The Tapeworm and Maria Callas' Diet: A Mystery Revealed

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Abstract: Maria Callas' diet, also known as the tapeworm diet, is a non-food-based hazardous treatment. This study aims to justify whether Maria Callas used this treatment for weight loss. To investigate this, we searched in the 'white', 'grey', and 'black' literature. The historical facts about the use of tapeworm pills seem to be inconsistent and include fake news. In the case of Maria Callas, it has been confirmed by her biography and personal communications that she was diagnosed with a beef tapeworm due to eating uncooked meat. This discredits the hypothesis that she consumed tapeworm pills.

Keywords: *Taenia saginata*; Maria Callas; tapeworm; diet; pills; uncooked meat

1. Introduction

Maria Anna Cecilia Sofia Kalogeropoúlou, known as Maria Callas, was an American-born Greek operatic soprano, born on 2 December 1923, who died of a heart attack at age 53 on 16 September 1977. Her life had many reversals of fortune some better and some worse. A significant amount of fake news surrounded her existence including the mystery of her physical metamorphosis [1] that was supposedly based on the consumption of a pill or tablet containing an embryonic tapeworm (*Taenia saginata*). This weight loss occurred during eighteen months, ending on 12 April 1954, and has been variously known as 'the Maria Callas diet', 'the tapeworm diet' [2], or 'the Hollywood tapeworm diet' [3]. This study aims to review the tapeworm diet and the relationship between Maria Callas' diet and the intake of this parasite.

2. Material and Methods

We conducted a study based on the 'white' (published journal papers, conference proceedings, and books), 'grey' (preprints, e-prints, technical reports, lectures, data sets, audio-video media, and blogs), and 'black' (ideas, concepts, and thoughts) literature [4]. Several access tools, electronic resources/databases, search engines, and catalogs to work in 'white' (Virtual Health Library, LILACS, PubMed, Scopus, Web of Science, CINAHL, and Embase), 'grey' (Google Scholar, Preprint repositories, New York Academy of Medicine's Grey Literature Report, Princeton University Library's Technical Reports and Grey Literature, and Open Grey), and 'black' literature were applied in this study. The study was developed according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement [5]. We included the following terms: 'tapeworms' OR '*Taenia saginata*' OR '*Taenia*' AND 'Maria Callas' OR 'Callas'. No restrictions were placed on the language of publication, but were limited to a time range from 1923 (her

birth date) to 2022. We excluded any information with minimal relevance to the topic of this manuscript. Two teams of paired reviewers with expertise in medical and health evaluations, and training in research methodology, independently screened titles, abstracts, and full texts for eligibility; assessed generalizability; and collected data from each eligible study using standardized pilot tested forms with detailed instructions. Reviewers resolved disagreement through discussion.

3. Results and Discussion

3.1. The History of the Tapeworm Diet

Its use, as a strategy to assist weight loss, dates back to the end of the 19th century, focusing on maintaining the physical standards of the Victorian era [6]. On the internet an advert, created in 1898, shows one of the first images describing this parasite as assisting in weight loss (Figure 1). However, this advert was exposed as a fake poster due to the fact that the fonts and styles are anachronistic and it was on show in The House on the Rock, in Wisconsin (USA), which is known for its fake exhibits.

Figure 1. Fake poster that was attributed to the first advertisement of the tapeworm diet. (Tapeworm Diet—by The U.S. Food and Drug Administration (Weight-Loss Ad (FDA 154)) (Public domain), via Wikimedia Commons).

In 2015, the poster was indicated as a fun 'vintage-inspired' exhibit [7]. On the other hand, a report [8] in 1912 in The Washington Post indicated unverified information about tapeworms' pill vendors. This year is the starting point of the fake news about this topic, which is based on a strange story where a social woman from Peoria, Illinois, bought this pill and sent it to her husband in Washington to be analyzed, who found the head of a tapeworm inside [2]. The story was denied by Surgeon General Rupert Blue [9], after the unsuccessful search for the results of this analysis in the Hygienic Laboratory of Washington. He explained that it was a fine yarn, but simply untrue; even the laboratory director said that it was the wildest story he had heard of for some time [6]. Two years later, other fake news appeared about a woman who had bought a liquid-filled capsule with a tapeworm inside for USD 300 [10]. The following story took place as a fictional humor column written by Mabel Herbert Urner [11], entitled 'The Married Life of Helen and Warren' [12], which involved a non-existent Dr. Phake prescribing treatment-based on the intake of parasite pills [13].

The myth was dismissed back in the 1930s, by the American Medical Association [9]. The myth reappeared prominently during the 1950s due to rumors surrounding Maria Callas which continued throughout the rest of her life, as we will see in the next section. It

then progressively disappeared until the arrival of the internet and social networks, where the myth re-emerged [14]. Tucker [15] reviewed the symbolic resonance of tapeworms including the history of Maria Callas. Furthermore, a rumor of model Claudia Schiffer's use of this treatment [16,17] was published, while a fake case report reflected the story of a mother who admitted giving tapeworms pills to her teenage daughter for a beauty pageant [18]. In fact, Khloé Kardashian indicated interest in buying a tapeworm online to lose weight [19]. Some webpages [20,21] indicate that treatment with a tapeworm pill is only available in Mexico, with an approximate cost of around USD 1500. Many internet users are looking to buy it, as reflected in Google Trends (Figure 2).
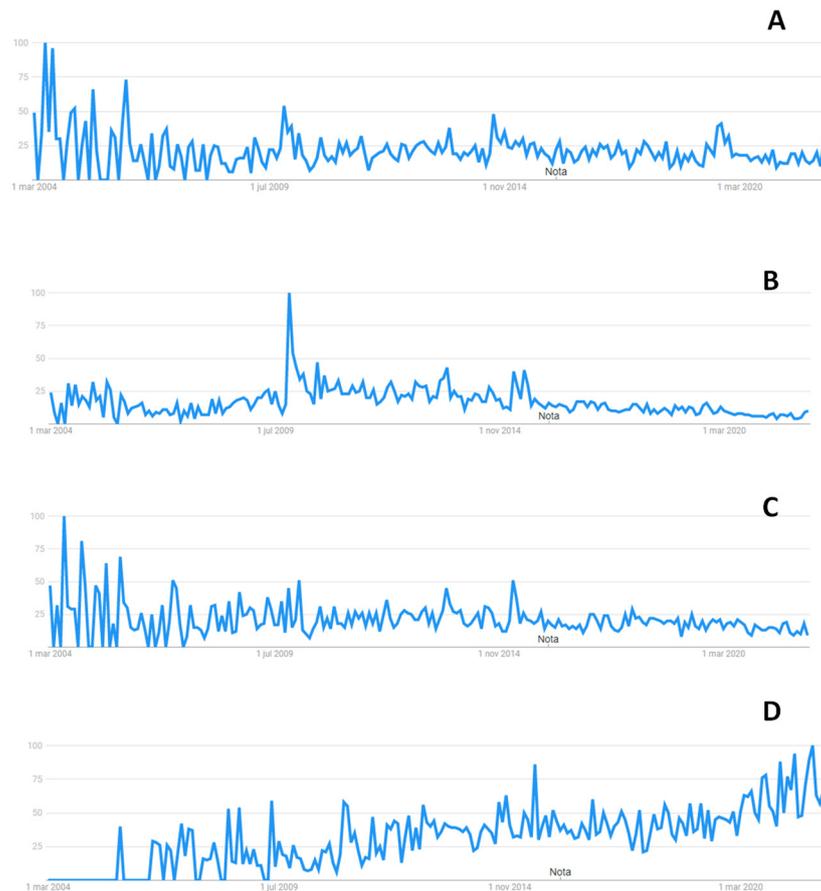
Figure 2. Interest over time as measured by Google Trends: "tapeworm pills" (**A**), "tape-worm diet" (**B**), "tapeworm weight loss" (**C**), and "comprar tenia" ("tapeworm purchase") (**D**). The last search was conducted in Spanish due to internet users thinking that is sold in Mexico.

According to a new proposal for classifying hazardous diets, this treatment is classified as a non-food-based hazardous treatment [22]. Król et al. [23] indicated three main risks, in tapeworm pills: (i) not knowing what they contain; (ii) before the tapeworm grows, weight loss will not be achieved (in fact, it is usual that the infection will be asymptomatic or with few symptoms); and (iii) some patients can be co-infected with an-other species, resulting in serious illness or even death. Song et al. [24] studied co-infection with *Taenia solium* which causes dangerous cysticercosis.

3.2. The Myth of Maria Callas and Tapeworm

Maria Callas suffered weight gain and loss throughout her life; the ratio of her height and weight is key. Petsalēs-Diomēdēs [25] (p. 268) reflected that value of Callas' height was 1.73 m, which can be confirmed by her ID card, found in Folder G51/1 and issued

on 9 June 1949, by the City Hall of Zevio. According to several authors, Figure 3 shows the timeline of her weight variation.
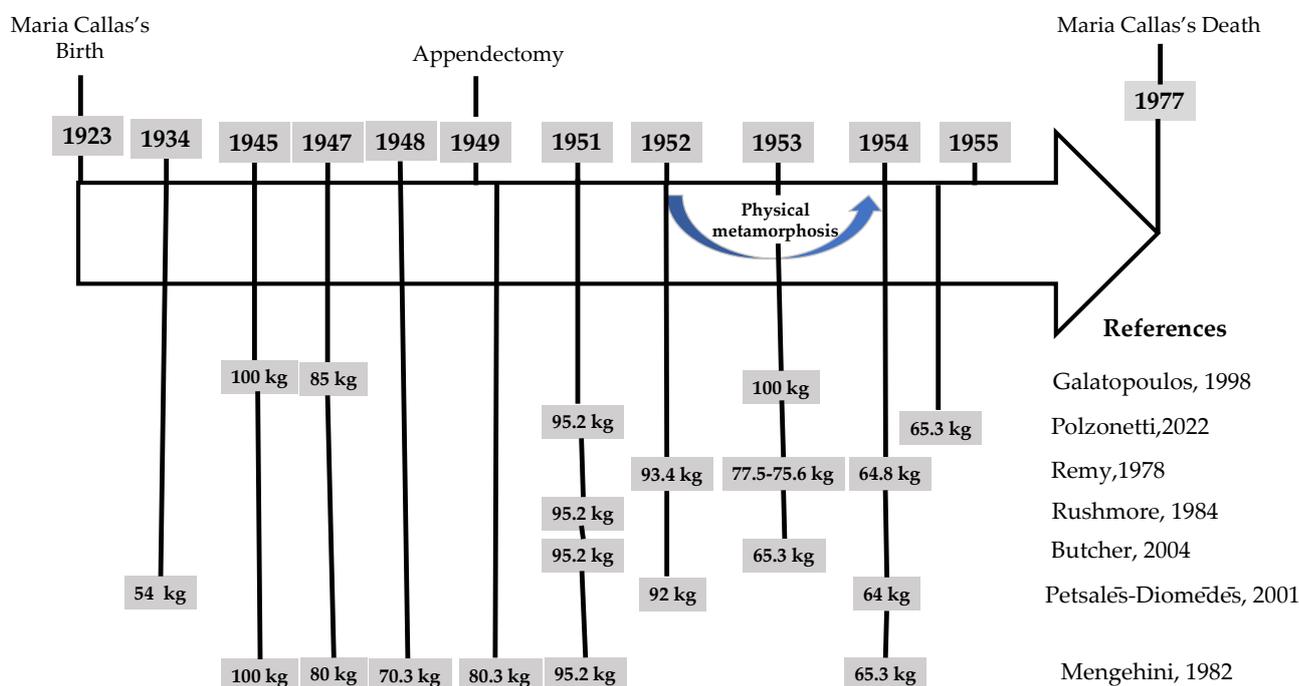
Figure 3. Timeline of weight variation of Maria Callas [25] (pp. 64, 269), [26–30] and [31] (pp. 105, 208).

Maria Callas' weight loss status is best expressed by the body mass index (BMI), expressed in kilograms divided by the square of the person's height in meters (kg/m^2), first proposed a century earlier by Quetelet [32]. However, data from Figure 3 are from the 1970s, and the use of BMI was not internationally standardized [33], as the best measure of obesity, until the arrival of The Seven Countries Study from Ancel Keys [34]. In our viewpoint, we think that the measurement we should use is the standard established by the American government in the 1950s, which was previously created in the 1940s by Louis Dublin, a statistician with the Metropolitan Life Insurance Company, who prepared life tables using a height-to-weight index to identify overweight and obese persons [35]. We worked with the 1942 Metropolitan Life Ideal Weight Women [36] and 1959 Metropolitan Desirable Weight [37] indices, due to the fact that the first reference [36] was in place at the start of Maria Callas' timeline (Figure 3), while the second [37], even though of late 1950s, had a recompilation that was carried out during the 1940s and 1950s.

In fact, maintaining the ideal weight had become an obsession for Maria Callas, as was reflected in a letter [38] from Buenos Aires on 3 July 1949, written to another soprano called Maria Caniglia [39]. According to Figure 3 and standard references of the Metropolitan Life Insurance Company [36,37], Maria Callas had ideal weight in 1948–1949 (until her appendectomy), 1954, and 1955. In fact, she was diagnosed with appendicitis by her brother-in-law, Gianni Cazzaroli, corroborated by Verona's leading surgeon, Salvatore Donati, and she was operated on at the beginning of December 1949 [31] (p. 67). She gained around 10 kg after her appendectomy in a short period of time, reaching her maximum weight (95.2 kg) by her formal debut at Teatro alla Scala in Milan in December 1951. Her weight slightly decreased by her debut, for Bellini's Norma, at the Royal Opera House, Covent Garden [28]. Eighteen months later, Maria Callas' physical metamorphosis took place, surprising her audience on 12 April 1954, when she made her debut with Verdi's Don Carlo again at La Scala [28].

Over her lifetime, she wanted to lose weight as a result of her own goals or via influences from other persons, such as the Milanese dressmaker Biki [27]. Regardless, several pieces of fake news were created about Callas' weight loss, including that she

carried out a diet to look like Audrey Hepburn in *Roman Holiday* (1953) [40]. However, her surprising weight loss caused rivers of ink to flow, and the fundamental starting point was to justify her success based on the intake of a tapeworm, either involuntarily [30] or voluntarily, with pills [41] or directly [42], as a slimming treatment. What is unquestionable is the fact that she had a tapeworm inside, which became proof of the fact of a physical metamorphosis [1]. This transformation was justified by Maria as an attempt to rid herself of the tapeworm, and this version was told by Giovanni Battista Meneghini [31] (p. 105). According to her husband, he had precipitously left the performance that he was attending at La Scala, and when he arrived at their suite at the Grand Hotel in horrified apprehension, Maria said that 'Battista, please come immediately. I've killed it!'. She told him that she had expelled and killed a tapeworm in the bathroom of their Milan hotel. Soon after, her husband called Callas' doctor, Gerardo de Marco, who prescribed some medicine to eliminate the problem. Let us pause to consider this version for a few moments. Battista had indicated that she was wearing a blue dressing gown after she exited the bathroom, justifying that she removed a rather long section of her parasite when bathing. Owen [43] indicated that when the tapeworm is expelled over a warm sitz bath, there is less fear of the expelled portion contracting and breaking before the expulsion of the head. Maria Callas explained to Claudia Cassidy, an influential American performing arts critic, that the simple explanation of her weight loss was due to the expelling of the tapeworm [44]; meanwhile, Maria received many letters from women begging her to reveal her secret, as well as from clinics and companies offering astronomical sums for an exclusive patent on 'the Callas formula' [31] (p. 209). Furthermore, she was exploited by the food industry as a model for slimming. In 1954, a remarkable announcement appeared in the *Corriere della Sera* stating that Maria Callas had lost weight after a treatment based on eating 'Pantanella Mills physiological pasta', which was backed by Cazzarolli. In indignation at this false claim, she sued the company. Pantanella's managing director, who is a nephew of Pope Pius XII, wanted to defend his company's reputation, requesting immediate assistance from his uncle, but Maria initiated a trial, and after four years of tough legal wrangling, she received compensation, plus costs, and a letter of apology written by Dr. Cazzarolli and Pantanella Mills that they were compelled to publish in the Corriere della Sera [45].

Nowadays, the idea that Maria Callas ingested a tapeworm via pills cannot be sustained due to the unlikeliness of this working. According to the American Medical Association [9], this is easily dismissed as an eccentric and ridiculous idea based on the notion that a famous doctor from Switzerland recommended that she ingest a tapeworm by drinking a glass of champagne [31] (p. 209). Accordingly, there are only two versions of the presence of a tapeworm in her body. The first version, based on an involuntary reaction, was indicated by her husband, in the bathroom scene, described above, which justified the presence of the parasite due to the intake of uncooked meat [31] (p. 213). The second version is based on her voluntarily intake of a tapeworm without pills; she disproved Meneghini's account through a mezzo-soprano, called Giulietta Simionato, Maria's close friend, and her sister, Jackie Callas, who confirmed that the reason for her dramatic weight loss was a tapeworm that she had voluntarily ingested [46]. In our opinion, the answer to this enigma is resolved by Callas' personal chef, Elena Pozzan, who indicated, in February 2014, that Callas and herself were both repeatedly infected by tapeworms due to the consumption of uncooked meat in her high-protein diet [27]. According to her husband, the Callas' nutritional treatment regime consisted of grilled meats or steak tartar, great quantities of unseasoned vegetables, a little water, only a drop of wine, and no bread or pasta [45]; moreover, steak tartar was the vehicle of food parasite contamination of their beef tapeworms (*Taenia saginata*) [47]. In fact, Lukes et al. [48] reviewed the historic use of self-infections to the early elucidation of life cycles of *T. saginata*. They considered examples of self-infection in protists and helminths, and suggested criteria which could be used as potential therapies for human diseases.

4. Conclusions

In conclusion, there are no case reports published in the literature about the consumption of tapeworms in pills or tablets; the discussion was solely based on rumors and fake news. Although its fame has spread over the last 100 years, the truth is that the claims in various media reports are not supported and it is another one of the lies used for weight loss. It is clear that if one 'repeats a lie often enough, it becomes the truth'. On the other hand, we concluded that the presence of this parasite in Maria Callas' diet was probably due to the consumption of uncooked meat, since tartar was her favorite dish, and could have easily been contaminated by *Taenia saginata*. However, eliminating this parasite was key to Maria Callas' physical metamorphosis and her success in reaching her ideal weight.

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References

1. Scott, M. *Maria Meneghini Callas*; Northeastern University Press: Boston, MA, USA, 1992; p. 128.
2. Rance, C. *The History of Medicine in 100 Facts*; Amberley: Gloucestershire, UK, 1975; p. 164.
3. Lüscher, A. Reproductive Decisions of the Hermaphroditic Tapeworm Schistocephalus Solidus. Ph.D. Thesis, Christian-Albrechts-Universität Kiel, Kiel, Germany, 2002. Available online: https://pure.mpg.de/pubman/faces/ViewItemOverviewPage.jsp?itemId=item_1507534 (accessed on 2 May 2022).
4. Giustini, D.; Thompson, D. *Finding the Hard to Finds: Searching for Grey Literature*; University of British Columbia: Vancouver, BC, Canada, 2012.
5. Moher, D.; Liberati, A.; Tetzlaff, J.; Altman, D.G.; PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Ann. Intern. Med.* **2009**, *151*, 264–269. [CrossRef] [PubMed]
6. Cassell, J.A. Social anthropology and nutrition: A different look at obesity in America. *J. Am. Diet. Assoc.* **1995**, *95*, 424–428. [CrossRef]
7. Quackwriter. Eat!Eat!Eat! Those Notorious Tapeworm Diet Pills. The Quack Doctor. Available online: https://thequackdoctor.com/index.php/eat-eat-eat-those-notorious-tapeworm-diet-pills/ (accessed on 2 May 2022).
8. Anonymous. Tape Worms Given in Pills. *The Washington Post*, 5 December 1912, p. 6.
9. Anonymous. Tapeworm Pills for Fat People Merely a Wild Yarn, Say Experts. *The Washington Post*, 6 December 1912, p. 7.
10. Standen, E.A. First efforts of an infant's hand. *Metrop. Mus. Art. Bull.* **1958**, *17*, 92–99. [CrossRef]
11. Clark, W.B. "The Black Dispatch": A Window on Ralph Ellison's First World. *Miss. Q.* **2009**, *62*, 3–18.
12. Urner, M.H. Get-thin-quick specialist is exposed by his bottled genii. *The Miami News (FL)*, 23 October 1927, p. 4.
13. Anonymous. A Story with a moral. *The Marion Daily Star*, 21 February 1914, p. 5.
14. Weller, C. Tapeworm Diet: Iowa Woman Ingests Parasite Bought on the Internet, Prompts Doctor Letter to Public Health Workers. Medical Daily. Available online: https://www.medicaldaily.com/tapeworm-diet-iowa-woman-ingests-parasite-bought-internet-prompts-doctor-letter-public-health-252607 (accessed on 2 May 2022).
15. Tucker, E. From oral tradition to cyberspace: Tapeworm diet rumors and legends. In *Folk Culture in the Digital Age: The Emergent Dynamics of Human Interaction*; Blank, T.J., Ed.; Utah State University Press: Boulder, CO, USA, 2012; pp. 150–165.
16. Weber, L. General Ignorance: There's a Lot of it out There. Publications International: Lincolnwood, IL, USA, 2015; p. 208.
17. Weber, L. *The Book of Unusual Knowledge*; Publications International: Lincolnwood, IL, USA, 2012; p. 579.
18. Moye, D. Mom Gives Daughter Tapeworms to Make Her Lose Weight. Available online: https://www.youtube.com/watch?v=dbAFhD_Fsks (accessed on 27 March 2022).
19. Willis, A. Eeew! One of the Kardashians Said She Wants a Tapeworm to Get Slim. Metro. Available online: https://metro.co.uk/2015/03/24/eeew-one-of-the-kardashians-said-she-wants-a-tapeworm-to-get-slim-5118092/ (accessed on 2 May 2022).
20. Matus, M. Tapeworm Diet: History, Methods, and Dangers. Available online: https://www.freedieting.com/tapeworm-diet (accessed on 2 May 2022).
21. Newswire. The Tapeworm Diet Can Help You Lose Drastic Weight. Available online: https://www.newswire.com/the-tapeworm-diet-can-help-you/109863 (accessed on 2 May 2022).

22. Soriano, J.M.; Zarzo, I.; Morales-Suarez-Varela, M.; Catalá-Gregori, A.I.; Merino-Torres, J.F. Terminology and classification of miracle slimming diets: A narrative review and new proposals. *Nutr. Clin. Diet. Hosp.* **2021**, *41*, 136–143.

23. Król, G.; Tomaszewska, A.; Wróbel, G.; Paprocka, P.; Durnas, B.; Piktel, E.; Bucki, R. Toxicity of parasites and their unconventional use in medicine. *Ann. Agric. Environ. Med.* **2019**, *26*, 523–531. [CrossRef] [PubMed]

24. Song, E.K.; Kim, I.H.; Lee, S.O. Unusual manifestations of *Taenia solium* infestation. *J. Gastroenterol.* **2004**, *39*, 288–291. [CrossRef] [PubMed]

25. Petsales-Diomedes, N. *The Unknown Callas: The Greek Years*; Amadeus Press: Portland, OR, USA, 2001.

26. Galatopoulos, S. *Maria Callas: Sacred Monster*; Simon & Schuster: New York, NY, USA, 1998; p. 134.

27. Polzonetti, P. Eating and Drinking in Opera: And the Callas Diet. Available online: https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199935321.001.0001/oxfordhb-9780199935321-e-119?result=73&rskey=v7ELaR&mediaType=Article (accessed on 2 May 2022).

28. Remy, P.J. *Maria Callas, a Tribute*; St. Martin's Press: New York, NY, USA, 1978; p. 82.

29. Rushmore, N. *The Singing Voice*; Dembner Books: New York, NY, USA, 1984; p. 231.

30. Butcher, N. *The Strange Case of the Walking Corpse: A Chronicle of Medical Mysteries, Curious Remedies, and Bizarre but True Healing Folklore*; Avery: New York, NY, USA, 2004; p. 89.

31. Mengehini, G.B. *My Wife, Maria Callas*; Bodley Head: London, UK, 1982.

32. Quetelet, A. Cap. 2: Relazioni Tra il Peso e la Statura. In *Fisica Sociale Ossia Svolgimento Delle Facoltá Dell' Uomo*; Politica, E., Boccardo, G., Eds.; Unione Tipografico-Editrice Torinese: Torino, Italy, 1875.

33. Rasmussen, N. Downsizing obesity: On Ancel Keys, the origins of BMI, and the neglect of excess weight as a health hazard in the United States from the 1950s to 1970s. *J. Hist. Behav. Sci.* **2019**, *55*, 299–318. [CrossRef] [PubMed]

34. Keys, A.; Aravanis, C.; Blackburn, H.; Van Buchem, F.S.; Buzina, R.; Djordjevic, B.S.; Taylor, H.L. Coronary heart disease: Overweight and obesity as risk factors. *Ann. Intern. Med.* **1972**, *77*, 15–26. [CrossRef] [PubMed]

35. Bray, G.A. Life insurance and overweight. *Obes. Res.* **1995**, *3*, 97–99. [CrossRef] [PubMed]

36. Metropolitan Life Insurance Company. Ideal weights for women. *Stat. Bull. Metropol. Life Insur. Co* **1943**, *24*, 6–8.

37. Metropolitan Life Insurance Company. New weight standards for men and women. *Stat. Bull. Metropol. Life Insur. Co* **1959**, *40*, 1–10.

38. Allegri, R. *Maria Callas: Lettere D'amore*; Mondadori: Milan, Italy, 2008; p. 161.

39. Feliciotti, G. *Maria Caniglia: Storia e Cronaca*; Azzali: Parma, Italy, 2007.

40. Stassinopoulos, A. *Maria Callas: The Woman behind the Legend*; Cooper Square Press: Lanham, MD, USA, 1982; p. 142.

41. de Beaufort, I. 'Please, sir, can I have some more? 'Food, lifestyle, diets: Respect and moral responsibility. *Best. Pract. Res. Clin. Gastroenterol.* **2014**, *28*, 235–245. [CrossRef] [PubMed]

42. Eidsheim, N.S. Maria Callas's waistline and the organology of voice. *Opera Q.* **2017**, *33*, 249–268. [CrossRef]

43. Owen, J.L. Common Helminthes of the Human Intestine with an Application to the Duties of a Medical Inspector of School-Children. Annexe Thesis Digitisation Project 2016 Block 6. Available online: https://era.ed.ac.uk/bitstream/handle/1842/19210/OwenJL_1908redux.pdf?sequence=1 (accessed on 2 May 2022).

44. Jellinek, G. *Callas: Portrait of a Prima Donna*; Dover: New York, NY, USA, 1986; p. 118.

45. Bret, D. *Maria Callas: The Tigress and the Lamb*; Robson Books/Parkwest: New York, NY, USA, 1998; pp. 114–115.

46. Gage, N. *Greek Fire: The Story of Maria Callas and Aristotle Onassis*; Knopf: New York, NY, USA, 2000; p. 66.

47. Kwa, B.H. Cysticercosis: The Ides of March. In *The Parasite Chronicles*; Springer: Cham, Switzerland, 2017; pp. 21–34.

48. Lukeš, J.; Kuchta, R.; Scholz, T.; Pomajbíková, K. (Self-) infections with parasites: Re-interpretations for the present. *Trends Parasitol.* **2014**, *30*, 377–385. [CrossRef] [PubMed]