

TO BE OR NOT TO BE POSTMODERN: REGARDING CONTEMPORARY BIOMEDICAL SCIENCE WITH LYOTARD

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Abstract: *This paper investigates the condition of contemporary biomedical science – as suggested by the underlying discourse of its visual output – in relation to Jean-François Lyotard’s proposition, in 1979, about the West’s postmodern distrust of metanarratives. I examine the Visible Human Project (a digital anatomical archive pioneered by the US National Library of Medicine), alongside its South Korean and Chinese counterparts, and the Anatomage Table (a US virtual dissection table incorporating US and Korean VH data), which draw on cutting-edge medical imagistic technology and aim to generate and improve biomedical knowledge and/or specific medical skills.*

Keywords: *metanarrative (Jean-François Lyotard); Visible Human Project (VHP); Visible Korean Human (VKH); Chinese Visible Human (CVH); Anatomage Table*

Jean-François Lyotard has famously defined the postmodern as “incredulity toward metanarratives,” reciprocally generated by and generating “progress in the sciences” (*The Postmodern Condition* xxiv; henceforth *PC*). Lyotard argues this proposition by investigating the condition of contemporary western knowledge as represented by science. This paper reassesses Lyotard’s theory of the modern/postmodern divide in science in relation to the Visible Human Project of the US National Library of Medicine and its Asian counterparts, on the one hand, and the Anatomage Table, their US spin-off, on the other.

Before I explore the biomedical sciences as postmodern or otherwise, I will examine critically Lyotard’s conclusions about the condition of knowledge in the late 1970s.

Lyotard and science

Why should Lyotard have reduced knowledge to scientific knowledge (cf. Jameson xv-xvi)? Lyotard himself admits that “scientific knowledge does not represent the totality of knowledge” (*PC* 7; see also 18): “Knowledge [*savoir*] in general cannot be reduced to science, nor even to learning [*connaissance*]” (*PC* 18). *Connaissance*/learning represents “the set of statements which, to the exclusion of all other statements, denote or describe objects and may be declared true or false” (*PC* 18), which makes science “a subset of learning” (*PC* 18). *Savoir*/knowledge includes both the statements covered by

connaissance and competences (e.g. *savoir-faire*, *savoir-écouter*) (PC 18).¹ In contemporary society, knowledge becomes “an informational commodity” (PC 5) with exchange value (PC 4), especially owing to late twentieth-century developments in informatics (PC 5-6, 14, 49-52). Informatisation of science and society alike explains the very choice of my corpus.

Furthermore, what makes science, all of a sudden, the arche-legitimizing game of the narrative of emancipation, thus promoted in connection with losing this position – or proving such belief untenable – in postmodernity (PC 40)? When Lyotard introduces modernity’s two grand narratives (of emancipation and of speculation), he describes the former – in connection with the French project of mass education – as having a sociopolitical burden (PC 31-2). This narrative qua ideology (whether political, religious or philosophical) purportedly fosters social progress and/or offers a totalising explanation of the human condition. Nowhere is science indicated as the premier tool of the narrative of emancipation (cf. PC 39-40), but occasionally as the victim of delegitimation.

The context of analysis is “the crisis of narratives” (PC xxiii), viz., the conflict between science and narratives (PC 19), which Lyotard couches in terms of a *legitimation crisis*. Whereas “nonscientific (narrative) knowledge” (PC 26) entails the “preeminence of the narrative form in the formulation of traditional knowledge” (PC 19), scientific knowledge imposes the verification of the ‘stories’ which the scientist ‘tells’ (PC 60; see also 7). Yet, science itself depends on narratives for self-legitimation: “[T]o the extent that science does not restrict itself to stating useful regularities and seeks the truth, it is obliged to legitimate the rules of its own game. It then produces a discourse of legitimation with respect to its own status, a discourse called philosophy” (PC xxiii). Traditional science – Lyotard’s *modern* science – “legitimizes itself with reference to a metadiscourse of this kind making an explicit appeal to some grand narrative, such as the dialectics of Spirit, the hermeneutics of meaning, the emancipation of the rational or working subject, or the creation of wealth” (PC xxiii). Modern science addresses the imperative of legitimation by making “the conditions of truth, in other words, the rules of the game of science, ... immanent in that game” through the experts’ consensus (PC 29).²

Postmodern science finds its modern predecessor’s discourse of legitimation through grand narratives *inadequate* (PC 60). Furthermore, as

¹ Lyotard conceivably avoids subsuming scientific knowledge under *savoir* because of the pure/applied science distinction.

² The imbrications between knowledge, truth and power suggested by Lyotard in his examination of the legitimation of scientific statements as scientific by appeal to “a ‘legislator’ dealing with scientific discourse ... authorized to prescribe the stated conditions (in general, conditions of internal consistency and experimental verification)” (PC 8; see also 9, 30) recall Foucault’s interviews from the 1970s (Foucault 51-2, 93, 131-3).

science entails making forays into the unknown rather than merely seeking the experts' approval/consensus (PC 43-4, 61), postmodern science tackles the unpredictable and paradoxical (PC 60) and resorts to *paralogy*, which enables a scientific pragmatics of *dissension* (PC 61). Briefly, “the more advanced forms of scientific enquiry” (Sim 118) – Lyotard’s *postmodern* science – “produce not the known, but the unknown” and “keep calling into question our theories of the world by generating data that those theories cannot satisfactorily explain” (118).

Examining the institutionalised divide between basic science (aka ‘fundamental’ or ‘pure’: curiosity-driven theoretical discovery aimed at expanding knowledge for knowledge’s sake) and applied science (problem-solving oriented science),³ Lyotard (PC 44-7) argues that the latter abides by the imperative of performativity⁴ and works in the service of power rather than truth (PC 46-7). However, can one describe this dichotomy *uncritically* when one posits the postmodern distrust of grand narratives?⁵ Is *postmodern* basic science disinterested in its application, viz., truly distinct from applied science?

What if not all *postmodern* science permanently and/or centrally searches for instabilities, undecidables and paradoxes, as Lyotard posits (PC 53, 60)? Strangely, Lyotard brands quantum physics,⁶ microphysics (atomic

³ See Feibleman (305-306) for a definition of pure science and applied science as propelling each other; nonetheless, “historically the problems toward which applied science is directed came before pure science,” as in the case of geometry (306). Speaking of his case studies, Benoit Mandelbrot (2), the father of fractal geometry, invokes the etymological promise of the term *geometry* (from Greek *gē*, “earth,” and *metria*, from *metrēs*, “measurer”). Accordingly, ‘pure’ geometry is an oxymoronic mystification.

⁴ ROI: Return on Investment.

⁵ 1956 Physics Nobel laureate William Shockley addressed in his acceptance speech precisely the “derogatory” nature of the basic/applied science dichotomy (Narayanamurti, Odumosu 2-3; cf. 17-18). Narayanamurti and Odumosu argue *against* (politico-institutional) segregation and pigeonholing of research through “the preservation of this artificial boundary between knowledge and practice” (9) and propound “a more holistic view of research” (10): the integrative model of “the discovery–invention cycle” (10). The basic/applied science divide is also epistemically “flawed because it assumes a linear relationship between the two that doesn’t always exist” (Powell n.p.). See also Douglas on the history and untenability of this dichotomy.

⁶ Quantum mechanics “contains an intrinsic margin of uncertainty regarding the future evolution of the system, even if the state of the universe is known as completely as possible at any given time” (Fromhold 364). Yet, quantum physics, whether indeed a postmodern science or not, by far precedes postmodernity (Capellmann 1-2, Fromhold 364-9).

physics), fractal geometry,⁷ catastrophe theory⁸ and the geometric model of Brownian movement, postmodern *science* (PC 53-60); yet, they are scientific subdivisions or even theories/models, rather than full-fledged sciences. Insofar as at least the existence of subdivisions makes no science homogeneous, should we posit one particular science, or even a sizeable subdivision thereof, as homogeneously postmodern or otherwise? Shunning an imposition of homogeneity would be not just a principled guiding idea for critical research but also an emendation to Lyotard's rather hasty, *metanarrative* overgeneralisations about contemporary science.

Gillian Beer rightly wonders whether “the story of the death of grand narratives [has] had any effect in the sciences” (6). Indeed, how many scientists would approve of Lyotard's postulates on scientific legitimation through grand narratives (Beer 7)?

Representation in Biomedicine

The crisis around which Lyotard, in *The Postmodern Condition*, subtly polemicalises against Habermas originates in the “crisis of representation” in aesthetics, philosophy and ideology alike. The latter crisis owes to “an essentially realistic epistemology, which conceives of representation as the reproduction, for subjectivity, of an objectivity that lies outside it” (Jameson viii). Whilst modernity, with its industrialist and technological impetus, believed in the possibility of, and promoted, accurate epistemic representation, modernism strove rather to represent the unrepresentable – Ideas, e.g. infinity or indivisibility – in form, if not in content (Lyotard, “Answering the Question: What Is Postmodernism?” 78-81; henceforth “AQWIP”).

Representation by whom and by what means, whose claims to accuracy rest on what? What kind(s) of *figure* do modernity's grand narratives employ to accomplish their legitimating function? How do these figures address their

⁷ Does the establishment of fractal geometry make this geometry subdivision ‘pure’ or ‘applied’ science? IBM had tasked Mandelbrot to “study[] turbulence over telephone lines, which led to the eventual discovery of a new field in mathematics” (“Fractal Geometry”). *The Fractal Geometry of Nature* describes the “solutions...propose[d] to a host of concrete problems, including very old ones, with the help of mathematics that is, in part, likewise very old, but that (aside from applications to Brownian motion) had never been used in this fashion” (Mandelbrot 5).

⁸ Catastrophe theory is “an extension of, or a development within, the calculus (rather than a radical new departure, or a replacement for current methods...)” (Poston, Stewart vii-viii). It “provides a universal method for the study of all jump transitions, discontinuities, and sudden qualitative changes” (Arnold 1), viz., of “the non-linear phenomena in which a continuous change in control parameters results in a discontinuous alteration of a quantity characterizing the examined system” (Okniński xi). Developed originally in mathematics, catastrophe theory, whose precursor ideas originate in philosophy, mathematics and the experimental sciences, is applied to mathematics, physics, chemistry, physical chemistry and biology (Okniński 2, 5-24).

task? Whom do such narratives truly interpellate? My questions concern issues of representation of and by the ‘hero’ of the quest for knowledge and representation of knowledge vis-à-vis the beneficiary. Representation as both *Darstellung* (depiction in any medium) and *Vertretung* (political-juridical standing in for someone else), as explained by Gayatri Spivak (275-9), actually conflates issues of power, knowledge and truth as examined by Foucault. Such conflation is manifestly important for the metanarratives on whose legitimating capacity modern sciences appear to rest and which postmodern science seemingly distrusts.

By Lyotard’s definition (*PC* xxiii), late twentieth- and early twenty-first-century biomedicine is pre-eminently a *modern* applied science: it *legitimizes* itself through the grand narrative of emancipation as a science in pursuit of health betterment.⁹ The ways in which biomedicine can achieve such ethical desideratum and live up to its *metanarrative* legitimation include better knowledge of both the human body and of normal and pathological conditions, and development of ever more efficacious means to address pathology. In short, biomedicine envisages, in principle (if, in fact, opportunity-related), the emancipation of the (elusively general) human being from disease-induced suffering (and/or ignorance thereof) and for better, happier and/or longer living. Or, one could argue that we witness, in contemporary biomedicine, an upgrading of the emancipation narrative of legitimation: its subject is now entrusted with medically enabled/enhanced powers of self-management (cf. *PC* 35), or at least vicarious self-management through the intervention of medical institutions (the health-care system, but also medical schools and research institutes). Lyotard (*PC* 45-6) would presumably rank all such efforts with the performativity imperative of “the system,” whose sponsorship and deployment of the applied sciences aims to maximise the profit of the social mechanism.

The Visible Human projects West and East (*sic*)

Let us examine the Visible Human projects, starting with the pioneer US one, to see whether they operate within the existing epistemic paradigm or not. The US National Library of Medicine’s (NLM) Visible Human Project (VHP) is a public-domain virtual library of digital anatomical images originally of two Caucasian cadavers obtained through cross-sectional cryosectioning and CT and MRI scanning. The two resulting data sets, the Visible Male (VM) and Visible Female (VF), released online respectively in November 1994 and November 1995, have been applied ever since “to a wide range of educational, diagnostic, treatment planning, virtual reality, artistic, mathematical, and

⁹ Nowadays, goals and findings of biomedical projects are stated in press conferences and through academic reports and studies/articles; results and promises are disseminated – diluted – to the populace in the media, but are also hijacked by popular culture, e.g. in doctor films.

industrial uses” (VHP: Overview). The VHP was “designed to serve as (1) a reference for the study of human anatomy, (2) public-domain data for testing medical imaging algorithms, and (3) a test bed and model for the construction of network-accessible image libraries” (VHP: Overview; see also Waldby, *Visible Human Project* 16-17, henceforth *VHP*).

Two caveats about the epistemological condition of the VHP archive are necessary. One concerns the invisible ‘algorithms’ of visual and epistemic body representation; the other, the equally invisible digital algorithms which enable the generation, manipulation and/or dissemination of biomedical knowledge as is encoded in the data sets themselves or in their applications.

Regarding the former issue, we should acknowledge that *dissection* of the dead body does not generate instant cognitive-medical in(-)sight (Wilson 62; Sawday 6-8). Rather, it requires body *reconstitution* as “a corpus of mental categories that make up the body of physiological knowledge” (Wilson 63). What is typically obscured are the complex cognitive-technological apparatus and pictorial grid¹⁰ underpinning both dissection and intelligible construal of the anatomical mess that meets the eye during it, which enable coherent representation – Lyotard’s *connaissance* – in the book/digital archive.

The second caveat concerns the underside of technology-enabled vision. The CT/MRI images forming much of the VHP database ultimately derive from *virtual models devised for computers* during the development of medical imaging technologies (Prasad 292; Nettleton, “Emergence” 663). Such models are but *simulacra* (Baudrillard 1-2, 6) whereby computer-assisted ‘vision’ digitalises the above-mentioned cognitive grid/model of anatomical intelligibility. Not only has the VHP created “impossible anatomies” which will reconfigure biomedicine’s power relations (Thacker, “Lacerations” n.p.; see also De Mul 70); the VH elicits the “splitting of viewpoint” (Virilio 59) through “the sharing of perception of the environment between the animate (the living subject) and the inanimate (the object, the seeing machine)” (59-60), thus generating “cyborg visuality” (Prasad 292), with metacognitive and metaepistemic ramifications. If modernity discovered “the ‘lack of reality’ of reality” and, accordingly, pursued “the invention of other realities” (Lyotard, “AQWIP” 77), medical imaging technologies attest to no less through the re-invention of how and what we see in/as the human body.¹¹ With the re-conceptualisation of the body and the cadaver “in terms of information and

¹⁰ Eg. specific cognitive protocols of relating tissues (and organs) organically and topographically, as well as metacognitive coordinates (e.g. the sagittal and transverse sections); see Wilson (63), Thacker (“Technoscientific Body” 324-7), Harcourt (35-7), Crawford (68-9), Daston, Galison (85), Waldby (*VHP* 55; “Virtual Anatomy” 92-9).

¹¹ See Anker et al. on *technogenesis*, the “co-evolution between technical expertise and animate matter” (275). See also Jewson; Nettleton (“Emergence”; “Appearance”); Waldby (*VHP*, chap. 7).

information flows” (Nettleton, “Emergence” 669) that can be disseminated worldwide (“Emergence” 670), do we not risk growing addicted to the virtual interface to the effect of rendering the interface *cognitively transparent*, which encourages the illusion of naturalness?

Furthermore, the context of the VHP creation sheds light on the metacognitive dimension of the project and its unacknowledged allegiance to the anatomical tradition it remediates, with metaepistemic ramifications. Through *remediation* – “the representation of one medium in another” (Bolter, Grusin 45) – any new medium appropriates the “techniques, forms, and social significance” of prior media and “attempts to rival or refashion them in the name of the real” (65); such *reform* (55-60) also includes refashioning the early point of view (15). Accordingly, the new medium becomes a hybrid incorporating new devices alongside their emerging social and cultural functions (66), “rhetorical justifications and social relationships” (61). Furthermore, remediation “can also imply reform in a social or political sense,” as in the case of digital media (60). Thus, any historically situated remediation “also re-mediates prior modes of social and cultural modes of communication” (Thacker, *Biomedica* 8). Yet, insofar as “all mediations are both real and mediations of the real, remediation can also be understood as a process of *reforming reality* as well” (Bolter, Grusin 56; emphasis added).

What does the VHP remediate/reform socio-ideologically? As regards the body donors’ social condition, the VHP merely recycles historical anatomical techniques and cognitive *loci communi* (Waldby, *VHP* 51-7), e.g. the socially marginal (the convicted criminal as the VM source; the two anonymous post- and premenopausal women as the VF sources). Nothing has been reformed in representation gender-wise either at this, primary, level,¹² or at that of VHP-based applications for both expert and lay teaching of human anatomy and physiology developed by various research centres. The latter developments indicate a default identification of the VM (15 GB data set) as whole body *human* anatomy (Waldby, *VHP* 54), despite the higher resolution of the VF (32 GB or 40 GB data sets).¹³ The VH women are blatantly set in their traditional patriarchal/Christian place: *woman* is merely the *repository of the reproductive organs*. Indeed, save the gynaecological simulator, simulators use VM applications to give the students and staff a ‘real’ feel of the body (Johnson 142-6; Waldby, *VHP* 54). Hamburg University’s visualisation

¹² E.g. first release: VM; the NLM’s digital projects webpage link to the VHP features the project’s logo (NLM: Digital Projects) as recognisably *male*; the VHP webpage’s logo features a colour VM thorax cryosection (VHP: Color Cryosections). Likewise, two NLM applications, AnatLine, now discontinued, and the AnatQuest Project (Thoma 300-1), acknowledge – or fail to (the latter) – using images from the VM data set “[f]or the purposes of this prototype” (AnatLine General Information n.d.), without stating biomedical reasons.

¹³ Even the cover illustration of Waldby’s excellent *The Visible Human Project* features the VM.

system, Voxel-Man, bears a self-explanatory gender name, whilst documentaries thereupon – “Visualizing the Human Body” (1993), “Prof. Roentgen Meets the Virtual Body: Voxel-Man and X-ray History” (1994) and “Reanimating the Visible Human” (1997) – use VM-based specimens consistently, as well as, with differences from one another, *male* voice-over, the generic pronoun *he* for the male-qua-human subject and/or a “splitting of viewpoint” which shows the head of a *male* user watching on his computer screen images of a *male* head. The University of Michigan VHP uses both data sets for its online demos, if differently: the VM serves for the overview and an arbitrary clip plane of the whole body; the VF serves for software demonstration and for fly-throughs of a historically sociopolitically charged anatomic region, the (‘reproductive’) pelvis.

Ironically, in response to the spurious *genotypic* representativeness of the US-VH, which denies racial differences (Moore, Clarke 62, 71-3, 86), rather than also to the *phenotypical* flaws of the VM data set (AnatLine General Information) and tacit societal aversion to the post-menopausal condition of the first female cadaver imaged (Waldby, VHP 14-18; Moore, Clarke 78), South Korea and China have advanced their own VH projects. The Visible Korean Human (VKH) was initiated in 2000 and released in March 2001, being “expected to be more helpful than [the US] *Visible Human*,” first of all “in diagnosing and treating the patients belonging to the yellow race” (J.Y. Kim et al. 228). In November 2001, China set up its own VH project seemingly in response to the critical medical drawback of the VKH, whose source was a 65-year-old male patient dead of cerebroma (Zhang et al. 165). This technologically improved version of the US-VHP consists of [a] “digitized Chinese male and [a] Chinese female typical of the population,” who feature “no obvious abnormalities” (Zhang et al. 165). By January 2002, South Korea had resumed its VKH project to generate (new) male and female whole body data sets – in this order (Shin et al., “Segmentation” 372).

Whilst technological-biomedical *remediation* may have obtained indeed, the Asian projects, ironically, evince the same *ideological* flaw as the US-VHP: they give the upper hand, not only in digitalisation chronology, to the male body – a deeply engrained patriarchal must akin to *one* biblical account of human creation (Gen 2.7, 2.18-23). China completed its VM in October 2002 and VF in February 2003, again with better female image resolution (Zhang et al. 165-8). The overview article of the CVH, written by the project’s authors, shows a predilection for the male CVH (Zhang et al. 167-72, Figs. 1, 3-6). Furthermore, articles typically introduce the Chinese and Korean Humans by reference to the whole body male data set (VCH: Tang et al.; VKH: Park et al., “Visible Korean Human: Improved” 216; Shin et al., “Browsing Software”; B.S. Chung, M.S. Chung). Alternatively, they show applications based on the male data set (VKH: C.H. Kim et al.; S.-B. Lee et

al.; Kwon et al., “New Viewpoint”) or demonstrate its usefulness (VCH: Zheng et al.; VKH: B.S. Chung et al., “Colonoscopy”; Park et al., “Digital Anatomy”). Occasionally, the researchers ignore mentioning the specimen’s gender (Fellner et al.; VHP: López-Cano et al.; VKH: Kwon et al., “Computer-Aided”; M.S. Chung; M.S. Chung, Park; J.W. Lee et al.), sometimes only in the abstract (VCH: Dai et al.), whereas the article identifies the specimen as *male* (VKH: Park et al., “Visible Korean Human: Its Techniques”; Park et al., “Technique”). B.S. Chung and Park’s earliest mention of the *male* head data set used to develop a real-colour volume model of the *human* head occurs on page 2; perfectly similar (including the page reference) is the case of 3D modellings of liver segments based on the *male* and *female* data sets (respectively Shin et al., “Advanced” and S.E. Lee, Park). (The abstracts never mention the specimen’s gender.) Elsewhere, neither the abstract nor the article identifies the gender of the CVH cadaver whose brain tissues undergo segmentation; only the possessive adjective (“her”) used for the donor’s relatives in the description of image acquisition (Zhao et al. 2) does – indirectly.

For specific anatomic region study, the Asian VH projects’ cadavers may be male or female, e.g. male for the stomach (B.S. Chung et al., “Peeled”) and the gastrointestinal tract (Shin et al., “Surface Model”), the urogenital tract (Uhl et al.), the foot and the hand (B.S. Chung et al., “Three Software Tools”), and female for the heart (Shin et al., “Segmentation” 372). To study the hip joint constituents, images of the pelvis were generated after its separation from the *female* cadaver (VHP: Sergovich et al.; Romero et al.; VKH: Hwang et al.; Shin et al., “Three Kinds”; Shin et al., “Two-Dimensional”; Shin et al., “Hip Joint” 822). A woman’s pelvis is socially more interesting to study than a man’s: the foetus can be nested (only) in the former (just as prostatitis may plague only the latter)! However, the VK team has also used a *female head* data set (B.S. Chung et al., “Advanced”), which is quite unusual by the Euro-American anatomical standards set in early modernity, which the VKH tacitly continues. Occasionally, though, the VK head may be simply *human (sic)* throughout the article (Shin et al., “Technical Report”)!

Do the VKH and CVH remediate and reform their US predecessor in *every* sense? Do the VH projects dabble in postmodern science’s (ideological) unpredictable?

The Anatomage Table

Released in 2011, the virtual dissection table created by Santa Clara-based Anatomage Inc. in partnership with Stanford Medicine’s Clinical Anatomy Department features both human (male and female) and animal anatomic data sets. A versatile visualisation system, the Anatomage Table includes, apart

from gross anatomy data sets now integrated with physiological traits,¹⁴ “CTs from actual patients in normal or pathologic conditions”; its loading function allows the users to import DICOM medical images¹⁵ “to build their own 3D volume models,” with similar movement, rotation and cutting possibilities (B.S. Chung et al., “Virtual Dissection Table” 443). Besides, the “Anatomage Table Clinical version is an FDA cleared radiology software” which can “serve as radiology review system for both clinical and educational purposes” (Anatomage Table). The Anatomage Table boasts ever improved software versions; for instance, “Table 8 [released in August 2021] enables Anatomage Bodies to evolve into living human bodies that look, respond, and function just like us” (Anatomage Table: Table 8).

The original Anatomage Table reconstructed 3D volume models (B.S. Chung et al., “Virtual Dissection Table” 441) also from “Visible Korean (VK) sectioned images of a male cadaver comprising high resolution and real color” (440) – a racially sighted, if still gender-blind (marketing) strategy. To date, the Anatomage human database includes two male-female pairs, one Korean and the other Caucasian.

Using Anatomage Table’s ‘rigid’ sets of male and female body images co-exists with the possibility of clinical inputting and the data’s manipulation into the user’s own models. Technological differential notwithstanding, the former feature would rank Anatomage with modernity (e.g. Duchamp’s readymades). The latter option, I argue, leaps forward in techno-time to (post-postmodern) *digimodernism* (Kirby 52-3): the Anatomage Table is a work in progress through *onwardness* (i.e., the incomplete, growing word/image text); it renders *author and audience roles* relatively *fluid* (or interchangeable to a certain extent) through the “reformulation and intermediation of textual roles” (if not quite “radical redefinition of textual functional titles: reader, author, viewer, producer, director, listener, presenter, writer”); however, its “anonymous, multiple and social authorship” is not, in this case, “scattered across obscure social pseudocommunities,” but rather shared between professionals. Its premier *digimodernist* trait, though, concerns its *electronic-digitality*, for its actual output “derives from digitization” and is “produced by fingers and thumbs and computerization” (Kirby 53). Nonetheless, the Anatomage Table lacks other digimodernist traits (Kirby 53): *evanescence*, for the data is (or can be) archived, and partially *haphazardness* (the undecided

¹⁴ Since 2019 the Anatomage digital bodies have been “integrated with physiological elements that allow them to produce heart motion, simulate nerve pathways, and replicate physiological interactions between stimuli and anatomical systems” (“Table 8 Enables”).

¹⁵ Digital Imaging and Communications in Medicine standard.

future development of the text).¹⁶ Neither is the Anatomage Table (software included) a *fluid-bounded text*, i.e., not materially determinate.

Notwithstanding, is there room for genuine user contribution to the pre-set ‘inventory’ of anatomical and clinical models? Insofar as all imaging data (MRI, fMRI or CT) of a particular individual derives from computer models of the human body, any such image is but a Baudrillardian simulacrum. Purported realism in the rendition of gross anatomy is thus but “effects of reality” (Lyotard, “AQWIP” 74), i.e., “lack of reality” (77). Simply stated, *technoscience* (Lyotard’s term) colludes with late capitalism in the technological and epistemic *de-realisation of the body* (cf. Lyotard, “AQWIP” 74) right at the height of claims to realism on behalf of the various VH projects.

Let’s consider another of Anatomage’s realism claims. According to the official website (Anatomage Table), “[t]he Anatomage Table based education is proven to be effective. Growing publications show improved test scores, more efficient class and lab sessions, and student acceptance.” This is so because “[t]he accurate details and rich content draw students’ interest and attention leading to more effective education outcomes,” but especially permit the medical students’ interaction both with seemingly pathology-free (digital) cadavers and with “different anatomical variations and a large number of pathological variations.” The former type of interaction entails exposure to “young and well preserved digital cadavers instead of aged and degenerated bodies.” Yet, the claim begs assessing the Anatomage Table both against the history of modern western anatomy since Andreas Vesalius’s *De humani corporis fabrica libri septem* (1543) and against our contemporary culture of youthfulness and ageism. Vesalius sought to teach a commonsensical rule for cadaver selection for dissection: “It is desirable that the body employed for public dissection be as normal as possible according to its sex and of medium age, so that you may compare other bodies to it, as if to the statue of Policletus” (qtd. in Harcourt 28) – the “most rigorously ‘normative’ of all antique statues” (Harcourt 42). Vesalius thus introduced a normative principle that subsequent generations of anatomists would further elaborate. Bernhard Albinus stated, in his *Tabulae sceleti et musculorum corporis hominis* (1747): “skeletons differ from one another, not only as to the age, sex, stature and perfection of the bones, but likewise in the marks of strength, beauty and make of the whole”; since Albinus wished “to shew an example of nature,” he “chused to take it from the best pattern of nature,” which for him meant presenting a skeleton “of the male sex, of a middle stature, and very well proportioned; of the most perfect kind, without any blemish or deformity” (qtd. in Daston, Galison 90). In the 1770s, Felice Fontana, the first director of Florence’s La Specola, also articulated the aesthetic programme of its anatomical ceroplastics as

¹⁶ I.e., “locat[ing] in [the text] the permanent possibility that it might go off in multiple directions” (Kirby 53).

idealisation/normalisation: “The interest of the Royal museum demands that the defects be removed and that the works be perfect” in order to obliterate the cadaver’s repugnance (qtd. in Ballestriero 227).

To revert to the Anatomage Table, the history of its digital data would explain cross-culturally the modestly covered digital male specimen (B.S. Chung et al., “Virtual Dissection Table” 442, Fig. 3), highly unusual in anatomical images, whether digital or analogue. B.S. Chung et al. explain: “Anatomage company [*sic*] protected the privacy of the original subject. The developers modified the facial appearance of the subject and hid the external genitalia with a virtual towel. These virtues would help the users study anatomy with less discomfort” (443),¹⁷ i.e., modified facial appearance for anonymisation; covered genitals for non-embarrassment (only?). The article ignores the female data set, then under construction (444).¹⁸ Notwithstanding, the implicit dissymmetry of the article’s explanation, as well as the actual dissymmetry of Anatomage Table *demonstrations* in the West (covered Korean male¹⁹ vs. uncovered Caucasian female²⁰), I contend, tacitly endorses and encourages male voyeurism of women (images) as traditionally encoded in the Venus representation of both pictorial and anatomical models.

In the footsteps of Lyotard, Scott Lash argued, in 2002, the “profound implications for knowledge and ideology” (Nettleton, “Emergence” 674) of technological means of knowledge distribution. As *discursive knowledge*, which “implies a set of beliefs, values, and theoretical underpinnings” (Nettleton 674), comparable with Lyotard’s modern science, is “displaced by ... *informational knowledge*” (Nettleton 674), we are faced with a type of knowledge that is “outside of a systematic conceptual framework” (Lash, qtd. in Nettleton 674), comparable with Lyotard’s postmodern science. Does the Anatomage Table appear to carve a novel conceptual framework unto itself, despite its digimodernist (web 2.0) dimension, which allows user ‘creativity’ of new models based on personal input?

Conclusion

Pace Lyotard, grand narratives have not yet seen their demise (West 5; Malpas 40-41; Braidotti 65; Sim 119). Nonetheless, as Beer argues, grand narratives may [be] “not necessarily authoritarian or reactionary in the stories they tell,” but rather “a valuable thought-resource” (7). As grand narratives “have a way

¹⁷ In the age of *Playboy*, porn video chat and films, can seeing/studying genitalia discomfit anatomy students? Indeed, the Anatomage Table is also purchased by schools (Anatomage Table 7 Brochure 14), yet studying anatomy is not about culturally induced sexual embarrassment or titillation.

¹⁸ The female Korean also has a virtual towel (Anatomage Table 7 Brochure 6-7; cf. 11).

¹⁹ Yet also covered Korean male and female vs. uncovered Caucasian male (“What’s New in Table 5” 00:11).

²⁰ Anatomage Table: Stanford Anatomy.

of transforming themselves and swerving back into place however often they are set aside,” “the grounding narratives that are invisible to us now” truly beg attention, for they “are the ones that most control us, as we ventriloquize them” (Beer 7; see also Jameson xii).

Do the Visible Human projects and the Anatomage Table remediate and reform paper-based forms of anatomic representation other than technologically? Furthermore, do they constitute a new scientific game of anatomic knowledge, with altogether new rules, or do they just move technologically forward in the game²¹ of progressively subtler anatomic visualisation – of *modern*, not postmodern, science, which legitimates itself implicitly through the grand narrative of knowledge qua emancipation?

Indeed, one master narrative that is demonstrably left in place, as critique of the sciences – and here of biomedical visualisations – shows, is one not even named as such, or anyway not by Lyotard and his likes: the patriarchal narrative of *en-gendering* (de Lauretis 38) knowledge as masculine, i.e., the differential generation of ideas, (meta-)cognitive models, etc. along gender lines.²² My own previous investigation of biomedical visual representation from the sixteenth- to the twenty-first century also suggests the en-gendering of human anatomical models: human iconicity is male by default, hence an instance of what de Lauretis (32-8) calls *en-gendering violence* [of representation].

Furthermore, is the informatisation of knowledge underpinning contemporary science (particularly biomedicine) one worth suspecting, as Lyotard does in *The Postmodern Condition*, but especially in *The Inhuman*, of giving pride of place to “the inhuman” without and within, e.g. through the “splitting of viewpoint” of “cyborg vision”? However, both the explicit and the implicit choices of specimen genders in my case studies reinforce the traditional default identification of the human body as male. Does this indicate biomedicine’s “complicitous critique” (Hutcheon 2-4) of grand narratives, or rather unabashed participation in them, if by remediating old topoi and occasionally entwining edutainment with gross consumerism? This paper hopes not so much to answer such questions as to raise them metaepistemically.

²¹ “[T]here are two different kinds of ‘progress’ in knowledge: one corresponds to a new move (a new argument) within the established rules; the other, to the invention of new rules, in other words, a change to a new game” (Lyotard, *PC* 43).

²² The research of Evelyn Fox Keller, Sandra Harding and Donna Haraway has “uncovered the extent to which the embedded narratives of gender, and related categories, control what is sought and what is found, in science as elsewhere” (Beer 7).

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