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Boundary-work and the human-animal binary: Piltdown man, science, and the media

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Boundary-working the human-animal binary: Piltdown man, science, and the media

The infamous Piltdown hoax offers an excellent opportunity to study how a figure that straddled the human-animal boundary (both figuratively in its positioning as a ‘missing link’, and literally given its post-hoax status as a modern human skull and a modern orangutan jaw) was made to fit dichotomous understandings of it. The process of making this figure human reveals how scientific claims in the disputed border zone between humans and non-human animals are shaped by the cultural themes upon which the division stands. Nationalism, race and species classification became enmeshed in the efforts to lead Piltdown from its liminal position to more conceptually stable ground. The result was a stretching of humanness, that brought Piltdown closer to us whilst modern day ‘savages’ were moved further away. The paper’s theoretical framework shifts Gieryn’s boundary-work model from an ontology of culture to an ontology of nature. Transplanting Gieryn’s model in this way is useful not only because of the parallels specifically between the science-culture and human-animal boundaries, but also as it serves as a reminder of the strong relationship between the categorization of the social and natural worlds.

Keywords: boundary-work, human-animal boundary, media

1. Introduction

Piltdown man has the dubious honor of being perhaps the greatest scientific hoax in history, and, as such, has provoked countless investigations into the identity of the hoaxer(s), and how they managed to deceive the scientific community for so long (e.g. Wiener 1980, Blinderman 1986, Russell 2003). A modern orangutan jaw placed with a modern human skull, stained to give the appearance of age, and heralded as an ancient missing link. Announced in 1912, the find was not discredited until 1953. The whole episode has acquired the air of a fictional “whodunit?” mystery, given that more than a dozen scientists have, at one time or another, been accused of

perpetrating the fraud. However, for the social scientist Piltdown has remained an untapped resource, one which provides an illuminating opportunity to study how the boundaries of science, and of the claims made by science, are negotiated within popular culture.

Such an approach takes its cue from Gieryn's (1983, 1999) conception of "boundary-work", regarding the demarcation of science and non-science. It stems from a recognition of a disparity between numerous failed attempts to separate science from other forms of knowledge production theoretically, and the on-going separation of the two in practice that occurs every day. It seeks to address this disparity by focusing on how science is conducted "down-stream" of its actual production, in its consumption outside the laboratories and university departments from which it originates. Going beyond Latour's (1987) two-faced Janusian visage of science engaging different groups with different voices, boundary work in practice involves the deployment of multiple, contextually dependent, images of science, created with the aim of maintaining science's demarcation from wider society. Informed in part by Abbott's (1988) structural study of how professions compete with one another for jurisdiction, at the heart of Gieryn's model is a recognition that such every-day demarcations have a very tangible effect, both on how knowledge claims are treated, and how future work is supported.

Piltdown offers the opportunity to observe the negotiation of the "biocultural"¹ boundary between humans and non-human animals by scientists and journalists. The cultural importance of the human – animal boundary has already been demonstrated by writers such as Haraway, who refers to boundary straddling figures (contemporary primates in her text, Piltdown man here) as "occupying the border zones between those potent mythic poles" (1989:1) of nature and culture. Haraway seeks to escape from the nature/culture dualism, and does so by demonstrating how both 'nature' and 'culture' in any particular scientific investigation of the boundary are the culturally constructed outcome of the particular socio-political context in which the work takes place. Similar efforts to show how fluid, and culturally dependant, our ideas of what nature (and by contrast, culture) are have included investigations of hunting (Cartmill

¹ The term "biocultural" is an attempt to recognize the diverse discourses that this boundary between humans and non-human animals is built on, including as it does both biological (e.g. upright walking) and cultural (e.g. the concept of the human soul) elements. An alternative term might be "humanity boundary" as this is what is at stake. However, I do not wish to anthropocentricise the debate any more than it already has been, so I shall continue to use the more neutral "biocultural boundary".

1996), pet ownership (Franklin 1999), and anthropomorphism (Daston & Mitman 2005).

Applying Gieryn's science – culture boundary-work model to the human – animal boundary reflects the great parallels between the two. Both boundaries carry enormous practical implications, the first enabling the on-going dominance of science as *the* source of knowledge production, and the second enabling the on-going dominance of humans in relation to the natural world. As with the former, the human – animal boundary is marked by a disparity between failed theoretical attempts to clearly delineate the two whilst, at the same time, a successful division is maintained in popular culture. Traditional Judeo-Christian beliefs have helped support a rigid, distinct boundary between human and non-human animal within western culture (Thomas 1996:17-25), furthered by prominent thinkers such as Aristotle and Descartes, yet almost 150 years ago *Origin of the Species* demonstrated that humans were fundamentally connected to other animals; that rather than being uniquely created in God's own image, our ancestors were in fact non-human too. A flood of scientific research in the twentieth century, primarily into the great apes, has undercut a number of grounds on which the boundary might be maintained. Primatology research with chimpanzees has found evidence of tool use and "cultures" specific to particular groups (e.g. Kawai 1965, Whiten et al. 1999); the ability to converse in sign language has also been attributed to them (e.g. Gardner & Gardner 1975); whilst the recent chimpanzee genome project confirmed that chimps share approximately 98 per cent² of their genome with ourselves (The Chimpanzee Sequencing and Analysis Consortium 2005). Features thought to be unique to human speech have been identified in other species, such as grammatical recursion in starlings (Gentner et al. 2006). In addition, there is a growing body of science seeking to attribute personality - formerly a quality strictly reserved for those on the human side of the line - to animals as diverse as octopuses and mice (Mather and Anderson 1993, Gosling 2001). On a philosophical level too attempts are being made to challenging existing dichotomous understandings (Singer 1990, Gray 2002).

Despite this mountain of evidence suggesting that any differences that do exist are but differences of degree rather than of kind, and that the boundary as it stands

² The preciseness of such figures, which can vary by several percentage points depending on the particular genetic material being analyzed, and the methods used, must be taken with a pinch of salt (see Marks 2003). Regardless, chimpanzees share the vast majority of their genome with ourselves.

may be built on decidedly shaky ground, a strict division is still maintained in western culture. This is evidenced in our language³; in our laws; in our treatment of animals in the meat industry and in our use of them scientific testing; in countless examples of economic development being put before ecological protection. As with the science – culture divide, the maintenance of dichotomous understandings of humans *and* animals, as opposed to understandings of humans *as* animals, raises the question of how this dichotomy is preserved, and what role science plays in it.

Latour's (1993) work is useful here in highlighting just how critical the disparity between theoretical and practical divisions of nature, culture, and science are. He argues that modernity is essentially built upon a system of ontological gerrymandering, that relies on a clear theoretical separation of nature and culture whilst in practice the joining of the two is the very thing that sustains the project. This joining takes the form of hybrids, the interlinking of human and nonhuman/object, whether conceptually or physically, but this profusion of mediation is, paradoxically, only made possible by insisting that nature and culture are entirely independent of one another. To explain this paradox Latour makes a comparison with premodern societies where no such division between nature and culture exists and in fact their co-constitution is a conceptual bedrock – here the cost of allowing hybrids to propagate is simply too great, as it could threaten their entire world view. The crucial lesson that I wish to take from this is that science is dependant upon modernity's separation of human and nonhuman representations, and so not only does science help construct the nature - culture boundary, it is also constructed by it. Not only then is the inspiration for the boundary-work model – the disjuncture between theory and practice – present at the human – animal boundary, it is also, if we accept Latour's argument, fundamental to modernity, and the entire edifice of science/culture/nature. In this light, utilizing the science – culture boundary-work model is all the more appropriate.

³ Author's note: Any constructivist attempt to discuss the boundary is hampered by the assumptions implicit in our language. Humans themselves are of course animals, and yet "animal" in its common usage tends to preclude humans. As such tensions are at the heart of the discussion here, they must be acknowledged. The problem can be avoided with the unwieldy distinction "human - non-human animal", but for the sake of the text I will persevere with "humans" and "animals", asking that the reader remain aware of such issues. "Primate" will also be preferred over the more accurate "non-human primate" for the same reason.

Where science's investigations of nature meet society's folk understandings we can find overlaps, non-fits, lines criss-crossing. The case of Piltdown man places this murky boundary zone under a microscope, a moment in time when an individual animal lay on the very cusp of humanity: its jaw on one side of the boundary, its skull on the other. As such Piltdown presented a monumental challenge to traditional binary conceptions. The efforts of scientists and journalists to respond to this challenge, evidenced in contemporary journal and news media coverage, forms the subject of this paper. The consideration of the Piltdown figure's standing in relation to the human – animal boundary became subsumed within nationalist and racial discourses. British coverage of the discovery was unhesitating in declaring Piltdown to be human, but it was the figure's cultural standing, not its physical remains, that decided this. Meanwhile, so-called modern-day 'savages' were invoked in the effort to award Piltdown with humanity, bringing the figure closer to us, whilst Piltdown was simultaneously used to move them further away. Along the way, the human – animal binary became mobilized as something more complex than a simple dichotomy, but only in an implicit manner that ultimately left the binary picture intact. Elsewhere, I discuss why Piltdown's humanness took the particular form that it did (Goulden *forthcoming*), but here the focus is on how Piltdown became human in the first place.

2. Methodology

The source material for the research was contemporary scientific journal and news media coverage of the Piltdown find. The research focused on the latter primarily, as the aim was to chart negotiations of the human-animal boundary within popular culture, for which the media was used as a proxy. During the 1910s the news media in the UK began to achieve mass readership for the first time (Stevenson 1990:402). Scientific journal coverage provided a "control group" in a sense, as it showed how scientists responded to Piltdown within their own private realm, inviting comparisons between it and the media coverage in the public realm. The materials gathered were then analyzed using a form of critical discourse analysis (Fairclough 2003). Following this method, the discourses (being forms of ontological representation which shape what ever social objects they discuss) within the texts studied are read as being in a dialectical relationship with popular culture generally, that is to say they are mutually constitutive of one another.

It was first necessary to identify periods in which Piltdown was “newsworthy”. This was achieved via a search of the *Times* newspaper’s digital archive, supported by secondary sources concerned with the fraudulent nature of Piltdown (e.g. Spencer 1990, Weiner 1980). The *Times* is the only UK national paper to currently have a digital indexed archive of the period in question. From these sources two periods of heavy coverage were identified, the first being the six weeks between the leaking of the discovery in mid-November 1912 up to the end of that year, including the official announcement on December 18th, the second being August-September 1913, during which time Piltdown featured prominently at two scientific conferences. Copies of the *Manchester Guardian*, *Daily Telegraph*, *Daily Mirror*, *Daily Express* and *Illustrated London News* were then searched by hand for coverage of the Piltdown find during these dates. Although the *Manchester Guardian* was a regional paper at this time, it was chosen for inclusion because it broke the Piltdown story originally.

Coverage by the respective newspapers, and their circulation figures, is shown below-

Number of articles/letters on Piltdown (Nov-Dec 1912 & Aug-Sept 1913)

| | |
|--------------------------------|----|
| Daily Express | 8 |
| Daily Telegraph | 2 |
| Daily Mirror | 0 |
| Illustrated London News | 10 |
| Manchester Guardian | 9 |
| Times | 12 |

Circulation Figures 1910

| | |
|--------------------------------|----------|
| Daily Express | 400,000 |
| Daily Telegraph | 230,000 |
| Daily Mirror | 630,000 |
| Illustrated London News | 200,000* |
| Manchester Guardian | 40,000 |
| Times | 45,000 |

Taken from Butler (1975) *British Political Facts 1900-1975*, R&R Clark Ltd.

* estimate by The Illustrated London News Picture Library.

The *Mirror* was the only newspaper to be published in a tabloid format at this time, although the *Express* took a similar approach to content (Bromley 1997). The *Mirror* boasted the widest circulation figures of any paper during the period of study, but Piltdown did not feature at all in the time frames identified. As a result, the *Mirror* played no further part in the analysis.

Although the jaw and skull were discovered in the summer of 1912, news of the find at Piltdown was kept secret for several months for fear of compromising the security of the site. In November of that year however, before any report had appeared in a scientific journal, the news was leaked to the *Manchester Guardian* by an unknown informant. They announced the find on the 19th November with two articles on the front page⁴, under the title “*The Earliest Man?*.” Beneath this, subtitles announced “*Remarkable Discovery in Sussex – A Skull “Millions of Years” Old.*” Aside from two brief articles concerned with the wider context of the find (22nd and 23rd November), no further coverage was given to the find amongst the sampled newspapers until after the 18th December, when Piltdown was officially announced to the world at a specially convened meeting of the Geological Society. Following this meeting, all the papers in the study (excluding the *Mirror* of course) ran stories.

A search of the *Times* indexed archives suggests that little coverage was given in the media during the first seven months of 1913, aside from a couple of reports on the popularity of the skull exhibit at the British Museum (*Times* 25.2.13:10, 13.5.13:3). We can presume that this lull merely reflected the absence of any “new news” during this time, as the Dawson-Woodward team devoted their summer to further digging at the site, which was water-logged during the winter months, and other scientists spent their time appraising the Piltdown team’s original report and carrying out their own analyses from casts of the skull and jaw which were made available to interested parties in April 1913 (Spencer 1990:57). Piltdown’s second period of newsworthiness, in August-September 1913, was prompted by another two meetings, the annual International Congress of Medicine on the 11th August, and the British Association annual meeting on the 16th September. Also at this time the

⁴ “Front page” in this case means page 8 as this was the first page of the paper on which news stories appeared. Listings, adverts etc took up the first seven pages.

controversy surrounding Woodward and Keith's rival figures spilled over into the news media as various scientists argued their cases via Letters to Editor⁵.

Aside from a brief news piece in *Nature* on December 5th (Anon 1912), Piltdown man did not appear in any scientific literature until a report of the paper presented by Charles Dawson and Arthur Smith Woodward to the Geological Society was published in the 17th January 1913 edition of *Science*, two months after his debut within the popular press. A version of Dawson and Woodward's paper itself was published that March in the *Quarterly Journal of the Geological Society of London*. As in the news media, a period of quiet existed during the summer of 1913, broken by a series of "Letters to Editor" in *Nature* during August, September and November⁶.

3. The Piltdown Discovery

Piltdown man was announced to the world in 1912 by a team of scientists led by the distinguished Arthur Smith Woodward, who was at the time campaigning to become Director of the British Museum of Natural History, and Charles Dawson, an amateur geologist/archaeologist. It was Dawson who had brought Piltdown to the attention of the scientific community, when he was handed two skull fragments by workers who were digging at the site in 1908. Dawson continued to investigate and in 1912 formed a digging team with the aid of two colleagues, Woodward and de Chardin⁷. The molar tooth of a prehistoric elephant species was the first notable find, soon followed by more hominan⁸ skull fragments and a lower jaw bone. These bones were to become Piltdown man, announced to huge scientific and popular interest in December of that year. The find was sensational, essentially an anatomically modern human skull – though unusually thick – with an ape-like jaw. It was the missing link rendered physical; an individual on the cusp of humanity. Crucially, the jaw had broken off at its joint, so it was impossible to confirm how it connected with this atypical skull. For some at the time, primarily foreign scientists, the juxtaposition between the two forms was such that they were convinced that the find was the result of two different skeletons buried within the same strata becoming accidentally mixed up with one

⁵ For examples, see the *Times* 13th, 14th, 18th Aug 1913.

⁶ See *Nature* 2nd, 16th, 30th October and 6th, 13th, 20th November 1913.

⁷ Teilhard de Chardin was a French Jesuit priest and philosopher, as well as a palaeoanthropologist. Given that he did not author any work within the parameters of this study however, his own take on the find is unknown.

⁸ "Hominan" is used to specify humans and their extinct relatives, in contrast to "hominid" which refers to any member of the Hominidae family (humans, chimps, gorillas and orangutans).

another – the “dualist” argument. According to this argument Piltdown man was actually the mistaken joining of two never-before-seen species - the skull of an archaic human and the jaw of an archaic ape (e.g. Miller 1915). The British palaeoanthropological community and media had fewer doubts however, and here the debate hinged on two different interpretations of the “monist” viewpoint. These competing interpretations came from the Dawson–Woodward (1913) team on one side, and Prof. Arthur Keith⁹ (1914), anatomist, palaeontologist and keeper of the Hunterian collection at the Royal College of Surgeons, on the other. This debate only appears in the second period of news coverage, as at the time of the first coverage only the Dawson-Woodward team had studied the remains. The discrepancy between British and European/American interpretations is something I shall return to in Section 7.

From the fragments of skull collected, Woodward constructed an individual with a brain capacity of 1070 c.c., roughly halfway between that of modern apes and humans. Due to this small skull and the large jawbone, his figure had a backwards-sloping forehead and a pronounced muzzle: a distinctly apish appearance. The Dawson-Woodward team declared their figure to be a member of a species they labeled *Eoanthropus dawsoni*¹⁰. Their figure’s species name was of course in honour of the discoverer, Dawson. “*Eoanthropus*” literally means “dawn-man”, and took its cue from the figure’s intermediate skull size. This placed Piltdown outside the human genus *Homo*. Keith’s reconstruction meanwhile resulted in a figure with a cranial capacity of 1500 c.c., slightly larger than the average amongst modern humans, and with an appearance similar to our own. Keith labeled his creation *Homo piltdownensis*, in recognition of its modern characteristics.

4. Boundary man

Piltdown man was a chimera in a very literal sense; a figure born of the artificial conjoining of fragments of a modern human skull with the right side of a modern orangutan’s jaw. To obscure the bluntness of their creation, the hoaxer placed two heavily filed human molars in the jaw. As such Piltdown straddled the human-animal boundary in a manner that refused to comply with binary discourses. In case one is

⁹ Both Keith and Woodward were later Knighted, but as this occurred after the events detailed here they will be referred to by their contemporary titles.

¹⁰ Under taxonomical naming conventions, the capitalized first word designates the genus, and the lower case second word the particular species within that genus.

tempted, in retrospect, to dismiss such a challenge as being merely the result of an artificial construction, a hoax, it is worth remembering that the existence of archaic figures that were neither obviously human nor non-human is unquestioned within evolutionary theory. At the turn of the twentieth century it was hypothesized that, in human ancestors, the brain had expanded before the jaw began to shrink¹¹, something that the Piltdown hoaxer took heed of. The genuine discoveries that followed Piltdown showed that the reverse was in fact true, which is why Piltdown had become such an anomaly by the time it was revealed as a fake in 1953. The precise order of the anatomical progression from animal to human form is not important to the project of understanding cultural responses to boundary challenges, so the fact that Piltdown was a hoax, and an imperfect one, can be ignored for the work at hand. Instead, the focus here is directed upon the question of how, given what the actors involved knew at the time, did they come to declare Piltdown human?

Piltdown man's debut in the *Guardian* on the 19th Nov 1912 gave only small hints of the challenges this was to bring to the media. It appeared under the heading "*The Earliest Man?*", though the question mark in the title appears to be directed towards querying Piltdown's status as the *earliest* human, rather than its status as *a* human. Its account tells of the discovery of a "human skull," "by far the earliest trace of mankind that has yet been found in England." It goes on to state "The skull resembles the Neanderthal specimen, but belongs to a much lower and more primitive type of mankind even than that." In these opening statements there appears no awareness of Piltdown's ambiguities; he was "primitive", but he was human. In the second half of the article some confusion appears though;

since Darwin's theory gained acceptance the need has been felt for discovering "the missing link" between the highest apes and the lowest men. The gulf between the two has not yet been bridged though we must wait for the judgment of the experts to know how much it has been narrowed by the discovery in Sussex. (19.11.12:8).

¹¹ Prof. GE Smith, who wrote an appendix to the Dawson-Woodward paper announcing Piltdown, states "The apparent paradox of the association of a simian jaw with a human brain is not surprising to anyone familiar with recent research upon the evolution of man... The growth of the brain preceded the refinement of the features of the somatic characters in general" (Smith 1913:147).

The use of bridging metaphors for “missing link” figures is not uncommon. Talk of “highest apes” and “lowest men” gives this bridge a vertical, rather than horizontal, plane, much like a “Lamarckian ladder” conception of evolution. This “vertical bridge” plays on a biblical conception of human-animal relations that sees humans as figures halfway between animals and God in a hierarchy of greatness, and as clearly delineated from the former as from the latter. It is this traditional binary understanding that the chimeric Piltdown causes such great problems for. In the metaphor’s specific use here, the effect achieved is a semantic slight-of-hand. The first half of this quote seems to suggest that Piltdown man was a link between the “highest apes” and “lowest men,” a status that would seem to preclude him from either one and hence contradicting the article’s attempts to claim him as human. However, the second line’s reference to Piltdown narrowing the gulf could be read as meaning that this is a figure that exists on the shore of the human landmass, and that extends it backwards into the “gulf,” so leaving a smaller gap for a missing link to span. Hence he might still perhaps be claimed as human.

From my focus on the negotiation of biocultural boundaries within culture, the question that stands out from the Piltdown episode is this: how was such a chimera of the human and the non-human reconciled with traditional binary understandings of the human-animal boundary?

5. The Challenge of a Non-fit

The flurry of news coverage in December 1912 was drawn almost exclusively from the meeting at the Geological Society on the 18th. Notably, the title of the paper assumes Piltdown’s status from the very start, entitled “On the Discovery of a Paleolithic Human Skull and Mandible in Flint-Bearing Gravel...” Dawson gives little mention of the hominan remains in his section of the paper, but crucially he does mention finding both an “unusually thick human parietal bone” (1913:117) and “the right half of a human mandible” (p.121). In Woodward’s section, the author repeats this claim; “The human remains comprise the greater part of a brain-case and one ramus of the mandible, with lower molars 1 and 2” (p124).

On the subject of the jaw, Woodward seems to contradict his earlier claim; “The great width of the temporal insertion, the situation of the mylohyoid groove behind rather than in line with the dental foramen... are all characters of the mandible in apes, not in man” (p.131). Of the teeth, he states “The molar teeth, therefore,

although distinctly human, are of the most primitive type, and must be regarded as reminiscent of the apes in their narrowness” (p.132). In a final statement, on his decision to award Piltdown membership of an entirely new species;

The brain-case alone, though specifically distinguished from all known human crania of equally low brain-capacity, by the characters of its supraorbital border, and the upward extension of its temporal muscles, could scarcely be removed from the genus *Homo*; the bone of the mandible so far as preserved, however, is so completely distinct from that of *Homo* in the shape of the symphysis and the parallelism of the molar-premolar series on the two sides, that the facial parts of the skull almost certainly differed in fundamental characters from those of any typically human skull. I therefore propose that the Piltdown specimen be regarded as the type of a new genus of the family Hominidae, to be named *Eoanthropus* (p.135).

Given the benefit of hindsight, much of Dawson and Woodward’s paper is unsurprising: Piltdown had a skull that appeared very similar to modern *Homo sapiens* except for its size (according to Woodward’s reconstruction) and a few minor details, and a jaw that appeared very similar to that of an ape, except the teeth, which in many respects were like those of modern *Homo sapiens*. Despite showing an awareness of these contradictions however, both authors label Piltdown as human. Even the features which appear ape-like become human once they are placed in the context of the whole being. This is perhaps fitting if humanity is tied to a particular taxonomic group, given that Linnaean taxonomy operates at the level of the organism, rather than sub-parts of it¹². As we shall see though, during the Piltdown debate humanity becomes increasingly independent of scientific classifications. In addition, it raises the question of why the being as a whole becomes human rather than ape - or something else entirely - when its constituent parts are so conflicting. Is it that greater importance is attached to the skull than the jaw - that a species essence resides in the skull that is not present in other bones? If so this would mean that had the Piltdown hoaxer had the foresight provided by the later discoveries of Peking man and

¹² For a more detailed appraisal of Linnaean taxonomy see Farber (2000).

*Australopithecus*¹³, and placed a human jaw with an ape skull, then Piltdown would have been labeled an ape. Consideration of the scientific and media discourses around this figure suggest though that it is unlikely that Piltdown would ever be anything but human, as I shall show below.

The opening metaphorical broadsides of islands of humanity and gulfs to be spanned, launched in the *Guardian*'s November announcement, preface the semantic problems that Dawson and Woodward become enmeshed in. The media coverage following their official announcement fares no better, and as the debate evolves the construction and attribution of humanity becomes increasingly complex, and seemingly divorced from simple binary understandings of human and animal.

The *Guardian*'s report of the official announcement quotes Woodward as stating “the skull may be regarded as presenting a hitherto unknown species of *homo* [sic] for which a new name is proposed” (19.12.12:11). Here is an inherent contradiction: Piltdown is claimed to be a species of “*homo*” and yet Woodward places it instead in the genus “*Eoanthropus*.” This statement is not present in the published version of the speech, so it may be that Woodward was misquoted, or that he made an error which was corrected for the published account. However, in a later article, the *Guardian* quotes Keith as saying “Possibly he [Woodward] has been a little too precipitate in saying that it belongs to a new genus of humanity” (20.12.12:16), which suggests that the potential exists for humanity to be detached from the genus *Homo* (see Sections 7 & 8).

These confusions herald a boundary debate which never materializes. The physical manifestation of the human-animal binary within one individual - what we know with hindsight to be a human skull with an orangutan jaw - might be expected to prompt a discussion of how this character challenged existing dichotomous understandings. One could imagine that such a figure would provoke considerable debate, especially arriving at a time when such figures were exceedingly rare – Piltdown's discovery having only been pre-empted by a handful of figures such as Neanderthal man and Java man. Despite the conflicting evidence though, Piltdown begins, and remains throughout the media coverage, strictly “man.” Rather than

¹³ Peking man was discovered in China during excavations in the 1920s and was an example of *Homo erectus*. *Australopithecus* was discovered in 1924 in South Africa. Both showed that the modern human jaw evolved before the skull, opposite to the pattern of evolution implied by Piltdown man.

attempting to weaken the rigid categories of human and animal, the consensus is to force Piltdown man to fit accepted ideas, even if the results appeared self-contradicting. A typical example of such coverage comes from the *Illustrated London News* (28.12.12:950):

the man (part of whose jaw and skull were found) was undoubtedly akin to the apes. The lower jaw is unmistakably ape-like, while presenting other features indubitably human.

In another example, the *Times* (11.08.13:3) states

the oldest human remains yet discovered in Europe... a being that is partly ape, partly man.

From the *Express* (20.12.12:1):

a new race of men, in points strongly resembling the apes, but still unquestionably “man”, although devoid of the power of speech.

Repeatedly, a statement of Piltdown’s humanity – usually implicitly in labeling the discovery “man,” but also through explicit reference such as that in the *Times* quote above – is juxtaposed with a recognition of non-human features. As well as the ape mandible and the suggested absence of speech, these conflicting features include; that the skull of was shaped like a chimpanzee’s (*Times* 19.12.12:4); that the neck was like that of an ape (*ibid.*); and that it walked like chimp, with a shuffling gait (*Express* 23.12.12:1). Clearly, the physical contradictions identified by Dawson and Woodward were recognized too by the journalists involved, and yet no one sought to question the scientists’ conclusion that here before us was a ‘man’.

6. Forcing a Fit

Piltdown’s treatment in the coverage given to it prompts two questions, namely; on what grounds was Piltdown’s humanity constructed?; and why did its human status remain so untouchable? In response to the former question, all the evidence concerned had to be drawn from the very fragmentary sources that palaeoanthropology deals in.

In Piltdown's case, these were anatomical (skull fragment and jaw measurements and reconstructions), abstractions from anatomical evidence (such as speech capabilities, posture), and lithic (both Eolithic and Chellean tools were discovered at the Piltdown site¹⁴). In consideration of the latter, one *Times* piece suggests that stone tools can only be an effect, not a cause of human status:

the "humanity" of the Eolithic flints has for many years been disputed – one of the chief objections to their acceptance having been that they had never been found in intimate association with human bones. With this discovery that objection finally disappears. (25.12.12:8)

The tools then became tools because they were discovered in association with human bones, rather than *visa versa*. As already shown, Dawson and Woodward's paper locates humanity in certain features of Piltdown's skull and teeth, which as we already know can give no clear answer to Piltdown's status as human or not. Unsurprisingly, the media too focus primarily on the skull, jaw and teeth. However, in a reflection of their position within popular culture, free of the constraints of the more cautious scientific realm, media coverage expands on the scientist's claims. One *Illustrated London News* piece discusses the possible lifestyle of Piltdown, including skills and tool use:

He was a man of low stature, very muscular, and had not yet attained that graceful poise of the body which is so characteristic of the human race to-day. But he was by no means lacking in intelligence... He had probably inherited the use of fire from his forbears, and this useful ally served to harden the ends of his wooden spears and perhaps to cook his food. (28.12.12:958)

Perhaps then Piltdown's humanity stems from tool and fire use? Such skills would seem to require language, or at least a developed form of social learning, which is one key attribute of humans. There is no sign of consensus on this however. The *Express* titles one article with the following header:

¹⁴ Eoliths (literally "dawn stone tools") are crude stone flints, sharpened on one side. Chellean tools were slightly more developed and worked on both planes to provide a finer edge.

The New Woman¹⁵ (200,000 Years Ago). She Could Not Cook. She Could Not Talk. She Could Not Wash. She Could Not Light A Fire. (23.12.12:1)

Here Piltdown is simultaneously claimed as human and stripped of many basic human characteristics. The article does go on to assert that Piltdown could use tools and clothe itself in animal skin, but here, as with all the coverage both popular and scientific, its humanity is not negotiated as an outcome of these skills, but is assumed from the start. Nowhere, in any of the literature, does there appear an explicit justification of Piltdown's human membership; the anatomical features are contradictory, as are the suggested skills; the tools are unsuited to conferring such status, and the general consensus is that it would have been unable to talk.

7. Human Boundaries, National Boundaries

This brings us to our second question - why was Piltdown's human status so unassailable despite the contradictory evidence? There are two answers, I would suggest. The first of these is simply that Piltdown the "backwards woman" (*Express* 12.08.13:1) is more exciting news than Piltdown the "forward ape" (*ibid.*). As a primitive human Piltdown takes on an immediacy, a relevancy, to popular culture that it would not have as an ape. Piltdown as a human "fit[s] well with media news values such as meaningfulness and relevance to daily life" (Cassidy 2005:136). Such 'human interest' stories were an identifiable aspect of print journalism since the rise of the 'New Journalism' of the 1890s (Lee 1980:121). For scientists and journalists alike, such sensationalism (if that is not too strong a word) means greater public interest and hence greater rewards, whether in terms of status, resources or finances.

The second answer is related to this, but is both more complex and more interesting from a boundary perspective. It also demonstrates why the construction of the human-animal boundary impacts on us as humans, and not just on our treatment of those on the other side of the line. It is linked to the first answer by the fact that it concerns the anthropocentrism that makes Piltdown the human more interesting to readers than Piltdown the ape. As a human, Piltdown becomes one of "us", it joins

¹⁵ "The New Woman" of the title refers to the possibly female gender of the remains of Piltdown, a suggestion made by Woodward on account of certain anatomical features of the skull. The other papers largely ignore this claim, but the *Express* makes great play of it. At this time of course the Suffragette movement was demanding that women be given the vote, and the *Express* was presumably playing on this theme.

humans on our side of the binary divide. Obviously, though, we do not construct our social alliances purely in species terms. Other important boundaries in the drawing of social alliances are the boundaries of nations and races, and both had an important role to play in Piltdown's attribution of humanity.

Piltdown was the first, and remains the only, major palaeoanthropological discovery to be found in England. He arrived at a time when Britain was, thanks to the likes of Darwin and Huxley, at the forefront of evolutionary theory. Great imperial rivals such as France (*Dryopithecus fontani*) and Germany (*Homo Neanderthalensis*)¹⁶ had already enjoyed the discoveries of ancient evolutionary ancestors within their borders. Although the idea of relating a creature that lived hundreds of thousands, even millions of years ago, to a particular nation state that at best might claim a few hundred years contiguous history is a logical nonsense, nationalists can still draw powerful historical discourses from them to support their ideas of national greatness. Such themes were certainly present in the reception of Piltdown man. The first report in the *Guardian* proclaims the find "quite as early as anything that has been found in Europe" (21.11.12:8), and later on declares "it is extremely satisfactory to English scientists that this find should have been made here and that it should have been made by two well-known English geologists" (20.12.12:16). Arthur Keith, in the same piece, states

[A] pleasing fact is that this model has been prepared by an Englishman, for hitherto all these models have been done on the Continent. In all these matters we are regaining the prestige we enjoyed half a century ago in the days of Huxley and Prestwich – the heyday of English anthropology.

The *Express* meanwhile announces Piltdown as "Ancestress Of The English Race Today" (20.12.12:1), and the *Illustrated London News* refers to "this Ancient Briton" (28.12.12:958). Woodward's own memoirs of Piltdown, published only five years before the hoax was unmasked, is entitled *The Earliest Englishman* (1948). Nationalist concerns were not restricted purely to the media and popular science however, but were present in the scientific realm as well. In a discussion section at the end of a follow-up paper by Dawson and Woodward (1915), scientists go so far as to

¹⁶ Remains of *Dryopithecus fontani* and *Homo neanderthalensis* were discovered in France and Germany respectively in 1856, and as such were the first recognized hominan discoveries.

label a bone implement found with this archaic figure as a “cricket-bat” (p.148)! More tellingly, whilst the reception amongst the English scientific community was overwhelmingly positive (though not without exception¹⁷) towards the monist interpretation of Piltdown, in Europe and America reaction was far more mixed. Prominent American palaeoanthropologists Miller (1915, 1918), MacCurdy (1916) and Hrdlicka (1922) all expressed considerable doubts over the belief that the jaw and skull were from the same individual or species. Miller (1915) also provides a bibliography of papers in which European scientists give their opinions on Piltdown, and there is clearly a degree of skepticism not present in Britain. This impression is supported by the media coverage:

German anthropologists, jealous no doubt for the superior antiquity of the Heidelberg and Neanderthal remains, have been especially skeptical (*Guardian* 12.08.13:6).

That the original reconstruction of the Piltdown skull is open to criticism is evident from the proceedings at a meeting of German anthropologists held last week in Nuremburg [sic]. English anatomists were openly censured for giving their approval to the manner in which the Piltdown skull had been reconstructed (*Times* 11.08.13:3).

Outlining the respective cases of Woodward and Keith’s models, the *Express* adds:

There is even a third party, however, dimly heard from Germany, which suggests that the jaw does not belong to the skull at all, but to an ape who chanced to leave his remains close by (12.08.13:7).

Piltdown the earliest Englishman was far more appealing than Piltdown the earliest English ape, and this meant that English scientists and journalists alike were willing to weaken the requirements needed to cross the human-animal boundary. In fact, such

¹⁷ A few British scientists, such as Professor Waterston, an anatomist at King’s College, London, remained skeptical throughout the debate (see McCurdy 1916:230).

was their keenness that no questions were asked of Piltdown upon its arrival, it was simply waved through the checks which one might expect.¹⁸

It could be argued that Woodward's decision to create a new genus for Piltdown was a recognition of its boundary-blurring characteristics; after-all "*Eoanthropus*" placed it outside the genus *Homo*. And yet in addition to the fact that *Eoanthropus* means literally "dawn man," repeated references to its human status undermines any attempt to argue that Piltdown's boundary-straddling nature was recognized in the discourse surrounding it.

The outcome of Woodward's taxonomic labelling is that humanity is exported beyond the confines of the genus *Homo*. There is, of course, no scientific definition of "human" in the way there is a biological definition for *Homo sapiens*, and yet within the Piltdown debate both scientists and journalists use the term repeatedly and unquestioningly. We, as modern *Homo sapiens*, are not alone within our genus; *heidelbergensis* and *neanderthalensis* (Heidelberg man and Neanderthal man respectively), as well as the recently discovered *flores*, are all prefaced by "*Homo*", as are several long extinct species (see chapter [X]). As such, it is perhaps understandable that scientists might refer to these figures as human, taking the word to be interchangeable with the term *Homo*. When humanity begins to be applied by scientists to figures outside of *Homo*, as it is here, its definition - its distinction - becomes increasingly stretched.

However, this is not to say that there are not strategies available to mask such problems. In the Piltdown debate a prominent device for hiding the inconsistencies is the concept of a "missing link". Labeling Piltdown as a "missing link", as it is in the first science journal coverage to appear (Haddon 1913:92), and as numerous media reports do, allows an escape from the human – animal dichotomy. A missing link is neither one nor the other, like Bauman's (1991) "third category"¹⁹ it is the outcome of a disjuncture between our dichotomous constructions of nature, and the contiguous

¹⁸ Nationalism continues to play a role in many debates involving fossil ancestors, for example the argument between Native Americans and scientists over the ownership of Kennewick man (e.g. Thomas 2001), and elements of the dispute between Australian and Indonesia scientists over the Flores remains (e.g. Editorial, *Nature* 2006).

¹⁹ Bauman's "third category" refers to objects that refuse to comply with attempts at ordering the social and natural worlds. Bauman argues that the process of classification inevitably throws up cases – the "third category", that either straddle multiple classifications, or are not covered by any. Douglas' concept of the "purity rule" (1969) also covers such objects that transgress divisions of categorization.

reality of it. A figure that is neither clearly human nor animal is either simply forced by will alone into one of the categories – as happens repeatedly in the case before us – or becomes something else entirely, in the case here a missing link. However, for Bauman, these third categories are a threat to the status quo, as they reveal the dichotomy for the sham it is:

“They are waste, as they defy classification and explode the tidiness of the grid. They are the disallowed mixture of categories that must not mix. They earned their death-sentence by resisting separation” (*ibid.* p15).

The missing link, in contrast, acts to protect the human – animal dichotomy. It allows a literal “no-man’s land” between the two frontlines, where a figure like Piltdown might safely shelter. In such a way the difficult questions – such as whether Piltdown was human, and on what grounds – can be avoided. It is telling of the failure of both scientists and journalists to really engage with the issue that they fail equally to recognize this as an escape route even when attempting to use it. Whilst they position Piltdown as a missing link, simultaneously he is being declared human, rendering the strategy useless.

8. Race and Species

Gieryn’s (1983, 1999) model of boundary-work demonstrates how the boundaries of science are contextually dependent – where the aim is to protect itself from religion some element of it, say the scientific method, might be depicted as empirical and clinical; when demarcating it from engineering it might become almost philosophical in its pursuit of ideas. A similar process is visible at work in the drawing of human-animal boundaries in the Piltdown debate. Whereas the treatment of Piltdown expanded the limits of humanity, and so weakened its exclusivity, elsewhere in the same debate the division remains rigidly limited. Keith’s quote regarding a “new genus of humanity” (*Guardian* 20.12.12:16), and Woodward’s attribution of the human Piltdown to the genus *Eoanthropus*: both imply that humanity becomes a characteristic of all within the *Hominidae* family. This would mean that chimpanzees (*Pan*), gorillas (*Gorilla*) and orangutans (*Pongo*) become eligible for human membership. Unsurprisingly though, despite repeated mention of chimps - and apes generically - in relation to the Piltdown jaw, there is not a single mention within the

scientific or popular literature regarding the attribution of humanity to our contemporary relatives in the *Hominidae* family. Where Piltdown is waved through they are waved away. A crucial difference of course between contemporary primates on the one hand, and Piltdown and our fellow inhabitants of *Homo* on the other, is that the latter are all extinct and so their inclusion as human and/or *Homo* raises no practical issues regarding their treatment. Awarding contemporary primates the same classification would not only demand a reappraisal of our dealings with them, but also leave the binary nature – culture model entirely unsupportable and so would threaten, like the crack in the dam, to quickly bring down the entire edifice, as Cavalieri and Singer acknowledge when they discuss how awarding rights to apes could lead eventually to the extension of such protection to all animals (1996:304-311). It could carry then a considerable philosophical, as well as material (in terms of requiring ecological protection and ethical treatment) cost. The absence of any living Piltdown, Neanderthal or Flores means that their classification as human is easier to negotiate within existing boundary models (due to the lack of challenging empirical evidence) and poses no material threat to human economies.

There is a second process of boundary-working going on simultaneously. The process of stretching the definition of “human”, of drawing its boundaries wider to encompass more landmarks, is used to distance white Europeans from indigenous groups – and non-whites generally - at the same time that it is allowing Piltdown to be brought closer to us. There are two elements to this. The first achieves its effect simply through the repeated comparison of Piltdown’s primitive features with non-whites. In Woodward’s (1913) paper, he states that Piltdown’s intermediate brain size “equals that of some of the lowest skulls of the existing Australians” (p126).

Similar claims pepper the news coverage. On the subject of Piltdown’s canines (only uncovered later), the *Illustrated London News* states that they would have “an ape-like character met with in savage races to-day” (28.12.12:958). On the same page it offers up for comparison photos of three jaws, labeled “Kaffir”, “Chimpanzee” and “Indian” respectively. Below it, another picture compares three more, with “Chimpanzee” and “European” either side of a suggested intermediary: “Torres Strait Islander”. Also in this article, a metaphor regarding the Piltdown eoliths with the same message implicit in it: “they speak as surely as did the footprints found by Robinson Crusoe.” The footprints in question were of course those of the black savage, who Robinson called “Man Friday”; in this way another implicit link is made

between Piltdown and non-whites. Continuing, of the brain, the *Express* says: “as large as that of the lowest type of savage – the Australian aboriginal or the Tasmanians” (23.12.12:1) and similarly, from the *Times* “the skull of *Eoanthropus*, though typically human, was as low in brain capacity as that of the lowest existing savages” (17.09.13:10). The *Guardian* quotes Keith as claiming “in size of brain it is human – at least equal to the brains of many individuals in living races” (20.12.12:16). On the subject of whether Piltdown could talk, the *Times* asserts

In the jaws of Europeans there were distinct tubercles... Among the lower races, and particularly those with imperfect speech, the tubercle was practically absent (16.9.13:6).

The second element is more subtle, but just as effective. Throughout the debate there is a continual conflation of the terms “species” and “race” so that they become indistinguishable. Stocking’s (1994) work shows how “race” as a concept in the early 20th century was often blurred with others such as “nation”. The effect achieved in the Piltdown case is that species becomes weakened as a divider and race becomes strengthened. The *Express* describes Piltdown as “a race of men who could not talk” (20.12.12:1) and mentions “the monkey race” (23.12.12:1). From the *Illustrated London News* we have this theme rendered explicit in a suggestion that Piltdown is no more different from modern *Homo sapiens* than we are from each other:

these fragments of man from the Sussex gravel tell us that already at this early period the human race had begun to split up into different peoples (28.12.12:958).

The *Guardian* makes a similar link, stating;

in Europe we have (in order of antiquity) the Chellean, Acheulean, Mousterian, Aurignacian, Solatrean, and Magdalenian classifications, based mainly on handiwork : and the Heidelberg, Gibraltar, Neanderthal, Grimaldi, Galley Hill, Krapina, Cro Magnon, and other categories based on an anatomical study of skeletons and skulls. We have by no means exhausted the bases of classification

even now : there remain, for instance, the straight-haired, wavy-haired and curly-haired peoples, the peoples with projecting muzzles, the peoples with their heads set on like hammer-heads and many others (19.12.12:16).

The process of expanding human membership to include Piltdown creates space - it stretches humanity, and so allows a distance to be opened up between white Europeans and other *Homo sapiens*. This ape jaw and human skull has traveled from the “doubtful borderland between recognisable man and indubitable ape” (*Guardian* 19.12.12:16) to become a human no more or less remote from white Europeans than an Aborigine, and certainly residing much closer than the great apes despite its apparent equivalent taxonomic status. It is a journey which shows how negotiations of the human-animal boundary can influence our treatment not just of animals, but of other humans as well. An ape jaw with a human skull passed through the boundary to become the earliest Englishman, on the basis that it (apparently) died where – millions of years later – the English nation was formed, whilst many contemporary humans were pushed in the other direction, condemned for lacking white skin and European language.

Remarkably, the binary conception of humans and animals emerges from this boundary exercise seemingly unscathed. Despite moving the boundary backwards and forwards, reinforcing it in places and pulling it down in others, no one in the Piltdown debate takes a moment to question its presence, or its implications, in the first place. The question of on what foundations this divider is being built is never asked. Much like the scientist who boundary-works their territory in public discourses whilst remaining wedded to the idea of a clear demarcation between science and other forms of knowledge (Gilbert and Mulkey 1984), the discourses surrounding Piltdown work the boundary without acknowledging the ambiguities they raise. The human/animal binary, which remains formally unquestioned, is implicitly supplanted by a “trinary”²⁰ of White European/Piltdown & Non-White “Savage”/Animal.

²⁰ ‘For further discussion of the role of ‘trinarities’ in discourses surrounding missing links, see Goulden (*forthcoming*)’

9. Conclusion

In this paper I have sought to shift Gieryn's boundary-work model from an ontology of cultural boundaries to an ontology of natural boundaries. Of course 'nature' itself, as this paper has sought to show, is a cultural artefact. Transplanting Gieryn's model in this way is useful not only because of the parallels between the science-culture and human-animal boundaries outlined in my introduction above, but also as it serves as a reminder of the strong relationship between the categorization of the social and natural worlds. As Douglas' (1969) work on the "rules of purity" demonstrates, social divisions are often justified via reference to the natural world, and the manipulation of the natural world (the removal of dirt from the home for example) is used to add coherence to the social world. At Piltdown we see this process working in both directions similarly – Piltdown as natural empirical fact is used to draw "savages" away from white Europeans' humanity, whilst social relations with other nations act as a spur for British scientists to position Piltdown as human.

The boundary-work model also encourages one to consider the role of agents in boundary construction, and their strategic aims. The uneasy relationship that exists between a contiguous nature, our compartmentalized understandings of it, and the social world often results in a disjuncture. Where this disjuncture exists only those with considerable epistemic authority have the strength to force a fit. This power to reward or deny "humanity," and the status that came with it, to groups and individuals was wielded by the scientists and journalists in the Piltdown debate. Just as the drawing of science's jurisdictional boundaries are an outcome of the context in which they are drawn, so too is the human-animal division: Piltdown's humanity is located not in its physical remains, but in its cultural standing. This boundary drawing is done not out of a concern for more accurately (scientifically) reflecting nature and our relations to it, but rather to support racist ideas of white superiority, and nationalistic concerns that Piltdown itself should provide England with an ancient history to match those of imperial rivals France and Germany.

Finally, we are reminded that at the close of this testing episode the binary model of human-animal relations remains in place. As with the science-culture boundary, the binary model of human-animal is exceedingly resilient, even when it is mobilized in contextually dependant discourses which implicitly rely on a more complex configuration, such as the trinary one present here. When considering why this is, it must be remembered that altering our models of the boundary would come

with considerable practical and philosophical costs, not least because it would threaten the dominance of humans which is implicit in the binary model as it stands. Additionally, an apparent lack of awareness during the Piltdown episode - on the part of scientists and journalists alike - of the role cultural construction plays in the concept of “humanity” allowed the mutation of the binary model into more complex configurations to be done so in an unspoken manner. In this way, “Kaffirs,” “Bushmen,” “Aborigines,” “Indians,” “Torres Strait Islanders,” “Tasmanians”... all are marginalized, pushed closer to the borderland, whilst Piltdown – half ape, but fully English – is welcomed in with open arms.

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