (pp. 108–132). Basingstoke, UK: Palgrave Macmillan.

Fressoz, J.-B. (2009). Circonvenir les *circumfusa*. La chimie, l'hygiénisme et la libéralisation des "choses environnantes": France, 1750–1850. *Revue d'histoire moderne et contemporaine, 56*(4), 39–76.

Funaro, L. E. (2015). "Medicina positiva": La corrispondenza fra Giovan Pietro Vieusseux ed Emanuele Basevi per l'*Antologia. Antologia Vieusseux, 21*(63), 5–24.

Garbiglietti, A. (1846). Considerazioni sull'antagonismo patogenico tra la scrofola e la pellagra. *Atti della Reale Accademia Medico-Chirurgica di Torino, 2*, 385–390.

Gentilcore, D. (2009). Il sapere ciarlatanesco. Ciarlatani, "fogli volanti" e medicina nell'Italia moderna. In M. P. Paoli (Ed.), *Saperi a confronto nell'Europa dei secoli XIII–XIX* (pp. 375–393). Pisa, Italy: Edizioni della Normale.

Geymonat, F. (2018). *Carlo Cattaneo linguista: Dal "Politecnico" milanese alle lezioni svizzere*. Rome, Italy: Carocci.

Golinski, J. (2007). *British weather and the climate of Enlightenment*. Chicago, IL: University of Chicago Press.

Govoni, P. (2002). *Un pubblico per la scienza: La divulgazione scientifica nell'Italia in formazione*. Rome, Italy: Carocci.

Govoni, P. (2011). Popularizing science in Italy: A historical perspective. An interview with Paola Govoni. *Journal of Science Communication, 10*. http://dx.doi.org/10.22323/2.10010304

Guillemain, H. (2020). A democratic program for healing: The Raspail domestic medicine method in 1840s France. *Science in Context, 33*, 385–403.

Guillemain, H., & Richard, N. (2016). Introduction: Towards a contemporary historiography of amateurs in science (18th–20th century). *Gesnerus, 72*(2), 201–237.

Guillerme, J. (Ed.). (1977). Le sain et le malsain au 18^{e} siècle [Special issue]. *Dix-huitième siècle, 9*.

Hallé, J.-N. (1798). Hygiène. In *Encyclopédie méthodique: Médecine* (Vol. 7, pp. 373–437). Paris, France: Agasse.

Hamlin, C. (1992). Predisposing causes and public health in early nineteenth-century medical thought. *Social History of Medicine, 5*(1), 43–70.

Hamlin, C. (2005). Games editors played or knowledge readers made? *Isis, 96*(4), 633–642.

Heaman, E. A. (1995). The rise and fall of anticontagionism in France. *Canadian Bulletin of Medical History, 12*(1), 3–25.

Jordanova, L. (1997). Earth science and environmental medicine: The synthesis of the late Enlightenment. In L. Jordanova & R. S. Porter (Eds.), *Images of the earth: Essays in the history of the environmental sciences* (pp. 127–151). London, UK: British Society for the History of Science.

Jorland, G. (2010). *Une société à soigner: Hygiène et salubrité publiques en France au XIXe siècle*. Paris, France: Gallimard.

Kennaway, J., & Knoeff, R. (Eds.). (2020). *Lifestyle and medicine in the Enlightenment: The six non-naturals in the long eighteenth century*. London, UK: Routledge.

Lacaita, C. G. (1970). Cattaneo e la cultura tecnico-scientifica. *Rivista Critica di Storia della Filosofia, 25*(2), 115–126.

Lanza, G. (1845). Della conservazione della salute degli operai la di cui industria s'esercita sul piombo e sulle sue preparazioni. *Letture di Famiglia, 4*(18), 142–144.

Lécuyer, B.-P. (1983). Les maladies professionnelles dans les "Annales d'hygiène publique et de médecine légale" ou une première approche de l'usure au travail. *Le mouvement social, 124*, 45–69.

Lécuyer, B.-P., & Brian, E. (2000). L'argent, la vie, la mort: Les recherches sociales de Louis-René Villermé sur la mortalité différentielle selon le revenu (1822–1830). *Mathématiques et sciences humaines, 149*. https://doi.org/10.4000/msh.2803

Léonard, J. (1980). Les guérisseurs en France au XIXe siècle. *Revue d'histoire moderne et contemporaine, 27*(3), 501–516.

Léonard, J. (1981). *La médecine entre les pouvoirs et les savoirs*. Paris, France: Aubier.

Le Roux, T. (2016). Du bienfait des acides: Guyton de Morveau et le grand basculement de l'expertise sanitaire et environnementale (1773–1809). *Annales historiques de la Révolution française, 383*, 153–175.

Lynn, M. R. (2019). Burning questions: Spontaneous human combustion in early modern Europe. *Gesnerus, 76*(1), 36–57.

Martini, L. (1835). *Manuali d'igiene e di polizia medica*. Florence, Italy: Tipografia della Speranza.

Martins, J. (2019). The afterlife of Italian secrets: Translating medical recipes in early modern Europe. In M. Rospocher, J. Salman, & H. Salmi (Eds.), *Crossing borders, crossing culture: Popular print in Europe (1450–1900)* (pp. 181–198). Berlin, Germany: De Gruyter.

Mascilli Migliorini, L. (1997). Lettori e luoghi della lettura. In G. Turi (Ed.), *Storia dell'editoria nell'Italia contemporanea* (pp. 77–112). Florence, Italy: Giunti.

McNeill, J. R. (2010). *Mosquito empires: Ecology and war in the Greater Caribbean, 1620–1914*. Cambridge, UK: Cambridge University Press.

Mena, F. (2003). *Stamperie ai margini d'Italia. Editori e librai nella Svizzera italiana, 1746–1848*. Bellinzona, Switzerland: Casagrande.

Nada, N. (2004). Istruzione e cultura agraria nel Piemonte preunitario. In G. Biagioli & R. Pazzagli (Eds.), *Agricoltura come manifattura: Istruzione agraria, professionalizzazione e sviluppo agricolo nell'Ottocento* (pp. 285–305). Florence, Italy: Olschki.

Nieto-Galan, A. (2016). *Science in the public sphere: A history of lay knowledge and expertise*. London, UK: Routledge.

Nieto-Galan, A. (2020). Useful charlatans: Giovanni Succi and Stefano Merlatti's fasting contest in Paris, 1886. *Science in Context, 33*, 405–422.

Panzac, D. (1998). Pratiques anciennes et maladies nouvelles: La difficile adaptation de la politique sanitaire au XIXe siècle. *Bulletins et mémoires de la Société d'anthropologie de Paris, 10*(1–2), 53–66.

Pelling, M. (1993). Contagion/Germ theory/Specificity. In W. F. Bynum and R. Porter (Eds.), *Companion encyclopedia of the history of medicine* (pp. 309–334). London, UK : Routledge.

Pickstone, J. V. (1992). Dearth, dirt and fever epidemics: Rewriting the history of British "public health," 1780–1850. In T. Ranger & P. Slack (Eds.), *Epidemics and ideas* (pp. 125–148). Cambridge, UK: Cambridge University Press.

Pivato, S. (1985). Quanto legge la classe operaia? Editoria popolare e lettori in Italia alla fine dell'Ottocento. *Società e Storia, 30*, 824–850.

Podgorny, I., & Gethmann, D. (2020). "Please, come in": Being a charlatan, or the question of trustworthy knowledge. *Science in Context, 33*, 355–361.

Porter, R. (Ed.). (1992). *The popularization of medicine, 1650–1850*. London, UK: Routledge.

Pouget, B. (2020). *Un choc de circulation: La puissance navale française face au choléra en Méditerranée, 1831–1856*. Rennes, France: Presses Universitaires de Rennes.

Rainhorn, J. (2019). *Blancs de plomb: Histoire d'un poison légal*. Paris, France: Presses de Sciences Po.

Ramsey, M. (2013). Medical pluralism in early modern France. In R. Jütte (Ed.), *Medical pluralism: Past-present-future* (pp. 57–80). Stuttgart, Germany: Franz Steiner.

Rangel de Almeida, J. (2015). Epidemic opportunities: Panic, quarantines, and the 1851 International Sanitary Conference. In R. Peckham (Ed.), *Empires of panic: Epidemics and colonial anxieties* (pp. 57–86). Hong Kong, China: Hong Kong University Press.

Restifo, G. (2005). *I porti della peste: Epidemie mediterranee fra Sette e Ottocento*. Messina, Italy: Mesogea.

Rey, R. (1991). La vulgarisation médicale au XVIIIe siècle: Le cas des dictionnaires portatifs de santé. *Revue d'histoire des sciences, 44*(3–4), 413–433.

Rey, R. (1992). Anamorphose d'Hippocrate au XVIIIe siècle. In D. Gourevitch (Ed.), *Malades et maladies, histoire et conceptualisation* (pp. 257–276). Geneva, Switzerland: Droz.

Rosnati, B. (1841). Dell'aria e sue relazioni principali colla salute. *Ape delle Cognizioni Utili, 9*, 180–186.

Secord, J. A. (2004). Knowledge in transit. *Isis, 95*(4), 654–672.

Sheets-Pyenson, S. (1985). Popular science periodicals in Paris and London: The emergence of a low scientific culture, 1820–1875. *Annals of Science, 42*(6), 549–572.

Snowden, F. M. (2005). *The conquest of malaria: Italy, 1900–1962*. New Haven, CT: Yale University Press.

Soave, E. (1976). *L'industria tipografica in Piemonte dall'inizio del XVIII secolo allo Statuto Albertino*. Turin, Italy: Gribaudo.

Strambio, G. (1845). *La riforma delle quarantene*. Milan, Italy: Valentini.

Taylan, F. (2018). *Mésopolitique: Connaître, théoriser et gouverner les milieux de vie (1750–1900)*. Paris, France: Éditions de la Sorbonne.

Topham, J. R. (2009). Rethinking the history of science popularization/popular science. In F. Papanelopoulou, A. Nieto-Galan, & E. Perdiguero (Eds.), *Popularizing science and technology in the European periphery, 1800–2000* (pp. 1–20). Farnham, UK: Ashgate.

Topham, J. R. (2016). The scientific, the literary and the popular: Commerce and the reimagining of the scientific journal in Britain, 1813–1825. *Notes and Records, 70*(4), 305–324.

Turner, B. S. (1982). The government of the body: Medical regimens and the rationalization of diet. *The British Journal of Sociology, 33*(2), 254–269.

Ubertazzi, L. C. (2000). *I Savoia e gli autori*. Milan, Italy: Giuffrè.

Valerio, L. (1839). Due parole ai nostri lettori. *Letture popolari, 3*(1), 1–3.

Valerio, L. (1840). *Igiene e moralità degli operai di seterie*. Turin, Italy: Baglione.

Valerio, L. (1841). *Interrogazioni proposte a chi intende visitare le manifatture*. Turin, Italy: Stamperia Sociale degli Artisti Tipografi.

Vermeir, K. (2020). Charlatan epistemology: As illustrated by a study of wonder-working in the late seventeenth-century Dutch Republic. *Science in Context, 33*, 363–384.

Vianello, N. (1967). *La Tipografia di Alvisopoli e gli annali delle sue pubblicazioni*. Florence, Italy: Olschki.

Viarengo, A. (1988). Tra filantropia e progetto politico: Le "Letture Popolari" di Lorenzo Valerio (1836–1841). *Rivista Storica Italiana, 100*(3), 559–668.

Viarengo, A. (2019). *Lorenzo Valerio: La terza via del Risorgimento*. Rome, Italy: Carocci.

Villermé, L.-R. (1842). I mietitori. *Letture di Famiglia, 1*(22), 172–174.

Vincent, J. (2012). Ramazzini n'est pas le précurseur de la médecine du travail: Médecine, travail et politique avant l'hygiénisme. *Genèses, 89*(4), 88–111.