

Treatment using chalybs, according to Johannes Hartmann and Eberhard Gockel.

A remedy against diseases of the liver and the spleen in 17<sup>th</sup> century Germany

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‘If one were to choose a single author as representative of the late-sixteenth-century Paracelsian view of nature and medicine, it might well be Oswald Crollius, whose *Basilica chymica* has already been frequently cited because of its extensive influence. Both in its original form and in a revision made by J. and G.E. Hartmann and J. Michaelis, the *Basilica chymica* went through some eighteen editions between 1609 and 1658 and appeared in French, English, and German translations’.<sup>1</sup>

This short and prospective article will not deal with Crollius but, rather with the Johannes Hartmann (1568-1631) mentioned above, who is reputed as having been the first professor of chemistry at the University of Marburg. ‘For Hartmann’, Bruce T. Moran has written, ‘the road to the laboratory of chemical medicine in Marburg began in Kassel, at the court of the university’s protector, the Landgrave Moritz of Hesse (1572-1632)’.<sup>2</sup> Having studied at Wittenberg, Hartmann was appointed as a mathematician in Kassel and was chosen to fill the chair of mathematics when the incumbent died. He received a medical degree in 1606 and ‘began a brief correspondence with the French Paracelsian, Joseph Duchesne (Quercetanus) (c. 1544-1609), who had visited Kassel in 1604’. Moritz had become captivated by the study of occult philosophy, especially in relation to alchemy, and was well on his way to amassing an extensive collection of alchemical, Cabbalistic, and Paracelsian manuscripts, and to fashioning a court circle of alchemical and medical adepts. Thus, ‘in 1608, he enthusiastically

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<sup>1</sup> Allen G. DEBUS, *The Chemical Philosophy: Paracelsian Science and Medicine in the Sixteenth and Seventeenth Centuries*, New York, Academic Publications, 1977; Mineola, New York, Dover Publications, 2002; e-book, empl. 1706-1868, notes 280-303. I am deeply grateful to David. ADAMS, Emeritus Professor of French Enlightenment Studies, University of Manchester, for having corrected the English version of this article and for his – as always - useful remarks. I also thank my wife Alice and Muriel COLLART for their support.

<sup>2</sup> Bruce T. MORAN, *Chemical Pharmacy Enters the University. Johannes Hartmann and the Didactic Care of Chymiatria in the Early Seventeenth Century*, Madison, Wisconsin, American Institute of the History of Pharmacy, 1991, 10 sq.

received a suggestion from Hartmann for founding a *collegium chymicum* at Marburg' and he 'chose to invest Hartmann with a new university role and a new title – *Professor publicus chymiatricae*'.

Here, we shall briefly deal with his *Praxis chymiatrica* (*Chemical Practice*) and with his views on the therapeutic use of a *medicamentum chalybeum* which was recommended by Croll among 'the extreme medications adapted to extreme diseases' – notably cancer.<sup>3</sup> We consider, in addition to the *Praxis chymiatrica*, two books by another author, who is not so well known, but who was also a German forerunner of chemistry: Eberhard Gockel ou Göckel (1636-1703), a physician at Ulm, and a member since 1685 of the famous Academia Leopoldina, who was attached to Eberhard-Ludwig Duke of Württemberg. He deals with chalybs in his *Consiliorum et observationum medicinalium decades sex* (*Sixty Medical Consultations and Observations*) published in 1683 and in a *Gallicinium medico-practicum* (*Medico-practical Sunrise*) of 1700.<sup>4</sup>

### **1. How are chalybs made? And when is it used?**

The Latin word *chalybs* means 'steel', and is taken from the name of a river in Celtiberia whose water was supposed to be good for cooling it. Hartmann has his method for obtaining chalybs. A sheet of metal must be ground and crushed on the anvil 'for as long as is necessary' to get a powder or filings 'finely pulverised'.<sup>5</sup> Then, the operator will, as far as possible, take on a knife small leaf-tips which will be incorporated into preparations using for example *cassia lignea*, that is to say 'the peel of a tree very similar to cinnamon-tree'.<sup>6</sup> This medicine is prescribed for patients suffering from a disease of the liver, who must take it three times a day: at breakfast, 'to clear the belly', three hours before dinner and again at the

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<sup>3</sup> Oswald CROLL, *Basilica chymica*, Franckfort, Apud Claudium Marnium et heredes Joannis Aubrii, 1609, p. 75; Johannes HARTMANN, *Praxis chymiatrica*, Leipzig, Sumtibus Gotofredi Grossii, 1633.

<sup>4</sup> Eberhard GOCKEL, *Consiliorum et observationum medicinalium decades sex*, Augsbourg, Impensis Theophilii Göbelii, 1683; *Gallicinium medico-practicum. Sive consiliorum observationum et curationum medicinalium novarum centuriae duae, cum dimidia*, Ulm, Impensis Georgii Wilhelmi Kühnen, 1700.

<sup>5</sup> *Op. cit.*, p. 126.

<sup>6</sup> *Dictionnaire universel françois et latin, vulgairement appelé dictionnaire de Trévoux*, Paris, Par la Compagnie des libraires associés, 1771, II, p. 305.

moment of going to bed. The elimination of the obstructions may take a few weeks. Gockel has no special article about making chalybs.

The best introduction to the latter is perhaps provided by an obscure ‘Monsieur de Meuve, conseiller et médecin ordinaire du Roy’, who was obviously – like many chemists of the early modern times - under the influence of the German alchemical tradition of Philippus Theophrastus Aureolus Bombast von Hohenheim, best known as Paracelsus (1493-1541). In his *Dictionnaire pharmaceutique* of 1677, he opens successive questions in a very pedagogic way.<sup>7</sup> There are two kinds of iron. That which is only named by this word is ‘an imperfect metal which includes very little mercury but much fix salt and terrestrial sulfur’, according to Christophe Glaser’s *Traité de la chymie* of 1663. ‘The chemists draw from it excellent remedies whose effects are wonderful for many diseases’. What is the difference with the ‘purified’ state of chalybs? The latter is obtained by a complex manipulation. First, horns and nails of animals are cut in small pieces or reduced to a coarse powder which is mixed with light charcoal, such as the one coming from willow or lime tree. The mixture is ‘stratified with iron bars in pots and furnaces made for this purpose’. The ‘volatile salt’ generated by these horns and nails penetrates ‘by its subtle character’, when it is burning, the substance of iron and reduces it into steel.

The latter, losing ‘sulphurous parts’ with the combustion, must be treated a special way to develop its best effects: it must be prepared ‘spagyrically’, that is to say by the ‘art of *spagyria*’, a word and a process created by Paracelsus. The neologism mixed the Greek *σπάειν* ‘to draw, extract’ and *αγείρειν* ‘to gather’, as the process was supposed to decompose the substances ‘by retrograding to their original nature’. Prepared this way, the iron was called in Latin *crocus Martis* or *Mars-saffron* because of its colour and it was symbolised by , ‘because the steel or the iron are assigned to Mars’. What did the ‘spagyric way’ mean? The apothecaries usually take ‘philings of steel, wash them in vinegar ‘according to the practice of the Arabs’, and dry them on a hot tile or under a burning sun. The mixture is ground, washed again and dried again ‘up to seven times’. Then, it is ready to be sold as drugs which have ‘the virtue of strenghtening the liver and the spleen, and of opening the obstructions which are in the viscera, as well as prodiving a remedy to pallor’.

It is clear that other German physicians belonging to the Paracelsian tradition had their own process of preparing the medical chalybs. For example, Martin Ruland the Younger (1569-

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<sup>7</sup> DE MEUVE, *Dictionnaire pharmaceutique ou plustost apparat medico-pharmaco-chymique*, Paris, Chez Jean d’Houry, 1677, I, p. 505-

1611), who practiced at Regensburg and was attached to the Habsburg court in Prague, proposed two ways of reducing chalybs ‘into a subtle condition’ in his *Lexicon alchemiae* of 1612.<sup>8</sup> First, the ‘calcination’ may be made by ‘vaporous corrosion’. He mixes mixes *aqua fortis*, a corrosive liquor made of saltpetre, and vitriol calcinated to whiteness, and he puts them into vessels in glass where are suspended, in the upper part, plates of steel. ‘I close up the mouth of the vessel with clay, lest the spirits of the *aqua fortis* should endeavour to escape at any point, and for twenty-four hours I permit it to steam in hot sand.’ He takes out the plates ‘to which very fine powder, color of saffron, will be adhering’, replaces them in the vessel and repeats the operations ‘until no more yellow powder can be made to rise up from the spirits or to deposit on the steel’.

Next to the process by ‘vaporous corrosion’, that by ‘sick corrosion’ mixes quicklime and adult’s urine, places them in a vessel ‘as will be a finger’s breadth deep’, arranges plates of chalybs in the vessel and put the latter into a furnace where a continuous fire is kept up for twenty-four hours. The product is also reduced to ‘a very fine powder’ and it will be ready for patients whose diseases are not specified, when the chalybs will be separated by heat from the quicklime and dried to residuum. You may offer, this way, ‘the best quality of crocus Martis’. Did some practitioners propose very different preparations of chalybs? Was there an evolution of the latters? National ordinary practices? Let us take the example of Nicolas Lémery (Rouen 1645-Paris 1715) in his *Pharmacopée universelle*, a best-seller during the 18<sup>th</sup> century. He borrows to Antoine Daquin, first physician of Louis XIV, several syrups including chalybs. For the one which is specifically called ‘Syrupus Chalybeatus’, he relates at length how to make it.<sup>9</sup> ‘A piece of red-fired steel must be extinguished seven times in water ; this steel-water will be put in a glazed earthen jug ; at the handle of this jug will be attached a string which will suspend a *nouët* of steel filings’ – that is to say a small packet, like a modern tea bag – ‘which soaks in the steel-water’. Some ‘white tartar roughly pulverised’ must be added to the *nouët* and the jug, carefully covered, is put upon ‘hot ashes’, where the material will be digested for twelve hours and boiled ‘at low heat’ for one hour. Herbs may be thrown into the

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<sup>8</sup> *Lexicon alchemiae sive dictionarium alchemisticum*, Frankfurt, Cura ac sumtibus Zachariae Palthenii, 1612, p. 126. I mostly follow the translation provided by Arthur Edward WAITE (1857-1942) in *A Lexicon of Alchemy by Martin Rulandus the Elder*, London, John M. Watkins, 1893, reed. 2010.

<sup>9</sup> Nicolas LEMERY, *Pharmacopée universelle. Quatrième édition*, La Haye, Chez P. Gosse et J. Neaulme, 1729, p. 159-160 : « Syrupus chalybeatus aperiens catharticus Ant. Daquin ».

mixture and the cooking will go on until the liquid has been reduced by one third. But it is not over, as the whole thing must infuse 'in a covered jug' on the hot ashes for another twelve hours with senna, safflower oil and *tartarus vitriolatus*, also called *salt of Lémery*. Add finally sugar, egg white and cinnamon. A genuine Parisian banquet!

More interesting is the fact that the Daquin syrup at issue here is supposed 'to destroy and purge the viscous earthly humours which make obstructions': more precisely 'the obstructions of the liver, of the spleen, of the mesenterium, of the matrix'. Another question is opening: what are the diseases especially cured by chalybs?

## **2. Hartmann on obstructions of the liver and the spleen**

Diseases of the liver and of the spleen are taken into account by Hartmann in two special chapters. That dealing with 'Obstructio epatis' describes the making of chalybs for medical purposes related above.<sup>10</sup> This kind of obstruction is a form of the general disturbances that occur in the relationship between macrocosm and microcosm, according to Paracelsus – whose chemical symbols will be widely used by Hartmann. It is one of the 'diseases of the kidneys' and had been the subject of various 'unblocking medicines' offered to patients as infusions, syrups or decoctions (*apozemata*), 'whether prepared by the common people or by the master'. In all obstructions of the liver, main parts [of the obstruction] must be carefully destroyed, using a raw powder with ♂, a symbol which means iron, so that ♂ will more often be ingested (two or three times per day).

There are many ways of preparing the iron, 'and the simplest is the best, for nature appreciates simplicity'. Thus, wine ♂ is very useful against the weakness of the liver. But if the patient is subject to nausea when he or she must absorb the iron as an everyday drink or even food, they may initially take it with a lower dose. 'The simple anti-cachectic powder is especially effective against all internal obstructions', and this is the medicine made from chalybean barley whose preparation is described in the previous chapter. But other remedies are available, for example the 'essentia crocitis ♂', that is to say the essence of saffron with iron, which is also 'commendable'.

A syrup is also considered by Hartmann as commendable for use against the spleen. The chapter on 'Obstructio lienis' describes this 'aperient infusion' based on hellebore mixed with

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<sup>10</sup> *Op. cit.*, p. 126-130.

dodder (*cuscuta*), senna, galanga (a spice similar to ginger), carthamus, etc.<sup>11</sup> Another potion or electuary could use hart's tongue fern or scolopendra in a drink made of wine or 'chalybeate barley', barley being represented by ∇.<sup>12</sup> The virtues of the *ptisana*, a decoction of water and barley, had been well-known since the time of Hippocrates and Galen, who devotes many pages to it in the *In Hippocratis de acutorum morborum victu*.<sup>13</sup> Galen had also recommended the *ptisana* in the *Therapeutics, to Glaucon (Ad Glauconem de medendi methodo)* in the chapter on 'Causes and treatment of cancer and elephantiasis'.<sup>14</sup>

If we do not find chalybs in the remedies explicitly prescribed by Gockel for liver or spleen diseases in his *Consultations*, the medicine is clearly recommended by Lémery for the obstructions which may affect them. His *Pharmacopée* has an article on the 'Pilulae Martiales, seu chalybeatae' – *martialis* being here an equivalent of steel.<sup>15</sup> 'The purgative ingredients of this composition are aloe and scammony'. They are pulverized with gum ammoniac mixed with saffron, porphyry and vitriolic tartar. 'These pills carry off

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<sup>11</sup> *Op. cit.*, p. 133-138. Christian WAROLIN, 'Ellébore ou Hellébore', in *Dictionnaire d'histoire de la pharmacie*, p. 167-168 observes that black hellebore, 'according to the doctrine of analogies, eliminated black and melancholic humours'.

<sup>12</sup> See Patrick BOURRINET, 'Électuaire', in *Dictionnaire d'histoire de la pharmacie*, p. 165-166.

<sup>13</sup> GALEN, *Commentaire au régime des maladies aiguës d'Hippocrate. Livre I*, ed. Antoine Pietrobelli, Paris, Les Belles Lettres, 2019, p. 34 sq.

<sup>14</sup> GALENUS, *Ad Glauconem de medendi method*, in *Opera omnia*, ed. C. G. KÜHN, Leipzig, Cnobloch. XI, ii, p. 139-144. For unexplained and unacceptable reasons, this chapter 12 has been omitted in GALEN, *Œuvres médicales choisies II*, Paris, Gallimard, 1994, p. 331.

Galen. 1994. The *ptisana* was very often recommended in the *consilia* of early modern times. We have calculated that it was prescribed by Giovanni Battista DA MONTE (1489-1551) and Christoforo GUARINONE (1540-1610) for around 8-9 % of the treatments dealing with a broad range of diseases, from catarrh to cancer (Daniel DROIXHE, *Alimentation et maladie dans les consultations à Padoue à l'aube des Temps modernes. Une introduction*, Bruxelles, Académie royale de Belgique, 2021).

<sup>15</sup> *Op. cit.*, p. 399. On pills, which, 'being taken dry', are supposed to 'stay more in the viscera' so that the remedy 'has more time to communicate its virtue', see Patrick BOURRINET, 'Pilule', in *Dictionnaire d'histoire de la pharmacie*, p. 330-331.

obstructions, excite the menses of women, are used for the pallors, for cachexy, dropsy'.<sup>16</sup> Another article, on 'Electuarium chalybeatum, Fabricii Barzonii', also uses porphyry and 'steel-saffron' mixed with cinnamom, nutmeg and rhubarb.<sup>17</sup> This electuary, which has the same effect as the pills, 'is closely related to the steel-bars and the cachectic powders described previously'. But 'its consistency seems more convenient for use by delicate persons, as it may be taken wrapped in *the pain à chanter*', literally 'bread for singing', that is to say unleavened bread – which accompanied singing at the Eucharist.<sup>18</sup>

Willis extends the virtue of chalybean preparations to the cure of most of the 'hepatic diseases', 'especially jaundice and dropsy', because 'they purify blood'.<sup>19</sup> In the case of jaundice, the medication is effective not so much because 'it opens the obstructions' as because 'it reduces the wild character excited in blood by sulphur and salt', providing a help which is 'not less remarkable than in other diseases related to cachexy'. In the case of dropsy, or exactly of *tympanit*.

### 3. Dropsy

Michael Stolberg has selected dropsy, along with cancer and consumption, as one of the three diseases which were considered as the most terrible in early modern times.<sup>20</sup> Hippocrates had also predicted the fatal nature of dropsy in his *Aphorisms*. 'Ulcers coming forth in those that

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<sup>16</sup> See also the article 'Chalybeate pills' in LÉMERY, *Pharmacopoeia Lemeriana contracta. Lemery's Universal pharmacopeia abridg'd*, London, Printed for Walter Kattilby, 1700, p. 84-85.

<sup>17</sup> *Op. cit.*, p. 482.

<sup>18</sup> Olivier LAFONT, 'Pain à chanter', in *Dictionnaire d'histoire de la pharmacie*, p. 310 writes that it 'was used in pharmacy during the 17<sup>th</sup> and 18<sup>th</sup> centuries to wrap the bitter or unappetising drugs, of a soft or semi-solid consistence', in order 'to mask the unpleasant taste and to encourage the oral administration of the remedy'. Thanks to Olivier Lafont for critical remarks.

<sup>19</sup> *Op. cit.*, p. 130-131.

<sup>20</sup> Michael STOLBERG, *A History of Palliative Care, 1500-1970. Concepts, Practices, and Ethical Challenges*, Cham, Springer, 2017, p. 16-18.

have a dropsie are not easily cured' (8).<sup>21</sup> 'A cough, coming upon those that are troubled with dropsie, is bad' (35). However, Hippocrates modulated the outcome of the disease: 'If the water of one that has the dropsie flows from the veins into the belly, the disease is dissolved' (14). But: 'If corruption or water heaped together, flow out all at once from those that are opened for the cure of inward imposthumations or dropsies, the patients will certainly die' (27). These warnings extend to the liver: 'Splenetick persons that are afflicted with a dysentery, die of the dropsie or lientery' (43); 'If the liver grows hard in those that have the yellow jaundice, it is a bad sign' (42). Furetière, in his *Dictionnaire*, defined dropsy as a 'swelling of the body members due to water which flows between skin and flesh when the liver no longer functions'.

Among the forms taken by dropsy, Hartmann distinguishes the well-known ascites, which requires medicines listed over two pages.<sup>22</sup> As a drink, he notably recommends 'wine containing wormwood and chalybs'. As stressed by Furetière, the disease was attributed to 'a significant cooling of the liver', either 'by it own defect', or 'by a cause communicated by the other parts', which involved 'the making of corrupt blood'.

It is also well-known that another form of dropsy, tympanitis, had been identified since Antiquity by the fact that the belly, swollen and tense, sounded like a drum in percussion. From this observation, the idea developed that 'one of the signs of a *hard apostema* (abscess, swelling, tumour) of the liver was a hard bulk under the ribs which may be felt to the touch'.<sup>23</sup> Thus, the identification of 'cancer' of the liver was interpreted increasingly according to the medical outlook of the time.

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<sup>21</sup> Conrad Joachim SPRENGELL, *The Aphorisms of Hippocrates and the Sentences of Celsus with Explanations and References*, London, Printed for R. Renwick et al., 1708, p. 154, 157, 164, 168, 172-173.

<sup>22</sup> *Op. cit.*, p. 146-149.

<sup>23</sup> Nancy G. SIRAISSI, *Medieval and Early Renaissance Medicine. An Introduction to Knowledge and Practice*, Chicago and London, The University of Chicago Press, 1990, p. 125 sq. On abdominal and thoracic percussion, see Jacques ROUËSSÉ, *Une autre histoire du cancer. Des lumières au stéthoscope. Europe, 1750-1816*, Montceaux-lès-Meaux, Éditions Fiacre, 2014, p. 19. Thanks to Jacques Rouëssé for long time support and encouragements.

As mentioned previously, Willis devotes his description of his preparation of chalybs to the treatment of anasarca.<sup>24</sup> He repeats that the remedy mixes ‘filings of iron and pieces of sulphur reduced in a fine powder’. As the matter is ‘liquified’, the particles of sulphur which were previously ‘asleep’ are ‘liberated’ and ready to activate the whole mass of blood, which recovers its strength and its power of ζυμωσις, that is to say ‘fermentation’, previously reduced.

As it was announced above, Pliny the Elder devoted many pages to medicaments supplied by ‘copper ores and mines’, in the book XXXIV of the *Natural History*.<sup>25</sup> ‘The flower of copper also is useful as a medicine. It is made by fusing copper and then transferring it to other furnaces, where a faster use of the bellows makes the metal give off layers like scales of millet, which are called the flower’. When the sheets or cakes of copper are cooled off in water, they shed off other scales of copper ‘of their own accord’, by themselves, and when they are detached by successive hammering, they are only called scales. Sometimes, cakes of copper and nails macerate ‘beforehand in a boy’s urine when they are going to detach the scale’, which is ground and washed with rainwater, so that it may be prescribe to dropsial patients.

#### **4. Gockel on two cases of spleen disorders**

Gockel considers two interesting cases of disease of the spleen in his new consultations of 1700. On September 27 1682, a lady sees him ‘for a noise, a whistling a constant uproar [*strepitu*] which has tormented her for some time’ and ‘which is sometimes followed by a swelling of the head, the forehead and the temples’.<sup>26</sup> This results of course in affliction and anxiety, but also in palpitations, an anomalous heating of the whole body and a profuse sweat.

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<sup>24</sup> *Op. cit.*, p. 152-153. He mentions a common preparation called ‘*salt of chalybs (sal chalybis)* or *vitriol of mars (vitriolum martis)*’ that is to say vitriol of iron. On the medication called *ball of mars*, see Jean-Armand MARTIN, ‘Boule de Mars, boule Nancy, boule d’acier’, in *Dictionnaire d’histoire de la pharmacie*, p. 72-73.

<sup>25</sup> PLINY THE ELDER, *Natural History, Volume IX : Books 33-35*, transl. By Horace H. RACKHAM, Harvard, Harvard University Press, 1952 (Loeb Classical Library 394), book XXXIV, xxiv-xxv, [107-109] ; *Histoire naturelle*, éd. Stéphane SCHMITT, Paris, Gallimard, 2013, p. 1573.

<sup>26</sup> *Op. cit.*, p. 24-27: Cent. I, ‘Consilium med. VI. Affectum quendam hypochondriacum ac uterinum cum molestissimis symptomatibus proponens’.

She complains about a significant weight loss and often feels an extreme cold (*algido frigore*) in the head.

Gockel quickly identifies the disease: ‘This is nothing other than an hypochondriac disease in relationship with the uterus’. ‘The cause is an obstruction of the mesenteric veins and vessels of the portal vein in the area of the liver, whose origin may be found in a cacochymia of atrabiliar and excrementitious humours’.<sup>27</sup>

As we are opportunely reminded by Furetière (s. v<sup>o</sup>), *hycopondre* [hypochondrium] means ‘each side of the epigastric area or upper part of the lower abdomen’, where ‘the liver is situated, almost the main part of the liver, while on the left are the spleen and the main part of the stomach’.<sup>28</sup> The chalybs is briefly mentioned among the various components of a decoction used for the evacuation of these ‘excrementitious humours’.

Gockel also refers to the medical process concerning the transfer between liver and spleen in another case of ‘hypochondriac melancholy’. In the middle of the summer of 1697, he was consulted by a teenager ‘of the highest social rank’, who suffered at intervals from intense sadness and love for loneliness which aroused all kinds of wrong ideas.<sup>29</sup> He hated conversations and spent his days in bed, reading two or three books ‘that he draws from I know not where’. He was always deep in meditation ‘except when he was called to eat, or when he went out of his very hot room to see the servants’. Sometimes, called to the table by his family, ‘he refused to come, staying in his bed, with his eyes closed and without saying a word’. To those who asked him, he only answered: ‘*it is so, or it is not*’. Even the minister, who was asking him about his state of mind or about the type of disease that he felt, received the answer that he did not know. As he was disgusted by food, the minister convinced him to take two or three juices of cochlearia officinalis, but he absolutely refused anything else.

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<sup>27</sup> On the mesenteric plexus, described in the XVII<sup>th</sup> by Raymond VIEUSSENS (1641-1715) in his *Neurographia universalis* (1684) and James Keill (1673-1719) in his *Anatomy of the Human Body Abridged* (1698), see Larry W. SWANSON, *Neuroanatomical Terminology. A Lexicon of Classical Origins and Historical Foundations*, Oxford, Oxford University Press, 2015, p. 961.

<sup>28</sup> On the hepatic plexus and the hepatic plexus branches to bile ducts, especially in Keill (1698), see SWANSON, *op. cit.*, p. 926.

<sup>29</sup> *Op. cit.*, p. 655-658: Decad. II, 'Observatio Med. IX. Melancholia hypochondriaca, cum loquelae interceptione’.

‘Sometimes, he closed his thumbs and squeezed them very tightly, as he was taken by convulsions’. Gockel adds: ‘To my questions to know whether he felt any headache, he said yes, but to other questions I made, he could only answer with words expressed in a hesitant discourse’. ‘His pulse, which was regular, was that of a healthy man, but his face was livid, his eyes were gloomy and every time he tried to get up from his bed and tried to move towards something, he could not reach it’.

The patient was obviously suffering from a ‘mental alienation’, and the first recommendation was not to leave him alone. The role played by the spleen was invoked again, as the chalybs was used to purge the young man of the ‘atrabiliar matters’ and also in an electuary to remedy the disturbance of the organs affected and to reinforce them. The same remedy had been used, in 1687, on two occasions for the same disease. First, Gockel cured a very anxious man, attacked by hypochondriac melancholy, who believed that he was warned of his forthcoming end to the point where he could no longer sleep. The chalybs allowed him to quickly recover, as it also helped a young woman of thirty-eight suffering from a disease of the spleen to get well.<sup>30</sup>

For this type of disease, Hartmann prescribes a syrup made with hellebore and rhubarb, which was nothing new.<sup>31</sup> Rhubarb deserves a comment, as it is included in the preparation of ‘philosophical water or wine’, and was also effective against obstructions of the liver and to cure dropsy, as is illustrated by so many examples in Renaissance literature.<sup>32</sup>

## 5. Cachexia and menses

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<sup>30</sup> *Op. cit.*, p. 127-129, Cent. I, ‘Consilium Med. XXXII. Melancholiam hypochondriacam feliciter curatam, exhibens’; p. 189-190: Cent. I, ‘Consilium Med. LXI. Dolor hypochondrii sinistri periodicus feliciter curatus’.

<sup>31</sup> *Op. cit.*, p. 133-136.

<sup>32</sup> *Op. cit.*, p. 128; DROIXHE, *Alimentation et maladie*, *op. cit.*, where we might have taken into account, ‘Rubarbe’, in *Dictionnaire d’histoire de la pharmacie*, p. 360-361. See also Clifford M. FOUST, *Rhubarb. The Wondrous Drug*, Princeton, Princeton University Press, 1992, esp. pp. 6, 36, 41 (on dropsy and tympany), 35, 38, 139 (on dysentery and lientery) and 141 (on consumption and cancer).

The ‘diseases of the abdomen’, François Boissier de Sauvages wrote in his *Nosologie méthodique*, are likely to involve ‘different types of tumours’.<sup>33</sup> He mentions among their symptoms cachexia, ‘a disturbance in colour, figure and volume of the body’ and one cause of cachexia is often stressed: the cessation of menses. M. Stolberg has reminded us that the latter was supposed to play an eminent role in the genesis of cancer of the breast or uterus at the menopause:

Cancer, in the early modern period, was experienced primarily as a female disease, because the large majority of those diagnosed with cancer were women. In retrospect, this can be explained by the fact that, at the time, the diagnosis of ‘cancer’ was largely based on palpatory findings and visual examination from the outside. The eye and the palpating hand, however, were inevitably more or less limited to detecting tumors that were near the skin surface or were at least connected to it through one of the orifices. This was above all the case in breast cancer and to some degree also in uterine cancer, which sometimes could be palpated or announced itself with bloody or purulent discharge. Until the 18<sup>th</sup> century, these two kinds of cancer represented the large majority of documented cancer diagnoses. The – perceived – much higher incidence of cancer in women, especially following menopause, also accorded with the early modern understanding of female physiology and could be taken to confirm it, in turn. In contrast to men, women required a monthly ‘natural cleansing,’ to rid themselves of impure, acrimonious and toxic substances that constantly accumulated in their bodies. When the monthly cleansing ceased at a certain age, these harmful substances accumulated in the body. They could harden and finally develop into painful cancerous tumors, which sooner or later formed ulcers through which they discharged the cancerous matter, at least in part.<sup>34</sup>

Galen, at the beginning, had linked such a cessation to ‘cancrosis tumoribus’ in the *Therapeutics*, to *Glaucon* already quoted (book II, chapter 12). To restore the menses, Hartmann prescribes Croll’s ‘cachectic powder’. But if it cannot reopen the menses, the physician will resort to chalybean water.<sup>35</sup> The latter, in this case, may be mixed with wormwood or absinthe and flavoured by saffron, cinnamon, sabina, tamarind peel, candied

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<sup>33</sup> François BOISSIER DE SAUVAGES, *Nosologie méthodique*, Lyon, Chez Jean-Marie Bruyset, 1772, I, p. 111 sq.

<sup>34</sup> *Op. cit.*, p. 16-17.

<sup>35</sup> *Op. cit.*, p. 172-175.

nut, honey and sugar – the French way, at a time when Parisian cooking was ‘triumphant’ in Europe.<sup>36</sup> The mixture must be kept ‘in a cold, dry place’.

## 6. Opening European windows on diseases of liver, spleen and uterus

In Europe, various countries used different methods for making and preparing chalybs. In his *Thesaurus medicinae practicae*, Thomas Burnet (1638-1704) puts switch points into a round earthen pot containing very pungent vinegar which burns as long as the latter is eliminated so that the filings of steel are consuming and white hot.<sup>37</sup> When they are extincted, they are reduced into a sort of powder of marble and mixed with various ingredients such as the powder of *diarrhodon abbatis*, a tonic and astringent preparation using red roses, another powder, the *diacrocum*, based on saffron, etc. The mixture is recommended in the treatment of hypochondria, as a syrup, pills or plasters, for dissolving ‘an obstruction of the spleen and of the the whole abdomen’. This is the treatment used with a patient from Burgundy who is suffering from ‘a tension in the left part of the hypochondrium’.

The spleen is also concerned in one of the syrups which Nicolas Lémery (1645-1715) borrows to Antoine Daquin, first physician of Louis XIV. In his *Pharmacopée universelle*, he writes that his *syrupus aperiens cachecticus*, syrup against cachexia using the ‘chalybean water’, ‘destroys and purges the viscous or earthly humours which make obstructions’. More precisely, the *syrupus chalybeatus aperiens catharticus* ‘is specific to remove the obstructions of the liver, of the spleen, of the mesenterium, of the matrix’ and it is not only given in case of cachexia and dropsy but also against the ‘retention of menses’.

Thus, another organ is often cured by chalybs. Luis Mercado (1525-1611), a professor at Valladolid university, states in a chapter dealing with ‘diseases of the uterus’, in his his *De mulierum affectionibus, libri quatuor (Four Books on the Diseases of Women)*: ‘It is well-

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<sup>36</sup> As is shown by François Pierre de La Varenne’s *Cuisinier françois*, which was translated not only into English in 1653 but also into Danish, Swedish, Dutch and Italian (it seems that one of the countries where the book was not translated was Germany, which was perhaps more interested in medical progress than in gastronomy). See Jean-Louis FLANDRIN, ‘Introduction. The early modern period’, in *Food. A Culinary History from Antiquity to the Present*, ed. Jean-Louis FLANDRIN and Massimo MONTANARI, New York/Chichester, Columbia University Press, 2013, p. 349-373, esp. p. 366.

<sup>37</sup> Thomas BURNET, *Thesaurus medicinae practicae*, Geneva, Sumptibus J. Ant. Chouët & Davidis Ritteri, 1698, p. 218-219.

known, among many physicians, that steel filings may cure obstructions when prepared in some light preparation which does not change its substance'.<sup>38</sup> 'Others prepare it with vinegar, until it is changed into a very fine powder; others rather incorporate it into oil, many into water or wine, and almost everyone uses a thousand other drugs'. Finally, Mercado praises his own way of preparing it 'which contains what is remaining'. He seems rather sceptical regarding all the virtues ascribed to iron for curing obstructions and regarding that 'power of penetrating the organs and dissolving what is agglomerated, as he has often heard'. In fact, this power is mainly due to 'the large quantity of sulphur and mercury involved in iron', properties that all metals have' and that iron possesses in the highest degree, so that it certainly has 'the greatest and most effective power of liquifying, scattering and mitigating the viscous and thick matter which has produced the obstructions'.

Thomas Willis (1621-1673), a famous Sedleian professor of natural philosophy at Oxford, agrees, in his *Pharmateutical rationalis* of 1676, that one must determine the extent to which the 'particles of sulphur' predominates, in the preparation of chalybs, over the other ingredients and are balanced with the 'saline elements'.<sup>39</sup> The important point is 'to eliminate the ferments which are outside in the viscera and to restore the true ones', 'to turn away the obstructions'. The latter are immediately associated with jaundice, and then with other hepatic diseases and diseases belonging to the category of dropsy and aqueous or gaseous effusion such as ascites, tympanitis, anasarca. For example, ascites coming from anasarca generates *tumores scirrhusos* and concretions, swellings or glandular tumours which develop 'unnaturally' around the mesenterium. Willis asserts that 'his preparation' of chalybs – 'like many other pharmaceutical ones', he recognizes – is outstandingly effective as is proved by 'frequent experiments', either it consists of a solution of iron-filings, or of a simple infusion, or of an acid composition with salt, or of with 'steel-vitriol'.<sup>40</sup> Thus, the formula used in his

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<sup>38</sup> Luis MERCADO, *De mulierum affectionibus, libri quatuor*, Valledolid, Didacus Fernandez à Corduba, 1579, p. 287.

<sup>39</sup> Thomas WILLIS, *Pharmateutice rationalis. Sive diatriba de medicamentorum operationibus in humano corpore (Diatribes on the Operations of Drugs in the Human Body)*, Leiden, Sumptibus Joannis Antoni Huguetan, 1676, p. 123-126, 130-134, 152-153, 165, etc. .

<sup>40</sup> WILLIS, *op. cit.*, p. 152-153. Pierre LABRUDE, 'Solution', *Dictionnaire d'histoire de la pharmacie*, p. 389-390. On Willis, see FOUST, *op. cit.*, pp. 39-41.

medicinal syrups made with ferric sulphate, adapted to everyone as sweeteners, are supposed to have been ordinarily named ‘Willis chalybs’.<sup>41</sup>

The attention granted to sulphur opens another window on the ancient history of the chalybs treatment. In the *Ad Glauconem de medendi methodo* (*Therapeutics, to Glaucon*), Galen devotes a chapter to ‘The treatment of scirrhus in general’.<sup>42</sup> He recommends the use of pyrites, that is to say iron sulphide, ‘heated until it is red hot’, on which ‘very biting vinegar will be poured’ so that the pyrites, when ‘shaken over the affected part’, ‘dissolves the scirrhus by means of the ascending vapor’. It often happened, he says, that ‘parts of the body already completely knotted and distorted have been completely cured during the time they were shaken over the vapour, so that the healing seemed prodigious’. In the following chapter, on ‘The treatment of tumours of the spleen and the liver’, he prescribes, for use against scirrhus of the spleen ‘a plaster of mixed properties, such as that of sulphur and alum’.<sup>43</sup> He also recommends ‘flower of salt’ (*salis flos*), which is effective against scirrhus of the liver if the disease is recent, because those which last some time are not curable and the patients who are suffering from them ‘necessarily fall into dropsy’.

The latter was also cured in the Antiquity by slags of copper, according to Pliny the Elder, mentioned by Ruland, as it will be related below. We shall not consider here through which ways the Galenic use of pyrites gave birth to the ‘chalybean therapy’. It is sure that Renaissance medicine found a medieval relay in the famous and controversial Trotula’s *De passionibus mulierum* (*On the Diseases of Women*).<sup>44</sup> Benedetto Vittorio (1481-1561) reproduced it in the second edition of his *Empirica*, of 1555, where this ‘extraordinary experimental book’ devotes the chapter 62 to ‘The preservation of human body from some diseases by the effect of a wonderful water’.<sup>45</sup> This one has a quasi ‘prophetical reputation’:

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<sup>41</sup> Charles GUYOTJEANNIN, ‘Sirop’, *Dictionnaire d’histoire de la pharmacie*, p. 385.

<sup>42</sup> GALENUS, *Ad Glauconem de medendi methodo*, in *Opera omnia*, ed. C. G. KÜHN, Leipzig, Cnobloch. XI, II, vi, p. 107-108; GALIEN, *Œuvres médicales choisies II*, Paris, Gallimard, 1994, p. 320-323.

<sup>43</sup> GALENUS, *Ad Glauconem*, vii, p. 108-111; GALIEN, *Œuvres*, p. 323-324.

<sup>44</sup> *The Trotula. A Medieval Compendium of Women’s Medicine*, ed. and transl. by Monica H. GREEN, Philadelphia, University of Pennsylvania, 2001, esp. p. 51-62 : ‘The Fate of the Trotula’. Thanks to Monica Green for comments and encouragements.

<sup>45</sup> Benedetto VITTORIO, *Empirica*, Venice, In officina Erasmiana, Vincentii Valgraisii, 1555, p. 462 sq. : « Trotulae de mulierum passionibus, ante, in, et post partum, cum reliquis partui

‘Take filings of silver, brass, iron, lead, steel, gold, foam of silver and of gold, styrax, according to the wealth or poverty of the patient’, etc. In the following days, the filings will be put ‘in the urine of a young virgin’, then in ‘hot white wine’, then in ‘juice of fennel’, etc. to cure lepra and ‘delete all the blemishes’.

The same passage is reproduced in the famous collection of texts published in 1566 by Caspar Wolf (1525-1601) under the title of *Gynaeciorum, hoc est de mulierum tum aliis, tum gravidarum, parientium et puerperarum affectibus et morbis, libri veterum ac recentiorum aliquot (Some Ancient and Recent Books about Women, that is to Say Diseases either of those who are Pregnant, in Labour or Delivered)*.<sup>46</sup>

### **Perspectives: national traditions and the cancer lexicon**

Other diseases were cured by chalybs in the works that we have considered: dysentery, diabetes, etc. Given the diversity of the diseases and the special relationship which developed between chalybs and those which involve the liver and spleen, one may be surprised by the omission of the remedy for some of the latter. This is mostly the case concerning what at that time was called ‘cancer’.<sup>47</sup> Hartmann’s *Practica chymiatrica* has a long article on the topic.<sup>48</sup> But it does not explicitly refer to chalybs and it mainly proposes ‘a gentle specific’ which remains quite classical, with senna, flower of thyme, polypode (a sort of fern), bugloss and lapis lazuli. The related diet is very similar to what was prescribed elsewhere in general: ‘avoid what generates melancholic juice, give *ptisana* with barley, mallow, orach, chard stalk, and everything that generates good blood and which is easily digested’.

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item inservientibus, liber experimentalis mirificus » ; « Pro conservatione corporis humani ab aliquot infirmitatibus, aqua mirabilis effectus », p. 522-

<sup>46</sup> Basel, Per Thomam Guarinum, 1566, col. 215 sq. : ‘Erotis medici liberti Iuliae, quam aliqui Trotulam inepte nominant, muliebrium liber, logne quam ante hac emendatior’ ; col. 308.

<sup>47</sup> About what was meant by this term in early modern times, see, for the last ten years: Jacques ROUËSSÉ, *Une histoire du cancer du sein en Occident. Enseignements et réflexions*, Paris, Springer, 2011; works by Leonard L. WEISS, Robert JÜTTE, Steven I. HAJDU, Guy FAGUET, Michael STOLBERG and Domenico BERTOLONI MELI mentioned in Daniel DROIXHE, ‘Tracing tradition. The idea of cancerous contagiousness from Renaissance to Enlightenment’, *History of European Ideas* 46/6, 2020, p. 754–765.

<sup>48</sup> *Op. cit.*, p. 94-98.

The same omission of any reference to chalybs is to be noticed in the thirty or so pages devoted by Gockel, in 1687, to two types of cancer: one for ‘Ulcerated, fatal cancer’ of a forty-five year old woman living in Giengen an der Brenz, in Baden-Württemberg, and another for a forty-eight year old woman suffering from an ‘Occult cancer of the right breast’.<sup>49</sup>

We could extend the same observation to Willis. He mentions in a first chapter ‘the main diseases involving liver’, which are ‘the jaundice and the tumour’, from which are related varied forms such as ‘the obstruction, the inflammation, the induration and the scirrhus’. But it is only in the second chapter that Willis, about ‘the remedies against jaundice’, that he refers to *chalybs*.<sup>50</sup>

On the contrary, it is odd that chalybs often appear in Italian consultations dealing with cancer. This may be illustrated by examples borrowed to two of the most important physicians of Padua. Girolamo Mercuriale (1530-1606) prescribes, for a woman complaining about a scirrhus of the spleen, a remedy that he always used with satisfactory results: ‘white wine, *pauciferus*, not astringent, which must contain steel which has burnt and is extinguished’.<sup>51</sup> The word *pauciferus* is equivalent to *oligophorus*, meaning ‘a light and aqueous wine’ according to Hippocrates.<sup>52</sup> The same remedy is recommended for a tumour of the spleen to Alvise Priuli, a member of the group of scholars who gathered around the Englishman Reginal Pole, a cardinal and the last Catholic archbishop of Canterbury (1500-1558).<sup>53</sup> A lady of Reggio – probably Reggio Emilia – is suffering from ‘cancerous ulcers in the uterus’, to

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<sup>49</sup> *Consiliorum, op. cit.*, p. 247-265: ‘Consilium XXII. Cancer exulceratus, lethalis, textoris cujusdam conjugis. 1674’ (on the treatment, p. 255-265); p. 266-274: ‘Consilium XXIII. Cancrum occultum in mamma dextra exhibens’.

<sup>50</sup> *Op. cit.*, p. 120-125: ‘Sect. II, Cap. 1’ and ‘Cap. II’.

<sup>51</sup> Girolamo MERCURIALE, *Consultationes et responsa medicinalia. Quattuor tomis comprehensa*, Venice, Apud Iacobum de Franciscis, 1620, I, cons. 104, p. 136-137: ‘Consultatio CIV. De lienis scyrrho’.

<sup>52</sup> Robert JAMES, *Dictionnaire universel de médecine*, Paris, Chez Briasson et al., 1748, V, p. 115 et 388.

<sup>53</sup> MERCURIALE, *op. cit.*, IV, cons. 44, p. 68-69: ‘Consultatio XLIV. De lienis tumore, pro Clarissimo Viro Aloysio Priulo Patritio Veneto, ad Ianuarium Corregium Medicum’.

which a ‘chalybean milk’ is applied ‘to soothe the pain, clean it moderately and without irritating the painful intimate part’.<sup>54</sup>

Another physician, Roderic a Fonseca (?-1622), who taught in Pisa and Padua, deals with cancers and scirrhus of the liver and spleen, as well as ‘obstructions’ in the same organs. A ‘chalybean milk’ – but here the milk of a goat – is prescribed for a woman of thirty-five who feels in her left breast a thickness the size of a nut.<sup>55</sup> ‘Presumably’, Roderic writes, ‘the liver and spleen are affected’. Roderic is also consulted by a man, aged around forty, who receives the chalybs powder in different ways, to stop the disease: either as it is, or sprinkled on a piece of linen which is applied to the supposed place of the organ, or mixed with a ‘generous wine’, which should be ‘not too light’.<sup>56</sup> This last preparation must be put into a glass pot which will be shaken under the hottest sun. But if the weather is cold, the wine and the chalybs will be put into a closed jug that must also be shaken every day for eight days, when it will be warmed up in a water-bath... A similar prescription is ordered for a lady of thirty-five who has scirrhus of the liver.<sup>57</sup> Other diseases which are supposed by Fonseca to hide a ‘tumour of the hypochondrium’ are due to ‘a melancholic spleen’ and ‘a liver loaded with slime’, that is to say a very bad phlegm.

How could we explain these national disparities, if not by the influence of Paracelsus in Germany, and by the struggle against a Galenism which was ‘accused of maintaining the status quo at the universities and of refusing to lecture on any of the results of the new Paracelsian investigations’?<sup>58</sup> An inquiry into the question might surely take into account a lexical aspect of the terminology of ‘cancer’. Nancy G. Siraisi has stressed that is often difficult, and sometimes impossible, when dealing with ancient medical observations, to relate

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<sup>54</sup> MERCURIALE, *Consultationes et responsa medicinalia*, II, p. 152-153: ‘Consultation LXXXIV. De cancerosis uteri ulceribus; pro nobili matrona Regiensi ad Leonardum Ghirardinum, medicum praetantissimum’.

<sup>55</sup> Roderic a FONSECA, *Consultationes medicae singularibus remediis refertae*, Venise, Apud Ioannem Guerilium, 1619, p. 151-155: ‘Consulatio quadragesimatertia. Pro cancro incipiente non ulcerato in mamma sinistra’.

<sup>56</sup> *Op. cit.*, p. 145-148: ‘Consultatio quadragesimaprima. Pro scirrhu lienis’.

<sup>57</sup> *Op. cit.*, p. 218-219: ‘Consultatio sexagesima prima. De scirrhu iecoris’.

<sup>58</sup> DEBUS, *op. cit.*, empl. 1851.

the diseases which are mentioned to those that are discussed in modern science.<sup>59</sup> Information consisting in ‘external symptoms’ does not allow the identification. Luke Demaitre has very precisely provided examples of this problem, that Laetitia Loviconi tries to solve by a new approach.<sup>60</sup> A particular part of the problem is arises from the indistinct meaning taken by the *realia* of cancer in corresponding words such as the Latin *cancrosus* or the English *cancrous*, which could refer to *cancer* or to *canker* or to *chancre* – while the German distinguishes *Krebs* and *Schanke*.

British medicine is, from this point of view, interesting. Thomas Bonham’s *Chyrgians Closet* of 1630, who frequently uses chalybs and recommends its filings ‘for use against non-ulcerated cancer’, mentions much more *ulcers* described as *cancrous*, *contumacious*, *sordid*, *gangrenous*, or *difficult to cure*, without letting us decide whether he considers them as ‘cancers’, even if they especially affect ‘the breast of women’ or their ‘intimate parts’.<sup>61</sup> Willis specifies that some ‘tumours’ which occur with dropsy, ascites and anasarca are ‘scirrhus’, thus supposedly cancerous, like other concretions, swellings or glandular tumours which develop ‘against nature’ around the mesenterium. But the passages in question also fail, as it seems, to mention the chalybs.<sup>62</sup> If German – or English – chemistry of the 17<sup>th</sup> century abstained from *naming* the obstructions of the liver and spleen as *cancers*, perhaps it was also a way of being more cautious – or, so to say, less expeditious – in the face of such a problematic and mysterious disease.

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<sup>59</sup> Nancy G. SIRAI, *Medieval and Early Renaissance Medicine. An Introduction to Knowledge and Practice*, Chicago and London, The University of Chicago Press, 1990, p. 130 sq.

<sup>60</sup> Luke DEMAITRE, *Medieval Medicine. The Art of Healing, from Head to Toe*, Santa Barbara-Denver-Oxford, Praeger, 2013, 98 sq.; Laetitia LOVICONI, ‘Les *Practicae*: un révélateur de la structuration et de l’élaboration des savoirs théoriques et pratiques médicaux’, in *Écritures médicales. Discours et genres, de la tradition antique à l’époque moderne*, ed. Laurence MOULINIER-BROGI and Marylin NICOU, Lyon and Avignon, CIHM-Éditions, 2019, p. 73-99. Thanks to Luke Demaitre and Laetitia Loviconi for comments and encouragements.

<sup>61</sup> Thomas BONHAM, *The Chyrgians Closet*, London, Printed by George Miller, for Edward Brewster, 1630, p. 50, 179, 334, 342, etc. Not mentioned in SKUSE, *op. cit.*

<sup>62</sup> *Op. cit.*, p. 133-134.