

THE AESTHETICS OF  
HAEMOTAPHONOMY: A STUDY  
OF THE STYLISTIC PARALLELS  
BETWEEN A SCIENCE AND  
LITERATURE AND THE VISUAL ARTS

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RESUMEN

Este estudio tiene la intención de profundizar en la estética de la ciencia de la Hemotafonomía (HTN), mediante la identificación de sus paralelos estilísticos con la Literatura y las Artes Visuales. El objeto de estudio de esta ciencia es la citomorfología de las células sanguíneas en manchas de sangre. Sus sujetos de estudio son especímenes manchados de sangre, mientras que su método de estudio es el análisis de imágenes en claroscuro obtenidas por Microscopía Electrónica de Barrido. Literariamente, la HTN es estilísticamente paralela a la estética del Tremendismo y el Decadentismo. Visualmente, la HTN es estilísticamente paralela a la estética de la decoración arquitectónica churrigueresca y al Tenebrismo pictórico. De acuerdo con los resultados de este estudio, la HTN puede también considerarse estilísticamente como un Realismo literario y un Naturalismo visual. Además, puesto que Tremendismo, Decadentismo, Churriguerismo y Tenebrismo convergen en la cultura del Barroco, debe concluirse que, estéticamente, la HTN es una ciencia barroquista.

PALABRAS CLAVE

*Glóbulos rojos de la sangre, manchas de sangre, historia y filosofía de la ciencia.*

ABSTRACT

This study intends to provide insight into the aesthetics of the science of haemotaphonomy (HTN), by identifying its stylistic parallels with literature and the visual arts. The object of study of HTN is the cytomorphology of the blood cells in bloodstains. Its subjects of study are bloodstained specimens, while its method of study is the analysis of images in chiaroscuro obtained via scanning electron microscopy. Literarily, HTN is stylistically parallel to the aesthetics of both tremendism and decadentism. Visually, HTN is stylistically parallel to the aesthetics of both Churrigueresque architectural decoration and pictorial tenebrism. In accordance with the results of this study, HTN can also be stylistically regarded as literary realism and visual naturalism. Furthermore, because tremendism, decadentism, churriguerism and tenebrism converge into the Baroque culture, it must be concluded that, aesthetically, HTN is a baroque science.

KEY WORDS

*Red blood cells, blood smears, history & philosophy of science.*

*eidos*

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PARALLELS BETWEEN A SCIENCE AND LITERATURE AND THE VISUAL ARTS

Policarp Hortolà\*

*Arte e Scienza sono, dunque, distinta e insieme congiunte: coincidono per un lato, ch'è il lato estetico. Ogni opera di scienza è insieme opera d'arte. Il lato estetico potrà restare poco avvertito, quando la nostra mente sia tutta presa dallo sforzo d'intendere il pensiero dello scienziato e di esaminarne la verità. Ma non resta più inavvertito quando dall'attività dell'intendere passiamo a quella del contemplare...*  
Benedetto Croce, 1902.

*Credo davvero che l'attività critica non possa che fondarsi su una attività interpretativa. La quale restituisca un senso di libertà e indipendenza dei giudizi di valore, il senso della ricerca della qualità non pregiudicata, il senso dell'avventura delle idee estetiche.*  
Omar Calabrese, 1987.

INTRODUCTION

Science cannot avoid being influenced by (and influencing) its historical and social context, as well as by the personal circumstances of those who establish its bases (founder) and/or practise it (practitioner). According to Croce (1990, p. 32), all scientific work is at the same time artistic work. Art and science are on a continuum in which artists work with 'possible' worlds whereas scientists are constrained to working in 'this' world (Root-Bernstein, 2003). All real-world innovation is a process that involves the elaboration through fantasy (imagination) of many possible solutions to any given problem, and the use of the widest range of mental and physical tools to constrain and evaluate which of these possibilities is most suitable for any given need (Root-Bernstein, 2003). What the arts provide the sciences is the

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ability to imagine possibilities (possible problems, possible tools, and possible solutions) through synthetic and sensual forms of thinking to which analytical and logical forms of thinking can later be applied as part of the selection process (Root-Bernstein, 2003). Therefore, consciously or unconsciously to its practitioners, all science has its own aesthetics.

Aesthetic traits are considered a merely collateral aspect of science. However, according to Root-Bernstein (1996) aesthetic sensibility underlies the most significant creative endeavours in science. Aesthetics was first defined as an independent discipline in 1735 by the German philosopher Alexander-Gottlieb Baumgarten (Božilović, 2006). Aesthetics is often regarded as the philosophy of art (Fraser, 1959). However, in its etymology, the Greek word *aisthesis* refers not in the first place to art, but to the whole region of human perception and sensation, as opposed to conceptual thought (Eagleton, 1990, p. 13). Aesthetics is primarily concerned with visual features. It has been suggested that the activation of the prefrontal cerebral cortex could play a key role in the human visual aesthetic perception (Cela-Conde *et al.*, 2004). Aesthetics is also involved in the feelings or affective responses that the writings transmit or provoke. As in any human work, the aesthetic traits of science can be analysed. According to Wechsler (1988, p. 2), both pure science and science related to observation are subject to aesthetic judgement. Although when scientists reflect on their work, the development of concepts, and the theories that expound them, intuition and aesthetics guide their sense of rightness ('this is how it has to be'), the role of aesthetic judgement is rarely mentioned in the corpus of science (Wechsler, 1988, p. 1). The choice of orientation is not necessarily set in science by the problem but by a mode of thinking, and the role of cognitive mode and aesthetic sensibility plays a vital part in the structure and style of the scientific process (Wechsler, 1988, p. 6).

The stylistic parallels between science and other human enterprises is an intriguing topic in the emerging areas of aesthetic cultures of science. Although science, literature and the arts are obviously not the same, aesthetic judgements can be made in relation

to any human work, and consequently to science. The underlying metalanguage of science can be better unlocked by analysing the connections between it and different aesthetic approaches. Of course, knowing the aesthetics of a science does not ‘mark’ its fundamentals or its advancement, nor does it determine how its practitioners will produce and interpret their results. However, knowing the aesthetic background of a science does contribute to the recognition of its cultural framework and, by extension, to a better understanding of science-society relationships.

#### **RATIONALE OF THIS STUDY**

The study described here intends to provide insight into the aesthetics of the science of haemotaphonomy (HTN) by identifying its stylistic parallels with literature and the visual arts. To do this, two types of parallels have been considered: content –regardless of form– in the case of literature, and form –regardless of content– in the case of the visual arts. Although in art aesthetics the idea of a content-form dichotomy was abandoned a long time ago (e.g. Müller-Freienfels, 1948; Croce, 1974, pp. 37–45), the scientific characteristics of the science in question necessarily require that this approach be followed. From the point of view of knowledge organisation, the aesthetic analysis of a science should be assigned to the subfield described as “concepts from other fields relating externally to the field” (group 7) in the classification set out by Dahlberg (2006). Furthermore, assuming that the basic units of knowledge organization are the semantic relationships between concepts (Hjørland, 2003), the epistemological approach of this work would fall into ontology, because it deals with a classification: the classification of a science in accordance with its aesthetic traits. This classification requires a key strategy, which is also used in this study, and that can be summarised in one word: ‘labelling’. Labelling is not only the basis of ontology but of scientific classification as well. Therefore, to assign ‘labels’ to a science –or to any other human endeavour– is not a frivolous exercise that obscures, but a serious exercise that clarifies. Any ‘-ism’ (tenebrism,

decadentism, baroqueism...) can simplistically be thought as ‘a mere label’, or it can seriously be considered as ‘a label with underlying conceptual implications’, for instance in literature, art, philosophy, and science. The final rationale behind this work is exactly to assign labels to HTN: its actual aesthetic labels.

In the aesthetic approach of this study, styles have been considered as atemporal, metahistoric categories instead of chronological ones. Moreover, an accumulation of scattered stylistic parallels is not contemplated in this text. Thus, the scheme that follows is not intended to deal with all the aesthetic movements in literature and the visual arts, but only with those that have been found to be self-evidently significant and analytically productive in explaining the aesthetics of the science under examination.

#### FUNDAMENTALS AND ORIGINS OF HAEMOTAPHONOMY

##### Definition of haemotaphonomy

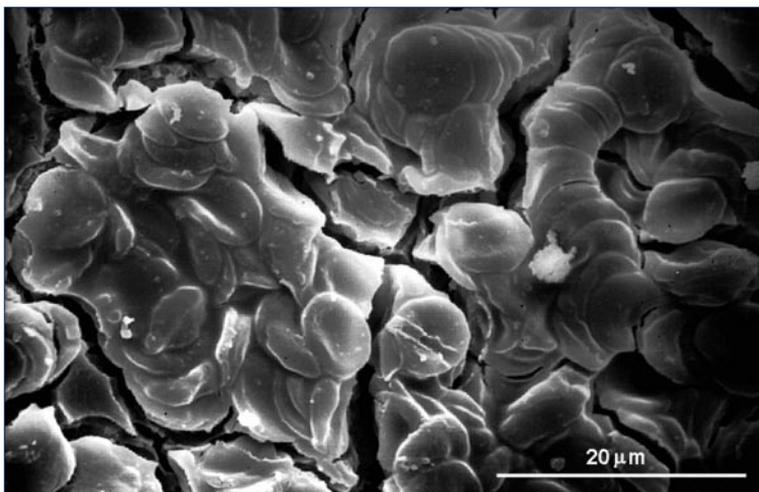
Haemotaphonomy was defined in early 1990s as “the study of bloodstains, and especially of the changes in appearance and size of the cellular components, as well as the characteristics of their cell position and appearance in function of the superficial topography and composition of the substrate” (Hortolà, 1992). From an etymological point of view, the term ‘haemotaphonomy’ –based on the palaeontological term ‘taphonomy’ proposed by Efremov (1940)– originates from the Greek *haima* for blood, *taphos* for burial, and *nomos* for law. Vertebrate blood, i.e. ‘blood’ in the strict sense, is a suspension of erythrocytes or red blood cells (RBCs), leucocytes or white blood cells, and thrombocytes (platelets, in mammals) in a fluid medium (plasma). The occurrence of bloodstains (BSs) or other smears is consistent with the well-known criminalistic Principle of Exchange (“every contact leaves traces”) of Edmund Locard. That is to say, when any two objects come into contact there is always a transfer of material from each object on to the other (Nickolls, 1962). Although tracing the origin of this aphorism has been somewhat difficult, the most likely candidate appears to come from a passage

of Locard's book *L'Enquête Criminelle et les Méthodes Scientifiques* [Flammarion, Paris, 1920] (Inman & Rudin, 2001, p. 44). The study of the different erythrocyte and plasma-matrix morphologies exhibited in BSs is a field with applications in disciplines such as prehistoric archaeology (e.g. Hortolà, 2002) and forensic biology (e.g. Hortolà, 2008). The main source of BSs on artefacts is mammalian blood. Unlike those of other vertebrates, mammalian RBCs are anucleate (e.g. Jain, 1986, p. 527). As exceptions amongst non-mammalian vertebrates, the RBCs of the pearlside fish (*Maurolicus muelleri*) are anucleate (Wingstrand, 1956), and the amphibia of the family Plethodontidae have a percentage of anucleate RBCs, with nearly 95% of the RBCs of the California slender salamander (*Batrachoseps attenuatus*) lacking a nucleus (Emmel, 1924). On the other hand, no significant presence of white blood cells or platelets can be seen on the surface of mammalian BSs. For this reason, in practice HTN would be synonymous with 'erythrotaphonomy'.

### **Object, subjects, and method of haemotaphonomy**

As in all sciences, HTN rests on three pillars that support the structure of its self-consistency as a singular, unique scientific discipline: an object of study ('the study of'), the subjects of study ('those studied by'), and a method of study ('the study with'). The object of HTN is the study of the cytomorphology of blood cells in BSs. Its subjects of study are bloodstained specimens, because in HTN the blood cells cannot be considered outside of the internal and external BS environment. Finally, the method of HTN is the analysis of images of BSs obtained via scanning electron microscopy, which renders chiaroscuro micrographs with a shadow-relief effect (Fig. 1). Single-word descriptors used in the field of knowledge organization can be also applied to categorise HTN. Thus, following the notions of Tennis (2003), haematology would be the 'domain' of HTN, whereas cytomorphology would be its 'extension', and scanning electron microscopy would be its 'intension'. In addition, following the concepts of Dahlberg (2006) the bloodstains would be the

'knowledge elements' of HTN, while the erythrocytes would be its 'knowledge units'.



**Figure 1.** Haemotaphonomy. SEM micrograph of a human (author's) blood smear on stone. *Reprinted from Forensic Science International, vol. 55(2), Policarp Hortolà, SEM analysis of red blood cells in aged human bloodstains, pp. 139–159, Copyright (1992), with permission from Elsevier.*

### The genesis of haemotaphonomy

The genesis of HTN is found in two opposing –but necessarily complementary– facts, which led to its birth as a science: the rise of forensic serology and the resulting fall of forensic microscopy of BSs. The microscopic study of BSs began in the early 19th century, a century during which interest in the microscopy of BSs was at its peak. Bonaventura-Mateu Orfila –who is considered to have founded modern toxicology in 1813– is credited as the first to attempt the use of a microscope to assess BSs (Inman & Rudin, 2001, p. 330). Throughout the criminalistic literature of the 19th and 20th centuries, this microscopic examination was only intended for confirming the presence of blood or, at most, for discriminating

taxonomically between mammalian and non-mammalian blood (e.g. Guy, 1861, p. 264; Fiori, 1962). The only microscopes available for the study of BSs were light microscopes until the scanning electron microscope (SEM) went onto the market. Unlike the transmission electron microscope (TEM), which was conceived for the study of (biological) sections at high magnification, the SEM was conceived for the study of (either biological or inorganic) surfaces at high magnification. Apart from its high-magnification capability –which it shares with TEMs– this instrument has other critical advantages over light microscopes: high resolution for bulk objects, large depth of field, and a shadow-relief effect of electron contrast. Consequently, SEMs are the most appropriate instruments in the study of the cytomorphology of the blood cells in BSs. The advent of the first commercial SEM (the Cambridge Instrument Company's *Stereoscan*) took place in the 1960s (Oatley, 1982; Wells & Joy, 2006). The rise of molecular biology techniques as applied to BSs during the same decade (Inman & Rudin, 2001, p. 337), and before the widespread use of SEMs, led to the virtual abandonment of the use of microscopy in the cytomorphological assessment of BSs, a little-used method in itself. SEMs afforded a new field of study, previously impossible to perform, of in-situ observation of the topography of BSs down to their last morphological detail.

Before 1992, very few reports on the use of SEM in BSs had been published. Dixon *et al.* (1976), working from a forensics perspective and, fifteen years later, Gramly (1991) within the field of prehistoric archaeology, reported X-ray energy dispersive spectroscopic analyses of BSs using an SEM. Nevertheless, these studies were carried out in order to characterise BSs via microanalysis, and the typology of erythrocyte morphologies in BSs remained unidentified. Thus, this previous lack of interest in the morphology of erythrocytes in BSs paved the way for the appearance of a new science: the science of HTN.

## STYLISTIC PARALLELS OF HAEMOTAPHONOMY

### Literary parallels: tremendism and decadentism

Tremendism is an approach that accentuates the sombre aspects of life, with cruelty and violence in the foreground of human relations, and with an atmosphere of boredom and anguish (Palley, 1961). Tremendism is a kind of realism, either emphatic (Palley, 1961) or naturalistic (Ortega, 1965). According to Palley (1961), tremendism is the Spanish version of European existentialism, differing from literary naturalism in two aspects: first, naturalism sought social and economic justice, and did not concern itself with human spiritual anguish; and second, tremendism is concerned with the individual rather than the masses. Although tremendism is widely considered a recent literary phenomenon pioneered by Camilo-José Cela (1942) (e.g. Luby, 1976), evidence of the style can be found in the picaresque novel (Palley, 1961). This genre is well represented during the Baroque in the writings of authors such as Mateo Alemán (1619), Francisco de Quevedo (1626), and Hans Jakob Christoffel von Grimmelshausen (1669). In fact, a continuum can be traced back from Spanish 15th-century satiric poetry, and especially from Fernando de Rojas (1507; Fig. 2) (Ortega, 1965). By analogy, the term ‘tremendism’ was later incorporated into the language of tauromachy or the ‘art’ of bullfighting. Coincidentally, tauromachy is, in the opinion of Ors (1964, p. 90), a “baroque custom”. In bullfighting criticism, tremendism refers to the style of those matadors who have a notable taste for extreme risk when faced with the beast, in order to create an atmosphere of anguish in the crowd. Bloodstained specimens are subjects of study with ‘dramatic’ and distressing psychological connotations. These connotations can be perceived in statements such as the following: “During a stone-knapping episode [...] an accidental slice of the left hand provided a thin bloodstain on a knife-like stone tool.” (Hortolà, 1992), “The projectile point was smeared with a thick film of blood, directly from the heart of the specimen [...]” (Hortolà, 2001), “A [...] surgical blade was extensively smeared, in one of its two faces, with

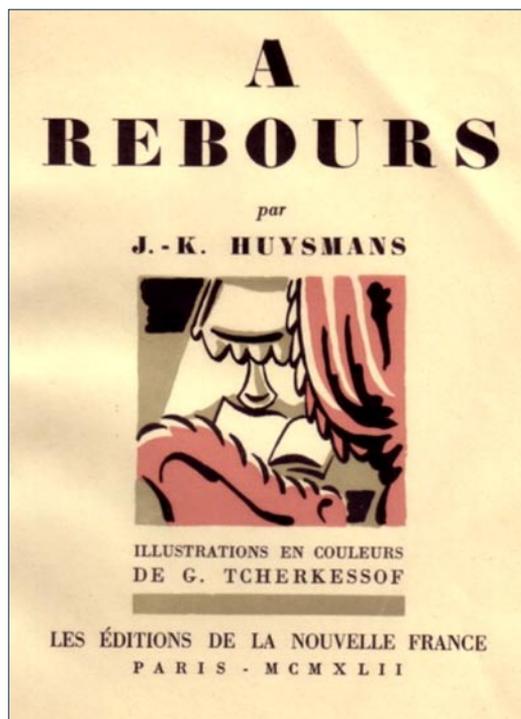
peripheral human blood of an adult female.” (Hortolà, 2008). Due to these ‘dramatic’ and distressing psychological connotations, HTN is stylistically parallel to the tremendistic literature.



Figure 2. Tremendism. *Tragicomedia de Calisto y Melibea* (Fernando de Rojas, 1507). First sheet of the ‘Zaragoza edition’, the first documented Spanish edition containing 21 acts. Reproduced from *La Celestina* [on-line; [http://www.spanisharts.com/books/literature/i\\_celestin.htm](http://www.spanisharts.com/books/literature/i_celestin.htm); retrieved 12 Dec 2006], with permission from the site owner.

On the other hand, decadentism is an approach that rejects the present, turns on the past, develops the artificial, and likes the morbid (Becker, 1992, p. 171). According to Bourget (1883, p. 24, in Calinescu, 1987, p. 170), individualism is central to any definition of decadence. A style of decadence is simply a style favourable to the unrestricted manifestation of aesthetic individualism, rejecting the tyranny of traditional authoritarian requirements such as unity, hierarchy, objectivity, etc. (Calinescu, 1987, p. 171). Decadentism is a kind of realism. The term ‘decadence’ implicitly reflects the inversion –from negative to positive– that the authors attributed to the very idea of decline, and decadentism can be interpreted as the expression of a writer’s consciousness of their estrangement from and superiority to bourgeois social norms considered corrupt and aberrant (Moroni, 2004). In some decadentistic works, a link between sex and death –an Eros-Thanatos Baroque paradigm– is clearly present (Bacarisse, 1974; Buci-Glucksmann, 1994, p. 144). Decadentism, symbolism and modernism are, if not synonyms, at least very related terms. For Symons (1893), Kronik (1966) and Wellek (1970) symbolism is a part of the Decadent Movement, while for Drake (1982) decadentism is a part of symbolism, and for Calinescu (1987, p. 219) decadentism and modernism are synonymous. On the other hand, according to Croce (1967, pp. 33 & 34, in Calinescu, 1987, pp. 215 & 350, note 109) decadentism has many points in common with the Baroque. Decadentism developed from the 19th-century fin-de-siècle style heirs of the aesthetics of Charles Baudelaire (1857), such as Arthur Rimbaud (1873), Paul Verlaine (1884), and Stéphane Mallarmé (1887). The most notable French decadentistic author is Joris-Karl [Charles-Marie-Georges] Huysmans (1884; Fig. 3). Among the non-French authors, decadentism is represented by Oscar Wilde (1891) in Ireland and England, Gabriele d’Annunzio (1889) in Italy, or Rubén Darío (1905) in Latin America (e.g. Carden, 1960; Long & Jones, 1961; Drake, 1982). Some of these writers were influenced by the tradition of the Romantic ‘Gothic fiction’, a literary genre that combines elements of both horror and romance, and which includes authors such as Ann Radcliffe (1794), Matthew-Gregory

Lewis (1796) and Mary [Wollstonecraft] Shelley (1818), as well as the poetry and fiction of Edgar Allan Poe (1840). For example, not only the influence of Baudelaire but also that of Poe can be found in Huysmans (Koehler, 2001). Even after it formally expired as a literary movement, the decadentistic style was still employed by many authors, for example Thomas Mann (1912), Marcel Proust (1913–1927), and Evelyn Waugh (1945). In connection with the scientific sphere, postdictive sciences are those characterised by the overdetermination of the past by the localised present (Cleland, 2002; Pigliucci, 2005). These kinds of sciences (historical geology, palaeontology, prehistory...) attempt to reconstruct the sort of events ('the past') that, due to entropy, evolution, and ultimately the laws of the thermodynamics of irreversible processes, are not recurrent, i.e. they are unrepeatable. In other words, these sciences turn on the decay, the perished things, on 'that which was but that will not be again'. Therefore, these sciences participate in some measure in the aesthetics of decadentism. The idea of perished things and decay is, in some ways, comparable to that of ruins and ruining. According to Hetzler (1988), a 'ruin' is the disjunctive product of the intrusion of nature upon the human-made without loss of the unity produced by humans, and the 'ruining' –started by either human or natural causes– is the maturation process done by nature in ruin time. This thought of perishing and decaying would also link in with the Hispanic Baroque worldview, which was constructed upon the premises of 'the wheel of fortune': the impossibility of permanence, of unstoppable growth, and of the final abandonment of the hope that something new might interrupt the chain of destruction (Flor, 2005). Dorfles (1986, pp. 117–118 & 126–128) deals with the modern architectural 'aesthetics of ruin'. The science of HTN is a sort of phoenix that is reborn, in electron microscopy, of its light-microscopy 'ashes'. This implies that the metalinguistics of the aesthetics of HTN is not only trapped by the bias exhaled by the decadentistic literary style, but that it even reinforces such bias.



**Figure 3.** Decadentism. *À Rebours* (Joris-Karl Huysmans, 1884). Front cover of the 1942 French edition [Paris: Les Éditions de la Nouvelle France], containing the foreword written by Huysmans in 1903, and illustrations by Georges Tcherkessof. *Reproduced from Romans et Poèmes [on-line; <http://www.biblioparfum.net/index.php?cat=romans>; retrieved 10 Jan 2007], with permission from the site owner.*

### Visual-art parallels: churriguerism and tenebrism

Churrigueresque is a uniquely Spanish derivation of European late Baroque architecture typified by the lively and elaborate surface decoration of sculptural effects (Lapunzina, 2005, p. liii). This ‘architecture’ embraces not only façades, but altarpieces as well. The denomination of this style derives from the family name Churriguera, a family of sculptors and architects working in Salamanca and Madrid, whose patriarch, Josep-Simó de Xoriguera, adapted his Catalan

surname into Spanish. The main cultivators of this style were not, however, the Churriguera family, but other architects, such as Narciso Tomé, Pedro de Ribera, and Lorenzo Rodríguez. Churrigueresque is a visually frenetic style that features a plethora of extravagant ornamentation and surfaces bristling with broken pediments, undulating cornices, spirals, balustrades, stucco shells, and garlands (Encyclopædia Britannica, 2006: Churrigueresque). Restraint is totally abandoned in a conscious effort to overwhelm the spectator (Encyclopædia Britannica, 2006: Churrigueresque). Although Churrigueresque is chronologically contemporary of Rococo, it is stylistically different (Tapié, 1981, p. 103). Churrigueresque is well represented in Spanish colonial America, especially in Mexico (Fig. 4). Mexican Churrigueresque has been equated to the European Ultrabaroque, although Baird Jr. (1959) finds it improper and prefers to refer to it as Mannerist-Baroque. In Spanish colonial America, tendencies from both the native art of the Americas and the everpresent Spanish-Moorish (*mudéjar*) art were incorporated, further enriching the style, and the Churrigueresque column became the most common motif (Encyclopædia Britannica, 2006: Churrigueresque). This column (*estípite*) is a Mannerist-inspired columnar or pilaster form made up of a special group of parts: an inverted obelisk, various blocks and medallions, a Corinthianesque capital, etc. (Baird Jr., 1959). To neoclassical taste, the Churrigueresque style represented the last word in decadence (The Oxford Dictionary of Art, 2004). Churrigueresque falls under the style of naturalism. In fact, according to the art historian John R. Martin (McCormick, 1955) all Baroque art is naturalistic. In connection with the light effects of the ‘optical domes’, a creative parallelism between Baroque buildings and some optical instruments invented just at the beginnings of the Baroque age –the microscope, the telescope, and the magic lantern– has even been suggested (Hersey, 2000, e.g. Figs. 3.18 & 3.19). The erythrocyte count in blood is very high. For example, some of the lowest mean values for mammalian blood (in million RBCs per microlitre) are still as high as 2.88 in the Asian elephant (*Elephas maximus*), 3.47 in the beluga whale (*Delphinapterus leucas*), and 3.62

in the Florida manatee (*Trichechus manatus*) (Smith, 1983). This high number of erythrocytes in blood gives rise to the appearance of a motley erythrocyte ensemble in SEM micrographs of BSs, with multitude of details that require a careful and punctilious analysis of each micrograph. Moreover, the piles of RBCs (rouleaux) that are occasionally visible in the SEM micrographs of BSs, suggest tortuous columns similar to their twisted Baroque counterparts. Furthermore, as a general feature, Wölffling (1986, pp. 49–50) opposes the angular, ‘hard’ character of the Renaissance art to the curved, ‘soft’ quality of the Baroque works, which evoke the (malleable) clay. A curious analogy between Baroque visual plasticity and that of HTN can be found, for instance, in the way that BSs are considered in the following paragraph: “In fact, in a smear these [blood] cells are equivalent to deposited soft-bodied microfossils in a clay-like sedimentary matrix” (Hortolà, 1992). Furthermore, as opposed to the angular forms of the Renaissance artist, the curved forms sought by the Baroque architect or painter bring to mind living things, at the macroscopic as well as the microscopic level, as do RBCs and their rouleaux which can be seen in BSs, as mentioned earlier. All of this gives SEM micrographs of BSs the visual characteristics of an exacerbated, exasperated baroquism, as in Churrigueresque architectural decoration.

On the other hand, tenebrism is a Baroque style of painting in which the contrast of darkness with light introduces an element of mystery, ambiguity, and understatement, lending a dynamic quality to the light and bringing an element of drama and pathos (Rzepińska, 1986).



**Figure 4.** Churriguerism. Façade of the Metropolitan Sacrarium adjoining the Mexico City Cathedral (1768, Lorenzo Rodríguez). Reprinted from *Gaceta Médica de Caracas*, vol. 113 (4), J. E. López, M. Marciano, J. E. López S., Y. López S. & H. Fasanella, *El arte del Barroco. Formas en el Barroco IV. Barroco latinoamericano: mexicano, arquitectura y literatura 2: Carlos de Sigüencia y Góngora y Sor Juana Inés de la Cruz*, pp. 519–534, Copyright (2005), with permission from *Academia Nacional de Medicina de Venezuela*.

Because of its bias towards transmitting a feeling of motion, tenebrism can be considered as ‘picturesque’, an approach in which what is essential is not the use of colour but the contrasting effect of light and shade (Wölfflin, 1986, pp. 35–36). Tenebrism, as Churrigueresque, is a naturalistic art. Tenebrism became a hallmark of Baroque painting, as Churrigueresque did of Baroque architectural decoration. The most well-known exponent of tenebristic painters is Michelangelo Merisi ‘Caravaggio’, who popularised this naturalistic

technique. Even, the term ‘naturalism’ was first used in connection with the visual arts to characterise the work of ‘Caravaggio’ and his followers (The Oxford Companion to Western Art, 2001). Other outstanding tenebristic painters were, for example, Georges de La Tour, Francisco de Zurbarán, and Rembrandt van Rijn. An elegant example of a tenebristic painting appealing to the visual-textual relationship in science is that of Rembrandt’s masterpiece *The Anatomy Lesson of Dr. Nicolaes Tulp* (Fig. 5). In this painting, the lecturer’s audience is not looking at the flayed arm of the human corpse, but at the textbook placed at the foot of the cadaver. Tenebrism was also used later by painters of the Romantic Movement, whose most outstanding exponent is Baudelaire’s acknowledged master Eugène Delacroix, whom in turn was sensitive to the phenomenon



**Figure 5.** Tenebrism. *The Anatomy Lesson of Dr. Nicolaes Tulp* (1632, Rembrandt van Rijn). Oil on canvas, 169.5 x 216.5 cm. Mauritshuis Royal Picture Gallery, The Hague. *Reproduced from Six masterpieces of medicine in art [on-line; <http://www.uchsc.edu/news/bridge/2003/March/art2.html>; retrieved 12 Dec 2006], with permission from the site owner.*

of decadence (Calinescu, 1987, p. 167). Due to the chiaroscuro display inherent to SEM bioimaging –in other words, inherent to the method of the science under study– HTN is also stylistically parallel to tenebristic painting.

#### **CULTURAL FRAMEWORK OF HAEMOTAPHONOMY**

Literarily, because of the psychological connotations of its subjects of study (bloodstained specimens), HTN is a tremendistic science, and because of its adscription to the focused-on-the-past, postdiction logic, HTN is a decadentistic science. Artistically, because of the visual characteristics of its subjects of study (a motley erythrocyte ensemble appearing in SEM micrographs of BSs), HTN is a churrigueristic science, and because of its method of study (the analysis of images in chiaroscuro obtained via SEM), HTN is a tenebristic science. Thus, tremendism, decadentism, churriguerism and tenebrism constitute the aesthetic essences of HTN. Moreover, because tremendism and decadentism are two forms of literary realism, while tenebrism and churriguerism are two forms of artistic naturalism, HTN can also be stylistically regarded as a form of written realism and scopic, visual naturalism. However, realism and naturalism, whether in literature or in the visual arts, are two terms that are difficult to define (Levin, 1951; Sedwick, 1954; Read, 1967, pp. 98–102; Morris, 2003, p. 2). In this study, ‘written realism’ must be understood as a literary approach that focuses on fidelity to real life and the accurate representation without idealisation of everyday life (Encyclopædia Britannica, 2006: realism). By the same token, ‘visual naturalism’ must be understood as an artistic approach that focuses on the accurate representation of the details of nature, including man and his works, irrespective of whether they are beautiful or ugly (Munro, 1960; *The Oxford Companion to Western Art*, 2001). These two concepts as they have just been defined are comparable, so it can be consequently inferred that the scopic naturalism of HTN personified by SEM micrographs of BSs is translated into its written language in the form of the literary realism embodied by the text of its respective scientific reports.

Tremendism is well represented in Baroque literature, decadentism has numerous points in common with the Baroque, tenebrism is a Baroque painting art, and Churrigueresque is a Baroque decorative architectural art. That is to say, the entire aesthetic background of HTN converges into the Baroque cultural framework. Therefore, in the light of its aesthetic background it must be concluded that HTN is a baroquistic science.

#### À PROPOS OF THE CULTURAL FRAMEWORK OF HAEMOTAPHONOMY: THE BAROQUE AND (NEO)BAROQUE

The word ‘baroquistic’ refers to a term that can have different meanings depending on its historical and geographical connotations. On one hand, with the initial capital it typically refers to the conventional, sensu-stricto Baroque. On the other hand, without the initial capital it usually denotes different possible kinds of sensu-lato Baroque. The latter can signify: a) a historical, unique modern baroque resurgence, as first anticipated in 1922 by the German art historian Albert-Erich Brinckmann (1922) and further openly suggested by the Italian art critic Gillo Dorfles (1951); b) a trans-historical, cyclic baroque revival, as put forward in 1915 by the Swiss art historian Heinrich Wölfflin (1976); or c) a metahistorical, fully unrestricted baroque as proposed in 1931 by the Catalan philosopher Eugeni d’Ors (1964).

It is widely accepted that the term ‘baroque’ was first used as a derogatory adjective, as synonymous with bizarre, grotesque or capricious. It probably comes from a Portuguese word that describes a misshapen, irregular pearl (Piper, 1984, pp. 44–45, quoted in Wakefield, 2004, pp. 3–4; Spagnolo, 2003; Lambert, 2004, p. 1). *Sensu stricto*, the Baroque was a historic style of art, the dominant style in Europe between the Renaissance and Neoclassicism (Wölfflin, 1986, pp. 14–15). In accordance with this definition, (proto-baroquistic) Mannerism and the (tardo-baroquistic) Rococo or Late Baroque –the transitional styles leading up to and out of the Baroque– should be considered as forming part of the Baroque. More than merely urban, the Baroque was essentially a metropolitan phenomenon (Maravall,

1975, p. 244), in which the city of Rome was its cradle (Wölfflin, 1986, pp. 13–14; Spagnolo, 2003). Michelangelo Buonarroti –born in Caprese (Toscana) in 1475, and died in Rome in 1564– is considered by some to be the father of the Baroque (Read, 1967, p. 109; Wölfflin, 1986, p. 17). This style was roughly coterminous with the 17th century, but flourished well into the 18th century in various areas, notably Central Europe and Latin America (Piper, 1984, pp. 44–45, quoted in Wakefield, 2004, pp. 3–4). The Baroque style was encouraged by the new strategic principles of religious communication that arose from the Roman Catholic Church’s ‘Counter-Reformation’. From these principles –embodied at the Ecumenical Council held in Trent from 1545 to 1563– the papal state decided that art was to be a principal means of persuading and involving believers (Spagnolo, 2003). Wherever Counter-Reformation spread to, the Baroque became the dominant style, being present in places as far from the Occident as Peking, where the Summer Palace was built by Jesuits (Read, 1967, p. 110). The Baroque is characterised by its vigorous suggestion of movement and emotional intensity (‘dramatisation’) (Fleming, 1946; Zucker, 1955; *The Concise Oxford Dictionary of Art and Artists*, 1996). In a single word, the Baroque is characterised by its ‘eloquence’ (Tapié, 1981, p. 126). This ‘eloquence’ can be transmitted via extreme luxuriance, extreme austerity, or the contrast of both extremes, but in any case via exaggeration (Maravall, 1975, pp. 422–423; Wölfflin, 1986, p. 65). According to Maravall (1975, pp. 452–453), the Baroque approach “proclaims, cultivates, exalts the novelty; recommends it”. The Baroque can be viewed not only as an artistic style but also as a general label for the period when it flourished, and one may speak of the ‘Baroque age’, ‘Baroque music’, ‘Baroque politics’, or ‘Baroque science’ (Munro, 1946; Stechow, 1946; Piper, 1984, pp. 44–45, quoted in Wakefield, 2004, pp. 3–4; *The Concise Oxford Dictionary of Art and Artists*, 1996). For instance, citing the Dutch physicist Christiaan Huyghens, Deleuze (1988, p. 7) speaks of ‘Baroque mathematical physics’. In the same way, the term ‘Baroque’ can be applied as a literary label (Daniells, 1946; Wellek, 1946; Oppenheimer Jr., 1951; Tapié, 1981, p. 16).

On the other hand, as mentioned above, Wölfflin suggested a trans-historical, cyclic Baroque revival, although in fact his proposal was broader, in the sense of a general phenomenon of a ‘spiralling’ remake of the styles in art (Wölfflin, 1976, p. 337). Beyond a merely material approach, Ors (1964, pp. 65–133) –as asserted at the international meeting on the Baroque held in the Pontigny abbey in 1931– explicitly advocated a transcendental baroque: a timeless, placeless spirit category, from Antiquity to modernity and from the Orient to Occident. Later on, this Orsian viewpoint was treated, under the term ‘neobaroque’, by authors such as the Cuban Severo Sarduy (1972), the French Gilles Deleuze (1988, e.g. pp. 111–112) and the Italian Omar Calabrese (1987, e.g. pp. 18–19). According to Degli-Esposti (1996), these and other scholars have “demonstrated” that the baroque mode has manifested itself over the centuries whenever a period of crisis has put the act of artistic creation at an impasse. The concept of neobaroque –especially as applied to the novel and poetry– has had particular success in Latin America, where, apart from Sarduy, the neobaroque is present in authors such as Carlos Fuentes and Gustavo Celorio in Mexico, and Alejo Carpentier (born in Switzerland) and José Lezama Lima in Cuba (Salgado, 1999; Kaup, 2005). A whole philosophy of current Latin American culture based on the neobaroque is even being attempted (e.g. Arriarán Cuéllar, 2004). Meanwhile, numerous modern architectural masterpieces can be considered as neobaroque works (Dorfles, 1951, e.g. pp. 14 & 48), for instance Pere Milà’s residential building known as *La Pedrera* (1910, Antoni Gaudí) in Barcelona, the *Einsteinturm* astrophysical observatory (1921, Erich Mendelsohn) in Potsdam, and the second *Goetheanum* General Anthroposophical Society headquarters (1926, Rudolf Steiner) in Dornach (Dorfles, 1951, e.g. Figs. 41, 36 & 38, respectively). At least in one case, a term referring to a Baroque architectural style has been transferred to modern literature: in 1946, Malcolm Lowry (1965, p. 61, quoted in Cross, 1974) described the structure of his novel *Under the Volcano* (Lowry, 1947) as churrigueresque.

Because a vigorous suggestion of movement and dramatisation are the two qualities that characterise the conventional Baroque, in this study ‘baroque’ is conceived as any visual or written work, regardless of its time or place, that exhibits those qualities; that is to say, in the sense of a metahistoric and transgeographical phenomenon. As with ‘naturalism’ and ‘naturalistic’, it is appropriate to use the word ‘baroque’ as a noun to refer to the baroque (*sensu* Ors) or neobaroque (*sensu* Sarduy) approach, and ‘baroque’ as an adjective to refer to the quality of (neo)baroqueness. For instance, because the configuration of the DNA molecule suggests Baroque-typical Solomonian columns (Hersey, 1999, p. 8), we could speak of its ‘baroque structure’, in the same way that we can speak of the ‘baroque structure’ of the piled RBCs in BSs.

#### CONCLUDING REMARKS

Knowing the aesthetics of a science plays a key role in deciphering its underlying cultural framework. The cultural framework of HTN is baroque. Although baroque or whatever cultural framework a science fits into should not affect its technical or methodological aspects, the detection of the cultural framework of HTN helps to unravel whether or not contemporary science follows the current ‘postmodern’ cultural trends that other spheres of human endeavour do.

On the other hand, an issue that is singularly latent in HTN relates to the discussion on the ‘national’ character of cultures of science. Haematophony was founded by a scientist from the Iberian Peninsula, and some of the styles that have been found to be related to this science (i.e. tremendism and churriguerism) originated in the same place. Is this common origin just a coincidence or might it be argued that there is something ‘uniquely Iberian’ about HTN? The response to whether or not HTN has local characteristics must essentially be negative. Although social circumstances figure among those that influence the origin and development of a science, HTN cannot be labelled as a ‘typically Iberian’ science. Both tremendism and

churriguerism come from Iberia, but decadentism comes from France, and tenebrism from Italy. Furthermore, the Baroque originated in the city of Rome. Therefore, just a slightly more Latin, southern-European or Catholic-country sensitivity than an Anglo-Saxon, northern-European or Protestant-country idiosyncrasy might perhaps be recognised in the haemotaphonomic discourse, but not beyond this simple dichotomy. Unlike literature and art, science only makes sense when universal in its approaches and development.

Finally, because each science has its own aesthetics and, consequently, its characteristic cultural framework, it is expected that the topic discussed herein will stimulate similar approaches to other scientific disciplines. In such a sense, this work might prove useful both to scientists reflecting on aesthetics and to aestheticists reflecting on science.

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