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The Effect of Medicine, in particular the Ideas about Renal Diseases, on the "Well-being" of Byzantine Citizens

At first sight it is rather strange that a conference on "Material Culture and Well-Being in Byzantium" should include a topic about a medical specialty. Medicine, tiptoeing hesitantly between the realm of sciences and that of humanities, is not automatically classified as "Material Culture". On second thoughts, there are arguments from medicine's past and present, which plead in favour of such an inclusion.

The most famous of all the existing ancient medical Greek codices is the *Materia Medica*, which was written by the 1st cent. AD medical writer Dioscurides, and then copied in Constantinople, at the beginning of the 6th cent[1]. As its title shows, medicine cannot be practised without the use of material substances, the medicaments, which are minutely listed in the text. It is tempting, however, to add, that Galen the most prolific and most self-assured of all ancient medical writers, found Dioscurides's Greek grossly inferior, but he, at least, accepted that the medical information in *Materia Medica* was correct[2]. On the other hand the over-all aim of medicine is to prevent the destruction of people's sense of well-being and to restore it when in decline during times of a disease. Hence, I think that such a topic is relevant to the conference. Before we proceed to the specific role of nephrology (i.e. the medical specialty dealing with kidney ailments) I will present some general characteristics of Byzantine medicine, and I will outline why an interest in it has arisen[3].

Usually, there are two ways to view the science and practice of medicine during the Middle Ages in the eastern part of the Roman Empire. From an ideological standpoint, some may claim that the theocratic nature of Byzantine society led to a "standstill" in the development of medicine. Diseases were thought of as the proper divine punishments for a person's sins; hence these should be accepted and the patient should only ask for forgiveness. This view was in fashion, mainly after the Enlightenment, as the specific expression of a more general anti-clerical and anti-eastern stance, of the then cultural establishment. It cannot be supported on strictly scientific reasoning, although it is a view still expressed in several books on the history of medicine. From a purely medical point of view, an extensive amount of work has been done to highlight the rights and wrongs of Byzantine medicine in comparison to modern medicine.

In this article I will limit my subject to the relationship in Byzantium between medicine and the general, not strictly medical, Well-Being of the people. I suggest that the theoretical and practical aspects of medicine created a feeling of reassurance for the educated elite and the laymen alike, and this led to an absence of uncertainties, and thus, to a feeling of Well-Being.

On theoretical grounds the bodily functions and their deregulation were explained in parallel with what was happening in the Universe as a whole. The world was composed from four elements, the warm, the cold, the dry and the humid (i.e. from the air, the fire, the earth and the water). And on the one hand the air is warm and humid, and on the other hand the fire is warm and dry; also the earth is cold and dry, while the water is cold and humid. Accordingly, *man the microcosm*, was composed from the four elements; from the warm, the cold, the dry and the humid; from blood, yellow bile, black bile and phlegm"[4]. The events in the external

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[1] Pedanii Dioscoridis Anazarbei De materia medica libri quinque, ed. M. Wellmann. Berlin 1906–1914 (Reprint 1958). J. M. Riddle, Dioscorides on pharmacy and medicine. Austin/Texas 1985; O. Mazal, Der Wiener Dioskurides. Codex medicus graecus 1 der Österreichischen Nationalbibliothek, Teil 1–2 (*Glanzlichter der Buchkunst* 8/1–2). Graz 1998.

[2] Galen, De simplicium medicamentorum temperamentis ac facultatibus V 12 (XI 303–304 Kuhn).

[3] Cf. in general I. Bloch, Byzantinische Medizin, in: Handbuch der Geschichte der Medizin, I, edd. M. Neuburger – J. Pagel. Jena 1902, 492–588; G. K. Purnaropoulos, Συμβολή εις την ιστορίαν της βυζαντινής ιατρικής. Athens 1942; O. Temkin, Byzantine Medicine: Tradition and Empiricism. *DOP* 16 (1962) 95–115; Symposium on Byzantine Medicine. Proceedings, ed. J. Scarborough (= *DOP* 38). Washington, D.C. 1984; H. Hunger, Medizin, in: idem, Die hochsprachliche profane Literatur der Byzantiner, II (*Handbuch der Altertumswissenschaft* XII 5, 2). München 1978, 285–320; J. Scarborough, Medicine. *ODB* II 1327–8; E. Kislinger – R. Volk, Medizin / Byzantinisches Reich. *LexMA* VI 459–64.

[4] Meletios, Peri tes tou anthropou kataskeues I (III 11–12 Cramer). See also below 97 with notes 43–47.

macrocosm, thus, could explain the events in the human body's microcosm[5]. This method of thinking was very old, starting in the Greek world with the pre-Socratic natural scientists, continuing with Aristotle, and then further elaborated in Late Antiquity. It was adopted full-heartily by the Byzantines because it fitted in with the hierarchical kind of thoughts of Christian faith, with Christian beliefs about the role of Provenance. Generally, the Byzantines did adopt the practices of ancient and Hellenistic Greek medicine and they thought themselves the rightful heirs of the Greek culture.

On practical grounds, the main differences between ancient and Byzantine vs. modern medicine is the very limited medicalization of society. It was not only the absence of bad habits like overeating, (hardly possible, with the 175 days of fasting during Lent and over other religious holidays), of binge drinking and narcotics that made the role of doctors less important, it was also the expectations people had of medicine. As a modern writer has declared: "Public health must divert itself of its biomedical conceptual foundations. The language of disease is not the language of well-being"[6]. Hippocrates himself, had declared that the role of medicine is only to aid nature when it fails to keep a person in a normal state of health. As his Byzantine commentator Theophilos[7] wrote, doctors should not try always to impress with their "modern" abilities, which much later was called *neomania*, but to leave Nature to do its job[8].

Another factor was the wide accessibility of various medical means (e.g. baths and medicaments). Most of the drugs, at least the simple ones, were very easily accessible. To refer only to two categories, herbs and bodily products were in every day use. Animals provided their bones[9], skin[10] and fat[11]. Although we read recipes including many exotic ingredients (e.g. hyena[12], eagle[13], leopard or lion[14]), there were serious doubts even then, as to if the products of such animals were superior at all to the products from common domestic animals such as hens and cats[15]. Accordingly, the poorest inhabitants of the Empire had access to a huge collection of drugs, which were called, exactly for this reason, *euporista,* (i.e. easily procured). These were equivalents of the modern kitchen-medicines. Again, this "availability", contributed to the feeling of Well-Being, as it created a kind of sense of social justice for the users of health facilities. The demand for simplicity in medicine paralleled the ethicists' preaching in favour of simple, hence honest foods[16]. Mainly the wise men of the village, or the old wives used these simple medicines, while the professional doctors were equipped with an array of more sophisticated therapeutic means[17]. Hence, the superior classes (e.g. the imperial court or the various magnates) had, apart from the simple cures, somewhat more sophisticated medicines at their disposal[18]. However, the geographical, social and educational distance between themselves and the laymen was great enough to proclude any comparisons. Galen had already commented on the suitability of the *euporista* medicaments mainly for the peasants and the lower classes, but not for the elegant men and women[19].

The most *euporista*, the commonest items to be used as therapeutic and diagnostic agents to restore Well-Being, that is human skin and urine, will also be at the centre of our main argument. To write about uroscopy in Byzantium is simultaneously an easy and a difficult task. It is easy because many Byzantine codices on uroscopy still survive. It is difficult because no comprehensive history on the subject has appeared written

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[5] A. Diamandopoulos – P. Goudas – A.H. Diamandopoulou–Drummond, The human skin: A meeting ground for the ideas about macrocosm and microcosm in Ancient and Medieval Greek literature. *Vesalius* 7/2 (2001) 94.

[6] J. D' Oronzio, The Integration of Health and Human Rights: An Appreciation of Jonathan M. Mann. *Cambridge Quarterly* 10/3 (2001) 237.

[7] Hunger, Medizin 299–300.

[8] Theophilos, Commentarii in Hippocrates aphorismos, ed. F.R. Dietz. Königsberg 1834 (Reprint Amsterdam 1966) II 288.

[9] Oribasios, Collectiones medicae XIV 38 (II 211–2 Raeder); Aetius of Amida, Libri medicinales II 3 (I 155 Olivieri).

[10] Aetius, Libri medicinales II 162 (I 211 Olivieri).

[11] Oribasios, Collectiones medicae XIV 38.

[12] Oribasios X 23 (II 66 Raeder).

[13] Oribasios X 23.

[14] Aetios , Libri medicinales II 218 (I 232 Olivieri).

[15] Pseudo-Dioscurides, De venenis. Alexipharmaka (De iis quae virus ejaculantur) 19 (Sprengel).

[16] Plutarch, Moralia. De virtute et vitio 100b–101e (II Babbitt); Pseudo-Gregory of Nyssa, De creatione hominis sermo alter 51a (Horner, Leiden 1972).

[17] Oribasios, Libri ad Eunapium Introduction 1 (557 Raeder [*CMG* VI 3]).

[18] Constantine Porphyrogenitos, De cerimoniis aulae Byzantinae 467, 19 (Reiske) = Constantine Porphyrogenitos, Three military treatises on imperial expeditions, ed. J. F. Haldon (*CFHB* 28). Wien 1990, C 205 (106–8).

[19] Galen, De simplicium medicamentorum temperamentis ac facultatibus X 22 (XII 298 Kühn).

by a trained historian with a nephrological background[20]. The doctors were, and still are, just medical doctors with a special interest in the history of nephrology. Doctors did examine urine but they did not consider themselves mainly uroscopists. They did so in their broader duties as general doctors, although there were specialist technicians, or even doctors, who were involved only in the laboratory.

EARLY BYZANTIUM (4TH–7TH CENTURIES)

A) SKIN

According to researchers of Byzantine medical history, this period begins with Oribasios from Pergamum (ca. 325–after 395/6)[21]. He emphasises that: "It is not useful to always cause perspiration in someone who is bathing. Because we often take to a bath not to deplete the body, but to moisten it all over when very dry"[22]. The skin's amphidromic permeability is obviously familiar to Oribasios. The therapeutic methodology's objective does not change in Oribasios' texts compared with that of more ancient writers. The body's cathartic insufficiency constitutes a significant cause of sickness, resulting in the accumulation of harmful substances.

Oribasios' chapter 8 of his 10th book, is dedicated to the therapeutic use of sand baths. One of the indications, among others, is the *oidema*: "Heating through the sand is appropriate for asthmatic patients and for those who have rheumatic diseases in the chest and abdominal diseases, and podagra, and paralyses, and cachexia, and oedemas, and any chronic painful illness. Suitable for therapy are all patients except for very young children."[23]. Oribasios describes this method in detail beginning with the way the sand is prepared: "You, therefore, should dig two or three deep holes of equal size at dawn and let them become overheated from the sun". He then moved on to the positioning of the patient, depending on the illness, and to the extra care to be taken (like covering the head so it did not get burnt from the sun's rays or the administration of fresh water if necessary)." As for the dropsical patients, the number of days that it [a sand bath] takes place should be proportional to the volume that must be removed. The benefit from this you should examine twenty-one days later and after a break of two or three days you should start again"[24]. The detailed description shows that the method was widely spread and the details were based on experience and observation and not upon untried theories.

The period after Oribasios is rather poor in physician-writers up to the time of the 6th cent. AD. At that time there existed two great personalities, who excelled in medicine. The first was Aetios of Amida[25], who wrote sixteen books in which therapeutics dominated, and with very few elements of anatomy and pathophysiology. Although they do not essentially differ from the writings by Oribasios and his predecessors, at certain points they do provide more insight into his personal views.

In his third book, and in the chapter on sand baths, he mentions that the objective of a sand bath, as well as other methods of body heating, is no other than the increase of insensible transpiration and perspiration: "the insensible transpiration it intensifies, and the sweat it extracts." The benefit of this increase of insensible transpiration and perspiration, is evident "in dropsical and nephritic patients and in those who have developed a chronic disease of the cyst"[26].

In Aetios' work phlebotomies are also mentioned, as well as thermal baths and cupping, and all other methods for catharsis referred to by previous physicians. Aetios also reports his predecessor's, Archigenes', opinion on the use of baths to provoke perspiration[27]. In the chapter, "on oedemas", he renders his own patho-

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[20] See already A. A. DIAMANDOPOULOS, Uroscopy in Byzantium. *American Journal of Nephrology* 17 (1997) 222–7; IDEM, Musical uroscopy. Athens 1996; IDEM, History of Peritoneal Dialysis, in: Proceedings of the 2nd Symposium on Peritoneal Dialysis, Athens, Greek Nephrologic Society. Athens 1995, 17–32 (in Greek); IDEM – P. C. GOUDAS, The substitution of the renal function through skin catharsis, a clinicohistorical review. *Kidney International* 59 (2001) 1580–9. K. DIMITRIADIS, Byzantinische Uroskopie. (PhD) Bonn 1971; S. MALAKATES, Urology during the Byzantine Era. (Diss.) Athens 1993.

[21] HUNGER, Medizin 293–4.

[22] Oribasios, Collectiones medicae X 1, 19 (II 43 RAEDER).

[23] Oribasios X 8.1 (II 53 RAEDER).

[24] Oribasios X 8. 2, 14–5 (II 53, 54 RAEDER).

[25] HUNGER, Medizin 294–6.

[26] Aetios, Libri medicinales III 9 (268–9 OLIVIERI).

[27] Aetios III 166–167 (341–3 OLIVIERI).

physiological interpretation, and therapeutics for oedemas, which are described in detail as oedemas that leave a recess after exercising pressure, and which should be treated with increased perspiration[28].

A generation later, another famous physician appeared, Alexander of Tralles[29] from Lydia, in Asia Minor (525–605). He identifies ascites from the "lurching as happens with a skinbag when one stirs the fluid that it contains"[30], tympanites, which "when we beat it a sound is produced as occurs with a drum beating"[31], and anasarca oedema from "the swelling of the entire body, which when it is pressed with a finger, a concavity is formed, and when we stop pressing it the concavity does not immediately assume its previous form"[32].

Alexander's observations are of great importance since he provides different treatments as regards each diagnosis, thus showing that he understands the existence of different pathophysiological mechanisms. Therefore, he concludes, if proper diagnosis is made then: "we treat ascites and tympanites with purgatives, whereas, for the anasarca oedema we also employ venesection if it is needed"[33].

The early Byzantine period ends with Paul of Aegina (died after 642)[34]. Paul lived most of his life in Alexandria, Egypt. His auctorial work, entitled *Epitome iatrike* (epitomae medicae), contains pharmaceutical and other treatments that are in most cases a mere copy of previous authors' views. Paul knows very well the consequences of a sudden loss of fluids, and he provides clear instructions with respect to the quantity that should be eliminated. In his description of abdominal catheterization for the relief of ascites we read: "Anyone interested in ensuring the patient's safety, must remove a small amount of fluid with the operation so that the patient is relieved of the force exerted by his excessive weight, and as for the remaining fluid, this is eliminated with the use of medication that helps the body eliminate liquids, with sand-baths and sun-therapy, as well as by recommending him to abstain from drinking liquid and by eating dry food"[35]. The same warning about the amount of fluid removed was given by Hippocrates, (Aphorisms, ed. Littré VI 27), thirteenth centuries before Paulos. Then he continues recommending the warmed sand as a geneal drying substance for oedematous bodies[36].

b) Uroscopy

Oribasios was personal doctor to the Emperor Julian the Apostate. He studied the various colours of urine and its prognostic value[37]. His work lacks the systematic approach of later authors.

Aetios of Amida, in Libri medicinales V, deals mainly with the prognostic and diagnostic value of uroscopy[38], based on previous medical writers, as far back as Hippocrates. Aetios began his treatise by describing the physical characteristics of urine from healthy individuals. His observations on colour, consistency and odour are correct in every detail. He then proceeded to the description of urines in several pathologic conditions. The model became more complicated when it was compounded with the theory of the four humours. Thus, if black bile was in abundance during a febrile fat melting disease, the urine turned black and oily. Consequently, a great variety of combinations could possibly occur. The idea was ingenious and simple, although some times it bordered on the naive. It became the basis for all the subsequent uroscopic treatises in Byzantium, the Latin West and Islam. Depending on each writer, it was embellished either with very accurate observations or with an array of imaginary colours.

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[28] S. Zervos, Αετίου Αμιδινού, Λόγος δέκατος πέμπτος (= Aetius Amidenus, latricorum Liber XV). *Athena* 21 (1909) 3–144, here 7–8.
[29] Hunger, Medizin 297–9.
[30] Alexander of Tralles, Therapeutica X 1.1 (II 440, 1–2 Puschmann).
[31] Alexander of Tralles X 1.1 (II 440, 3–4 Puschmann).
[32] Alexander of Tralles X 1.1 (II 440, 4–7 Puschmann).
[33] Alexander of Tralles X 1.2 (I 443, 1–3 Puschmann).
[34] Hunger, Medizin 302.
[35] Paul of Aegina, Epitomae VI 50 (II 89 Heiberg).
[36] Paul of Aegina VII 3 (II 192 Heiberg).
[37] Oribasios, Synopsis ad Eustathium VI 4 (186 Raeder).
[38] Ed. Olivieri (*CMG* VIII 2) 19–25.

Paul of Aegina also correlated uroscopy with diagnosis. Following Hippocrates he stressed the need to compare any patient's urine with urine from a healthy person, and he describes the several urine colours and their origin. He also wrote on the sediment, the cloud and the floating components of the urine[39].

MIDDLE BYZANTINE PERIOD (7TH–12TH CENTURIES)

A) SKIN

After the 7th century Byzantium gradually loses its philosophical and scientific prestige. There are minor references to earlier works in writings of a few scholars, such as Stephen of Alexandria and Meletios the Monk.

Stephen of Alexandria / Athens lived in Constantinople in the 7th century and taught in the "University"[40]. It is very likely that Stephen did not practise medicine, himself. However, he wrote many treatises and memorandums on Hippocrate's, Galen's and Aristotle's works, as well as various works on philosophy and astronomy. In his treatise on Hippocrate's *Prognostikon*, he makes a reference to the causes of perspiration. He also takes up Erasistratos´ ideas in as much as he writes: "The organ that produces sweat is the pores, through which this sweat comes, and the raw material is all liquid, that is, all juices that are in excess; this is proved by the colour, the taste and the smell of perspiration in the baths, as well as on the clothes of men who sweat, and which have various colourings, various tastes and various odours as they are generated by different fluids"[41]. Moreover, in his work "Enarratio Galeni de methodo medendi ad Glauconem librorum", he describes baths and their uses[42].

Meletios the Monk, who lived during the iconoclastic period[43], was a conscientious compiler of famous ancient and Christian authors, as he himself clearly states. In his *Peri tes tou anthropou kataskeues*[44] he repeats Galen's views and he speaks of three kinds of digestion: that which occurs in the stomach, that of the liver, and finally, that of the rest of the body: "The waste matter of the third digestion is derived from the entire body and is called perspiration. It is purified through insensible pores. And all that takes place, so that this waste is not accumulated in the course of time and becomes decomposed into the intestines thus producing harm to the animal"[45]. And in the chapter entitled "On the skin and hairs", he writes with respect to the usefulness of skin: "It eliminates from the body all that is redundant and for this reason it is entirely covered with holes so that respiration and sweat excretion are made possible"[46]. He continues to perpetuate the age-old idea of the similitude between the microcosm and the macrocosm when he writes: "The creative or better yet, guardian nature, in caring for the animal it created by channelling pores through which the waste and muddy substances of the body are purified. For it knows that food is on one hand useful to the body, but also that it has wasteful elements, for this reason it invented these (pores) just as they, who care for cities, build sewers and streams, so that whatever waste matter is collected, it can be eliminated into lakes, rivers or sea"[47].

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[39] Paul of Aegina, Epitomae II 13 (I 94–95 HEIBERG).

[40] HUNGER, Medizin 300–1; W. WOLSKA-CONUS, Stéphanos d'Athènes et Stéphanos d´Alexandrie. Essai d´identification et de biographie. *REB* 47 (1989) 5–89.

[41] J. M. DUFFY, Stephanus the Philosopher. A Commentary on the Prognosticon of Hippocrates (*CMG* XI 1, 2). Berlin 1983, ch. 1, 11. Cf. W. WOLSKA-CONUS, Les commentaires de Stéphanos d'Athenès au Prognostikon et aux Aphorismes d´Hippocrate: de Galien à la pratique scolaire alexandrine. *REB* 50 (1992) 5–86.

[42] K. DICKSON, Stephanus the philosopher and physician. Commentary on Galen´s Therapeutics to Glaucon (*Studies in Ancient Medicine* 19). Leiden–Boston–Köln 1998, 78–80 (ch. 23).

[43] HUNGER, Medizin 304–5.

[44] Ed. J. A. CRAMER, Anecdota graeca e codd. manuscriptis bibliothecarum Oxoniensium, III. Oxford 1836 (Reprint Amsterdam 1963) 1–157.

[45] CRAMER III 108.

[46] CRAMER III 132.

[47] CRAMER III 107–108. A. A. DIAMANDOPOULOS, A history of natural membranes in dialysis. *American Journal of Nephrology* 17 (1997) 304–14.

b) Uroscopy

Theophilos Protospatharios was considered the great authority on uroscopy in the Christian East and West during the Middle Ages. His popularity was due to the systematic method and the conciseness of his writings, and the fact they were translated early into Latin, by Constantinus Africanus, and that they influenced the School of Salerno. His treatise[48] was subdivided into various chapters. The third chapter was devoted to renal physiology according to Hippocrates, Galen, and Magnos of Emesa. The fourth chapter deals with the consistency of the urine and especially with its changes under mechanical force. In the sixth chapter twenty different colours of urine are presented, while in the seventh chapter several possible combinations of the thin consistency and of different colours, are explained. In the eighth chapter the combinations of the thick consistency and of ten different colours are presented, while the medium consistency (symmetric) was combined with discussion of only three colours in the ninth chapter. In the following chapters (10–13) the several solid particles, as well as the normal sediment, and the cloudy opacities, were discussed. The latter, were explained in accordance with Galen, by the action of the "undigested spirit" (*apepton pneuma*). Theophilos believed that it was possible for only five different colours of sediment to exist. In the next section he presented three tables with the combinations of white sediment, white suspension and white opacities, while in the following chapters he described the oily urines due to the melting down of the body's adipose tissue. The following chapter dealt with the malodorous urine containing pus, and the ultimate chapter dealt with the combinations of a thick consistency with a thick red, dark red and black sediment.

Michael Psellos who lived in the 11th century acts as a very interesting case. He was not a medical doctor, but he was an excellent politician, historian, philosopher and poet with an encyclopaedic knowledge of medicine[49]. His *ponema iatrikon* is a long poem on medicine, in the iambic manner[50]. Psellos classified the urine during pathological conditions, into three categories, depending on its colour, consistency and sediment. Its sediment was then subdivided into three classes: the fatty, the fleshy, and the chalky. Eighty three lines in verses were used to describe the several combinations of these categories[51].

LATE BYZANTIUM (13TH–15TH CENTURIES)

One of the reports on the medicine of this period is found in the poem "On urines" by Nikephoros Blemmydes[52], where in dealing with the disease the recommended methods for catharsis do not change: these are enemas, baths, embrocations[53]. Blemmydes, in his treatise, described thirteen different colours of urines. The text is a typical example of a canon composed of nine odes, each of which consists of 3–6 canticles, and they appear after Linear hymns (*stichera prosomoia*). Prior to each ode, the corresponding ecclesiastical canticle is quoted, according to how the specific ode should be chanted. Each ode of the poem is devoted to a particular colour, and to its pathologic, diagnostic and prognostic importance. Ode D, 9–12, for example, constitutes a keen description of severe acidosis, accompanied by hypocalcaemia and tetany, which are often encountered during the final stage of uraemia[54].

Nikolaos Myrepsos[55] demonstrates a method of spa-therapy for very fat people, with which in a few days of increased perspiration, they thin and grow so much slimmer that "not even they who see them with their own eyes believe it"[56]. He, thus, recalls to our memory, advertisements of slimming centres, whereby use of diuretics, massage and saunas they also promise tremendous weight loss.

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[48] Ed. I. L. Ideler, Physici et medici graeci minores, I. Leipzig 1841 (Reprint Amsterdam 1963) 261–83.

[49] R. Volk, Der medizinische Inhalt der Schriften des Michael Psellos (*MBM* 32). München 1990.

[50] Ed. J. Fr. Boissonade, Anecdota graeca e codicibus regiis descripsit, I. Paris 1829 (Reprint Hildesheim 1962) 175–232.

[51] Vv. 442–528 (Boissonade). Volk, Inhalt 72–5.

[52] Hunger, Medizin 311; *PLP* II 87–8 (no. 2897).

[53] Ed. A. P. Kuzes, Les oeuvres médicales de Nicéphore Blémmydès selon les manuscrits existants. *Praktika Akademias Athenon* 19 (1944) 59–63. Diamandopoulos, Musical uroscopy offers an english translation and extensive commentary.

[54] "The patient's tongue burns like a furnace and is laid down exhausted, as a worn-out chord, and he grinds his teeth, and when he is awake he stares sullenly".

[55] Hunger, Medizin 312; *PLP* VIII 90 (no. 19865).

[56] Nikolaos Myrepsos, Peri syntheseos pharmakon. National library Athens, codex 1478, f. 152 (A. Eutychiades, Εισαγωγή εις την βυζαντινήν θεραπευτικήν. Athens 1983, 99).

John Zacharias "Aktuarios"[57], an eminent Byzantine doctor, who was born ca. 1275, and who died (after) 1328, refers to the four digestions in his work "On urines by the wisest Aktuarios"[58]. This book is divided into seven chapters as follows: 1) On the differences of urines, 2–3) On the diagnosis of urines, 4–5) On the reasons of urines, 6–7) On the prognosis of urines. In his monumental treatise Zacharias explains the importance of cardiac, hepatic and cerebral function in the mode of Aristotle and Galen.

He classifies the three kinds of digestion, but he adds a fourth one, corresponding to the transformation of blood to flesh. The first digestion takes place "in the stomach", and its waste products are excreted through the faeces and vomiting. The second takes place "in the pyle and the concave part of the liver", and its waste products are excreted through the heterogeneous humours. The third digestion's waste products are urine, and the fourth digestion, which is the conversion of blood into flesh, produces a substance, which is eliminated through the skin by insensible transpiration.

The urines are considered the products of the third digestion. John Zacharias also, elaborates on the differences of the urine's characteristics between male and female healthy persons and also, on the influence of bodily and environmental temperature on urines. One of his main contributions to uroscopy, is that he recommends only high quality translucent glass should be used for uroscopy vials. He even invented a uroscopy vial divided into horizontal lines, thus, enabling the accurate location of any suspension and/or sediment. He suggested that the findings of the urines from particular sections of the uroscopy vial correspond to particular parts of the body.

John Zacharias' treatise was, for five centuries, the basis of all the European works on uroscopy, although he never exaggerated the importance of uroscopy to such extremes as occurred in the West. On the contrary, he always emphasized the need to combine the findings of uroscopy with pulse–checking, and with the general physical examination.

Many of the empirical findings of Byzantine medical writers were later verified by scientific uroscopy. The oily appearance of urine when the patient's adipose tissue is melting down was described by Aetios V 38 (II 23 Olivieri), by Psellos' (lines 480–490 Boissonade), by Blemmydes (Ode H, Kuzes) and by others. The condition was named *pimelorrhe* from the word *pimeles* that Blemmydes uses for a fatty substance. However, even as late as 1875 this oily excretion in urines was also referred to as *pimelorrhe*[59]. Blemmydes discussed at length the importance of an oily film at the top of the urine (Ode B), and he called it *tsipa elaiode*. The reference to an oily film in urine sounds strange in a modern nephrological ward. But at least until the end of the nineteenth century it was mentioned in medical text–books as *pellicle* and it was considered to be the result of the interaction between the air in the environment, and several constituents of the urine, such as urates and kiestein[60].

The use of someone's own skin and urine for therapeutic and diagnostic purposes, mainly in renal diseases, was easily accessible, cheap and in many cases it produced good results. Moreover, it created a feeling of self-sufficiency, essential for a person's well-being. Byzantine medical writers were surprisingly modern in their views concerning the meaning of well-being for their patients. It didn't suffice for them to consider the restoration of the bodily health of their clients, but they also insisted "on a person's balance of the natural, the psychological and the animal forces"[61]. Hence, they described health as "The balanced Well-Being"[62]. The idea is very similar to the progressive definition of health given by the World Health Organization at the declaration of Alma-Ata in 1978: *"Health is a state of complete physical, mental and social Well-Being"*.

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[57] S. I. Kurusis, Το επιστολάριον Γεωργίου Λακαπηνού – Ανδρονίκου Ζαρίδου (1299–1315 ca.) και ο ιατρός-ακτουάριος Ιωάννης Ζαχαρίας (1275 ca. – 1328;). Athens 1984–1988; A. Hohlweg, Johannes Aktuarios: Leben – Bildung und Ausbildung – „De methodo medendi". *BZ* 76 (1983) 302–21.

[58] *Peri ouron* / De urinis, ed. I. L. Ideler, Physici et medici graeci minores, II. Leipzig 1842 (Reprint Amsterdam 1963) 3–192. Dimitriadis, Byzantinische Uroskopie 55–64.

[59] A. Bouchardat, De la glycosurie ou diabete sucre: son traitment hygienique, avec notes et documents, sur la nature et le traitment de la goutte, la gravel urique, le diabete insipide avec exces d'uree, 1'hippurie, *la pimelorhee* … Paris 1875.

[60] L. Beale, Kidney Diseases, Urinary Deposits, and Calculous Disorders. Their Nature and Treatment. London 1869, 297.

[61] Meletios, Peri tes tou anthropou kataskeues 47, 5–6 (Cramer).

[62] Meletios 46, 29 (Cramer).