

Genetic information as part of the “Great Chain of Being”¹

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Abstract

The article investigates discourse traditions of key-metaphors in popular accounts of genetics, such as those of genes or cells as *selfish replicators*, or of selection as a *self-propelling agent* or *prime mover* of evolution. Such agentive metaphors recall folk theories of heredity in terms of *blood relations* and *blood lineage*, which informed racist Nazi ideology in the 20th century but which can be traced back further to the theory of blood as one of the four “humours” in pre-modern thought. It is argued that, like the “blood myth” of heredity, the agentive metaphors of modern popular genetics have their origins in the ancient theory tradition of the “Great Chain of Being”, which helped to shape Western philosophy and which has been found by cognitive researchers to be still present today in the form of idioms and public language use.

Gegenstand dieses Artikels sind die Diskurstraditionen, auf welchen Schlüsselmetaphern populärwissenschaftlicher Darstellungen zur Genetik und ‚Gentechnologie‘ beruhen, z.B. Beschreibungen von Genen als *egoistisch handelnden* Wesen oder der natürlichen Auslese insgesamt als *Akteur* oder *Beweger* der Evolution. Diese Metaphern erinnern stark an vorwissenschaftliche Vorstellungen von Vererbung als *Blutsverwandtschaft*. Die Theorie von Blut als Erbräger spielte eine prominente Funktion in der NS-Ideologie, sie lässt sich aber bis hin zur antiken „Säfte“-Lehre zurückverfolgen. Es wird die Hypothese entwickelt, dass sowohl der „Blut“-Mythos der Vererbung als auch die *Handlungs*-Metaphern populärerer Genetik-Darstellungen dem Kontext der Theorien einer „Kette des Seins“ (*Great Chain of Being*) zuzuordnen sind. Dieser bis in die Antike zurück gehende Theoriekomplex war nicht nur von enormer Bedeutung in der westlichen Philosophiegeschichte, sondern liegt auch, wie kognitive Forschungen gezeigt haben, in Form von Idiomem und konzeptuellen Metaphern modernem Sprachgebrauch zugrunde.

1. Introduction

“In sexually reproducing species, the individual is too large and too temporary a genetic unit to qualify as a significant unit of natural selection. [...] *The genes are not destroyed [...], they merely change partners and march on. Of course they march on. That is their business.* They are the replicators and we are their survival machines” (Dawkins 1989:34-35, italics A.M.).

Almost thirty years ago (first edition: 1976), Richard Dawkins introduced his notion of the “Selfish Gene” that takes the centre stage in his theory of evolution. He presents genes as *moving* (“marching on”) and intentionally *acting* entities that are cunning and full of foresight. However, as Dawkins himself points out on several occasions in his book, this way of talking about genes *as if* they were purpose- and resourceful agents – *replicators* – is nothing but a shorthand expression for statistical distributions of genes (as evidenced by the size of the populations of their “survival machines”). The following quotation is representative of this conscious use of metaphor:

¹ I am indebted to Bettina Ziegler for making several of the historical texts quoted here available in electronic form.

“Polar bear genes can safely predict that the future of their unborn survival machines is going to be a cold one. *They do not think of it as a prophecy, they do not think at all:* they just build in a thick coat of hair, because that is what they have always done before in previous bodies, and that is why they still exist in the gene pool” (Dawkins 1989:55, italics A.M.).

Despite such disclaimers, Dawkins has had to defend himself against critics who accused him of propagating an anthropomorphic perspective on genes.² Dawkins’ main defence is that he is open about his use of simile and metaphor, and that he often ‘translates’ his talk about genes *predicting* or *doing* something into statements about statistical, computer-based calculations of real or probable outcomes of evolutionary processes. Technical “gene language” may, he concedes, become “a bit tedious, and for brevity and vividness” it may be best to “lapse into metaphor” – but, he assures us, “we shall always keep a sceptical eye on our metaphors” (Dawkins 1989:45).

Likewise, Steve Jones, in his introduction to the history of modern genetics under the title *The Language of the Genes*, explicitly introduces his main metaphor: in his view, inheritance is “a discourse through time” that “has a vocabulary – the genes themselves – a grammar, the way in which the information is arranged, and a literature, the thousands of instructions needed to make a human being” (Jones 2000:XII).³ Here, the genes are not presented as agents but as parts of a “discourse through time” – Jones leaves it open who the author of that discourse is supposed to be. In some cases, however, the genes become *agents* for Jones, too, although he seems not entirely at ease with the image. Thus, he asserts that “if we use the (rather dubious) metaphor that every gene acts in its own interests, it pays those that come from the father to extract as much as possible from the mother in which they find themselves” (Jones 2000:157), but later in his book he uses the agentive metaphor for genes without criticism on several further occasions (Jones 2000:191, 234, 244). He also introduces his readers to embryonic stem cells as *secondary agents* of genetic technology, which “when injected into another developing embryo, *are happy to develop* into blood cells, nerves and so on; or, *if they find themselves in the right place*, into the precursors of sperm or egg” (Jones 2000:295-296, italics A.M.).⁴ It is obvious to any well-meaning reader that expressions, such as *being happy*

² Cf. Midgley (1979), Dawkins (1989:278, 1999:180).

³ Jones is not – nor does he claim to be – the inventor of *language* metaphors in genetics, which have played a major role in the modern public debate about biotechnology and genetic research in general for some time; for detailed analyses cf. Nerlich/Dingwall/Clarke (2002) and Hellsten (2002:82-91).

⁴ As regards “cells” as selfish agents, it is not genetics but the metaphors of illnesses, specifically, of malignant tumours, that have provided a good breeding ground; thus Susan Sontag already recorded statements that “cancer cells *do not simply multiply; they are ‘invasive’*”, that they “‘colonize’ from the original tumor to far

with, finding oneself in the right place, are lexicalized idioms that do not imply agency in the human sense – but what do they then imply? What is the status of the metaphors of *agents* or *selfish replicators* in narratives of genetic research? This article will sketch some aspects of the European discourse traditions that these metaphors belong to.

2. Is blood thicker than genes?

When Dawkins speaks of heredity with least metaphorical emphasis, he defines the gene as “any portion of chromosomal material that potentially lasts for enough generations to serve as a unit of natural selection” (Dawkins 1989:28). Such a definition has become possible only after the scientific identification of chromosomes in sperm and egg cells as the carriers of genetic information. Today, of course, the term *gene* has entered common parlance but we also still speak of kinship relations as *being of* or *sharing the same blood*, *blood relations* or *of noble blood* (*Encarta World English Dictionary* 1999:196), or of *blood being thicker than water* (meaning that kinship bonds are stronger than any other relationships). These are the terminological remnants of theories of heredity that predate the scientific discoveries made since the Enlightenment. Up until the Renaissance, blood was considered in European traditions to be one of the *four humours* (together with *Melancholy*, *Phlegm* and *Choler*), which were in correspondence with the elements (in the case of *Blood: Air*), of which the world was made (Tillyard 1982:76). The humours were viewed as “the life-giving moisture” that was carried through the veins from the liver to the heart, and thence, refined, to the brain, and their specific mixture determined human temperament and character (Tillyard 1982:77). In Shakespeare’s *Julius Caesar*, for instance, Brutus is praised by Antony for having “elements So mix’d in him, that Nature might stand up And say to all the world”, “This was a man!” (*Julius Caesar*, V, 2:73-75).

As regards the specific symbolism of blood, one of Shakespeare’s ‘bloodiest’ history dramas, *Richard III*, provides a host of examples. Right at the start, the Duke of Gloucester’s presence draws his dead victim’s, Henry VI, blood as a symptom of his, Richard’s, guilt (*Richard III*, I, 2:59). Another group of Richard’s victims who are led to their execution bemoan their own “guiltless blood” (III, 3:14), and when Richard usurps the throne, his accomplice, Buckingham, justifies the action as the only proper way to continue “the lineal glory” of the

sites in the body”, and that even after treatment “rogue cells [...] eventually *regroup and mount a new assault* on the organism” (Sontag 1978:63-64, italics A.M.).

House of York “successively from blood to blood” (III, 7:120, 134). Here we find the main attributes of blood in the pre-scientific world-view united, i.e. its ‘capability’ to reveal the identity of a murderer, its representation of the moral status of a person and the function of establishing heredity. The symbolical-cum-magical characteristics of blood were part of a larger system of conceptual metaphors, which has been analyzed in detail in the “History of Ideas” research tradition as *The Great Chain of Being*. In his classic analysis under this very title, A.O. Lovejoy (1936) described the *Great Chain* concept as a Neo-Platonist fusion of three principles inherited from ancient philosophy, i.e. the principles of plenitude, continuity and gradation of all beings in the universe (1936:47-63). From Neo-Platonism, this set of principles “passed over into that complex of preconceptions which shaped the theology and the cosmology of medieval Christendom” (1936:67).

It was during the ‘classical’ stages of the *Great Chain of Being* worldview, i.e. during the Middle Ages and the Renaissance, that the doctrine of the four humours and specifically that of blood as a life-force and carrier of heredity, enjoyed greatest prominence. The reason for its importance was the central position of humans, and thus also of the human body, in the *Chain of Being*: “man [was] the nodal point, and his double nature, though the source of internal conflict, had the unique function of binding together *all* creation, of bridging the cosmic chasm, that between matter and spirit” (Tillyard 1982:73).

As one of the four humours that sustained the life in the body, blood was an essential “link in the chain” (Tillyard 1982:77). Heredity, conceptualised as blood lineage, was linked to the principle of continuity, in terms of genetic ‘lineage’ through time, as well as to that of gradation, in terms of the hierarchy of ‘noble’ and ‘less noble’ blood, as shown in the examples from *Richard III* quoted above.⁵ In combination, these principles had the potential to form a new concept, i.e. that of *evolution* over time as *progress*. The *Great Chain* now became “temporalized” as a “program of nature, which [was] being carried out gradually and exceedingly slowly in cosmic history” (Lovejoy 1936:244). The French philosopher Charles Bonnet, in his *Palingénésie philosophique, ou Idées sur l’état passé et sur l’état futur des êtres vivans*, of 1770, for instance, was “sure that the sequence of epochs, and accordingly of organic types, constitutes a progress from lower to higher” (Lovejoy 1936:285). When

⁵ It is, however, significant that in Shakespeare’s play the concept of “the lineal glory” of the royal blood is applied to the usurper-king Richard III by his accomplice (and later victim), Buckingham. Richard is, in terms of both social and (pre-scientifically defined) physical gradation, of *noble blood*, but he is not “noble” in any moral sense. His *blood*-based claim to the throne is denounced as pretence, on account of his numerous acts of treason and murder. The endorsement by Buckingham is thus shown to be transparent propagandistic trick.

applied to notions of *blood lineage* and to the dichotomy of *common vs. noble blood*, the temporalized, evolutionary notion of the *Great Chain* could now be conceived of as the progress or refinement from lesser to more *noble blood*.

Over the past decades, cognitive research has established that the *Great Chain of Being* metaphor complex was by no means confined to ‘high’ culture, i.e. explicit philosophical and poetic formulations, nor did it vanish together with pre-scientific theories during or after the Enlightenment. In the form of idioms and proverbs, in everyday discourse and folk-theories, it is still with us. It exists both in a specifically Western “extended” version spanning the whole cosmos, and in a (possibly universal) “basic” version that focuses on “the relation of human beings to ‘lower’ forms of existence” and provides an unconscious model “indispensable to our understanding of ourselves, our world, and our language”.⁶

It thus comes as no surprise that those folk-theories that link blood with kinship and heredity have continued to inform idioms and everyday discourse despite the demise of the theory of the “four humours”. It was only at the turn of the 20th century that the “blood myth” of heredity, i.e. the belief that an offspring’s blood contained a mix of the parents’ blood, and with it their genetic inheritance, was falsified by the founder of Eugenics, Francis Galton (1822-1911), through an experiment of blood transfusion between rabbits (Jones 2000:39). However, during the first decades of the 20th century, despite experiments such as Galton’s and despite the (slowly) growing awareness of Gregor Mendel’s (1822-1884) laws of heredity, the blood myth lost little of its appeal. Instead, it reached its most notorious and sinister application in Nazi ideology and its implementation from 1933 to 1945. The myth and metaphor of *blood* as the carrier of biological and cultural inheritance played a central role not only in their own version of eugenics, which led to the mass murder and mass sterilization of people with hereditary handicaps, but also in their general view of mankind, which was based on the concept of a global hierarchy of human “races”. In the first volume of his book, *Mein Kampf*, which was published in 1925, Adolf Hitler had presented a fully elaborated, systematic account of human racial heredity and hierarchy in terms of the blood myth:

“[...] so wenig [die Natur] aber schon eine Paarung von schwächeren Einzelwesen mit stärkeren wünscht, soviel weniger noch die Verschmelzung von höherer Rasse mit niederer, da ja andernfalls ihre ganze sonstige, vielleicht jahrhunderttausendelange *Arbeit der Höherzüchtung mit einem Schlage wieder hinfällig wäre*. Die geschichtliche Erfahrung [...] zeigt in erschreckender Deutlichkeit, dass bei jeder *Blutsvermischung des Ariers mit niedrigeren Völkern*

⁶ Lakoff/Turner (1989:167). Cf. also Kövecses (2002:124-127).

das Ende des Kulturträgers herauskam. [...] Das Ergebnis jeder *Rassenkreuzung* ist also, ganz kurz gesagt, immer folgendes: a) Niedersenkung des Niveaus der höheren Rasse, b) körperlicher und geistiger Rückgang und damit der Beginn eines, wenn auch langsam, doch sicher fortschreitenden *Siechtums*“ (Hitler 1933:313-314, italics A.M.).

[Even less than any mating between weaker and stronger individuals does Nature desire the blending of a higher with a lower race; for, if she did, *her whole work of higher breeding, over perhaps hundreds of thousands of years, might be ruined in one fell swoop*. Historical experience [...] shows with terrifying clarity that in *every mingling of Aryan blood with that of lower peoples* the result was the end of the bearers of culture. [...] In short, the result of any *mixing of races* is therefore always the following: a) Lowering of the level of the higher race; b) Physical and intellectual regression and hence the beginning of a slowly but surely progressing *sickness*.]⁷

„Die *Blutsvermischung* und das *dadurch bedingte Senken des Rassenniveaus* ist die alleinige Ursache des Absterbens alter Kulturen; denn die Menschen gehen nicht an verlorenen Kriegen zugrunde, sondern am Verlust *jener Widerstandskraft, die nur dem reinen Blute zu eigen ist*“ (Hitler 1933:324, italics A.M.).

[*Blood mixture and the resultant drop in the racial level* is the sole cause of the demise of old cultures; for men do not perish as a result of lost wars, but by the loss of that *force of resistance which is contained only in pure blood*.]

„Er *vergiftet das Blut der anderen*, wahrt aber sein eigenes. Der Jude heiratet fast nie eine Christin, sondern der Christ die Jüdin. *Die Bastarde schlagen aber dennoch nach der jüdischen Seite aus*“ (Hitler 1933:324, italics A.M.).

[He *poisons the blood of others*, but preserves his own. The Jew almost never marries a Christian woman; it is the Christian who marries a Jewess. *Yet, the bastards take after the Jewish side*.]

In these passages, the genetic blood myth is integrated into a complex, multi-scope “blended space” (Fauconnier/Turner 2002:131) of source and target concepts. In the first place, two source concepts – one from the domains of heredity/breeding, the other from medicine, i.e. the ‘mixing of blood’ and ‘blood poisoning’ –, are blended in order to suggest a causal link between ‘inter-racial’ mixed marriage and a dangerous disease of the members of the supposedly ‘higher’ race. Such a link would not pass as an accurate account even in terms of a pre-Mendelian concept of heredity. Biologically, ‘blood mixture’ in the sense of mixed heredity and ‘blood poisoning’ have got nothing to do with each other. Furthermore, the biological category of ‘race’ is blended with the notion of cultural differences. As culture is usually regarded as a socially acquired faculty or achievement, such a connection would suggest a ‘Social Lamarckian’ perspective of the heredity of acquired characteristics. Hitler, however, saw culture as an innate quality of human “races”, of which he distinguished three types: ‘founders of culture’ (= Aryans), ‘bearers of culture’ and ‘destroyers of culture’

⁷ The translations of this and all following quotations from *Mein Kampf* are based on the Manheim translation of 1943 (= Hitler 1992) but include modifications by me, A.M.

(“Kulturbegründer, Kulturträger und Kulturzerstörer“, Hitler 1933:318). This blend is presented in the form of a scenario of mortal combat: the culturally creative “high” Aryan race and the allegedly destructive – hence, “low” – Jewish “races” are depicted as individuals, one with good, the other with poisonous *blood*, which fight each other to the point of the complete extinction of one of the opponents. In this scenario, any ‘mixing of blood’ between the adversaries works to the disadvantage of the Aryans, i.e. it ‘lowers’ their blood.

The same basic combat scenario holds for the further concepts that Hitler connects with the genetic “blood myth” in *Mein Kampf*, i.e. the characterization of “the Jew” as a parasitic *eternal leech*, sucking blood from the body of the German nation (“Blutegel”, Hitler 1933:338), and, following popular mythology, its demonic personification as a *vampire* (“Vampir”, Hitler 1933:358). Strictly speaking, the imagined *blood sucking* (whether by the leech or its mythological relative) is completely unlikely to effect a *blood mix* on the part of the victim, but this conceptual inconsistency at the level of the source input again does not impede the rhetorical effect of reinforcing the basic racist idea that contact of any kind between the blood of higher and that of lower races would lead to a catastrophic *dilution* and *poisoning* of the higher blood.

In this dramatic scenario, blood is the *carrier* of genetic information and the *competitors* are the (personified) races. The chief *agent*, however, the ‘prime mover’, is “Nature”, as the first of the above quoted passages from *Mein Kampf* already announces. Nature is seen as a universal, anonymous and, in principle, impartial authority. Hitler does not even shy away from considering the theoretical possibility that this super-human power might not be on the side of what he considers to be the high(est) race, i.e. the “Aryans”, but on the side of the enemies:

„Siegt der Jude [...] über die Völker dieser Welt, dann wird seine Krone der Totenkranz der Menschheit sein, dann wird dieser Planet wieder wie einst vor Jahrmillionen menschenleer durch den Äther ziehen. *Die ewige Natur rächt unerbittlich die Übertretung ihrer Gebote*“ (Hitler 1933:69-70, italics A.M.).

[If the Jew is victorious over the other peoples of this world, his crown will be the funeral wreath of humanity and this planet will, as it did millions of years ago, move through the ether devoid of humans. *Eternal Nature inexorably avenges the infringements of her commands.*] ⁸

⁸ Hitler even drew the conclusion that any people that was oblivious of or unwilling to obey nature’s “inexorable” commands had no place on earth: “Wenn ein Volk die ihm von der Natur gegebenen und in seinem Blute wurzelnden Eigenschaften seines Wesens nicht mehr achten will, hat es kein Recht mehr zur Klage über den Verlust seines irdischen Daseins“ (Hitler 1933: 359). [If a people no longer wants to respect its essential qualities that Nature has given it and which root in its blood, it has no further right to complain over the loss of its earthly existence.]

However, despite the grammatical ‘realis’ form of this conditional statement (“If the Jew *is* victorious ..., his crown *will be*...”), the hypothetical victory of the ‘lower’ race serves only as a worst case scenario. As we can conclude from the first of the passages quoted above, Hitler deemed himself to be sufficiently acquainted with *Nature’s* ‘true’ purpose to know that she would not ruin ‘her whole work of higher breeding’. *Nature* follows an *aristocratic principle* (“aristokratische[s] Prinzip der Natur“) that favours strong races and ‘makes life difficult’ for the weak ones, i.e. effectively eliminates them in the long run (Hitler, 1933: 69, 313). Hitler’s own policies were meant to be the fulfilment of this *will of nature for the breeding of higher life-forms* (“Wille der Natur zur Höherzüchtung des Lebens überhaupt“, Hitler 1933:311).

Hitler could build on long-standing, powerful ideological traditions of racist, specifically anti-Semitic, thought and discourse that had gained particular prominence in the second half of the 19th and the first decades of the 20th centuries (Friedländer 1998:80-95), but this does not explain fully the ‘compelling conceptual force’ (Fest 1973:295) of his racist notion of blood heritage. What makes the blood metaphor central to Nazi ideology is its integration into a tightly knit system of conceptual metaphors that depict nations as (human) *bodies*. This basic mapping underlies Hitler’s whole theory of *Nation and Race* (“Volk und Rasse”: the title of the relevant chapter, i.e. chapter 11 in volume I of *Mein Kampf*). As part of a larger, both physically and mentally distinct, race, each nation has a *body* (“Volkskörper”) of its own. This body can be *healthy* (“gesund”) or suffer from a *disease* (“Krankheit”), e.g. *pestilence* (“Pest”, Verpestung), *poisoning* (“Vergiftung”), or *infestation by parasites* (“Parasiten”, “Bazillen”, “Schmarotzer”), which may even lead to its *death* (“Verlust seines irdischen Daseins”).⁹ Within this conceptual network, blood – the supposed biological manifestation of race – plays a central role as the ‘life force’ that sustains the national organism and guarantees the unbroken line of biological and cultural heritage.

The most “mystical” and also mystifying but no less vicious version of this blood myth was propagated by the chief Nazi ideologue, Alfred Rosenberg,¹⁰ in his book *The Myth of the 20th*

⁹ Cf. Hitler (1933:333-362); for analyses cf. Schmitz-Berning (1998:460-464), Hawkins (2001:44-47).

¹⁰ Rosenberg was in charge of the office for supervision of the intellectual and ideological education of the NSDAP. During World War II, he became the Führer’s Representative for Safeguarding National Socialist ideology and minister for the Administration of the occupied Eastern territories, for which he was charged and executed at the Nuremberg war crimes tribunal (Bärsch 2002:198-201). Even though Hitler is reported to have ridiculed some aspects of *The Myth of the 20th century* (Fest 1973:202, 732) and although Rosenberg lost out in many power struggles against Goebbels (Friedländer 1998:132-133), his impact on shaping Nazi ideology can hardly be overstated.

century (*Der Mythos des 20. Jahrhunderts*), first published in 1930. In it he systematically developed the idea of history as a series of *battles between race and race, blood and blood*:

„Das Blut, welches [im 1. Weltkrieg] starb, beginnt lebendig zu werden. [...] Geschichte und Zukunftsaufgabe bedeuten nicht mehr Kampf von Klasse gegen Klasse, nicht mehr Ringen zwischen Kirchendogma und Dogma, *sondern die Auseinandersetzung zwischen Blut und Blut, Rasse und Rasse, Volk und Volk*“ (Rosenberg 1930:1-2, italics A.M.).

[The blood (i.e. the generation) that died in World War I is coming back to life. Both the meaning of history and our task for the future are to be found not longer in the fight of one social class against another class, or that between church dogma and other dogmas but in *the conflict between blood and blood, race and race, nation against nation.*]¹¹

For Rosenberg, the central part of his new mythology was to be a ‘religion of the blood’, and the history of this ‘religion’ was the *great world story of the rise and fall of the nations* (“die Geschichte der Religion des Blutes aber ist [...] die große Welterzählung vom Aufstieg und Untergang der Völker”, Rosenberg 1930:23). Part of this new religion was to be the cult of the ‘Nordic blood’, which represented the ‘mystery that had replaced and conquered the old sacraments of Christianity’ (“der [...] Glaube, daß das nordische Blut jenes Mysterium darstellt, welches die alten Sakramente ersetzt und überwunden hat”, Rosenberg 1930:114). He openly advertised the mythological status of his ideological construct by praising ‘the new but also old blood myth’ (“dieser neue und doch alte Blutmythus”) that he wanted to foster in the German national soul (“Volksseele”, Rosenberg 1930:698). Like Hitler, Rosenberg linked the blood myth to the idea of racial hierarchy as the ‘eternal law of nature’ („ewige Naturgesetzlichkeit”, Rosenberg 1930:598), and he, too, portrayed the Jews as an ‘incredibly tough blood community’ (“Blutsgemeinschaft von unglaublicher Zähigkeit”, Rosenberg 1930:463), whose sole purpose in life was the parasitic exploitation of others (“jüdische[s] Schmarotzertum”, Rosenberg 1930:463). He and Hitler may have differed in their emphasis on the pseudo-religious justification of a racial hierarchy, especially as regards Rosenberg’s allusions to the transubstantiation of wine and blood in the Christian Eucharist,¹² but the underlying metaphor scenario was the same. Humanity was differentiated hierarchically into biologically and culturally distinct races that passed on their heritage in the blood and were in constant war with each other. The “Aryan” or “Nordic” race occupied the highest, Jews the

¹¹ This and the following translations from Rosenberg (1930) by A.M.

¹² For an analysis of Rosenberg’s claims to have founded a new ‘religion of blood’, which built on and transcended the tradition of the “mysterium fidei” (i.e. the transubstantiation of consecrated wine into Christ’s blood in the Eucharist), cf. Bärsch (2002:208-223, 355-358). Whilst acknowledging minor differences in detail, Bärsch emphasizes the parallels in Hitler and Rosenberg’s versions of Nazi ideology as a ‘political religion’ on the grounds that both were based on the notion of the fundamental conflict of the ‘god-like’ Aryan and ‘Satanic’ Jewish races (Bärsch 2002:270, 310, 318, 320, 348-349).

lowest rank, respectively. The latter were seen as *parasites*, which all other races and cultures, and especially the German people, had to fight and eliminate, both as individuals and as a whole *bloodline*. After 1933, these ideological tenets were converted into law, as in the ‘law for the protection of German blood’ (“Gesetz zum Schutze des deutschen Blutes”) of 1935, which outlawed marriage and any sexual contacts between “Aryans” and the supposed carriers of ‘Jewish blood’ (Friedländer 1998:148-164). Soon the *blood = race* definitions entered school textbooks and popular encyclopedias,¹³ to prepare the general public for the ‘elimination of the Jewish race from the nation and the state’ (“Ausscheidung der jüd. Rasse aus Volk und Staat”, *Knaurs Lexikon* 1938:682), which set the stage for the Holocaust.

The deliberate mystification and instrumentalization of the genetic blood myth for the purposes of racist stigmatization, as developed in Nazi ideology, is communicatively as well as politically a different matter from the use of semantically bleached expressions such as *blood relations* or other *body*-related analogies from the *Great Chain of Being* in everyday discourse.¹⁴ When employing expressions such as *noble blood*, *bad blood*, etc. these days, no competent adult speaker assumes that the evaluative attributes of ‘blood’ have anything but their conventional figurative meaning. Nonetheless, such idioms are evidence of conceptual continuities that reach back to the traditions of the *four humours* theory as part of the *Great Chain of Being* complex; and the Nazi *blood/race* myth is a part of that continuum. Both Lovejoy (1936) and Tillyard (whose book, *The Elizabethan World Picture*, first appeared in 1943) did hint at a connection between the *Great Chain of Being* tradition of thinking in terms of correspondences between “micro”- and “macrocosmos” and the *blood/race* mythologies of their day. Lovejoy saw the gradation principle of the *Great Chain* in 19th-20th century thinking perverted into a “kind of collective vanity”, the “tragic outcome” of which had “been seen, and experienced, by all of us in our own time”; and he held one strand of (German) Romanticism, as the “belief in the sanctity of one’s idiosyncrasy”, responsible for this distortion (1936:313).¹⁵ Tillyard, in turn, warned explicitly against the naïve belief that the

¹³ Cf. e.g. Schmeil/Eichler (1940:163-157) (chapter C.III.2 on the racial character of the German nation) and *Knaurs Lexikon* (1938:1295), which lists ‘differences of blood’ (“Unterschiede des Blutes”) among the defining criteria of human races, which are then used to justify the distinction between the ‘master race’ (“Herrenrasse”) and ‘lesser races’ (“nicht ebenbürtige Rassen”).

¹⁴ For further *body*-related metaphors that have links to the *Great Chain of Being* metaphor complex in present-day public discourse cf. Kövecses (2002:129-130), Musolff (2003), (2004).

¹⁵ Lovejoy did not fail to stress that this elitist version of Romanticism was “precisely opposite to the other Romantic tendency” of valuing individualities in persons and peoples (cf. 1936:312), but he still provoked an impassioned critique of his view of Romanticism as the link between the temporalized *Great Chain of Being* concept and “Hitlerism” by Spitzer (1944:200-203).

apparent exoticism of some *Great Chain of Being* formulations from the Middle Ages or the Renaissance indicated a loss of their ideological power and appeal:

“Yet we shall err grievously [...] if we imagine that the Elizabethan habit of mind is done with once and for all. If we are sincere with ourselves we must know that we have that same habit in our bosoms somewhere, queer as it may seem. And if we reflect on that habit, we may see that (in queerness though not in viciousness) it resembles certain trends of thought in central Europe, the ignoring of which by our scientifically minded intellectuals has helped not a little to bring the world into its present conflicts and distresses” (Tillyard 1982:116-117).

What separates the *Great Chain of Being* concept complex from the racist phantasms of, and genocidal implementation by, the Nazis was the latter’s implicit rejection of one of the constituent principles of the *Great Chain*, i.e. continuity, as well as the exaggeration of another one, i.e. gradation. In the classic *Great Chain of Being* there was gradation, i.e. hierarchy, too, but no absolute breaks or discontinuities between any parts of the Chain. Everything in it was connected with everything else: there were no absolute contrasts or gaps between races, species etc. Nor was anything, not the least part of creation, entirely worthless or could it be missed – in the words of Pope’s *Essay on Man*:

“Nothing is foreign: parts relate to whole;
One all-extending, all-preserving soul
Connects each being, greatest with the least;
Made beast in aid of man, and man of beast;
All served, all serving: nothing stands alone:
The chain holds on, and where it ends, unknown”
(Pope 1994:61).

By contrast, the Nazi world view including its version of the “blood myth” rested on the sharp, unbridgeable distinction between *good* and *bad blood*, *good* and *bad race* and on the necessity of a complete victory of the representatives of one over those of the other – the loser was therefore to be eliminated. In such a concept, any meaningful continuity among bloods or races was inconceivable and gradation was turned into a sharp contrast. Plenitude as the third assumption of the *Great Chain of Being* – i.e., the principle that the universe was complete and everything in it was necessary – became irrelevant in the combat scenario of Nazi ideology. The only thing that mattered for ideologues like Hitler and Rosenberg was the elimination of the carriers of the supposedly *evil blood*, in order to secure the survival of those of supposedly *noble blood*.

3. ‘Prime movers’ in the *Great Chain* and in genetics

In Hitler’s *Mein Kampf* and Rosenberg’s *Mythus*, two types of ‘agents’ are presented as dominating the course of world history. One type includes the biological-cum-cultural entities of ‘blood’ or ‘race’, which we have analysed already, the other type consists of ‘eternal nature’, which supposedly ‘avenges’ any ‘infringements of her commands’ (i.e. any ‘mingling of blood’). In modern popular accounts of genetic research, such as those presented by Dawkins and Jones, the ‘agentive’ depictions of cells and genes are also complemented by their descriptions as *tools* or *objects* of an anonymous, universal agent that shapes and determines the course natural history:

“*Natural selection favours* genes that control their survival machines in such a way that they make the best use of their environment. This includes making the best use of other survival machines, both of the same and of different species” (Dawkins 1989:66, italics A.M.).

“*The old gene-selected evolution, by making brains, provided* the ‘soup’ in which the first memes arose” (Dawkins 1989:194, italics A.M.).

“*Nature often plays the role of ‘banker’,* and individuals can therefore benefit from one another’s success” (Dawkins 1989:224, italics A.M.).

A philosophical interpreter of Dawkins’ genetic theories, Daniel C. Dennett, speaks of “the machinery *Mother Nature* has given us“ (Dennett 1995:367, italics A.M.), and Steve Jones, too, employs constructions that depict anonymous evolution in general as an *engineer* (but without a *master plan*), and of selection as its *driving force*:

“*Evolution always builds* on its weaknesses, rather than making a fresh start. *The lack of a grand plan* is what makes life so adaptable and humans – the greatest opportunists of all – such a success” (Jones 2000:299, italics A.M.).

“*Mutation is the fuel of evolution* but, as far as can be seen, *evolution rarely runs out of steam. Natural selection, though, is its engine* and, like most engines, often *speeds up and slows down* to face changing circumstances, [...] *Nature is always liable to come up* – as it has so often before – with a nasty shock” (Jones 2000:305, italics A.M.).

“*The raw material* of evolution and the power of *its prime mover* are both running out and, as a result, the rate of change is slowing down” (Jones 2000:310, italics A.M.).

Even today no popular account of genetics seems to be able to do completely without the assumption of some underlying principle that (*kick-*)*starts, moves and holds together* the evolutionary process of passing on genetic information. This principle or authority is usually an abstraction: *Nature, Evolution* or *Selection*. In terms of their status for the conceptual architecture of conceptualising evolution, these universal agents occupy a similar position to that which the allegedly ‘harsh but just’ *Eternal Nature* has in Nazi ideology, or to that which

Pope’s “all-extending, all-preserving soul” or specific deities in religious versions of the *Great Chain of Being* held. In each case, an ultimate *moving force* is invoked that transcends human nature. As in the case of the bio-agentive metaphor, it is evident that the *prime mover* metaphors in modern popular science have a wholly different import from that of their predecessors, due to the vastly different ideological contexts. Nevertheless, it is instructive to follow up some of the specific transformations of this concept.

The notion of a *prime mover* is a distant echo of the “unmoved mover” that figures prominently in Aristotle’s *Physics* as the first cause of all motion in the universe (Aristotle 2000, especially books IV, V, VIII). Aristotle’s concept of a “self-sufficient” *first mover* was not immediately compatible with classical notions of the *Great Chain of Being* (Lovejoy 1936:55). However, when integrated into Neo-Platonist and Christian world-views, it could be re-interpreted as God and/or the sphere closest to him in the universe.¹⁶ Especially since the Enlightenment, the *prime mover* could also be conceived of as an impersonal, abstract, anonymous force. In Pope’s *Essay on Man*, the beginning of the “Vast chain of being” is attributed to an unspecified “God” or an even more abstract “Universal Cause”, which “Acts to one end, but acts by various laws” (Pope 1994:51, 61). By the end of the eighteenth century, anonymized “Nature” had taken the place of the *prime mover* in the *Chain of Being*, e.g. in the writings of such diverse philosophical authors as Kant, de Maupertuis, Diderot, d’Holbach and Robinet (Lovejoy 1936:265-282).

In the case of Bonnet’s *Palingénésie* of 1770, this temporalized version of the Chain was based on the optimistic view of evolution as interminable progress: its *prime mover* is an essentially benevolent force. As the quotations from Dawkins and Jones show, this positive figure of the anonymous mover of evolution has persisted to this day, but it has also gained a competitor ever since Mary Shelley introduced the spectre of a human *mover-creator* in her novel *Frankenstein; or, The Modern Prometheus* (1818). Currently, the notion of the evolutionary *agent* figures prominently in debates about stem cell researchers, geneticists and cloning experts as *evolutionary engineers* who are *playing god* or *taking the place of god*.¹⁷ In a recent comment on a “breakthrough” of human embryo cloning at Newcastle University, Nigel Cameron, president of the Institute on Biotechnology and the Human Future at the Illinois Institute of Technology in Chicago, warned against the dangers of scientists “mass-

¹⁶ In medieval cosmology, the *primum mobile* was the highest of the nine spheres of the heavens, governed by the highest rank of Angels, the *Seraphs*; cf. Tillyard (1982:49).

¹⁷ Cf. Hellsten (2000:218-219), Jones (2000:286-298).

manufacturing embryos to generate the stem cells”, which might herald a “Brave New World of embryo research and cloning” (*The Guardian*, 21 May 2005). The non-religious alternative to a deity as the *first mover* of the temporalized *Chain of Being* is thus twofold: either it is an abstract, universal subject, e.g. Evolution, Nature, Selection or it is represented by particular human beings (as groups or individuals) who fulfil the role of *genetic engineers*. Either way, in order to be able to conceive of and speak about a *beginning* of evolution, we seem to need to presuppose the existence of a *beginner*. At this general level of conceptualization of evolution as a kind of *movement* that implies some notion of a *mover*, the metaphorization of genetics appears to be inescapable and also relatively innocuous. On the other hand, we cannot just ignore the fact that our present-day folk-theories and formulations are not created from scratch but form part of socio-historically situated discourse traditions. Some of these traditions may be ancient and venerable, such as those of the philosophical discussions that furnished the intellectual background of the *Great Chain of Being* metaphor complex. Other discourse contexts, however, which feed on the same ancient traditions, provide a shocking counterfoil, such as Nazi ideology.

4. Conclusions

In a way, we can construe another *Chain*, i.e. that of the survival and evolution of the *Great Chain of Being* complex itself. According to Lovejoy and Tillyard, this set of conceptual metaphors had its origins in antiquity, but it reaches into present-day idioms, folk theories and popular science. The instrumentalization of aspects of this complex in Nazi discourse is an integral part of that discursive chain, which is why Lovejoy and Tillyard saw fit to warn their readers of contemporary ‘perversions’ of the tradition in their day, and why even present-day authors such as Jones and Dawkins take care to explain the difference between their use of agentive metaphors of evolution and the Nazi interpretation of heredity. Dawkins, for instance, stresses that his focus on the *selfish gene* instead of individual organisms (“survival machines”) as an agent of evolution must not be confused with “speciesism” or any other speculations that evolution *works* for the supposed ‘common good’ of some collective (Dawkins 1989:10, 67-68, 163). Jones, likewise, devotes large parts of the introduction and the first chapter in *The Language of the Genes* to debunking the “blood myth” of heredity and to emphasizing the contrast between eugenicist and genetic interpretations of the concept of selection (Jones 2000:6-16, 23-35).

Despite such disclaimers, however, the textual evidence suggests that there are significant continuities that are partly motivated by the cognitive primacy and universalism of what Lakoff/Turner (1989:167) have dubbed the “basic” *Great Chain*. Most folk-theoretical world-views tacitly presume the *Great Chain* principles of gradation and continuity for commonly known “natural kinds” of organisms and inorganic entities. These conceptual metaphors of the basic *Great Chain* complex are probably linked to “primary scenes” (Grady/Johnson 2003) of bodily experience (e.g. the connection of blood with the notion of being alive) as well as to fundamental “orientational” concepts (e.g. UP-DOWN and MOVEMENT). The more specific metaphors that we have analysed, e.g. those of *blood-as-carrier-of-heredity*, *prime mover*, *Nature as an eternal law-giver* or *Mother Nature*, are, however, not as experientially obvious but are related through allusions or explicit references to explicit discourse chains based on the philosophical and poetic formulations of the specific *Great Chain of Being* tradition. Without subscribing to the methodological baggage of the traditional “History of Ideas” research, we can use some of its results to investigate the background of modern conceptualisations of evolution and heredity. The two main assumptions that underlie both the historically distant and the present-day ways of conceptualising heredity, and which also inform – albeit in an ideologically perverted and contorted form – racist discourse as exemplified by the *blood myth* and *blood religion* of the Nazis, are:

- a) the reification of a specific biological entity – blood or genes – as an agent of heredity (in Dawkins’ terminology: a *replicator*) in the sense that it has a *selfish* interest in its own preservation and reproduction;
- b) the reference to some kind of first principle or authority that provides (at least, grammatically) the ‘subject’ for statements about evolution: be it a God, a universal “prime mover”, an anonymous “all-extending, all-preserving soul”, “Nature”, or “natural selection”; or, alternatively, the quasi-deification of human agents as *engineers* that have taken over the *prime mover’s* function.

Of these reifications, the first is the most transparent and, pragmatically speaking, also the least problematic one. As we have seen, its chief modern proponent, Dawkins, goes out of his way to repeat time and again his “customary warning” (Dawkins 1989:123) that the *selfishness* or *self-interestedness* of genes as *replicators* is a shorthand expression for statistical calculations over populations of genes. The metaphor fulfils a legitimate function – especially in popular science, i.e. that of rendering a complex and highly abstract hypothesis

in a more familiar, concrete, and thus more easily accessible way. Any society or culture that does not consist exclusively of scientific experts needs such popularisations in order to disseminate new scientific hypotheses and findings. At the same time, the notion that cells or genes act “selfish” is also so provocative, bordering on the paradoxical, that it is unlikely to become too familiar too quickly: it sticks in the mind as a quirky, troublesome question. Moreover, as Daniel Dennett has argued, this provocative notion answers a specific scientific problem:

“Before Williams and Dawkins pointed to the alternative gene’s eye perspective, evolutionary theorists tended to think that it was just obvious that adaptations existed because they were good for the organisms. Now we know better. The gene-centered perspective is valuable precisely because it handles the “exceptional” cases in which the good of the organism counts for nothing, and shows how the “normal” circumstance is a derivative and exceptional regularity, not a truth of pure reason, as it seemed to be from the old perspective” (Dennett 1995:364).

The “selfish gene” perspective serves to explain the phenomenon of seeming ‘altruism’ on the part of animal organisms (Dawkins 1989:4-11, 166-188): what appears to be an altruistic or even self-destructive behaviour on the part of the individual organism makes good sense from the “gene’s eye perspective” in terms of genes’ evolutionary success. This new perspective provides a strong alternative to Social Darwinist speculations that individuals act altruistically out of some vague interest in the good of the species (or, in the racist version, in the interest of a particular race or nation). It thus avoids precisely the equivocation between biological and socio-cultural levels that the mystifications of Hitler and Rosenberg’s “blood myth” rely on.

The second reification, i.e. that of the universal agent of evolution, is more difficult to ‘deconstruct’. It lies at the centre of the *Great Chain of Being* metaphor complex: how can the *Chain*, especially in its temporalized form, be conceived if not on the assumption of some kind of *prime mover*, some ‘starting agent’? Steve Jones uses a series of quasi-paradoxical formulations to stress the fact that even though there is directed movement, i.e., *progress* in evolution, there is and has been no master plan: “Natural selection *cannot plan ahead; it acts, without foresight, taking no thought for the morrow*”; “Natural selection has *superb tactics, but no strategy*” (Jones 2000:227, 252, italics A.M.). Dawkins, in his turn, has used the figure of the *Blind Watchmaker* (Dawkins 2000) to contradict the creationist ‘argument from design’. Evolution does not need a conscious *prime designer* like the one who plans to make a watch and then builds it. Instead, the interplay of genetic mutations and changing

environmental circumstances accidentally increases the survival chances of some organisms (“survival machines”) and, with them, their genes, whilst blocking the chances of others.

Even in this paraphrasing statement, the syntactic and semantic structure of subject and verb suggest some form of agency, but hardly anybody is likely, one would wish, to misunderstand the notion of ‘genetic-environmental interplay’ to be equivalent to that of a purposeful *designer-mover*. However, Hitler and Rosenberg did do precisely that: they accorded conscious will and design to “eternal Nature” and derived from this reification their supposed mandate to carry out her “laws” and “commands”. It hardly needs reiterating the fact that this misunderstanding was deliberate, construed to justify racist prejudices and genocidal policies, which had nothing to do with scientific interest in heredity or *Great Chain*-related philosophising. Nevertheless, the case of the Nazi blood myth of heredity demonstrates that such a misunderstanding of popular reifications of biological and evolutionary processes is not just possible but can gain immense social and historical significance.

The last aspect of the above-mentioned reifications in public debates with genetics, i.e. the demigod-like position of the geneticist who *engineers evolution* and who can *read the book of life* because he understands the *language of the genes*, is a further link to long-standing traditions of thought and discourse. Classic mythology had Prometheus, modern mythology has Frankenstein, and both figures feature prominently in popular science accounts of genetics. It will be a question for another study to establish whether and in which way these traditions and their modern descendant, the *genetic engineer*, may have been connected to parts of the *Great Chain*.

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