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Medical and surgical treatment of the  
pilgrims to Santiago de Compostela in the Middle  
Ages (Pictures of human suffering in medicine  
and in the fine arts)***

***Contents:***

International significance of roads ("camino") and of the pilgrimage to Santiago de Compostela

Foundation of monastic hospitals as an international medical support network

Expansion and fall of the St. Anthony's order

Fire of St. Antonius (ignis sacer, ergotism)

Admission and medical management of ergotism:

Anodynic substances and surgical procedures

Traces of ergotism in the medieval fine arts

Pictures of the apocalypse by H. Bosch and P. Breughel

***Lecture on the Fifth International Symposium on the History of  
Anesthesia. Santiago de Compostela, 19-23. September, 2001***

## **The medical and surgical treatment of the pilgrims on the roads to Santiago de Compostela in the Middle Ages. (Pictures of human suffering in the fine arts and medicine)**

One of the main topics of our historical reminiscences should be devoted to anaesthesia in the fine arts, or to express this another way: the relation of the arts to the art of medicine. We need also to be reminded of the fact, that in the Middle Ages the physicians and the artists were generally placed in the same guild. Their fraternity was common place in the old days, at least in the Mediterranean area <sup>4, 12, 36, 38, 52</sup>.

With this study we want to fulfil two purposes, to approach my subject from two angles; tracing the effects of historical events in fine art, and in turn, the paintings as a testimony of medical history. All these paintings and drawings bear authentic witness to the suffering and fate of the pilgrims, who are stricken with "ignis sacer" ("St. Anthony's fire", "ignis sacer"<sup>1, 5</sup>. Sometimes these images reflect suffering and dying in a clearer way than some contemporary medical reports <sup>8, 15, 22, 25, 29, 31</sup>.

Our further purpose is to study how these stigmas of mankind were managed by medical and surgical therapy in medieval times, the use of medical herbs, as well as amputation of necrotic limbs by wandering surgeons under contract to the hospitals of the caminos <sup>7</sup>. Did they have a standardized operative procedure <sup>21, 24, 28</sup>? What types of analgesic and anaesthetic methods have been applied in every-day practice in the hospitals <sup>1, 2, 5, 7, 32, 51, 59</sup>?

### **1) The international significance of roads ("camino") and of the pilgrimage to Santiago ("finis terrae"): Foundation of monastic hospitals as an international medical support network** <sup>30, 34, 40, 52, 56</sup>

: About 857 A.D. the chronicler reported a new epidemic, ignis sacer (ergotism) in the cloister of Xanten on the Rhine. About 1090 the monk Sigebert from the Benedictine cloister of Gembloux (at Namur) deplored the mass dying in his chronicle <sup>64</sup>: "Many people, whose inner self had been desintegrated by ignis sacer, putrified all their limbs, which became black like coal, have either died miserably or were pursuing a much more miserable life, after their hands and feet had already been amputated. Many of them have also been tortured by nervous cramps"

Ergotism was gradually becoming a cruel fate for all European countries <sup>63</sup>. Expectation of Judgment Day, the fear of eternal damnation after death, disgrace before God and a deep sorrow for salvation of the soul have led many people to go on pilgrimages <sup>65</sup>. The pilgrimage to Santiago usually took two and half years <sup>2, 3, 10, 45, 46, 69</sup>.

**a) Beginning, expansion and fall of the order St. Antonius** <sup>40</sup>: Towards the end of 11<sup>th</sup> century it had generally become accepted, that the new epidemics, later called "the fire of Antonius", must somehow be identical with the related symptoms referred to by some medical chroniclers of the late Antiquity: Cassius Felix: "Sacer ignis, quem graeci herisipilam vocant".

Certain circumstances have helped the small village of Santiago ("the cradle of Occident") to become the third favoured centre of Christian pilgrimage outside of Rome and Jerusalem<sup>10, 15, 46</sup>. Firstly, the Reconquista, the liberation of the Spanish peninsula from the Saracens, secondly the fall of Jerusalem and the defeat of the crusaders in the Middle East (1291), and thirdly, the decline of papacy during the time of exile in Avignon<sup>3, 19, 54</sup>. Great devastation due to ergotism didn't plague Western Europe before 1089, and was chiefly in the countries of Flanders, Lorraine, Eastern France and Rhineland<sup>7</sup>. Only six years later the lay-fraternity of St. Anthony has been formed and very soon became (from 1247) one of the most successful clerical orders of the World, spreading into many lands in the East, e.g. 1514 the Lapland<sup>40, 41</sup>. At the end of the Middle Ages the order was in possession of more than 360 settlements (in Germany called *Präzeptorei* under the jurisdiction of the principal cloister of the knight-hospitaller (*Komturei*; Mischlewski, 1958)! In this way the Antonites became the first hospital-holders managing a huge international medical and social welfare system. Insignias of the fraternity were a silver "Tau" (*T-shaped sign*) with a small bell, a T-ended walking-stick (as a symbol for the crutches of the cripples) and a swine (Antonite-swine)<sup>1, 7</sup>. (*A map illustrating many monastic hospitals of St. Antonius in Germany s. Fig.1*) Shortly after the foundation it was clarified that this new epidemic was equally fatal for rich and poor people, wasn't contagious<sup>63</sup>, rather emerging during the years of famine, some months after a poor harvest (Mollat, 1984). Hence the German name: *Hungerkorn*<sup>16, 48, 64</sup>: (In years, in which, as we meanwhile know, the winter form (*conidien*) of the split mushroom (toadstool) ergot (*Claviceps purpurea*) can more lightly survive and his honey-sweet excrements be carried by the insects to other ears of the rye.)

After three centuries of charitable work an irresistible fall of this brotherhood began, accelerated by the reformation and Hussitian wars. The decline of the order had been also promoted by the discovery of the exact genesis of ergotism (Baldvinus, 1592, J.C. Brunner, 1695; in J. des Scavans, 1677, C. N. Langen, 1717 and Andreas Wittenberg, 1723)<sup>5</sup>. J. Taube (1782)<sup>5</sup> observed the symptoms of the ergotismus convulsivus, e.g. the epileptic convulsions, the craving ("*Heißhunger*"), the irregularities of the pulse and the trophic alterations of the skin. By this time it had become clear that consumption of bread baked from rye mixed with the ergot was the exclusive cause of the ignis sacer. There was no further need for prayers and miracles. The cloisters of Antonites were later (1776) incorporated into the order of Knight Hospitaller (Maltese)<sup>38</sup>. Unfortunately, in this way nearly all recipes of their herbal wines and Antonite-balsams were lost<sup>35</sup>. This is why the reconstruction of their wide-spread and frequently applied secret medicaments remain till now a practically insolvable undertaking for medical history. However, for centuries the Antonites had still enjoyed an unchallenged reputation as faith-healers.

**b) Cloisters and monastic hospitals as hagiotherapeutic centres**<sup>1, 13, 27, 55</sup>: Considering the enormous popularity of this order we may consider that these medicines, applied externally or internally as analgesic and vasodilating ointments and wines, couldn't have been without some effect on the recovery from ergotism. Besides this there must have been many other factors at work promoting recovery: a strong faith in God's help or the vow being made before departure to Santiago and the very valuable growing social prestige connected with the pilgrimage after returning home. Bearing this in mind and considering the healing force of religious experiences and exaltation in the numerous cloisters and hospitals, the increasing mental tension along the roads, full of hope after arrival at the glorious entrance of the Cathedral of Santiago, it can be understood why "miraculous healing" occurred very often. Many of these marvellous events of recovery that are totally astonishing and inexplicable (for common sense in medicine) can be re-read in the Books of Miracles in the cathedral-archive of Santiago<sup>4, 63, 71</sup> or elsewhere (K. P. Jankrift, 15.2. 2001, letter to the author). This is why the cloisters with their infirmaries can be regarded as *hagiotherapeutic* centres, often the very first and last place for rescue for travellers in medieval times in countries without a regular medical infrastructure. Through narration or account by returning pilgrims these miracles have been spread in the homelands of peregrini, and, as often happens, surmounted by fables and pious legends:

<p>"Ils revenaient de Compostelle  Un surd, un muet de compagnie  Le muet jasait comme une pie  Le sourd pensait: ô bon grand saint  Rebouche-moi les deux oreilles!  O grand saint Jacques, guérissez-moi"</p>	<p>translated "They came back together from Compostela  in prose: Two men with deafness and stuttering  Like a magpie the stutterer was chattering  And the deaf thought: O great gracious Saint,  Close please my ears with a cork again!  O great St. Antonius, rescue me right away!"</p>
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Some chroniclers such as the compiler of *Liber Sancti Jacobi* or Jacobus da Voragine in his *Legenda aurea* (compiled between 1263 and 1273) dared even to declare, that the recovery from illness didn't occur by administration of ointments, purgatives, emetics, stretch-plasters or electuaries, by the application of antidotes, syrups or by the healing power of other remedies such as curing potions, but exclusively by the mercy and help of God, *Christus Medicus*<sup>4</sup>. This suggests that at this time religious *ex voto* souvenirs were exactly the same for the pilgrims as placebos are for the ill today. Nevertheless, all the faith and vows of the pilgrims, --through peregrination to imitate the Passion of our Lord and St. Anthony (*imitatio Christi*)--, could have been of no help in the case of clinically manifest ergotism, caused by consuming bread made from rye which was attacked by the fungus spore of *Claviceps purpurea* in the shape of *sclerotium* (*Secale cornutum*)<sup>5, 48, 64</sup>. As a consequence of the great, although unknown numbers of pilgrims and travellers, which may have been many hundreds of thousands, many *xenodochium* (hospitals) were founded in the 11/12 centuries<sup>2, 46, 64, 67</sup>. Originally these charitable institutions of the lay-brothers and -sisters of St. Anthony

functioned merely as a *domus elemosinaria*, houses of alms for beggars and paupers, not for the ill and invalids. Two centuries later, about 1300 A.D. almost all small towns and villages have had their own pilgrim-hostel and -hospital, the so-called *hospitale maius*; a socioeconomic and welfare-structure, some of which exist today. These historical events, the first European religious mass movement, as well as the tragic circumstances of the spread of ergotism promoted the success of the friars of St. Anthony, whose lay-order had been founded a little earlier, about 1095 (in La-Motte-aux-Bois, later called St-Antoine en Viennois), in the Dauphiné, between Chambéry and Grenoble, situated mid-way along the main pilgrim-roads to Santiago. The clerical order of Antonites has been constituted in 1247 from this lay-fraternity. At the end of the Middle Ages there were about 200 hospitals along the four roads to Santiago. Pilgrims with leprosy were refused admission<sup>41, 64</sup>. These highly specialised hospitals were devoted solely to the treatment of one disease, -- ergotism<sup>7, 43</sup>. They were situated along the classical main pilgrim-roads to Santiago as well as Via Podensis, Via Lemovicensis und Via Turonensis in France or the "camino frances" in Northern-Spain (fig 1.)<sup>2, 10, 40, 43, 46, 49, 54, 58</sup>. They were the greatest medical support system with a network of monasteries, hostels, churches and hospitals (*domus infirmariae*) that had ever existed in Europe<sup>27, 30, 49</sup>. They could be found at all passes in the mountains (Somport, Roncesvalles, Great St. Bernhard, Gotthard), at many "neuralgic points" on the roads such as bridges and at the most fords (Altopascio, the Rhine-bridge at Avignon, Puente la Reina. As a result of the short distances between two hospitals in the neighbourhood each pilgrim could get to his next refuge before dusk<sup>4, 54</sup>. About 1200 in Germany some main hospital centers of the Antonites become more and more important: first, the order-house in Memmingen (which is now a museum), further in Grünberg (near Roßdorf-Höchst and Prettin) in the North and Isenheim (near Konstanz and Freiburg) in the South-West; all together functioning as the six German *praeceptoriae generales*, Generalpräzeptorei<sup>7, 40</sup>.

## **2) Fire of St. Antonius (ignis sacer, ergotism, "Heiliges Feuer", Mutterkornbrand): the medical and surgical treatment of the patients with ergotism<sup>1, 2, 5, 7, 41, 43, 46, 48</sup>:**

**a) Admission of the pilgrims with ergotism to the hospital of the Antonites<sup>5</sup>:** The fraternities provided ill, tired pilgrims and travellers overnight accommodation with catering and nursing care. Neither the suffering of the body nor the sorrows of the soul had been forgotten. Nowadays no one can estimate the enormous socio-economic, cultural, religious, political, scientific and medical impact of this pilgrimage to Santiago for the development of international connections between many European countries<sup>10, 12, 14, 34, 36</sup>. Recurring and devastating epidemics, the shift of the main pilgrim-roads into Western Europe, an enormous growth in population with increasing mobility supported the development of medicine in the 12<sup>th</sup> century; a sudden change in socio-economic conditions took place<sup>27</sup>. However, the

pilgrim couldn't have met with such high-quality nursing on the roads to Santiago as in the Holy Land and Jerusalem, where the best tradition of Arabic and Byzantine medicine had already been practised for centuries<sup>38</sup>. Nevertheless, two aims of the pilgrimage (*peregrinatio religiosa*) could have been usually fulfilled: the recovery from diseases (*restitutio ad integrum*) and also the perfect restoration of the social and mental state, and salvation by God's help (*restitutio ad integritatem*)<sup>55, 56</sup>. The dualism of the body and the soul, as we have it in modern medicine since 1900, didn't exist in the Middle Ages. In the first centuries there were only monastic institutions in use, which practised charity. Towards the end of the Middle Ages, however, many public or municipal hospitals were also founded as independent establishments, separate from the monasteries, in which a great number of barber-surgeons or surgeons were engaged under contract to perform small operative procedures, chiefly amputation of gangrenous limbs due to ignis sacer<sup>35, 58</sup>.

The admission of the pilgrims with ergotism took place on the understanding that the disease could be diagnosed with absolute certainty. Therefore the ill were carefully interviewed and examined--in the hospital at Memmingen (founded 1214) by three barber-surgeons with the assistance of all other patients (!), who could always compare their new patients with the other inhabitants of the hospital. If this inspection confirmed the suspicion of ignis sacer, the diseased pilgrim acquired a right to life long accommodation, food and a reasonable standard of living at the hospital<sup>7, 41, 43, 51</sup>.

The medical welfare, catering, nursing and management in the medieval hospitals was consequently quite different from the customs of modern medical treatment<sup>26, 56</sup>. At the entrance *the ill pilgrim was welcomed as the sick Lord himself*. For his spiritual health he had to confess, to hear the daily public worship and to obey the monastic regulations, that were regarded absolutely necessary for his recovery, e.g. strictly keeping the dietary prescriptions of the monks<sup>49</sup>. They also had to accept the clerical rules of the order such as chastity, poverty and obedience. He had to bequeath his entire property, goods and chattels to the cloister<sup>13, 26, 30, 42, 45</sup>. After this admission ceremonies had been completed, the friar gave him warm food and a bed, which was very often already occupied by 2 or 3 other patients, as well as some wine of the Antonites as a sleeping draught<sup>43, 61</sup>. The local wound treatment began on the second day<sup>1</sup>. The leg ulcers and the carbuncles of the body were inspected, cleaned, and an Antonite-balsam was applied, finally the wound was dressed with a linen bandage. After this procedure a bottle of Antonite-wine was given to the patient<sup>43</sup>. The feeding with bread, made from sound (ergot-free) rye-harvest from the cautiously cultivated fields belonging to cloister prevented the ingestion of poisonous material, having a salutary effect on the patient's recovery<sup>5, 7</sup>.

**b) medical treatment of ergotism and the use of anodynic substances in preparing the patient for the operation:** The order of St. Anthony had been only allowed to accept pilgrims with ergotism or with their late complications (mutilation, contracture); the treatment of other diseases couldn't be performed in their hospitals. Besides these general ordinances some hygienic precautions such as foot-washing-- as a symbolic act remembering the Last Supper--, furthermore bathing, lodging in a warm chamber, hair-washing and delousing were offered (Varron, 1955). Two or three times daily the patients were provided with warm nourishment: bread, vegetables, fish, meat and wine (Rocenvalles), often better and more frequently than the friars of the cloisters. The sick inhabitants, who were recovering, weren't regularly separated from the dying patients. The murmur of prayers, groaning and cries due to the unbearable pain of gangrenous extremities, fear of death, being far away from home as well as the stinking limbs to be amputated, the whole gloomy scene of mutilation and of dead companions, whose fate they soon might share, the mourning atmosphere of the medieval hospitals should be taken into consideration. The victims of ergotism urgently needed vasodilating and analgesic agents rather than dietary prescriptions or blood-letting, which the friar-physicians used to perform until the patient fainted. As mentioned before, we cannot definitely say, how many and what sort of ingredients the wines and balsams of the Antonites contained. We can illustrate this with a single historic event as it happened in the cloister of Froideval at Belfort (affiliated to Isenheim). The order-reformer Franziskus Beer had been asked by the Archduke Ferdinand of Austria for a transcript of the recipe of the sanctified Antonite-wine (hallowed through the contact with the bones and other relics of St. Antonius Eremita). Beer was only able to answer, that the recipe of the sanctified ointments as well as the ointment pot had been completely destroyed by the passing companies of Wilhelms von Chatillon<sup>35</sup>. We can only assume that these remedies (wines and balsams) might exert some vasodilating, deodourising and antiseptic effect on the ischemic limb, ulcers and amputated stumps. Discovering the recipes and ingredients of medieval drugs is therefore not an easy task<sup>8</sup>. In order to study the medieval pharmacopoeia as they were in use by the friars we first have to look at some collections of medieval dispensing<sup>32, 57, 59</sup>. These preparations have been constituted of herbals, minerals and also of organs of animals, according to the ancient *organotherapy* ("similis similia curantur") or the later more fashionable *doctrine of signature*<sup>44</sup>. Generally they didn't contain any remarks how they should be administered exactly, therefore always bearing the danger of overdose with a fatal outcome. The friars administered almost lethal doses of mandrake: 2/3 of letal dose (e.g. 0,05-0,2 grams) have been used as narcotics<sup>33</sup>! We shouldn't assume that the medieval drugs weren't of any harm and of having any effect in curing the diseases. Mandragora (mandrake), a narcotic herbal with the longest use in the history of anaesthesia<sup>18, 37, 50, 57</sup>, was supposed to have manifold healing power to ward off

disease from cattle, to cure *and* to provoke disease, eagerly sought for women in labour as well as by sterile women to become pregnant. Its wide use in the medieval pharmacopoeia as an anaesthetic, pain-killer and aphrodisiac had only been exceeded by the theriacum, a general antidote for poisons and a universal remedy containing 65-72 ingredients and requiring three months preparations<sup>18, 44, 57</sup>. Due to the difficulty in distilling and preparation of such complex mixtures with many ingredients the pharmacy became not only a place of mystery but also of chemical discoveries and a highly respected profession<sup>57</sup>. On the contrary, the medieval pharmacist didn't have any knowledge about synthetic compounds and wasn't able to isolate the active principles of the drugs<sup>44, 52</sup>. Concerning anaesthesia and analgesia each era of human society seems to believe, that the former generations must have been more resistant to physical pain and therefore didn't need so much anodyna<sup>33</sup>. This opinion is quite false. A single look at the Antidotarium Nicolai (compiled in the middle of the 12<sup>th</sup> century) clearly reflects just the contrary. This Antidotarium contains exactly 142 recipes, of which more than 70 are anodynic mixtures. About 20% of the preparations contained Opium, 30% henbane and 9% mandrake (Jütte, 2001). On the contrary, the contemporary pharmacopoeia of Germany knows only 729 analgesic (and antirheumatic) substances, merely 9.9% of the 7355 chemical defined pharmaceutical preparations in use (Rote Liste 2001)! In comparison with today's society people of *the Middle Ages obviously needed more pain-killers than we do!* There were many sorts of drugs in circulation: tablets, powders, pills, potions, ointments, oils, balsams, cataplasmas, suppositories and electuaries. All these medicaments of the antidotaries were naturally also known and still given in the monastic hospitals. As analgesic drugs, as anodyna many preparations for diverse applications have been in use, e.g. *Ypnoticum adiutorium* (9<sup>th</sup> century), *spongia somnifera* (containing opium thebaicum, henbane, juice of mandrake and hemlock), sleeping-draught (with the same ingredients as in *spongia somnifera*), later chiefly *opiates as a sole medicament* (Laudanum purum; Paracelsus, 1527/28)<sup>6, 32, 57, 59</sup>.

About 1500 there was a growing fear of fatal complications due to general anaesthesia performed by using mixtures of some nightshade-anodyna and a trend towards the use of opiates, regarded as not so dangerous for surgical patient began (H. von Gerssdorff<sup>24</sup> and A. Paré).

Also other surgeons of this epoch, e. g. G. De Vigo (1450-1525) referred to the ambivalence of the surgical analgesia for amputations: "The limb must be amputated at once during sleep: firstly, in order to avoid pain under cutting, secondly, to diminish the blood loss, and thirdly, for the sake of preventing too great suffer under the removal of the bone part.... This method of amputation could also be dangerous, even if there are many (surgeons) demanding *the application of opiates by inhalation from a sleeping sponge..*"<sup>6</sup>. Nevertheless, we need to state, that this warning of De Vigo in the last sentence seems to be



contradictory to the three claims on the necessity of surgical anaesthesia! Unfortunately, with time the narcotic drugs had been brought into discredit because of their failure to work or causing many fatal incidents. A remark of Martin Luther in his Bible (Book of Proverbs, 1545) reveals this general dread of the laymen: "Give strong beverage them, who should die, and wine for people in sorrow..."<sup>57</sup>. Following the warning of Guy de Chauliac (about 1290-1368), one of the greatest surgeons in France, from further using of the nightshade herbs, after 1600 the surgeons began using narcotic and soporific drugs (often called "*mortifera*") for external application instead of internal administration. Opium was continued to be used both internally and externally<sup>57</sup>. We find the same statement in "Feldtbuch der Wundtartzney" of Hans von Gerssdorff (1517)<sup>24</sup>: "Es würt gar vil gesagt vn oft gemeldt/ wie man tranck jngebe die do schlaffen mache diße die man schniden soll/loß ich sein/ich hab es aber nie keim gethon/oder gesehen jngeben/und hab doch ein hundert glyd oder zwey abgeschnitten in sanct Anthonien hoff zu Straßburg/und vßwen dig des hoff. ich hab sye aber nie gebrucht.dann ich großen schaden douon weissz entston oder kummen... Ettlich geben jne opium allein on zusatz.do hüt dich vor,dan sye werdent gern schöllig vnd vnsinnig doruon (H. v. Gerssdorff: Feldtbuch der Wundtartzney, 1517: "Von dem heisszen brand.. sanct Antonien feür genant")<sup>24</sup>. Here Gerssdorff admits quite frankly, that, although he possessed this recipe, he never gave sleeping potions or applied *spongia somnifera* at the 200 amputations he performed in the Antonites-hospital. "Be careful with it", he comments, "otherwise they (the patients) become senseless and foolish from them". Therefore the surgeons rather employed medicaments for external use. Typical analgetic sorts of medicaments were: the *oleum mandragoratum* (12<sup>th</sup> century), *unguentum populeon* (12-15<sup>th</sup> century), the poplar ointment and later the *cataplasma narcoticum* (Fabry, 1560-1634) or the *unguentum narcoticum* (17<sup>th</sup> century)<sup>6, 32, 59</sup>. *The discovery of the first transdermal therapeutic system (TTS) was the chief contribution of the Middle Ages to the evolution of modern pharmacology*, which had been condemned as *witch-ointment* in the Renaissance<sup>38</sup>. Camerarius later wrote about the the effect of such ointments used by "witches" (*Living library*, 1625): "The witch rules over all her bodie with a certain oyntment, which we saw thoraw the chinks of the door. The oyntment was compounded, made her fall to the ground and brought her into a deep sleep". Finding vasodilating drugs was more difficult task for our study. No proven data could be found in the not too opulent references about the medical management of the Jacobus-pilgrims. Notwithstanding, we dare to postulate that in some way standardized methods of nursing and support of the victims of ergotism with vasoactive drugs must have been in the network of the hospitals along the roads to Santiago. The general application of *Antonius-wine* and the *Antonite-balsam* might be possibly interpreted as weak evidence for this supposition. On the contrary, the assumption of the existence of disinfecting drugs used by the Antonites must remain solely speculative. The preparation and the ingredients of the wine and balsam must have been a well-protected secret of the order of St.Anthony.

Moreover, the vessels containing the Antonius-wine and -balsam, the alborellos (as it was painted by Grünewald on the altar of Isenheim) were lost during the Peasant's Revolts (1524-25) and during the troubles of the Reformation. To solve the mystery of the ingredients for the wines and balsams therefore we have to take into consideration the 14 herbs of the so-called *conversation wing* of the altar of Isenheim<sup>35</sup>.

**c) surgical procedures:** When the limbs became painful, swollen, with open sores, injured by thorns and stones, covered in blisters, smitten by erysipelas or inflamed and gangraenous, often connected with epileptic seizures or septic deliriums, attacked by localised tetanus, the life of the sufferers could only be saved by surgical management, dressing, excision, local wound treatment or amputation<sup>21</sup>. As mentioned above, the friars had been at this time (1215) already prohibited from performing operative procedures<sup>17, 30, 38, 67</sup>. Therefore the fraternities had to engage travelling surgeons and barber-surgeons under contract<sup>46, 58</sup>. (Of course, the surgeons weren't at that time so popular as the shoemakers, who were only allowed to follow their trade on Sunday and other feast-days<sup>10</sup>.) Unfortunately, very little historical data has been delivered to us regarding indications for the art of amputation and only sporadic allusion, if any, about surgical analgesia and anaesthesia in the monastic and municipal hospitals of the roads to Santiago. Presumably some references are lying dormant in the Cathedralarchives of Santiago, among the old documents of the former *Hospital de Santiago de Compostela*, in the *Museo Virtual de la Sanidad en Espana*; and possibly in the *Museo de los Caminos* in the city of Astorga. Unfortunately, these sources weren't available to me during the preparation of this essay. Medieval guide-books for pilgrims such as the *Liber Sancti Jacobi* (12<sup>th</sup> century) contain remarks about medical but not surgical procedures.

**d) Evidence and traces of ergotism in the medieval fine arts:** Depictions of the pilgrimage in earlier paintings such as the altar of Isenheim, the apocalyptic works of Hieronymus Bosch and other painters (Pieter Brueghel the Ambrosius Fracken, Urs Graf, Martin Schaffner, Martin Schongauer, Jan Wellem de Cock, Francesco de Stefano Pesselino and Parentino in Italy) from the end of the medieval period are generally well-known, whose pictures reflect the two great epidemics of the Middle Ages: leprosy and ergotism<sup>5, 20, 23, 25, 35, 47</sup>, against which the physicians could have done very little. From a medical point of view human suffering has been best and very realistically portrayed in the paintings and drawings of Hieronymus Bosch van Aken (1450?-1516)<sup>5, 23, 60</sup>. Many crippled people are clearly seen with their wooden legs, walking on stilts (Fig.3.), many of them surely victims of ergotism. But there are also other types of invalids and wretched creatures: with wooden legs following traumatic amputation ("limping courier"), with infantile cerebral palsy or atrophic legs as a result of polio<sup>53</sup>. Understandably the painter Bosch couldn't differentiate among these sort of disabled people, who were sliding and hobbling along on wooden legs on all church-festivals

about 1500. The religious works of the monks and their life, their self-sacrificing duty are still best mirrored in the fine art of the late medieval period. In the absence of first-hand historico-medical knowledge we have to see around in the Christian iconography and in the treasury of the fine art<sup>7, 5, 20, 22, 23, 25, 47, 60</sup>. Some of them should be presented here. On one of the wood-cut of Hans Weidnitz the Younger (about 1500-1536) we see St. Anthony with the typical T-shaped pilgrim-sign on the walking-staff (another pilgrim-sign); on his left side a victim of ergotism is kneeling with burning hands in form of flames. Above his head numerous wax devotional objects, so-called *ex voto* souvenirs from the pilgrimage are hanging, chiefly amputated lower limbs (fig. 4.). The right leg of the praying pilgrim has been already amputated; he is carrying a wooden prosthesis (German:"*Stelzprothese*"). In the cloister of Burgos on the road to Santiago and in the Prado in Madrid, the church of St. Michael in Munich and also in Antwerp and in the literature (e.g *Legenda aurea*) a very scurrilous surgical scene demonstrating amputation of a gangrenous limb by two medical saints Cosmas and Damian (literary first deceased in 13<sup>th</sup> century by Jacobus da Voragine's *Legenda aurea*). The curiosity of the fresco-cycle (painted by Fernando Rincón in the XVI<sup>th</sup> century, deposited in Prado; fig. 5.) is hidden in detail: a leg of a Saracen man had been amputated in the waiting-room of the operating theatre before the miraculous replacement; a mystical transplantation of the extremity took place<sup>39</sup>. In reality there was no need for such a black donor in this dishonourable manner: the leg itself has become already black before. At the same time, the succesful transplantation of the limbs (*inserere*), a more symbolic act of curing, had to demonstrate the salutary operative skill of the saints for the pilgrims suffering from ergotism. For this insertion (transplantation) the graft in the horticulture might have served as an exemple<sup>20</sup>. It is also worth noting another wood-cut from the "Feldtbuch der Wundtartzney", a handbook for military surgeons in the battlefield, written by Hans von Gerssdorff in Strasbourg, 1517 (fig. 6.)<sup>24</sup>. This picture illustrates how a leg stricken with ergotism should be amputated. The patient is sitting in an arm-chair, already unconscious due to pain rather than anaesthesia, which wasn't regularly administered before the "serratura" (sawing off) of the limb. However, the evident deep sleepiness of the woman seems also to indicate that she may have been given some anaesthetics before the mutilation. The man standing behind on the right is carrying the T-shaped sign of pilgrims around his neck. He had already lost his left hand due to St. Anthony's fire. This frightful demonstration of the bloody profession of a barber-surgeon seems more authentic when we consider, that Gerssdorff performed more than 200 amputations in the court of Antonites in Strasbourg<sup>24, 40!</sup> In the search for anodynica and narcotic agents, applied before surgical operations in the hospitals we don't need go far from Strasbourg. In Isenheim, also in Alsace, in the vicinity of Colmar is an another great hospital of the order (founded 1314) which was well known and frequented

by the pilgrims. Mathis Gothardt Neithardt (1480-1528), the mystic painter, who later became famous and erroneous under another name Grünewald <sup>47</sup>, a contemporary of Dürer and Raffael, was living in the Antonite-infirmery of Isenheim--still a hospital today. Grünewald might have often observed here both manifestations of ergotism with gangrene (more typical for France) or with convulsions, delirium and apathy (chiefly observed in Germany as "Kribbelkrankheit") <sup>5, 64</sup>. How far Grünewald has been involved in the work of charity in Isenheim, remains unclear. Like Dürer Grünewald was interested in botany, and besides this also in mineralogy, mining, hydraulics, and during his last years in alchemy <sup>47</sup>. About 1514-15 he painted for the hospital the greatest and marvellous tableaux of the winged altar in the Western fine arts illustrating the temptations of St. Antonius . (This table-work can be seen nowadays in the Museum *Unterlinden* in Colmar.) <sup>23, 35, 47, 60</sup> His figures and surrealistic creatures are reminiscent of the similar apocalyptic paintings of Hieronymus Bosch and Pieter Brueghel the Elder. Grünewald also created figures whose bodies are fully covered with disgusting and purulent ulcers. A dreadful, fabulous creature lying in front of a nightmare landscape has only a mutilated hand on the left side; his right hand has already lost the index finger. Earlier art historians tried to explain this picture rather as a portrayal of leprosy, syphilis or pestilence, but it is obvious that it demonstrates the mutilation due to ergotism (Winkle, 1997). Nevertheless, the so-called *conversation wing of the Isenheim's altar* is more important for our study . At the feet of the saints Antonius and Paulus at least 14 medical herbs could be identified by Kühn (1948); tab. 1). They are displayed in the museum "Antoniterhaus" in Memmingen <sup>51</sup>. To understand the significance of these 14 medical herbs it will be sufficient to note that 8 of them could be found in many medieval herbals; the other 6 had been employed for curing ignis sacer, bubonic plague, dysentery, craving ("Heißhunger") and thirst, gangrene (necrosis, mortification), purulent wounds and old ulcers <sup>35</sup>. Most of the herbs painted by Grünewald can be also found in the pharmacopoeia and herbals between 1244 and 1591 <sup>35</sup>. All the herbs portrayed by Grünewald are botanically correct; they aren't a simple piece of meadow as painted by Dürer. Grünewald's plants weren't to be found anywhere else at the same time in this botanical entity. This lower part of the painting is really a botanical table. Therefore Kühn (1948) supposed: *these herbs served as ingredients for the preparation of Antonite-wine and -balsam*, further components of the "Saint-Vinage", of a wine-vinegar with herbal additives. Regarding the vasodilating and narcotic effects of these herbs we can draw no firm conclusions. Ergot in the rye-harvest occurs even in our time (fig. 7). As a consequence of the disappearance of ergotism, no one can study the effects of these medical herbs of Grünewald as the disease doesn't exist any more. However, we have no proven evidence that a strong effective substance has been at work in the curing of ignis sacer. The faith of the pilgrims, the physical contact of the medical preparations with the relics of

the saints further the organ-therapy according to the postulate "similis similia curantur" were considered the healing power of the officinal herbs<sup>35</sup>.

**e) Pictures of the apocalypse by Bosch and Breughel: An effect of ergot alkaloids and of LSD?** It would be surely alluring to postulate, that religious-tinged hallucinations and deliriums, which often occurred at the end stadium of sepsis or ergotismus convulsivus might have influenced or even inspired the fancy of the painters living in the hospitals (Grünwald) or observing crippled people after church-festivals in the years of the epidemics (H. Bosch, P. Brueghel). This very attractive hypothesis is given strong support by comparing the clinical signs of ergot-intoxication with the mass hallucination scene in Eleusis in Greek Antiquity after consuming a psychotropic mixture (*aira*) prepared from *Claviceps paspali*, another type of ergot, enabling people to initiate in the Great Mystery of Demeter<sup>18, 28, 37, 50, 62, 68</sup>. Also in the Roman period the soporific and narcotic effect of this potion of ergot was well-known and often alluded to by Pliny, Ovid and Plautus. There is no denying, such psychotropic influences of drugs could explain the origin of many paintings of a very surrealistic manner such as the "Last Judgment", "The Garden of Desires" and "The Temptations of St. Antonius" (H. Bosch, about 1500). However, this purely *medical view of the fine arts* can only be regarded as a superficial interpretation. *Great art doesn't need any psychodelics to stimulate the imagination*, as appears to be the case in many works of our present day "*Psychonautics*" in modern art (using the terminology of Ernst Jünger)<sup>68</sup>.

Studying the early Christian iconography<sup>5, 31</sup>, one can follow how the tradition of the "St. Anthony's fire" was emerging and influenced by the very dramatic events of social upheaval<sup>11-14, 27, 36</sup> and the warlike atmosphere of the 14<sup>th</sup> century (Tuchman, 1980)<sup>70</sup>. The imminent dangers of every-day life, the ever existing threat of the end of the world, which could happen daily, the warning "memento mori!" , the numerous popular depictions of the *dance macabre*, the legends of Christian martyrdom, and the torments and tortures before the executions --all these factors were for the imagination of the artists more important than the hypothetical but unprovable effects of some ergotamin alkaloids, even though we now know that *all the alkaloids of Claviceps purpurea are derivable from LSD (lysergic acid diethylamide), and therefore capable of producing model psychosis* (A. Hofmann, 1943, Wasson, Hofmann and Ruck, 1978)<sup>28, 62</sup>. Indeed, LSD causes psychotropic alterations in humans in very small quantities: Its psychotropic potency for causing mental changes and hallucinations is actually immense: 1/6.10<sup>3</sup> of ethanol, 1/13000 of ether and 1/33 of morphiun (expressed in gamma=0,000 001 gramm)<sup>18, 37</sup>. In my opinion there is no need to postulate the witnessed experience of such deliriums due to convulsive ergotism in the hospitals as a source of artistic inspiration. After examining the tableau-works of Bosch, Brueghel and other contemporary painters we can conclude that many details illustrated more realistic symptoms of the disease

and concrete historic events <sup>5</sup>. Medical and art historians have long supposed that the demon covered with disgusting suppurate ulcers in the "Temptation of St. Antonius" by Grünewald (painted about 1513-1516) portrays the typical cutaneous signs of gangrenous ergotism <sup>63</sup>. The victims of ergotism (*ignis sacer*) might appear in the fancy of the painters as the preliminary stage of the torments of Hell <sup>5</sup>. Considering the dreadful pains and suffering this was surely no exaggeration, and explains why ergotism had been also called "*ignis gehennae*" (*fire of hell*) in medieval times. On a tableaux of H. Bosch ("Temptation of St. Antonius" in Museu Nacional de Arte Antiga, Lisbon) a cripple can be seen with wooden leg and walking on crutches (fig. 8.)<sup>23, 60</sup>; below him a "*sorcerer*" with a top hat, whose walking-stick is in reality a crutch. The amputated foot lies to the right of him on a sheet, demonstrating the helplessness of St. Antonius against ergotism <sup>5</sup>. In the background, a building is burning; this house is possibly an Antonite-hospital, visible by the T-shaped cross of the ridged turret. A short distance away the inhabitants of the hospital are standing while the demons help to destroy the house (fig. 8.). Presumably the same burning hospital was being portrayed by Grünewald on his altar of Isenheim. On the contrary the rider at the central tableaux is carrying a huge fruit like an orange-red berry on his head; a usual medieval symbol of dreams (fig. 8.). In the opinion of W. Fraenger (1975) this berry is the fruit of the mandrake (*mandragora* or *dudaim* in Genesis 30, 14). A little ahead, on the left side another horseman can be seen riding on a ceramic urn, whose thorny head is composed of the thorn-apple (*Datura Stramonium*) or possibly only the fruit of the *Cardanum arvense* (*scratch-thistle*). Without doubt, these two nightshade plants indicate the use of narcotic herbs by the witches eliciting sexual excitement, dizziness, wild dreams, raging, hallucinations and other toxic symptoms connected with the *black mass of the Adamites* (*in Hertogenbosch*) as it is portrayed by H. Bosch <sup>23</sup>. In this way Bosch could be regarded as a forerunner of Thomas de Quincey, Charles Baudelaire and Edgar Allan Poe, who used narcotic drugs as a source of artificial inspiration <sup>23, 68</sup>.

To summarize we can state that the Medium Aevum, physicians, as well as artists have had to grapple with the enigma of an epidemic, whose origin and spread they couldn't explain and which they couldn't treat successfully. The only way to overcome the problem were the strong faith in God's grace and punishment, the strict isolation of the ill and a resigned, virtuous life of simplicity, poverty and despair (Herzlich and Pierret, 1991, Ohler, 1990, Schipperges, 1990). Faith and the devotional pictures helped as a panacea and a religious placebo for the solving of the incurable, expressing the unutterable. Faced with the thousands of victims of the war in Afghanistan or elsewhere, an army of people, all missing limbs as a result of landmines, hobbling towards a Red Cross food package dropped from the sky; faced with the two seemingly unconquerable epidemics of our time (BSE and foot-and mouth-disease) and

challenging the greatest systematic massacre of domestic animals that Europe has ever seen, these medieval pictures of human suffering are actually gaining in importance in a very impressive manner. The killing of many millions of animals in the hope of preventing small human epidemics shows clearly how much we have lost the respect for the singularity of Creation.

(The authors should like to thank Gillian Sorge, Jetzendorf/Bavaria for her generous and skilled help with the preparation of this paper.)

**Tab...: Medical herbs of the altar of Isenheim (M. Grünewald, 1515 according to Kühn, 1948)\*\*:**

<u>Latin</u>	<u>German:</u>	<u>English:</u>
<b>Plantago major</b>	<b>breiter Wegerich</b>	<b>plantain</b>
<b>Plantago lanceolata</b>	<b>Spitzwegerich</b>	<b>ribwort</b>
<b>Papaver rhoeas</b>	<b>Klatschmohn, Magsamen, Kornrose</b>	<b>corn-poppy</b>
<b>Verbena officinalis</b>	<b>Eisenkraut</b>	<b>verbena, vervain</b>
<b>Ranunculus bulbosus</b>	<b>St.-Antoni-Röslein, knolliger Hahnenfuß</b>	<b>ranunculus</b>
<b>Scrophularia aquatica</b>	<b>Drüsenwurz, Herba Divi Antonii</b>	<b>?</b>
<b>Lamium album</b>	<b>Taubnessel</b>	<b>deadnettle</b>
<b>Triticum repens</b>	<b>Queckengras</b>	<b>couch-grass?</b>
<b>Veronica chamaedrys</b>	<b>Gamander-Ehrenpreis, Donnerbümlein,</b> <b>Köhlerkraut</b>	<b>speedwell</b>
<b>Gentiana cruciata</b>	<b>Kreuzenzian, St.-Peters-Kraut</b>	<b>gentian</b>
<b>Vincetoxicum officinalis</b>	<b>Schwalbenwurz, Lorenzkraut</b>	<b>?</b>
<b>Trifolium repens</b>	<b>Klee, Wundklee</b>	<b>trefoil</b>
<b>Cyperus fuscus</b>	<b>Cypergras, Wilder Galgen</b>	<b>galingale (family)</b>
<b>Triticum spelta</b>	<b>Spelt, Peterskorn</b>	<b>spelt</b>

(\*\*Enclosing to this botanic study we have to remark that L. Behling (1957, 1967) was actually able to identify only 10 herbs on this painting of Grünewald)

**"Even as a surgeon, minding off to cut  
Some useless limb, before in use he put  
His violent engines on the vicious member,  
Bringeth his patient in a senseless slumber,  
And griefless then (guided by use and art)  
The save the wole, cuts off the infected part"  
/Guillaume Bartas de Saluste (1544-1590)  
in his *Pleiade* (1611)/**

**Fig.1.:** Spreading of the St. Anthony's cloisters in Germany and France at the end of medieval times (from: Guide to the St. Anthony's museum in Memmingen, ed. J. Hoyer H.-W. Bayer, Memmingen, 1998, p16)

**Fig. 8.:** St. Anthony's temptation of Hieronymus Bosch (triptych of the Museo Nacional de Arte Antiga, Lisbon) which refers the suffering from ergotism and the use of psychotropic drugs of the nightshades, e.g. depicting a burning St. Anthony's hospital (left at the top), a

fruit of mandragora (left at the bottom), a pilgrim carrying a wooden prosthesis (left in the middle) as well as a horsemen riding on a ceramic urn with a thorny head like a thorn-apple (*Datura Stramonium*) and another rider with a man- drake-plant on the head on the right corner. A little right to the huge "mandrake in the morass" a "sorcerer" can be identified, whose amputated foot is lying on the cloth; his stick is like a crutch (according to the interpretation of the art historians Charles de Tolnay, 1965 and Wilhelm Fraenger, 1975 portraying an obscure-obscene allusion to the hidden sect of Adamites in Hertogenbosch with many references of medical importance).

**(Fig. 8/b:** A burning St. Anthony's hospital visible by the T-shaped cross of the ridged turret. The inhabitants of the hospital are standing around while the demons in the air are also trying to destroy the house.

**Fig. 8/c:** The huge "mandrake in the morass": symbol for the magic charm of this plant with his well-known erotic and narcotic effects

**Fig.8/d:** The victim of ergotism: a pilgrim with the wooden leg on the "black mass"

**Fig. 8/e:** Two horsemen carrying a thorn-apple(?) as a head (left) or a mandrake-fruit on the cap as a symbol for the deep narcotic sleep in medieval times (Fraenger, 1975)<sup>23</sup>  
*(The figures aren't added to this publication)*

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