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Gladstone as linguist

Abstract: Anyone who urges that differences between languages may correlate with differences in societies' perceptions of the world is open to misunderstanding by those who do not recognise the arbitrariness of their own socially-conditioned perceptions. A striking example is the reception of William Gladstone's nineteenth-century analyses of the vocabulary of the Homeric epics, Europe's first literature. Gladstone anticipated themes that are commonly seen as original advances of twentieth-century anthropology and linguistics; but this achievement has been obscured by a longstanding misinterpretation, according to which Gladstone ascribed Homer's surprising use of colour words to colour-blindness. At present, that misinterpretation is being disseminated more widely than ever before. In fact, Gladstone explicitly did not believe that Ancient Greeks were colour-blind. He did express a range of ideas standardly credited to much more recent scholarship. The reception of Gladstone's Homeric writings demonstrates the strength of the human disposition to trivialize significant cultural differences.

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1 Introduction

A writer who urges that differences between languages may in some cases correlate with differences in societies' perceptions of the world they inhabit will always be open to misunderstanding: to many readers that idea is so alien that they may assume the writer cannot mean what he or she says in so many words, and may impose some less literal but more comfortable interpretation on the writing in question. If this happens much, an important point of view about language and cognition is rejected not because it is examined and found wanting, but because it is not entertained as a candidate for acceptance.

Currently, one example of this kind of rejection through misinterpretation has become the centrepiece of what is probably the most widely-read book about language of the twenty-first century to date. The present paper aims to set the record straight by showing that in this case the writer in question did mean what he said (and that his point of view deserved to be taken more seriously than it has been).

The writer in question is the British statesman William Ewart Gladstone (1809–98), who published a series of studies of the vocabulary of Homeric Greek (that is, the language of the *Iliad* and *Odyssey*), covering words for numbers (*SSHA3*: 425–56, 1869: 535–9), speed (1879), and in particular colour (*SSHA3*: 457–99, 1869: 539–41, 1877).[1] In these writings Gladstone argued that Homer's language showed that Greeks of his time perceived or understood these fundamental aspects of reality in ways very different from modern Europeans.

These writings have received a bad press down the decades. Notably, Gladstone has repeatedly been described as believing that Greeks of the Homeric period were colour-blind: that is, rather than accepting that Gladstone thought members of another culture might mentally categorize the world differently from us, people have supposed that he must have meant that there was something physically different about their eyesight (an idea which was seen as absurd). This misinterpretation has now been used as the central plank of an outstandingly successful new book, Guy Deutscher's *Through the Language Glass* (Deutscher 2011) – a book which in some respects is more sympathetic to Gladstone's views on language than many have been. Deutscher's book is probably the most popular book about language to have appeared so far this century, being bought and read by many people with no special knowledge of linguistics.[2] Thus we must reckon with the fact that Deutscher's interpretations, if they go unchallenged, are destined to become part of received educated belief about human language and cognition.

Gladstone did not believe that Homer or the Greeks of his day were colour-blind, and his linguistic contributions have been seriously undervalued. Gladstone's discussion of Homer's vocabulary would have been a worthwhile contribution to social science even if it had been made a hundred years later than its actual date; appearing when it did, it was quite remarkable. From a twenty-first-century vantage-point Gladstone's work did have flaws; but this is forgivable, considering that the same flaws recur in very recent published research on the same topic.

It might seem that a paper which aims to set the record straight on Gladstone's linguistics can nowadays be of historical interest only. But the tendency to reinterpret claims about cultural differences in ways that turn them into something easier to digest, or even trivialize them, is perennial. It takes a case where

1 The abbreviation *SHHA3* will be used for volume 3 of Gladstone (1858). In quoting Gladstone, where he showed examples in the Greek alphabet I silently substitute transliterations.

2 On 27 Aug 2012 Deutscher's book had the amazon.co.uk "Bestseller Rank" 2467. For comparison, Steven Pinker's *The Language Instinct* ranked lower, at 4315. (Of course Pinker's book may have ranked higher when it was as new as Deutscher's is now.)

historical depth is available to demonstrate how successful that tendency can be at eliminating from consideration even a well-argued, widely publicized point of view put forward by an author of high prestige – and hence to help arm us against the same tendency as it applies to research today. That is the central purpose of this paper.[3]

2 What Gladstone didn't say

2.1 The colour-blindness misinterpretation

Although the Homeric epics contain what appear to be colour words (some of which became straightforward colour words in later Greek), Gladstone noted that these occurred surprisingly infrequently, even in descriptive passages where one might expect to find colours mentioned (*SHHA3*: 477–83); and, more remarkably, that some of the apparent colour words which do occur are attributed to ranges of things which no present-day European would see as sharing a common colour. For instance (*SHHA3*: 461) the adjective *porphyreos*, which in later Greek meant approximately "purple" or "dark red", is applied to the following natural objects: blood, dark cloud, wave of a river when disturbed, wave of the sea, disturbed sea, and rainbow (as well as to things such as garments, which might be of various colours, and metaphorically to bloody death). The cognate verb *porphyrō* is

3 Certain issues closely related to the topic of the paper will not be covered. Gladstone wrote not just about Homer's vocabulary but, in his three-volume 1858 work *Studies on Homer and the Homeric Age* and in various later contributions, about many other aspects of the Homeric world, some of which had nothing to do with language (e.g. an attempt to reconstruct the geography of the *Odyssey*, *SHHA3*: 249–365), while others perhaps verged on language but related more to early Greek psychology (e.g. their concept of beauty, *SHHA3*: 397–424, 1869: 516–19). I shall not touch on these aspects of Gladstone's work. (As it happens I feel quite sceptical about the value of Gladstone's attempt to link mythical sections of the *Odyssey* to real locations, but this does not reduce my respect for Gladstone as a linguist.)

Also, there has been longstanding controversy about whether "Homer" was a single individual; and if he was, the legend had it that he was blind (really blind, not colour-blind). It is unnecessary to enter into these issues here. The *Iliad* and *Odyssey* are what they are; they include plenty of visual description, so evidently sighted individual(s) were heavily involved in their composition, whether or not they were edited into final form by one man and whether or not, if so, that man was himself sighted. It is convenient to use "Homer" as shorthand for "whatever Greek or Greeks composed the *Iliad* and *Odyssey*", and "Homeric Greeks" for "Greeks of the period described in those poems, and/or the (perhaps considerably later) period when they were composed"; nothing more specific will be implied by these terms here.

applied to the sea darkening (and to the mind brooding); and the compound adjective *haliporphyros*, "sea-*porphyreos*", is applied to wool.

From a modern European perspective it seems impossible to link the red of blood and the blue or green of the sea as shades of one colour; and since "The art . . . of dyeing was almost . . . unknown" to the Homeric Greeks (*SHHA3*: 480), it seems likely that coloured wool was naturally-brown wool, so that again it is paradoxical to find its colour described by a word which compares it to the sea. Yet this is not merely a matter of eccentric usage conventions for a particular word (as the English conventionally use the word "pink" for the scarlet coat of a huntsman, which is by no means pink in the normal use of that word). A stock Homeric epithet for the sea is *oinops* "wine-looking" (in English translations often rendered "wine-dark"); evidently red wine really was seen as sharing an important visual property with blue or green sea.

Gladstone's proposed solution to these paradoxes was that Homer's visual vocabulary referred mainly to contrasts of light versus dark, and only to a minor extent to contrasts of hue (i.e. position in the rainbow spectrum from red to violet): "Homer's perceptions of the prismatic colours, or colours of the rainbow, . . . were, as a general rule, vague and indeterminate" (*SHHA3*: 483); "Homer seems to have had . . . principally, a system in lieu of colour, founded upon light and upon darkness" (*SHHA3*: 488); "the Homeric colours are really the modes and forms of light . . . and . . . darkness: partially affected perhaps by ideas drawn from the metals, like the ruddiness of copper . . . and here and there with an inceptive effort, as it were, to get hold of other ideas of colour" (*SHHA3*: 489). Thus *porphyreos* for Homer seemed to Gladstone to mean essentially "dark" (*SHHA3*: 486) rather than referring to any particular hue; on the other hand *xanthos*, for instance, did already for Homer appear to refer to a yellow hue, being applied to human hair and to horses – a head of blond hair and a bay horse are closer in hue than in lightness.

Again and again this idea of Gladstone's has been interpreted as a claim that Homeric Greeks were colour-blind. That interpretation began to be expressed soon after the publication of Gladstone (1877), which appeared in a magazine whose readership will have been far wider than that of *Studies on Homer*, at a time when Gladstone had become much more famous than when that book was published. Thus, Grant Allen ([1879] 1892: 202–3), objecting to Gladstone's theory and the related ideas of the German ophthalmologist and historian of medicine Hugo Magnus (to be discussed further below), asserted that "the main points of their hypothesis" began with "an absolute blindness to colour in the primitive man"; Allen went on to object, correctly, that the development of a new sense over just three thousand years is unacceptable in terms of biological evolution. An anonymous article in the *British Medical Journal* (*British Medical Journal* 1881)

discussed a Danish paper about colour-blindness published in 1880, saying "The author ... quotes frequently ... from the writings of Holmgren, Gladstone, ... and others, who have investigated it". Even the popular press contained attributions of this view to Gladstone; writing in *Popular Science Monthly*, William Eddy (1879–80) explained that "Mr. Gladstone ... does not maintain that everybody in Homer's time was color-blind. He simply [claims] that, we will say, where one person is color-blind now, nine were color-blind then."

(Not everyone at the time read Gladstone this way. William Pole, who was colour-blind himself, believed (1878) that Gladstone FAILED to appreciate that his data on Homer's colour vocabulary suggested colour-blindness.)

In recent times the same interpretation has recurred too frequently for a comprehensive survey. The art historian John Gage (2000: 12) discusses "Gladstone's belief in the colour-blindness of the Ancient Greeks". Barry Cole (2003: 194) states in an optometry textbook that Gladstone "concluded they [the Greeks] had defective colour vision". Jordanna Bailkin in a paper about the history of labour relations (2005: 96) claims that Gladstone "argue[d] that Homer and his contemporaries had been effectively color blind". And now Guy Deutscher tells us that Gladstone "argued that Homer and his contemporaries perceived the world in something closer to black and white than to full Technicolor" (Deutscher 2011: 30, spelling of trade name corrected); "what Gladstone was proposing was nothing less than universal colour blindness among the ancient Greeks" (2011: 37).

2.2 Correcting the misunderstanding

In fact, Gladstone was not saying that the Homeric Greeks were colour-blind. After asking whether the odd use of colour terms can be explained in terms of the legend of Homer's blindness, Gladstone went on to ask "Are we to suppose a defect in his organization, or in that of his countrymen?"; his answer to both questions was no (*SHHA3*: 483–4). "[We are not] to suppose that ... he bore, in the particular point, a crippled nature; but rather we are to learn that the perceptions so easy and familiar to us are the results of a slow traditionary growth in knowledge and in the training of the human organ" (*SHHA3*: 495–6). In his 1877 article Gladstone summarized his ideas about Homer's colour sense in a pair of propositions, and immediately added "I rejected the supposition, that this was due to any defect in his individual organisation" (1877: 366); by contrast, "Colour-blindness proper ... appears to partake of the nature of organic defect" (1877: 367).

In his 1879 paper Gladstone discussed Homer's vocabulary for visible movement, and again noticed a difference from present-day languages in that Homer's vocabulary is rich in words for different types of rapid movement but barren in

words for slow movement; "I do not recollect that [Homer] anywhere distinguishes majestic and stately movement from such as is merely slow" (1879: 463). This discussion is explicitly introduced by Gladstone as an extension of his earlier work on Homer's colour vocabulary: "It is a matter of interest to consider as kindred topics the manner in which [Homer] appreciated other visual phenomena, such as those of form and movement" (1879: 463). This would make no sense if the material on colour were intended to refer to colour-blindness, because there is no analogous physical condition that prevents a sighted person distinguishing between fast and slow motion. The contrast between a stately progress and a torpid crawl is a conceptual distinction, which depends largely on matters such as the inferred motives or causes of slowness; drawing the distinction does not depend on one's eyesight being free of some innate abnormality. If Gladstone's treatment of motion words is a "kindred topic" to his account of colour vocabulary, the latter cannot be interpreted in terms of colour-blindness.

Nevertheless, colour-blindness is such an obvious way to misunderstand Gladstone's 1858 discussion (as demonstrated by the number of writers who have misunderstood it that way) that one might ask "If indeed Gladstone did not intend to suggest colour-blindness, why did he not say so explicitly?" There is a straightforward answer to that question, which Gladstone alluded to in 1877 (p. 366): when he wrote his 1858 work the colour-blindness phenomenon was not yet widely known. Gladstone wrote "The curious phenomena of colour-blindness had then been very recently set forth by Dr. George Wilson" (he footnotes Wilson 1855). Gladstone did not say in so many words "I failed to explain that I was not referring to colour-blindness, because at the time I had not heard of it" (Gladstone had a politician's instincts, after all), but that is the obvious explanation for his failure to avert the misunderstanding.

Colour blindness was in fact first described in English in 1798, by the chemist John Dalton, who himself had the condition (it was sometimes, though more often in Germany than Britain, called *Daltonism*); but it did not become a widely-known phenomenon until far later. According to Google Ngrams (accessed 19 Jun 2011), the frequency of the bigram *colour blindness* in British sources was essentially zero until about 1850, rose gradually to about four per billion bigrams until about 1890, and then climbed abruptly to a peak of about 13 per billion bigrams, roughly the same frequency as in recent years. There is no reason to expect Gladstone (who was not medically qualified) to have known about colour blindness by the time he was writing a book published in 1858. Even when he first (to my knowledge) explicitly referred to the condition (Gladstone 1869: 540), his words suggest that he may then have taken colour-blindness to be a consequence of deficient experience rather than a congenital condition. (It is not clear whether

Gladstone was making that mistake, but this is much more plausible than the suggestion that he mistakenly supposed Homer's non-modern colour vocabulary to result from a congenital condition.) By 1877, as we saw above, Gladstone did understand that colour-blindness was congenital, and hence that it was not what he was attributing to the Homeric Greeks.

Deutscher points out (2011, ch. 2) that a number of German scientists in the 1870s were discussing the issue of colour perception in early Man, and some at least of these Germans did mistakenly believe that the physiology of colour vision had changed over the three thousand years between Homer and themselves. One of this group, Hugo Magnus, who had evidently read *SHHA3*, sent Gladstone a copy of one of his own books in early 1877, after which Gladstone was in friendly correspondence with him and discussed his work favourably in his own article published later in that year. (In 1880 Magnus asked Gladstone if he could help him find a better academic job in Britain, though nothing came of that (Bellmer 1999: 42).) Deutscher suggests to me (personal communication) that Magnus's writing may have been inconsistent about whether the development of colour vocabulary was a matter of physiological evolution or of cultural development. Bellmer (1999: 30) quotes passages pointing to the former; but there were certainly other passages where Magnus explicitly adopted the latter view. He responded (Magnus 1877: 3) to the objection that members of primitive cultures are said to have particularly sensitive sight, hearing, etc. with the very relevant point that keen eyesight but failure to recognize colours is akin to having acute hearing but no musical appreciation (the latter being uncontroversially to a large extent a matter of education and experience rather than physiological capacity):

> Ebenso mag das Ohr schon auf unglaublich ferne Strecken hin das geringste Geräusch vernehmen können, und doch fehlt ihm die Fähigkeit, die klangreichen und melodischen Tonfiguren der Musik zu verstehen oder auch nur als solche zu vernehmen.
>
> [Similarly, the ear can hear the slightest sound over a remarkable distance, and yet may lack the ability to understand the sonorous and melodious tones of music, or even apprehend them as such.]

This is a good analogy for what Gladstone believed about the Homeric colour sense, and Gladstone (1877: 368) picked out this analogy of Magnus's for approval.

It is perhaps true that in discussing in a friendly spirit the work of this younger and vastly less eminent writer, Gladstone was insufficiently alive to the risk of endorsing a complex body of ideas that included some which he disagreed with. That is not the same as saying that Gladstone himself argued for or believed

in Homeric colour-blindness. He explicitly did not. But by the time Grant Allen said that he did (cf. sec. 2.1), Gladstone was leading what is sometimes described as the world's first modern political campaign (the "Midlothian Campaign"). Doubtless he had more urgent calls on his time than correcting misrepresentations of his beliefs about Homer's vocabulary.

2.3 Are biological explanations of colour-vocabulary differences unreasonable?

Writers who took Gladstone to attribute colour-blindness to Homeric Greeks have often not merely rejected that specific hypothesis, but claimed more generally that it is absurd to suppose that any differences between the colour vocabularies of different languages could be caused by differences in the eyesight of different ethnic groups. But that is not at all absurd. Marc Bornstein (1973) surveyed numerous studies demonstrating that the darker-skinned races have pigmentation in the eye which reduces sensitivity to the blue region of the spectrum, and he argued that this was a plausible explanation for the often-noticed fact that languages which possess few colour words tend to lack a word for "blue" in particular. Deutscher (2011: 67–8) treats as untenable the claim by W.H.R. Rivers that the natives of Murray Island in the Torres Straits have a "certain degree of insensitiveness to blue (and probably green) as compared with . . . Europeans" (Rivers 1901: 94, quoted by Deutscher); but although Rivers's experimental techniques may well have been flawed by present-day standards, the researches quoted by Bornstein suggest that his conclusion may nevertheless have been correct. Biological differences between human groups could well be relevant to some cases of differences among colour vocabularies.

However, they were not relevant to Gladstone's ideas about the Homeric colour vocabulary.

2.4 Convention and training

A key to Deutscher's misunderstanding of Gladstone (and a key to others' incomprehension when faced with the suggestion that members of alien cultures may perceive the world differently from us) is a passage (Deutscher 2011: 55) where he asks, rhetorically, "Are the concepts of colour directly determined by the nature of our anatomy – as Gladstone, Geiger, and Magnus believed – or are they merely cultural conventions?" The word "convention" here makes this a false opposition.

Standardly, a "convention" is a behaviour pattern which participants, if they are reflective, recognize as contingent. If I am walking with a woman and we come to a door, I open it and let her through before me. Logically that need not be the rule – there could be (I believe there are) cultures in which the man goes first; but I long ago adopted the social role of Englishman, so I follow the English rule. The situation which Gladstone was describing is more like the following: if I am with a geologist gazing at a stretch of landscape, he may see a glacial valley, a row of drumlins, or the eroded remains of a volcanic crater. All I see are hills and valleys. That is not because my eyesight is inferior, but it is not a matter of "convention", either. It is not that I have adopted the role of "geological layman" and consequently avoid noticing drumlins or using that word to describe them: I truly cannot recognize them as such, because I have not been trained to do so.

In the case of landforms this is easy for us to appreciate, since so many of us lack the training. We are all trained to identify and name colours in early childhood, so it is harder to appreciate that this ability is a matter of training, but so it is. As Gladstone summarized his thesis in 1877 (p. 367), "painters know that there is an education of the eye for colour in the individual. The proposition, which I desire to suggest, is that this education subsists also for the race." An experienced painter has a more refined ability to recognize and identify shades of colour than many non-artists, but this is not because there is anything special about the anatomy of the painter's eye: it is uncontroversially the result of "education", or training. Gladstone is saying that that kind of training has occurred in the history of civilizations as well as in the biography of individuals. A painter may have acquired the ability to recognize and identify various precise shades, say gamboge or citrine, which the average layman might lump together simply as "yellow", but this does not imply that the painter's eyesight is physically acuter than the layman's. Gladstone is saying that even the ability to identify yellow and distinguish it from green or red, which in our time and culture is universal, itself had to be learned at an earlier stage in human history, again without that implying any change in the biological apparatus of human vision.

2.5 Changing terminology

Gladstone's word "race" in the passage just quoted might suggest to some that he must have been thinking about biological properties rather than cultural developments. But that would be to misinterpret nineteenth-century writing in terms of twenty-first-century preoccupations. We are familiar, today, with the

idea that there is no necessary correlation between cultural inheritance and biological descent, and "race" is used to make explicit a reference to classification in terms of biological descent rather than membership of a particular culture. In the nineteenth century, in many nations the two classification principles coincided much more closely than they do now (large-scale immigration into Britain began only in the mid-twentieth century), and writers were not careful to distinguish the two principles: "race" could refer to what we should call a society or a culture. When Charles Lamb in his *Essays of Elia* wrote "The human species . . . is composed of two distinct races, the men who borrow, and the men who lend",[4] or when Benjamin Jowett translated Plato's *Laws*, 3.700d, by writing "after a while there arose a new race of poets . . . who made pleasure the only criterion of excellence" (Jowett 1875: 56),[5] they were not implying that these groups formed separate gene pools but only that they were distinguished by characteristic cultural norms. Gladstone knew that there was some ethnic diversity in the ancestry of the Greeks (this was one of his main topics in the first volume of *Studies on Homer*); his phrase "education [of] the race" referred to the development over generations of a particular culture, in this case the culture whose members spoke Greek.

Another potential source of misunderstanding is Gladstone's use of the word "organ", as when he wrote "I conclude, then, that the organ of colour and its impressions were but partially developed among the Greeks of the heroic age" (*SHHA3*: 488). Today, the word "organ" (used for an aspect of human functioning rather than for the musical instrument) certainly tends to suggest a physical element of anatomy, such as eye or heart. But in the nineteenth century, although "organ" could and often did mean that, it could also be used for a mental faculty. In a lecture written in 1836–7 Sir William Hamilton wrote "Faith, – Belief, – is the organ by which we apprehend what is beyond our knowledge" (Hamilton 1859: 531). This usage was not wholly obsolete more recently; in 1961 Sir Julian Huxley wrote "A religion is an organ of man in society which helps him to cope with the problems of nature and his destiny . . . It always involves the sense of sacredness or mystery and of participation in a continuing enterprise . . ." (Huxley 1961).

Clearly Hamilton and Huxley were referring to mental software rather than hardware, as we might put it today: faith or belief are not innately fixed aspects

4 The collected *Essays of Elia* have been published in numerous editions. The essay "The two races of men" first appeared in the *London Magazine*, December 1820.

5 The word "race" here was supplied by Jowett; his translation is fairly free, and there is no corresponding word in the Greek original.

of cognition, since what a person believes, or believes in, is heavily affected by his or her upbringing and education; and Huxley's reference to "sense of sacredness or mystery" shows that he is discussing religion not as a social structure but as an aspect of individuals' cognitive functioning, which again depends on upbringing. So Gladstone's use of "organ" in the passage quoted did not imply that an aspect of the Greeks' physical anatomy was "undeveloped". Indeed, in 1877 (p. 366) Gladstone quoted that 1858 passage in the same sentence in which he denied that he was suggesting a "defect" in Homer's organism – showing that by "undeveloped" he meant untrained or uneducated.

2.6 Was Gladstone a Lamarckian?

Deutscher (2011: 54) reinforces his claim that Gladstone believed in a biological rather than cultural difference between Homer's colour-sense and ours by quoting Gladstone's statement, in the introduction to his discussion of Homer's number words (*SHHA3*: 426), that "the acquired aptitudes of one generation may become the inherited and inborn aptitudes of another". Deutscher characterizes this as Gladstone "spouting received wisdom" and embracing the Lamarckian rather than Darwinian model of biological evolution.

It is unsurprising that Gladstone was not a Darwinian in 1858, since *The Origin of Species* had not yet been published (whereas Lamarck's *Philosophie zoologique* had appeared in the year of Gladstone's birth). Nevertheless, "spouting received wisdom" does not do justice to Gladstone's position. Gladstone's main point, in the passage quoted, was that a child's learning does not begin with formal schooling but includes a great deal of "insensible training, which begins from the very earliest infancy, and which precedes by a great interval all the systematic, and even all the conscious, processes of education" – no student of linguistics will disagree with that, since mother-tongue acquisition is the most obvious example. Gladstone wanted to say that acquiring what we think of as elementary number and colour concepts are also examples, so that even if it seems to us that we have "always" had these concepts and were never formally taught them, that does not contradict the claim that we acquired them from our early experience while Homeric Greeks did not acquire them from their different early experience. Only as an afterthought to this did Gladstone add "Nor am I for one prepared by any means to deny that there MAY [my emphasis] be" what we would now call a Lamarckian conversion of acquired into genetically transmitted characteristics, and he adds "we MAY [my emphasis] believe that the acquired aptitudes ... [and so on as quoted by Deutscher]".

By 1869, when Gladstone had read *Origin of Species* (he read it in December 1859, shortly after it came out (Bellmer 1999, n. 14)), he toned this down by omitting "inborn": "the acquired knowledge of one generation becomes in time the inherited aptitude of another" (1869: 539). Rewritten that way, the statement was compatible with Darwinism, since "inheritance" can be cultural as well as genetic: a painter's child may inherit awareness of painting techniques through hanging round his father's studio.[6]

Lamarck versus Darwin is really a side-issue, since the more interesting question with respect to differences between cultures is how people's awareness of colours can CHANGE over history, rather than what mechanism transmits it from generation to generation during periods when it is not changing. Gladstone was always clear that the historical development of colour awareness was a matter of education and experience rather than of biological innovations. But even if it mattered whether or not Gladstone was a Lamarckian, the truth is that he expressed a Lamarckian view only hesitantly, and only at a period when it was the sole concept of evolution on offer.

3 Gladstone's positive contributions

I turn now from what Gladstone did not say to what he did say. What are the positive aspects of his writings which entitle him, in my view, to a high place in the history of the social sciences?

I see at least four:

1. the idea that chaotic-seeming structure in a "primitive language" represents a system of its own rather than mere failure to achieve the kind of system found in recent European languages;
2. the idea that differences between languages may not be merely alternative methods of encoding a common world of experience but may correlate with different ways of experiencing or understanding the world;

6 Elizabeth Bellmer (1999: 32) makes an odd comment which seems to say that since Gladstone in 1877 had read Darwin he ought to have treated the development of colour-vocabulary as a Darwinian process:

> He did not address the absence of Darwin's theory from Magnus's paper, nor did he really discuss it at any depth in his own. Inadvisedly, perhaps, since one hardly expects any work of evolutionary import written in 1877 to give Darwinism only passing mention, or to ascribe only non-Darwinian mechanisms to a process of change over time.

Surely, if Gladstone believed (correctly) that the development of colour vocabularies since Homer was a non-Darwinian process, that was a very appropriate way for him to write?

3. the idea that properties which an exotic language groups together as jointly contributing to the meaning of a vocabulary item are not necessarily sets of properties which familiar languages encourage us to see as linked;
4. the idea that abstract structural features of a language may correlate with language-external features of the culture which uses the language, to the point that linguistics might succeed in being a predictive science.

All four of these ideas have been seen as significant intellectual achievements of the past hundred years; each was anticipated by Gladstone in the nineteenth century. I now discuss them in turn.

3.1 "Primitive languages" have system of their own

This, surely, is the central insight of modern linguistics as it has developed over the past century, and the point which gives that subject its chief claim on the attention of the educated public at large.

An assumption which has been (and probably still is) widely held outside the academic community is that European languages of the historical period approximate in their structures to a unique ideal system for articulating thought, and if languages of non-Western cultures resist analysis in terms of familiar European grammatical categories, that must be because those languages are just defective. (A variant of this idea, advocated for instance by August Schleicher (1848) and underpinned by the philosophy of Hegel, was that the classical European languages approximated to the structural ideal and modern languages have been decaying from that ideal.)

It was against this intellectual background that Franz Boas strove to show that, with respect both to phonology and to grammar, various American Indian languages were structurally very different from European languages but equally or even more subtle in their own ways. English grammar requires certain logical categories to be expressed, e.g. singular versus plural, but allows others to be left vague; some American Indian languages require precision about categories that would commonly be ignored in English:

> In Kwakiutl [the sentence *The man is sick*] would have to be rendered by an expression which would mean, in the vaguest possible form that could be given to it, *definite man near him invisible sick near him invisible*. . . . In Ponca, one of the Siouan dialects, the same idea would require a decision of the question whether the man is at rest or moving, and we might have a form like *the moving single man sick*. (Boas [1911] 1966: 39).

For comparable remarks about American Indian versus European sound systems, see Boas ([1911] 1966: 12–14). A decade later, Edward Sapir wrote:

> One may argue as to whether a particular tribe engages in activities that are worthy of the name of religion or of art, but we know of no people that is not possessed of a fully developed language. . . . Many primitive languages have a formal richness, a latent luxuriousness of expression, that eclipses anything known to the languages of modern civilization. (Sapir [1921] 1963: 22; see also 123–4)

When Boas and Sapir were writing, "linguistics" was scarcely established as a subject in its own right. As the twentieth century proceeded, the growing community of professional linguists came to take these ideas for granted, but they certainly were not equally axiomatic outside that narrow academic community. The *Guinness Book of Records* has for many decades aimed to provide a popular compendium of sober factual information about the world's biggest, smallest, fastest, etc. in all areas of science and human life. Its 1956 edition (Guinness Superlatives 1956) had an entry for "most primitive language", the answer being the Australian language "Arunta" (now called Aranda), which is "grammatically primitive" and in which "Words are indeterminate in meaning and form". A twenty-first-century publication might be less forthright, if only out of political caution, but the axiom that, with respect to language structure, unfamiliar implies unsystematic is surely not yet dead.

When we consider how badly Boas's and Sapir's points needed making in the twentieth century, we might expect that it would have been virtually inevitable for Gladstone in the 1850s to take the apparently chaotic application of colour terms by Homer as representing real chaos in the vocabulary of a pre-classical society. It would have been very easy for Gladstone to conclude, in the words of the *Guinness Book*, that Homer's colour words were "indeterminate in meaning". Instead, Gladstone argued that they represented a system whose basis contrasted with that of modern European colour vocabularies. Our modern colour words are based mainly on place in the wavelength spectrum – what Gladstone called "prismatic colours"; Homer on the other hand had "principally, a system in lieu of colour, founded upon light and upon darkness" (*SHHA3*: 488); "the Homeric colours are really the modes and forms of light, and of . . . darkness . . . the quantity of light, not decomposed [i.e. regardless of wavelengths included in it], which falls upon [an] object, and . . . the mode of its incidence" (*SHHA3*: 489).

To see what Gladstone meant by "modes and forms of light", consider his discussion (*SHHA3*: 473) of the words *aithōn* (derived from *aithō* "to kindle") and its compound *aithops* ("*aithōn*-looking"). Homer applies these words to: horses; iron; a lion; copper utensils; a bull; an eagle; wine; copper; and

smoke.[7] Gladstone asks "In what manner are we to find a common thread upon which to hang the colours of iron, copper, horses, [etc.]? We must here again adopt the vague word 'dark' . . . But as the idea of *aithō* includes flame struggling with smoke, so there may be a flash of light upon the dark object." In English, Gladstone suggests, to indicate a low position on the light-to-dark dimension we have only the vague term "dark", while Homer had separate words for different kinds of "dark": *aithōn* was something like "dark with gleams of light" (in the case of the animals, the gleams perhaps came from eyes and/or teeth), whereas for instance *porphyreos* denoted "dark" without any implication of gleams of light, as in the case of blood or dark cloud; and Gladstone quotes other Homeric words too for which English provides only the translation "dark".

It might fairly be objected that Gladstone did not succeed in articulating the system he discerned in Homer's vocabulary to any degree of detail. He was hampered in trying to do this by limited understanding of the physics of light and colour. But this shortcoming is very forgivable, when we consider that (as I shall show below) much more recent scholarly writing on the same topic suffers from the same limitations, with less excuse in terms of the general state of scientific knowledge.

Physically, to define the colour of a surface requires specifying points on a number of dimensions or scales. Three important dimensions are *hue* (place in the spectrum of wavelengths from red to violet), *lightness* (from white through pale and dark tones of any hue to black), and *saturation*: what in layman's terms might be called the "richness" of a colour – the extent to which it departs from a grey of the same degree of lightness.[8] The human eye can perceive greater saturation at some points on the two-dimensional hue/lightness surface than at others: an intense scarlet is much more vivid than the most intense possible pale blue-green, for instance. George Collier (1973) showed that the "focal colours" which Berlin and Kay (1969) found to recur as denotata of basic colour terms in diverse modern languages coincide almost perfectly with the hue/lightness points where the eye can perceive most saturation.

Hue, lightness, and saturation do not exhaust the dimensions of colour perception. For instance the difference between "gold" and "yellow" has to do not with those dimensions but with a contrast between shiny and matte. Van Brakel

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7 Gladstone also linked *aithōn* and *aithops* with *Aithiops* for a dark-skinned African; but the stem here seems to have meant literally "burnt", Africans being taken by the Greeks as heavily suntanned, rather than being a colour word.

8 The dimension of "lightness" is sometimes alternatively called "brightness" in the literature; but that is potentially confusing, because in everyday English *bright red* (e.g.) is more likely to mean "highly saturated red" than "light red".

(1993, n. 21), referring to a monograph on the psychology of colour perception (Beck 1972), lists as further dimensions:

> size, shape, location, fluctuation (flicker, sparkle, glitter), texture, transparency, lustre (glossiness), glow, fluorescence, metallic appearance (iridescence), insistence, pronouncedness, and possibly more.

Gladstone clearly recognized the dimensions of hue and lightness, and phrases such as "modes and forms of light" show that he had some awareness that there was more to it than just those two dimensions; but he had no clear grasp of further dimensions. There was certainly no explicit concept in Gladstone's writings corresponding to saturation, and this may well have prevented him going further than he did to articulate Homer's system of colour words. Looking at Gladstone's account of Homer's uses of *porphyreos*, it seems possible that what this term actually meant was something like "dark but high on the saturation scale (irrespective of place on the hue dimension)". The colour of blood is a vivid (high-saturation) red; a wave of the sea shows a high-saturation blue-green (whereas a flat sea shows largely reflected sunlight rather than high-saturation colour). In the modern world we are surrounded by highly-saturated samples of many contrasting hues, so it might be odd to have a term that meant merely "highly saturated, irrespective of hue". But in Homer's low-tech world highly saturated colour will have been rare. Look at a rural landscape today, and the few vivid splashes of colour, if there are any, will often coincide with artificial objects: say, a scarlet postbox, or a yellow warning sign; fields and woods are much more subdued in colour. Homer's world had no postboxes or warning signs. High saturation, irrespective of hue, may have been remarkable enough to call for its own descriptive term. "Dark but highly saturated" could have been the property which motivated *oinops*, "wine-looking", as an epithet for the sea.

I do not claim certainty about my gloss for *porphyreos*. (I suspect the data are not sufficient for us to achieve a full, reliable reconstruction of Homer's colour vocabulary.) But the gloss is at least plausible, and it illustrates the way in which Gladstone's success in linguistic reconstruction was limited by his limited understanding of the scientific facts: if my gloss is correct, it is unlikely that Gladstone could have formulated it.[9]

9 My hypothesis about *porphyreos* could not be right if Gladstone were justified in claiming that Homer applied the word to "The grey and leaden colour of a dark cloud when about to burst in storm" (*SHHA3*: 462): leaden grey is an entirely unsaturated colour. But Gladstone appears to be thinking here of *Iliad* xvii.551, which contains no mention of "lead(en)". British stormclouds are leaden grey, but those of southerly latitudes are sometimes described in English as "coppery". The Wikipedia article on "Clouds" (accessed 3 March 2011) describes the "blood-red" appearance

From the perspective of 150 years later we might see Gladstone's "two-dimensional" concept of colour as naïve. But academics in recent decades have been no less naïve.

Many students in the 1950s and 1960s came to linguistics via H.A. Gleason's *Introduction to Descriptive Linguistics* (1955). Gleason's initial example of structural differences between languages (Gleason [1955] 1969: 4–6) related to the non-equivalence of colour terms between languages of diverse cultures. Where English has six basic terms for different hues, two African languages, Shona and Bassa, were described as having respectively three and two. Gleason's exposition is based on a model of colour which was not two-dimensional but one-dimensional: hue was the only dimension considered.

One-dimensional models of colour have a respectable scientific ancestry. Beare (1906: 69) notes that Aristotle held such a view, and that it survived as late as Goethe's early-nineteenth-century *Farbenlehre*.[10] However, by the 1950s a one-dimensional model could hardly be taken seriously.

It may be that Gleason did not take it seriously: it is reasonable to simplify complicated things in an introductory student textbook. But if we examine Berlin and Kay (1969), written as a research monograph rather than an undergraduate textbook, we find that Berlin and Kay are still using a model based on just two dimensions, i.e. no more sophisticated than Gladstone. Berlin and Kay investigated colour vocabularies by asking language informants to define their colour terms with respect to a standard set of colour samples (the Munsell set, Nickerson 1940). The Munsell set consists of 1600 samples ("chips") representing points spaced at psychologically-equal intervals through the three-dimensional space defined by the hue, lightness, and saturation scales. But Berlin and Kay did not use the 1600-sample set; they worked just with the 320 samples of maximum saturation for each hue/brightness combination, plus the ten samples of zero saturation. In other words, except for words corresponding to English *black*, *white*, and *grey*, Berlin and Kay simply assumed that contrasts among colour terms in the languages they studied would not relate to differences on the saturation dimension (or on any other dimensions apart from hue and lightness). Furthermore Berlin and Kay were not idiosyncratic in studying colour vocabulary this way; ethnographers since Lenneberg and Roberts (1956) have consistently used this restricted version of the Munsell system (MacLaury 1992: 138) – though

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of "large, mature thunderheads" near sunrise or sunset. Homer may have meant that the cloud was dark and had as much colour in it as clouds ever do.

10 Beare bases his account of Aristotle's colour theory on Prantl (1849). If I understand Prantl (pp. 116–19) correctly, Aristotle saw colours as arranged in a sequence white–yellow–red–violet–green–blue–black.

the availability of the full system implies that recent ethnographers, unlike Gladstone, knew that they were choosing to ignore at least the dimension of saturation. (Jaap Van Brakel 1993: 112 has suggested that this methodology may eliminate as many as "95 per cent of the world's colour words" from consideration.)

Clearly, if recent scholars knowingly adopt an impoverished model of colour, we cannot criticize Gladstone for adopting the same model without knowing that it was over-simple. Within the last twenty years, Robert MacLaury published a "target article" (MacLaury 1992) which attracted considerable discussion, arguing that an evolution from vision vocabulary based on the lightness dimension to one based on hue can regularly be observed as cultures develop in technological sophistication. Well over a century earlier, Gladstone had argued for just such a transition as the Greeks emerged from their dark age.[11]

3.2 The Sapir–Whorf hypothesis

The idea that exotic languages are systematic in their own way may be the aspect of linguistics which most deserves the public's consideration; but the area of the subject which has actually attracted most attention from laymen is probably the so-called Sapir–Whorf hypothesis, which is the topic of Guy Deutscher's 2011 book. As Edward Sapir expressed this idea: "the 'real world' is to a large extent unconsciously built up on the language habits of the group. . . . The worlds in which different societies live are distinct worlds, not merely the same world with different labels attached." (Sapir 1929: 209). People are understandably fascinated by the idea that our perception of basic, abstract features of the world we inhabit may differ radically in ways that relate to the structure of our native language.

Most twenty-first-century academics probably dissent from the Sapir–Whorf hypothesis in the strong form in which Sapir and Benjamin Lee Whorf propounded it. This is partly because Whorf's analyses of the Hopi language and world-view, which made that strong hypothesis seem plausible, are now known to have been based on very limited acquaintance with Hopi, and Whorf's large claims about Hopi being a "timeless language" (Whorf [1940] 1956: 216) have been contradicted by independent evidence (see Malotki 1983, discussed by

11 To a reader who persists in believing that Gladstone was discussing colour-blindness, I would comment: clearly MacLaury at the end of the twentieth century did not suppose that members of technologically simple societies are colour-blind. MacLaury has put forward a coherent hypothesis about cultural development of sensitivity to colours; what could we reasonably expect Gladstone to have said that he did not say, if he were aiming to advocate the same hypothesis which MacLaury certainly does advocate?

Deutscher 2011: 143). But it is also because the hypothesis seemed to ascribe to language too much control over individuals' minds. Sapir wrote (1931) about the "tyrannical hold" of grammar over our interpretation of experience, and (in the 1929 passage excerpted above) about people being "very much at the mercy" of their language. But we know that people can and sometimes do learn to see the world in radically new ways, and their native language does not prevent that. The German language served successfully to express mediaeval and then Newtonian concepts of physics, but it did not hinder Albert Einstein from replacing these with a very different model of space, time, and other fundamentals.

Nevertheless, one can reject the idea that language constrains original thinking, and yet accept the possibility that societies may differ in their usual ways of perceiving the world, and that those differences may sometimes be reflected in the structures of their respective languages. Language will not prevent our ideas changing, but if they do change and the change pervades our society then it might trigger corresponding changes in our language.

In this weaker form the Sapir–Whorf hypothesis (if we can still call it that) remains an idea of great public interest. We have already seen in sec. 2.1 how Gladstone used the case of colour to argue for this idea. The appearance of surfaces is one fairly fundamental aspect of perception: Gladstone argued that the Homeric Greeks categorized them in terms of light and dark but were only beginning to learn to categorize them also in terms of hue, which to us is so basic a feature of vision that we can scarcely imagine ignoring it. By claiming that Gladstone believed in Homeric colour blindness, Deutscher (2011) makes it appear that no-one before Sapir and Whorf imagined that language differences might reflect socially-determined differences in perception. In reality, Gladstone proposed such a correlation in a subtler form than Sapir and Whorf; Gladstone did not suggest that the Greek language prevented its speakers learning to develop a hue-based colour system – he knew that, in due course, they did so.

Deutscher does not discuss what Gladstone wrote about Homer's arithmetic concepts, but this was even more telling. Gladstone gave a long, detailed argument to support the claim that Homer's "mind never had before it any of those processes, simple as they are to all who are familiar with them, of multiplication, subtraction, or division" (*SHHA3*: 438). Homer "has not even the words necessary to enable him to say, 'This house is five times as large as that.' If he had the idea to express, he would say, Five houses, each as large as that, would hardly be equal to this" (*SHHA3*: 430).

Arithmetical operations are as abstract and fundamental an aspect of our world-view as there could be, so if Gladstone was right to infer from the numerous passages he cites that Homer had no concept of them, this is very striking support for the Sapir–Whorf hypothesis – in its reasonable, weaker version (later Greek-

speakers certainly learned about multiplication, etc.). How far one can make inferences from a language to the arithmetical concepts of its speakers is a matter of intense controversy among anthropological linguists today (e.g. Gordon 2004, Frank et al. 2008).

I know of no-one other than Gladstone who so clearly and carefully anticipated this important intellectual issue.

3.3 Natural families of properties

The categories encoded by vocabulary items of a natural language will commonly not be single, simple physical properties but families of properties which for speakers of the language are somehow related. William Labov (1973) showed how the meaning of English *cup* involved separate properties such as a particular width-to-height ratio, possession of a handle, use for liquid rather than solid food, and others, which jointly differentiates this word from similar words such as *beaker* or *bowl*.

Because modern technology gives us the ability to endow manufactured objects with surfaces of any visual appearance we choose, it seems to us natural for words describing the quality of light reflected by surfaces to combine various of the "colour" properties already discussed, such as hue, lightness, and so forth, but unnatural for them to combine some of those properties with properties unrelated to light quality. There is nothing surprising about the English adjective *navy*, which combines a "blue" value on the hue dimension with a "dark" value on the lightness dimension, but we would not expect to find a word combining the properties blue and heavy, say – what has weight got to do with colour?

Which properties relate closely enough to one another to be linked verbally in this way is a culture-dependent issue, however. Harold Conklin (1955) showed that colour terms in the Philippine language Hanunóo combine light-quality properties with non-visual properties such as wet or fresh versus dry/withered. In terms of hue and lightness, *rara?* and *latuy* denote red and light green respectively; but a "shiny, wet, brown-colored section of newly-cut bamboo" is called *latuy* rather than *rara?*: the brown hue is closer to red than to light green (or to the focus of other Hanunóo colour terms), but the fact that the bamboo is fresh and wet rather than old and dessicated outweighs its hue in determining the applicable "colour" word. For Hanunóo culture, wet/dry and hue are related properties: very often (though not in this particular case), vegetable materials are green when fresh and change hue towards the red end of the spectrum when they wither. And this correlation is important in practice, because people need to distinguish foodstuffs that are good to eat from those that are stale.

Conklin's analysis of Hanunóo colour terms had great impact. The Harold Conklin page on the Minnesota State University "EMuseum" website[12] treats his four-page "Hanunóo color categories" paper as so important that it is the only Conklin publication to be individually identified; it is described as a pioneering exercise in helping "anthropologists to see how people in different cultures conceptualize their world in their own ways". The classic status of the paper was confirmed by inclusion in Dell Hymes's standard anthology *Language in Culture and Society* (Hymes 1964). By now, it is well established that words of non-Western cultures whose senses include colour as one aspect may combine this with diverse other properties, including even properties such as nice/nasty or traditional/modern (see references by Van Brakel 1992: 169 and 172; MacLaury 1992, n. 15). But when Conklin published it, this idea seemed new.

It seemed new; but it wasn't. What Conklin said about Hanunóo *latuy* was said a century earlier by Gladstone about Homer's word *chlōros*. *Chlōros* is the only word in Homer that could be a candidate for the meaning "green", and (according to Liddell and Scott 1855) it derives from *chloē*, "the first light green shoot of plants in spring", which makes "light green" a plausible translation.[13] Sometimes Homer uses *chlōros* in contexts where that translation makes sense, e.g. *chlōras rhōpas* for (presumably leafy) brushwood gathered to create a makeshift bed (*Odyssey* xvi.47) or *rhopalon . . . chlōron elaïneon* for a freshly-cut olive branch (*Odyssey* ix.319–20). But he also applies *chlōros* to honey, whose hue we would describe as yellow rather than green; and in other cases again the word seems to mean simply "pale", applied to a face pale with fear, or by extension to fear itself – that metaphorical usage accounts for the majority of occurrences of *chlōros* in Homer. (In English, of course, we do sometimes describe a frightened person as "going green".) Gladstone's conclusion is that visual appearance is only one aspect of the meaning of Homer's *chlōros*: "the governing idea is not the greenness, but the newness"; "Next to paleness, [*chlōros*] serves chiefly for freshness, i.e. as opposed to what is stale or withered: a singular combination with the former sense" (*SHHA3*: 468). The combination is "singular", or in modern English strange, because we would not want to combine a property of light-quality with properties relating to newness or physical consistency in a single adjective. But for the Homeric Greeks, as for the Hanunóo, this may have been a very natural combination.

Deutscher (2011: 93) comments "Conklin probably never set eyes on Gladstone's explanation . . . But anyone comparing their analyses might be forgiven

12 <www.mnsu.edu/emuseum/cultural/anthropology/Conklin.html>, accessed 3 March 2011.

13 Mallory and Adams (1997, s.v. "yellow") appear to reject this etymology; I am not qualified to resolve the disagreement.

for thinking that Conklin simply lifted his passage wholesale from *Studies on Homer and the Homeric Age*."

3.4 Linking language structure to technology

Gladstone not only recognized that Homer's seemingly chaotic use of colour vocabulary reflected a system based mainly on properties other than hue, which modern colour vocabularies are based on, but he understood the reason for that: modern colour categories are a product of modern technology.

> . . . much of our varied experience in colour is due to chemistry, and to commerce, which brings to us the productions of all the regions of the world. Mere Nature, at any one spot, does not present to us a full and well-marked series of the principal colours such as to be habitually before the mind's eye. (1869: 539–40).

In Homer's time

> The artificial colours, with which the human eye was conversant, were chiefly the ill-defined, and anything but full-bodied, tints of metals. The materials, therefore, for a system of colour did not offer themselves to Homer's vision as they do to ours. Particular colours were indeed exhibited in rare beauty, as the blue of the sea or the sky. Yet these colours were, so to speak, isolated fragments . . . the eye may require a familiarity with an ordered system of colours, as the condition of its being able closely to appreciate any one of them. (*SHHA3*: 488).

Any Western child today learns colours in connexion with plastic toys, alphabet books, and the like which present contrasting examples of highly-saturated primary hues. Homeric Greeks were not exposed to such stimuli.

In the light of modern knowledge, Gladstone's comments seem spot on. People are often puzzled by the fact that many languages lack a word for "blue", when the daytime sky offers such a clear example. But (setting aside the issue of racial differences in perception, cf. sec. 2.3 above), there is evidence (Kristol 1980: 142) that even some modern European dialect speakers may not see the sky as a thing with a nameable colour (and after all, the sky is not a thing). According to Van Brakel (1993: 115), "The most plausible explanation for the ubiquity of common colour meanings in twentieth-century languages is . . . that it reflects the spread of cultural imperialism and common technology, in particular the invention of artificial dyes."

Even Berlin and Kay, who in general are much more interested in innately-determined features of language structure than in culture-dependent features,

recognize (1969: 16) that "to a group . . . who possess no dyed fabrics, color-coded electrical wires, and so forth, it may not be worthwhile to rote-learn labels for gross perceptual discriminations such as green/blue, despite the psychophysical salience of such contrasts" – though this was not a central or widely-noticed aspect of Berlin and Kay's theory. (Those less committed than Berlin and Kay to the concept of innate semantic structure might doubt whether the green/blue contrast will necessarily be psychologically salient for a group such as described.)

Gladstone's discussion implies a testable hypothesis about correlations between the technological resources of a society and an aspect of its language structure. "The art . . . of dyeing was almost . . . unknown" to the Homeric Greeks, so they did not have a hue-based colour vocabulary of the modern European type. By implication, then, other cultures with little experience of artificial pigments will likewise lack a hue-based colour system, whereas cultures which do have that technology, even if they are otherwise little advanced technically, will have a hue-based system.

I do not suggest that Gladstone spelled this out as an explicit hypothesis; there might have been little point in his doing so, because probably he would not have been in a position to test it. But the hypothesis is implicit in his writing; and we can test it.

Testable hypotheses linking non-linguistic features of a society with aspects of its language structure, while obviously desirable if one is keen to establish the scientific credentials of linguistics, have been strikingly rare in the history of that subject. The tendency has been the other way: to assume that any kind of society can have any kind of language. For instance Sapir was making essentially the latter point, in vivid wording, when he wrote ([1921] 1963: 219) "When it comes to linguistic form, Plato walks with the Macedonian swineherd, Confucius with the head-hunting savages of Assam." The earliest point I know of when testable language-type/society-type correlations entered the mainstream of linguistic discourse was with Peter Trudgill's work (e.g. Trudgill 1989) on links between language complexity and the size and openness of societies.

Dyeing was not entirely unknown to the Homeric Greeks, but it was known as an exotic art practised by neighbouring societies to the east. The adjective *porphyreos*, discussed above, derives from *porphyra*, a marine mollusc which yields a dark-red dye;[14] the dye was called *phoinix*, which was also the word for "Phoenician", because the process of making and using it was associated with that

14 It is possible therefore that the compound *haliporphyros* mentioned in sec. 2.1 meant, not "sea-coloured", but "dyed with genuine *porphyra* dye from the sea".

people. (The Romans called the dye "Tyrian purple", from Tyre in the present-day Lebanon.) It is striking that even the simple technique of staining ivory is explicitly associated by Homer (*Iliad* iv.141) with the Carians and Maeonians, non-Indo-European peoples of Asia Minor. According to Hummel and Knecht (1910: 744), "The Phoenician and Alexandrian merchants imported ... dyestuffs into Greece, but we know little or nothing of the methods of dyeing pursued by the Greeks and Romans" – in view of the general articulateness of the two latter peoples, it seems safe to conclude that even in the classical period this technology was not well developed among them. Since it must surely take time for a novel technology to remould basic vocabulary, it is reasonable to see Homeric colour terms as the product of a dyeless culture: and Gladstone tells us that these terms are not hue-based.[15]

MacLaury (1992) offers many examples of other languages of technically-unsophisticated cultures whose "colour" vocabularies are not hue-based. Unfortunately he does not give detail on the technologies traditionally available to the respective cultures, and I am not qualified to do so. What I can do is examine the other leg of the hypothesis, which predicts that the language of a society at an early stage of civilization, if it has acquired the art of dyeing, should have a hue-based colour vocabulary. I have tested this by looking at colour words in the Chinese *Book of Odes* (*Shi jing*).

3.5 Old Chinese as a test case

The *Book of Odes* is a good match in terms of date and genre to the Homeric epics. Both are the earliest literary products of their respective civilizations. The *Odes* are believed to have been composed at different times from the tenth to seventh centuries BC (in Chinese terms, during the Zhou dynasty); Homer, if he was a single individual, probably lived in the eighth century BC (Lane Fox 2008: 381–4), and cast into final form poetic material much of which may have originated well before that time. (The two sets of writings do not match in terms of quantity; the *Odes* comprise just 305 songs or poems, many of which are very short.)

15 One might object that the Minoans, before the Homeric period, knew the art of painting in many colours (as anyone who has seen the frescos from Knossos in the Iraklion Museum could confirm). But, first, Minoan civilization was separated from Homer by a dark age during which many arts were lost; and, probably more important, figurative painting does not lead the mind to consider colour contrasts, as dyeing does. Faced with a polychromatic picture, the obvious thing to think or talk about is what it depicts; with dyed fabrics there is not much for a non-expert to discuss other than their colours.

However, unlike the Greeks of Homer's time, Zhou dynasty Chinese were familiar with the art of dyeing. And as predicted, the use of colour terms in the *Book of Odes* seems much more "normal" by modern European standards than Homer's usage.

The basic colour terms for the Chinese were the so-called 五色 *wǔ sè* "Five Colours": 玄 *xuán* or 黑 *hēi* "black", 朱 *zhū* or 赤 *chì* "red", 青 *qīng* "green, blue", 白 *bó* "white", 黃 *huáng* "yellow".[16] There are 71 occurrences of these words in the *Odes* (not counting separately cases where a word is reduplicated or a line is repeated with or without variations).[17] Among these occurrences, 23 – almost one in three – refer to garments, fabric, spun yarn, red (therefore presumably dyed) leather, or directly to dye.[18]

In the balance of cases where these words apply to things that are not artificially coloured, the choice of colour word seems entirely normal to the European reader. The breakdown is:

24 references to fauna, including eight to horses (mainly "yellow", which seems a natural enough way to describe bay horses) and five occurrences of 黃鳥 *huáng niǎo* "yellow bird", thought to be a name for the oriole
11 references to flora (blooms, leaves)
4 human hair in old age ("yellow")
3 stones
6 miscellaneous (yellow liquid poured as a libation – millet wine?; white dew; white clouds; Black King (apparently a name); and a reference to a horse as black and yellow that seems not to describe its natural coat colours (it may indicate flanks blackened with sweat and legs covered with the yellow mud of North China).

The only choice of colour term which strikes me as even slightly surprising is one reference in Ode 261 to 豹 *bào*, translated variously as "panthers" or "wild cats", as red. But I do not know precisely what colour the big cats in China 3000 years

16 Schuessler (2007: s. vv.) notes that *xuán* was replaced by *hēi* as the basic word for "black" during the Zhou period, and suggests that the same may have been true of *zhū* and *chì* for "red" (which seem to be used interchangeably in the *Odes*).

17 I also omit places in Odes 55 and 233 where standard texts read *qīng* but Karlgren (1942–6: 146) gives reason to believe that the graph is borrowed to represent a different, non-colour word.

18 I include here two cases in Ode 98 where colour words are applied to 充耳 *chōng ěr* "ear stoppers". Karlgren (1950: 63, note a) points out that knowledge of the nature of this important element of Zhou-dynasty apparel was already lost by the Han dynasty, so we cannot now know whether they were made of fabric or perhaps stone such as jade, whose colour is natural rather than artificial.

ago were, and it is not hard to imagine that the fur of some may have been rufous enough to be called "red" rather than "yellow".

Apart from the above words for the "Five Colours", many other colour words occur in the *Odes*; I have not systematically examined their use, but it is noticeable that several, possibly most, of them are written with the "silk" radical (e.g. 素 *sù* "white", 綠 *lǜ* "green"), suggesting that at the time the graphs were created these were perceived as words specially relevant to dyed fabrics.[19]

I find nothing at all that might suggest that any of these words, the Five Colours or the others, were used to denote light-qualities other than hue (together with the senses "black" and "white"). If the early Chinese colour sense had been as different from ours as Gladstone believed Homer's colour sense was, it is implausible that so many uses of colour words should read so naturally to twenty-first-century eyes.[20]

Thus Gladstone's implicit hypothesis relating colour terms to technology passes at least one test involving data that would have been unfamiliar to him (and which have not been examined, to my knowledge, by those who have discussed colour terms recently). Many respected theories in the social sciences have achieved less, in terms of empirical predictions about data unknown to the theorist.

4 Conclusion

If Gladstone had written what he did about Homer's vocabulary in the 1950s–70s rather than a century earlier, expressing himself in the academic idiom of that time rather than of his own, his name might now appear in every introductory linguistics textbook. As it is, although *SHHA3* has occasionally been mentioned in specialist works (e.g. by Berlin and Kay, who appear (1969: 148) to share the misunderstanding that Gladstone believed the Homeric Greeks were colour-blind), Gladstone's scientific writings have largely been ignored, until Deutscher

19 By giving *sù* and *lǜ* the same glosses as I have given for two of the Five Colours, I do not imply that these were simple synonyms; it may be, for instance, that *lǜ* was a specific shade of *qīng*.

20 Since Gladstone remarks (*SHHA3*: 479–81) on the surprising fewness of places where Homer refers to the colours of horses, it should for completeness be pointed out that the Chinese *Odes* also contain numerous specialized terms for horses which are claimed by the commentary tradition to refer to particular colours or patterns of colour. I do not pursue this point, partly because it is not clear in which direction it tends with respect to my overall argument, and partly because these words are long-obsolete and the meanings attributed to them sometimes strain credulity. For instance, would any language really have a simple one-syllable word for a "horse with white left hind leg", the meaning traditionally assigned to 騅 *zhù*?

has now made them widely known but in a way that perpetuates that misunderstanding. Gladstone's writing about language is a striking example of the principle that intellectual advance requires not only individuals who produce good ideas but also an audience ready to receive them.

Over the decades during which Gladstone was writing about Homer's vocabulary, he was first a leading backbencher, and then from 1859 successively Chancellor, Leader of the House, Leader of the Opposition, and Prime Minister, in a parliament which at the time was the ultimate political authority over almost a quarter of humanity. It is not every political figure of Gladstone's stature, to say the least, who finds time to make significant contributions to social science. When one does, we ought not to be grudging in celebrating the fact. And studying how even such a figure can find his intellectual contributions shuffled aside when they are awkward to digest should make us alert to the greater danger that good work by unknown names may receive similar treatment today.

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