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Headache among the educated in the century of enlightenment

Abstract Owing to B. Ramazzini's *De morbis artificum diatriba*, the 1700s may be considered as the century when occupational medicine was born. This paper considers Ramazzini's treatise and some publications of the same century dealing with headaches as an occupational ailment of educated persons. Besides *De morbis artificum diatriba*, we also analyse *De valetudine litteratorum* by S.A. Tissot, *Domestic medicine* by W. Buchan, *Della preservazione della salute de' letterati e della gente applicata e sedentaria* by G.A. Pujati and the *Dizionario compendioso di sanità*. In these works, headache is considered a typical illness of educated people, defined in a wide sense, close to the modern term "intellectual". Head pain was regarded as the consequence of either a plethora

of blood in the brain or tension in the head caused by mental concentration. No specific pharmacological therapy was suggested; instead, prophylactic measures were recommended, such as periodic interruptions of study, working areas that were well-ventilated and brightly lit, use of olive oil-burning lanterns and wax candles for evening study, abolition of toxic substances such as tobacco and alcoholic beverages, avoidance of the lying position while studying, and moderate consumption of legumes. Our investigation shows the attention given, in the century of the Enlightenment, to headache caused by the professions requiring mental activity.

Key words Headache • History of medicine • Educated people • Occupational medicine

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Introduction

This paper examines the role given to headache as an illness tied to the intellectual professions in the century of the Enlightenment. We studied 5 different works written in the seventeenth century: *De valetudine litteratorum* [1] by Simon André Tissot, *Della preservazione della salute de'*

letterati e della gente applicata e sedentaria (How to protect the health of educated people, of clerks and of those having a sedentary lifestyle) [2] by Giuseppe Antonio Pujati, *De morbis artificum diatriba* [3] by Bernardino Ramazzini, *Domestic medicine* [4] by William Buchan, and *Dizionario compendioso di sanità* (Concise health dictionary) translated from French into Italian by Gianpietro Fusanacci [5].

The authors and their cultural contexts

Simon André Tissot (Grancy, 1728; Lausanne, 1797) graduated from Montpellier University in 1749. He practiced for many years in Lausanne, where he became well appreciated after introducing an innovative therapy for small-pox, with sweeteners and refreshers in an era where sudorifics and stimulants were the most widespread remedies. He wrote many medical works that were successful and translated into various languages. He was nominated to the Royal Society of London, and the King of Poland named him archiater in 1776. In 1780, Joseph II offered him a professorship at the University of Pavia, which Tissot held for three years according to the contract; he later returned to Lausanne where he died in 1797.

In the work *De valetudine litteratorum* (Fig. 1), Tissot considered the conditions that brought on certain illnesses in those who have intellectual professions and the modalities of prevention and cure. He gave a rather wide definition to the term “educated”, which also included medical doctors and was close to the modern attribute “intellectual”. Headaches played an important role and the volume contains interesting pathogenetic explanations. It must be remembered that this author also wrote on the same subject in his *Traité des Nerfs*, a work that gave insight into the treatment of headaches in the following century.

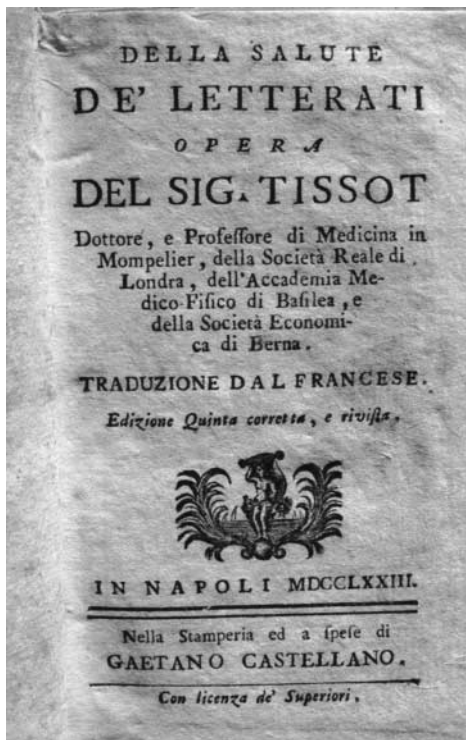


Fig. 1 Title page of *Della salute de' letterati* (1773), Italian translation of *De valetudine litteratorum* (1766) by Simon André Tissot

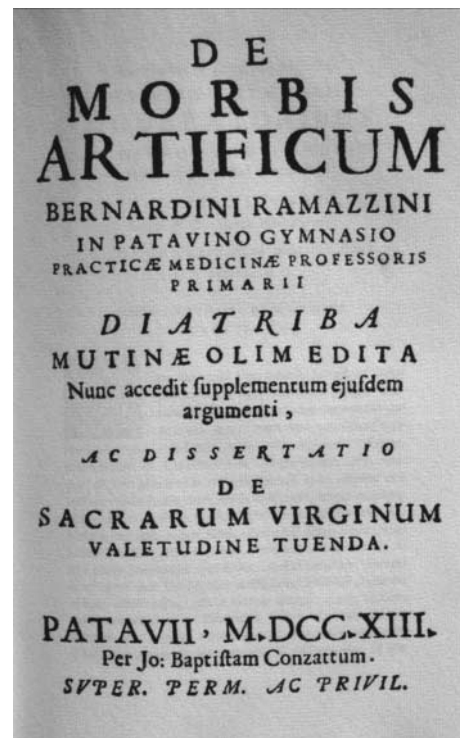


Fig. 2 *De morbis artificum diatriba*, by Bernardino Ramazzini. Title page of the second, enlarged and definitive edition (1713)

Bernardino Ramazzini (Carpi, 1633; Padua, 1714) graduated from the University of Parma in 1659, and held chairs at the University of Modena (1682–1699) and later in Padua. Here, from 1700 to 1709, he was professor of Practical Medicine, and from 1709 to 1714 he was professor of Theoretical Medicine. His death, due to a stroke, occurred at the age of 81 years [6]. In his most important work, *De morbis artificum diatriba* (1700 and 1713) [3], which is recognized as the first treatise devoted to occupational medicine (Fig. 2), the author paid special attention to headache; we found that Ramazzini regarded headache as the consequence of 12 of the 69 professional activities that he considered [7].

Giuseppe Antonio Pujati (Sacile, 1701; Padua, 1760) graduated from the University of Padua, and had as teachers Vallisneri, Morgagni, and Macoppe. After having practiced many years in Feltre and Venice, he was called by the University of Padua in 1754 to take the chair of Practical Medicine from his own mentor Macoppe. He remained at this position until his death in 1760. In his work *Della preservazione della salute de' letterati e della gente applicata e sedentaria* (Fig. 3) [2], headache is quoted only once, in a passage which we examine later; we mention now that the author considered it as a common problem among the educated.

William Buchan (1729–1805) graduated from the University of Edinburgh in 1761. Later, he moved to



Fig. 3 *Della preservazione della salute de' letterati e della gente applicata e sedentaria*, by Giuseppe Antonio Pujati (1762)



Fig. 5 Title page of *Dizionario Compendioso di Sanità*, Italian translation (1770) by Gian Pietro Fusanacci of the French original

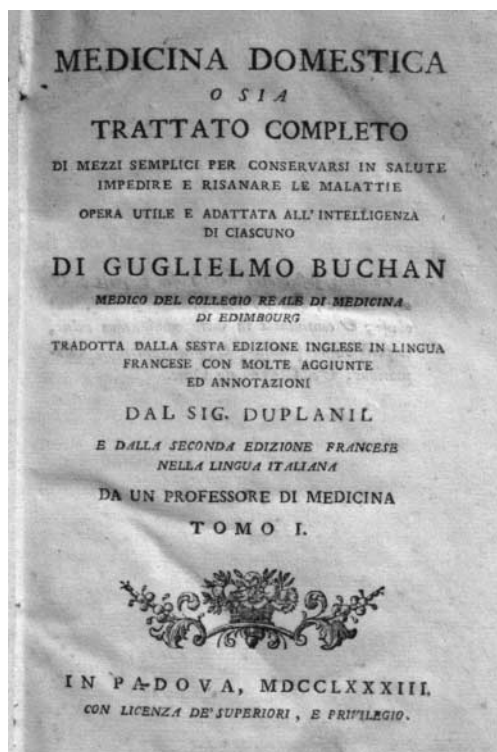


Fig. 4 Title page of *Medicina domestica*, Italian translation (1783) of *Domestic medicine* (1769) by William Buchan

London, where he established a large practice. His greatest work is his guide to the principles of treatment of everyday illnesses, providing medical advice for self-caring to the educated classes: *Domestic medicine* (Fig. 4) [4]; the volume was translated into various languages and was his most important and successful work. In the first volume, he examined professional illnesses and also considered those of the educated.

Concluding these brief notes, we must indicate that we do not know the original French author of *Dizionario compendioso di sanità* (Fig. 5), so we refer only to its Italian version [5].

Tissot's view

We start with Tissot's quote from *De valetudine litteratorum* [1], Chapter IV, examining two passages that interest our research and where the author claimed that headache was a professional illness of the educated. He underlined here the influence on a healthy body of mental concentration, which draws too much blood to the brain: "Whoever during his life has sometimes thought very hard, he would have had this experience; and there is no educated man, who many times coming out of his office did not only

have a violent headache, but also felt heat on the same part; this depends on the fatigue and heat which the medulla feels. The effects of this fatigue are also seen in the eyes, and if we consider a man immersed in meditation, we understand that all the muscles of his face are tense, and at times convulsive” [8]. He also wrote: “When the brain acts, it receives a new quantity of blood that, by increasing the tone and the movement of the vessels, it produces that bothersome sense of pain and heat of which I have already talked about” [9].

This concept is repeated in Chapter XXXI, when the author discouraged the bad habit of many educated men to even study in bed or, however, lying down: “...meditation, as I have already said, brings a greater quantity of blood to the brain, the horizontal position of the body facilitates this effect, the sleepiness which comes about increases it, and because of this the organ must suffer the consequences of this bad habit, as happens to the whole body when it is deprived of sleep, which is nothing but a consequence of reading for a long period during the night; one becomes weak and suffers extremely bad headaches” [10]. With reference to an excessive amount of blood diverted to the brain, he wrote: “If the vessels of the head are weak, the pain in that part or the flow of blood from the nose will be the most frequent disturbance; those who suffer this the most are youth who study a lot, because, as I have already demonstrated, mental application causes a greater amount of blood reaching the brain” [11].

Considering then the behaviour of the educated, the diet which must be followed, environmental atmosphere which may be proficuous for their health, the toxic materials which must be avoided, we find again specific reference to headache, or to “disturbance”, “heaviness”, “flushing of the head”, all of which we assume are synonyms of headache.

Referring to activities that can improve health, in this specific passage the author described the benefit of walks: “Whoever for days is occupied in his study, feels his head heavy, the eyes warm... a walk in the country for two or three hours totally dissipates them” [12].

Further on, when dealing with diet, Tissot curiously advised against legumes for the educated for specific reasons: “Those containing great quantities of air, which continue to develop, acquiring a lot of space which cannot be held by the organs, because they are too weak; [air] which cannot be correctly distributed, yet always developing, creates a considerable swelling, which is always accompanied by listlessness, and difficulties all over the body, and above all by a flushing of the head, that compromises all the functions” [13].

According to Tissot, the headache of the educated may also have triggering causes, such as an excessive consumption of wine (which constitutes a specific vascular risk fac-

tor): “Wine... increases the amount of blood in the head, therefore the ailments to which studying has already predisposed, are exacerbated in this part. Headache rarely abandons the educated, and apoplexy cannot be prevented, without forbidding wine to them” [14]. He also considered tobacco use a risk factor for headache: “I have observed after some pipefuls a headache which was one of the most cruel” [15]. He even cited physical inactivity: “To those who are weak, cold feet are harmful. This condition supervenes frequently on those who do not engage in physical activity; this coldness causes a sense of heaviness to the head” [16].

More in general, Tissot clearly affirmed the concept that headache is a habitual symptom of the educated, and that is associated with all the other disturbances that can afflict them: “...When the educated are ill, usually they are also tormented by a headache...” [17].

Pujati and headache among the educated

In the book of Giuseppe Antonio Pujati, *Della preservazione della salute de' letterati e della gente applicata e sedentaria* [2], headache is mentioned only once: “And so not few complain about their heads, either that it becomes hot, or that it becomes painful too frequently. But almost as if this is a desirable ailment, this way Man finds it necessary to interrupt the study, and subtract himself from the act which causes the damage to it” [18].

Although headache is dealt with only in the preceding passage, it is apparent that the author considered it a common affliction in the professional and also a self-protective condition. Regarding this passage, we stress that the original Italian text is difficult to be faithfully translated. Since it is particularly interesting, the reader who knows Italian should look to the original words, reported in notes 18 and 19. Regarding the pathogenesis of headache, it seems that the author recognized a mechanism involving “heating” of the head with “wasting” due to the excessive intellectual application, as described in the following passage: “It is also known that the fibres, which the nerves are composed of, are only the medullar substance of the brain lengthened... Therefore our spirit works through nerves: but it is not possible to understand how these nerves are the instruments of the spirit, if they are not considered as either many strings in various vibrating and trembling forms, which according to the type of vibration and tremors, present one or another idea to the spirit; as a musical chord indeed, which according to its different vibration, enables us to hear one sound or another: or as a multitude of very thin canals, filled up with a substance exceedingly subtle and mobile, whose various and multiple waves originate the variety and multiplicity of the perceptions... Now, let

us consider someone who initiates ... to meditate and study: the power and the organs, which this action needs, that is the spirit and the nerves inside the brain must be moving. Greater movements create greater heat, and therefore the head starts to become warmer than usual. Either this heat, acting as a stimulus, calls a greater amount of blood, as it happens when an external stimulus acts on the part that is stimulated; or the nerves which are moving and tense, as those easily seen in many places twisting around blood vessels and wrapped to them, accelerate through these the movement of blood towards the brain; or the heat and tension relayed to the tunica of the vessels of the brain draw there the blood with greater force; or for all three of these causes, which are dependent only on the increase of movement and heat [we observe the following consequences]: the head receives a larger amount of blood; the arteries pulsate with more force; the eyes become red; the face gets flushed; and the effect of more heat is that more fluid, the thinnest, more spirited of the humors starts to dissipate ... Therefore to certain heads already considered too hot, application and study are forbidden, as that which adding movement to movement, and heat to heat, with maximum ease can light and damage them" [19].

Ramazzini's contribution

In *De morbis artificum diatriba* [3], Ramazzini did not deal with headache in the chapter relative to professional illnesses of the educated; this is unexpected, considering that the author wrote of this disturbance as the cause of 12 of 69 occupational ailments [7]. But he did mention that headache was caused by some jobs that required a similar type of intellectual application (e.g. notary public and clerk); furthermore, headache afflicted the educated themselves when they studied with animal fat oil lamps. In the second chapter, "De Scribarum, Notariorum Morbis" (Illnesses of Clerks and Notaries) of the Supplementum, there is a precise reference, supported by a physiopathogenetic interpretation regarding the problem in these professions: "...What really afflicts these workers is the continuous and intense diligence; in this type of activity it is necessary that the entire brain, the nerves, and other fibers remain strongly tense, from this we arrive at an atony of these structures and consequently headache" [20].

Moreover, an accurate reading of Chapter XV, "*De Morbis, quibus obnoxii sunt Olearii, Coriarii, alii qui sordidi Artifices*" (Illnesses which afflict those who produce oil, leather, and the craftsmen of other dirty jobs), which does not regard the educated, allows to find advice on the prevention of headache: "...I also want to advise the professors, when they study, to abstain from using tallow can-

dles, and if their economic resources do not permit them to use wax candles, they should use olive oil-burning lanterns" [21].

Domestic Medicine and the Concise Health Dictionary

Briefly considering the contribution of William Buchan, we find only a sentence on the subject, in the first tome of his *Domestic medicine* [4], where he discusses the illnesses of the educated: "A long and serious application often gives dangerous headaches, which bring to apoplexy, dizziness, paralysis, and other disastrous ailments. The way to prevent this is to never remain studying for long periods of time; regularly evacuate once a day, either using appropriated foods or often taking small doses of a laxative" [22].

It is interesting to note that Buchan, who in his book takes into consideration all the most common works of his time, mentions headache as an illness tied to a profession only in another passage, when treating illnesses of "sitting craftsmen" (e.g. tailors, shoe repairmen, cutlers); but here it is simply listed among many other symptoms, without particular consideration. Therefore, it seems that Buchan considers headache to be of specific relevance for the category of the educated.

The *Dizionario compendioso di sanità* [5], by an unknown French author, takes into consideration 47 different types of jobs: in 8 of these, headache is cited as a symptom caused by work, and precisely for those working with starch, washwomen, butchers, gilders, fulling-millers, glass- and mirror-workers, and the educated.

Regarding the pathogenesis of headache, in the latter category, the hypothesis refers to the Galenic theory of animal spirit: "The nervous structure, or better, the spirits bear the wasting of this fatigue, which is more insidious the more attractive it appears, because of the pleasure that the discovery of truth brings; but the nerves themselves, brought beyond their natural tone, because the spirits escape them, become upset and altered. We cannot say there is a source of more dangerous illnesses, and consequently less susceptible to recovery: such are the melancholic and hypochondriac affections, the colics, insomnia, indigestions, hemorrhoids, headaches, and attacks of nephritis and gout" [23].

Conclusions

In the century of the Enlightenment, which affirmed that human reasoning was the main warranty of social progress, headache was considered to be a frequent ailment of the educated. No specific pharmacological thera-

py was recommended; instead, preventive measures were suggested. In the works examined, headache was not described in depth regarding its characteristics, duration, localization or associated symptoms. This does not allow us to understand what type of headache the authors were referring to in their books [24]. Regarding the pathogenesis, even in the frame of Galenic doctrine of the “spirits”, headache was considered mainly to be the consequence of the strain due to concentration, which increased the blood flow to the brain and also caused visible alterations of the

person: flushing, and turgidity of the arteries followed by paleness and weakness. These elements suggest the vasomotor theory, whereas other passages seem to suggest tension-type headache. More in detail, Ramazzini referred to a strong tension; headache, however, was not caused by tension itself, but by the relaxation that followed it. This concept is present today in the distinction we make between the appearance of pain during a stressing experience, typical of tension-type headache, and the attack which comes after stress, more characteristic of migraine.

References

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6. Wiel Marin VT, Bellinati C, Panetto M, Zanchin G (2003) Bernardino Ramazzini lies in Padua. *Lancet* 362(9396):1680
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8. Tissot AS, *Della salute de' letterati*, p 20: “Chiunque in vita sua ha qualche volta fortemente pensato, avrà sopra se stesso fatto quest'esperienza; e non si dà letterato veruno, che più e più volte sortito non sia dal suo gabinetto sorpreso non solo da un violento dolor di testa, ma eziandio da un forte calore in questa stessa parte; ciò che dipende dallo stato di fatica, e dal riscaldamento, nel quale la midollare del cervello ritrovasi. L'impressione di questa fatica si fa altresì vedere negli occhi, e se si considera un uomo immerso nella meditazione, vi si comprendono tutti i muscoli della faccia tesi, e qualche volta anche convulsi”
9. *Ibid.*, p 38: “Quando il cervello agisce, riceve una nuova quantità di sangue, che aumentando il tono, ed il movimento de' vasi, produce quella molesta sensazione di dolore e di calore di cui ho già parlato”
10. *Ibid.*, p 66: “...la meditazione, come ho di già detto, determina una maggiore quantità di sangue al cervello, la positura orizzontale del corpo facilita quest'effetto, il sonno che sopravviene l'aumenta, e quest'organo deve per questo necessariamente patire, e risentirsi di questo cattivo abito, come succede in tutto il corpo per privazione del sonno, che altro non è che una conseguenza delle veglie letterarie; s'indebolisce, gli sopravvengono mali di testa violentissimi”
11. *Ibid.*, p 79: “Se i vasi della testa sono deboli, i dolori in quella parte, o i flussi di sangue dal naso saranno i mali più frequenti, a quali soggetti vanno que' Giovani, che studiano molto, perchè, come ho di già fatto osservare, per l'applicazione determinasi maggior copia di sangue al cervello”
12. *Ibid.*, p 94: “Chiunque siasi per alcuni giorni occupato nel suo gabinetto, sente la testa pesante, gli occhi caldi... una passeggiata di due, tre ore in campagna totalmente li dissipa”
13. *Ibidem*, p.109: “Quelli che contengono grandi quantità di aria che sviluppandosi, acquista tanto spazio, che non può essere rattenuta dagli organi, perchè troppo deboli, nè distribuirsi a misura, che si va sviluppando, cagionando gonfiamenti considerabili, che sono sempre accompagnati da un sentimento di svogliatezza, e di difficoltà in tutto il corpo, e massime da un imbarazzo alla testa, che ne conturba tutte le funzioni”
14. *Ibid.*, p 128: “Il vino ... determina una maggiore quantità di sangue alla testa, onde accresciute vengono le malattie di questa parte, alle quali moltissimo dispongono di già gli studi. L'emicrania di rado abbandona i letterati, e non si può prevenire l'apoplessia, senza proibire loro il vino”
15. *Ibid.*, p 146: “Ho io osservato venir in seguito ad alcune pippe un mal di testa de' più crudeli”
16. *Ibid.*, p 152: “Nuoce assai a temperamenti deboli il freddo de' piedi, a cui si soggiace quando non si fa moto; questo freddo cagiona delle gravezze di testa”
17. *Ibid.*, p 165: “...Allorchè i letterati sono ammalati, per l'ordinario sono tantosto tormentati da male di testa ...”

18. Pujati GA, Della preservazione della salute ..., p 12: "Così pure non pochi si lagnano di testa o che troppo facilmente riscaldasi, o che s'addolora con troppa frequenza. Ma quasi che questo è un male desiderabile, perchè così L'Uomo si trova in necessità di interrompere lo studio, e di sottrarsi all'azione della causa che lo danneggia"
19. Ibid., pp 49–51: "È altresì noto che le fibrette onde i nervi sono composti, non sono che la sostanza midollar del cervello allungata ... Opera adunque la nostr' anima col mezzo de' nervi: ma perchè non può concepirsi, come sien questi nervi affatto meccanici dell'anima, se non si considerano, o come tante cordicelle in moltissime fogge vibranti e tremole, le quali secondo la varietà delle loro vibrazioni e tremori, or una idea, or un'altra all'anima presentano, come appunto una corda Musica, che secondo il suo diverso vibrare, or un suono, or un altro ci fa sentire: o come tanti sottilissimi canaletti d'una sostanza oltre modo sottile e mobil ripieni, ne' cui vari e molteplici ondeggiamenti la varietà e molteplicità dell'idea consista ... Ciò posto, pongasi taluno ... a meditare ed a studiare: le potenze e gli organi, che a questa azione servono, cioè lo spirito ed i nervi dentro al cervello denno porsi in movimento. Il maggior moto eccita calor maggiore, e quindi il capo oltre del solito a riscaldarsi comincia. O che questo calore operando come stimolo chiami maggiore copia di sangue, come veggiamo farsi da' stimoli esterni, alla parte stimolata, o che i nervi messi in moto e tesi, come quelli che visibilmente in moltissimi luoghi s'attortigliano attorno i vasi sanguigni, e gli allacciano, il moto del sangue per questi verso il cervello accelerino; o che comunicato il calore e tensione alle tonache de' vasi del cervello, determinano queste colà il sangue con maggiore forza, o per tutte e tre queste cause dal solo moto e calore accresciuto dipendenti; maggior quantità di sangue riceve la testa; pulsano con più forza le arterie; rosseggiano gli occhi, la faccia s'incolorisce; e quel ch'è effetto del maggior calore, il più fluido, il più sottile, il più spiritoso degli umori comincia oltre il dovere a disperdersi ... Quindi a certe teste da se troppo calde si proibisce l'applicazione e lo studio, come quello che accrescendo moto a moto, e calore a calore, con somma facilità le accende e danneggia". The Italian text is refined and peculiar, so that the English translation has been particularly difficult and does not give, in many instances, the nuances of the original passage, which should be understood as such to be fully appreciated
20. Ramazzini B, De morbis artificum diatriba, p 96: "Quod vero histe Operariis crucem figit, est fortis & assidua animi intentio; in hoc enim opere cerebrum totum nervos, fibras in magna contentione esse necesse est, & exinde atonia subsequi; hinc cephalalgiae ..."
21. Ibid., p 33: "Litterarum professores ego quoque monitos velim, ut a candelis sebaceis, quotiescumque in suis musaeis litteris operam dant, quantum possunt, abstineant, ac si opes non suppetant, ut cereis candelis uti possint, lucernis ex oleum olivarum, utantur ..."
22. Buchan G, Medicina domestica, p 103: "Una lunga e seria applicazione spesso cagiona dei pericolosi mali di capo, che conducono all'apoplessia, alle vertigini, alla paralisia, ed ad altri mali funesti. Il mezzo di prevenirli è di non mai restare allo studio troppo lungo tempo di seguito; di procurarsi regolarmente facilità di secesso una volta per giorno, sia col far uso di alimenti convenevoli, sia spesso prendendo piccole dosi di un minorativo"
23. Dizionario compendioso di sanità, p 160: "Il genere nervoso ovvero gli spiriti sono quelli che somministrano il dispendio di questa fatica, tanto più insidiosa quanto più lusinga con il piacere che apporta nello scoprire la verità; ma però i nervi stessi portati di là del suo tono naturale, perchè gli spiriti se ne sfuggono, si sconcertano e si alterano. Non c'è possiamo dire sorgente di malattia più pericolosa, e in conseguenza meno suscettibile di guarigione: tali sono le affezioni melanconiche e ipocondriache, le coliche, le veglie, le indigestioni, l'emorroidi, i mali di testa, gli attacchi di nefritica, di gotta"
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