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Color Terminology and Color Classification: Ancient Egyptian Color Terminology and Polychromy

The ancient Egyptian language possesses 4 basic color terms; painting uses 7 and later 9 polychrome colors. These sets correspond to Stages IIIa, V, and VII (incomplete) of the Berlin and Kay encoding sequence for language, and support the theory of 11 "basic perceptual color categories." The categories are probably available only through progressive differentiation. The use of color in pictorial representation fits an "active" rather than a "response" model for this expansion. The separation of color use and color terminology has significant cognitive implications.

IN *BASIC COLOR TERMS,* BERLIN AND KAY (1969:104) PROPOSE that "there exist universally for humans eleven basic perceptual color categories, which serve as the psychophysical referents of the eleven or fewer basic color terms in any language." Subsequent work has not invalidated this claim, although their evolutionary "encoding sequence" has subsequently been modified (Figure 1).[1] The "perceptual" and "psychophysical" component of their theory has been investigated in relation to ethnographic and other materials, and synthesized by Kay and McDaniel (1978:especially 617, n. 4, 620, n. 5; see further, Cole and Scribner 1974:43–50; Tornay 1978; von Wattenwyl and Zollinger 1979). These studies have confirmed that the common human perceptual response to some wavelengths of light coincides with some category foci for colors, and that in essence the Berlin and Kay color encoding sequence maps the progressive naming of potential color categories in a set of alternative orders. Language is an index of the discrimination of these categories, but not the only one. If they have any meaning, they should exist outside language, because there is no constraint in language that would require precisely this set or "evolutionary" order to obtain (see also Sun 1983). So far, studies in this area have used primarily physiological and psychological data. It is therefore desirable to investigate suitable nonlinguistic but specifically cultural material in relation to the linguistically based theory of Berlin and Kay.

Here, unusual ancient Egyptian evidence is valuable, for it shows color being used as well as spoken about. This material fits neatly with Berlin and Kay's linguistic hypothesis, placing it in a different light and suggesting some alternative reasons for its organization and "evolution." In this article I explore "perceptual" and "evolutionary" implications of Egyptian color terminology and of color classification as it can be seen in colored decoration and in pictorial representation, concentrating on the latter material. Whereas Berlin and Kay treat the use of color terms as a "response," this can scarcely hold for pictorial representation (e.g., Gombrich 1977; Schäfer 1974), of which coloring is a part, so evidence in paint may reveal different aspects of the issues involved. At the end of the article I return to these questions and consider whether Berlin and Kay's model

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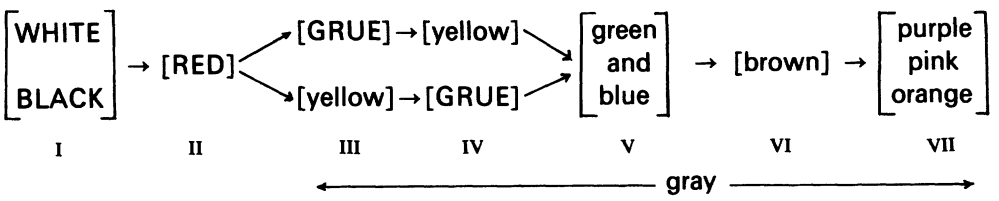


Figure 1
Color encoding sequence (after Turton 1980:331, Fig. 2; schematic version of data in, for example, Kay 1975:260–261; Kay and McDaniel 1978:639, Fig. 13).

for explaining the progress of languages along the encoding sequence is adequate, or whether an "active" model, in which the ordering of experience is central, would be more appropriate.

Egyptian Color Terminology

Egyptian color words are attested from the mid-3rd millennium B.C. to the Middle Ages, and do not appear to have changed greatly during that immense period. Partial extensions of the set of basic terms may have occurred in restricted social contexts and periods, but they did not leave an enduring legacy. Egyptologists have studied this terminology more or less independently of other work in the area, have entertained hypotheses similar to those of other scholars, and in one respect have arrived at conclusions in advance of more widely known disciplines. In an important study, Schenkel (1963) anticipated some features of the work of Berlin and Kay, dividing Egyptian color terminology into "basic" and "secondary" and arranging the basic terms on a biconical rather than a "Mercator" diagram (1963:145, Fig. 4; compare Kay and McDaniel 1978:628, Fig. 8). Schenkel concluded that there are four basic color terms (not his way of putting it) in Egyptian: BLACK *(km)*, WHITE *(ḥḏ)*, RED *(dšr)*, and green (Berlin and Kay GRUE [green/blue]: *w3ḏ*). To these should perhaps be added *s3b*, a texture term meaning "variegated" or "multicolored," used for animals' skins, birds' plumage, and snakes' skins, but apparently not for anything else (Erman and Grapow 1930:15, ref. 13; 16, ref. 3). This terminology corresponds to Berlin and Kay's Stage IIIa. The only subsequent discussions of the terms are those of Hermann (1969), who wished to reinstate a basic term for "blue," the existence of which was denied by Schenkel (1963:142), and of Brunner-Traut (1977), who does not address the same issues directly (see also Weeks 1979:66–68; see further note 3). The proposal of Hermann is effectively excluded by the Berlin and Kay theory (which he could not have known), because the term Egyptian should have acquired after GRUE is not blue but yellow. Other evidence, such as the fact that blue plays no part in color symbolism in texts, also speaks against Hermann's view. Schenkel's analysis still stands, and words for blue, of which there are at least two, *ḫsbḏ* and *jrtjw* (also sometimes applied to red objects), are secondary.

In distributing the chromatic terms *dšr* and *w3ḏ* on his biconical diagram, Schenkel assumed that they designated sectors of the color solid. Since the work of Berlin and Kay, this is known to be improbable, because color terms have a focus, rather than delineating an area. Instead of saying that *dšr* covers both red and yellow, we should say that it describes "warm" colors (as Schenkel also put it) and focalizes in red; similarly, *w3ḏ* almost certainly has its focus in green. The work of Berlin and Kay allows a better understanding of how colors, and, in Egypt, the use of colors on the monuments, can be related to color terms, but it does not affect the basic findings of Schenkel.

According to the analysis of Landsberger (1967), Sumerian and Akkadian, the languages of ancient Mesopotamia, also possess four basic color terms: BLACK (Sum.: gi_6/Akk.: *ṣalmu*), WHITE (babbar/*pesû*), RED (su_4/sa_5/*samu*), and GRUE (sig_7/*warqu*), as well as a word, ugun/*burrumu*, for "variegated."[2] These are given in the canonical bilin-

gual lexical list HAR-ra—*hubullu,* in the order just used, except that "variegated" comes between RED and GRUE—possibly pointing to a later incorporation of GRUE in the set. Sumerian and Akkadian are unrelated, and the constancy in color terms across a change in language and language family emphasizes the primacy of nonlinguistic factors in the formation of the set. In their basic color terms, the two most important civilizations of the ancient Near East are thus identical.

It might be possible to reduce the Egyptian terminology further and reconstruct an original three-term set in which *w3ḏ* (GRUE) is absent or secondary (Berlin and Kay's Stage II); such a set could have existed before the Old Kingdom (ca. 2500 B.C.; for comparable reconstructions see Witkowski and Brown 1981). *w3ḏ* is the least "stable" of the terms, also meaning "fresh" and "papyrus stem," both of which senses have strong symbolic associations. It can even describe an archetypally red object, the king's "red crown," but this can be explained without assuming a reduced terminology (Schenkel 1963:146; but cf. Harris 1961:226). The best interpretation is that red, whose symbolism may be negative, is being avoided, and such an avoidance is most neatly accomplished if the word substituted can be a color term, so that the "fresh" crown also implies the "non-red"one.[3] The other basic terms also have strong noncolor associations: *km* (BLACK) with "Egypt" or the color of the soil *(kmt), ḥḏ* (WHITE) with "silver" (also *ḥḏ*; reduced to this meaning in Coptic), and *dšr* (RED) with "desert" *(dšrt).* It is not, therefore, possible to argue that, unlike the others, *w3ḏ* is not "abstract" enough to be a basic color term. Despite its ambiguous status, the evidence for excluding it from an original set is insufficient. In all known stages, Egyptian possessed a four-term set of basic color terms.[4]

Coptic, the medieval successor of Egyptian, has a set of terms derived etymologically from Egyptian, with one or two changes (Schenkel 1963:144–145; see in general Černý 1976; Westendorf 1965–77). The repertory is *kmom* (BLACK), *ubaš* or *alaw* (WHITE), *tōrš* (RED), and *wōt* (GRUE). In addition, there is a term, *mroš,* of uncertain focus in the red area. If this is a basic color term, there are two with apparently similar meaning, and one of them might turn out to be "yellow." If so, some stage or dialect of Coptic may have had a terminology corresponding to Stage IV of Berlin and Kay. Both *tōrš* and *mroš* derive from Egyptian roots with red associations, so that etymology does not offer a solution.[5]

Color symbolism in Egyptian religious texts supports Schenkel's interpretation (cf. Kees 1943). The only symbolically important colors are the basic four, together with *s3b* ("variegated"). This symbolism is to a great extent independent of the equally religious symbolism visible on colored monuments, where a larger number of basic colors is employed (discussed below). There are points of contact between texts and color on the monuments in such contexts as descriptions of the bodily forms of gods in terms of colored minerals like gold, silver, lapis lazuli, turquoise, Egyptian faience (an artificial substance), jasper, and carnelian, but although these descriptions, which correspond with the use of precious substances in the manufacture and inlay of statues and reliefs, allow additional color values to appear in texts, they are specialized and in many instances metaphorical (e.g., Lichtheim 1973:220, 1976:198, Fecht 1965:52–55; Harris 1961:222–223; see also note 3 herein).

As well as basic color terms, Egyptian possesses a word for "color," *jwn* or *jnm* (Harris 1961:225–226; on words for color see Conklin 1973:934). There are sufficient examples of *jwn/jnm* meaning the "color" of a material for it to be clear that this is an autonomous usage. These roots also have the meanings "skin" and "character"; in Egyptian terms, color is an indissociable part of anything (Kees 1943:414–415). The presence of a word for "color" shows that color was perceived as a separate domain, but it is uncertain how much general significance this has. The prominence of color symbolism and classification in a culture may be in inverse ratio to the complexity of color terminology and to the use of abstractions for ordering phenomena. Here one might compare the Stage II language of the Ndembu with the role of color classification in their rituals (Turner 1966). In psychological testing, color is preferred to form or function as a criterion of classification

precisely by those who will have a more restricted vocabulary of basic color terms (cf. Cole and Scribner 1974:90–94).

Polychromy: Nature and Status of the Evidence

In strong contrast with Egyptian color terminology, the evidence for the *use* of color in Egypt is unique. All representations in sculpture in the round, relief sculpture, and painting were ideally painted in full color, and much color is preserved on monuments and objects from the earlier periods (ca. 2600–1000 B.C.; cf. Reuterswärd 1958). Little of what is preserved and now vanishing is published, but it is still possible to make a better comparison between linguistic and artistic color classification in Egypt than almost anywhere else. Except in the work of Schenkel, one bar to progress has been a tacit assumption that color use and color terminology should coincide.[6]

Egyptian painting is basically polychrome, that is, it uses colors in solid patches or, more rarely, in textures and patterns.[7] Shading (e.g., Davies and Gardiner 1936, II: pl. 91) is extremely rare, and color perspective and other similar modifications almost unknown. Each color indicates in schematic fashion that the class of object shown is "red," "green," and so forth; it does not show the color of a particular object or of that object as seen on a particular occasion. The same is generally true of Egyptian representation, which shows objects and scenes in the first place as examples of categories or types and secondarily—if at all—in their specific appearance (Schäfer 1974; Baines 1985b). In the present context, what is at issue is not so much the representational role of color as the number of colors used and how far they form a set. If the number is stable and the usage consistent, the set of colors in pictorial representation and decoration reflects—within the technical limitations of pigment production—a classification of colors, irrespective of how precisely it is used (compare Bruno's [1977:50] comments on Classical Greece). The color categories that are reflected in representation exist outside it, just as the set of color terms in a language attests to, but does not itself constitute, a color classification.

In theory, it would be possible to have wholly arbitrary color conventions, but in fact the choice of colors in painting seems relatively "natural" and its motivation straightforward. There is, in addition, a non-"realistic" symbolic use of color, in which, for example, figures of deities may have a blue or green skin. Because of the association skin–color–nature, these colors may in part display the "nature" of the being depicted, but colors are also used in more arbitrary fashion, so that sets of figures are colored according to numerical schemas, and different parts of a figure may have distinct, non-"realistic" colors for reasons of pattern (Baines 1985a:Appendix). Such examples demonstrate that colors are not always believed to be inherent in the figures that receive them and may convey meaning as a set. Since blue is very prominent in patterning, the set must be excerpted from the range of colors used in paint, not defined by basic color terms in language.

The precise shade of painted colors is in part technically determined. Pigments are not completely stable and have suffered loss and occasional discoloration since antiquity; the original character of painting often has to be reconstructed (compare Ransom Williams 1932:pl. 13 with pl. 12). In any case, the Egyptians were not concerned with reproducing identical shades in paint, so it is not relevant to define the shades of the different colors on a chart (for values see Schenkel 1963:136–138). An obvious illustration of this is where figures of men in a layered row are painted in alternating lighter and darker shades of red (e.g., Davies and Gardiner 1936, I: pls. 28 mid, 45, 48; II: pls. 60, 61 [men and women], 63, 71, 73, 81 [Nubians], 98). The color is mostly the conventional male red, and the alternation is there for the visual purpose of making the picture more attractive and easily legible. Men are red and women yellow (with many exceptions).[8] Here, different colors were used to keep categories apart and to say something about ideals of beauty, in which women were paler, probably because they led a more indoor life (cf. Fischer 1963:17–22).

Colors in the polychrome repertory are not restricted to single shades. From as early

as the beginning of the Old Kingdom (ca. 2600 B.C.), different shades of a single color, especially of red, occur side by side.[9] The colors—red, yellow, etc.—remain distinct, however, and gradations of color within one patch of paint are rare in all periods.

Another significant feature of coloring is that colored textures such as brindled animal skins, unlike other types of shading, occur alongside plain colors. This may relate to the importance of the texture term *s3b* ("variegated"), and it has parallels elsewhere, as in Mursi, in which all color terms are ultimately terms for cattle color or pattern and texture on cattle hides (Turton 1980:320). Texture terminology, which can be far more specific than color terms, appears to have received little attention (see also Turton 1980:328–329).

The schematic character of Egyptian color use justifies an attempt to analyze the color classification it implies, and the development of that classification, in relation to the Berlin and Kay theory.

The Changing Set of Colors in Paint

Painted colors changed significantly between the Old Kingdom (ca. 2600 B.C.) and the later New Kingdom (ca. 1540–1070 B.C.), and evolved further by the Greco-Roman period (332 B.C.–ca. A.D. 250). The sparse Greco-Roman evidence shows that color use in that period was different from, and more heavily symbolic than, that of earlier times.

The Old Kingdom repertory of painted colors consists of black, white, red, green, yellow, blue, gray.[10] Red tends, as in all periods, toward brown, and yellow tends to be an ochre shade. These characteristics might relate to the objects for which the colors are used—because bright red or yellow men and women would not look natural—but they could also be the result of the technical origin of the pigments, or of a compromise between the two factors. In any case, they are far from the foci of these colors as defined by Berlin and Kay.

The first four of these colors are covered in an obvious way by color terms in the Egyptian language. In normal usage, yellow would probably be described by the same word as red, and blue by the same as green; how gray would be designated is uncertain.

Blue is not found in the earliest material, but from its introduction in the form of an artificial frit around 2550 B.C., it was used as a normal color along with the others. Many features of its usage show that it was the most prestigious color in paint, and in later periods it came to be the commonest, but in the Old Kingdom it was sufficiently rare to be worthy of note. In a text of the 5th dynasty (ca. 2450 B.C.), an official states that the king "caused pigment(?) to be placed in" the hieroglyphs on a monument of his, and they were "inscribed" in "blue *ḫsbḏ*," an implied contrast with the more widespread and less prestigious green paint used for inscriptions (Sethe 1933:39, 2–3; Posener Kriéger 1983:52 reports another occurrence of "inscribed in blue"). *ḫsbḏ* is also the word for lapis lazuli, which was not used as a pigment (as it was in the European Middle Ages), so here it should have the transferred sense of blue, either the pigment or the color (the object, which is preserved, shows no abnormal treatment).[11] The term is secondary (Schenkel 1963) and describes a significant favor bestowed on the official. In normal speech, he might have used *w3ḏ* for both blue and green, but here it was necessary to be more specific.

Whereas blue is a latecomer in paint, yellow is not. It is derived from an easily available mineral and was used in all periods (Lucas and Harris 1962:349–351). It is therefore especially significant that there is no basic color term for yellow in Egyptian.

Gray is seldom a specific color in Old Kingdom depictions of objects, but it was used, often as a blue-gray, as an overall background to scenes (Ransom Williams 1932:70). It also occurs in the texture of goose plumage in an early 4th-dynasty painting (ca. 2550 B.C.) (Mekhitarian [1954:9])[12] and extensively on slab stelae dating a few decades later. On these, gray appears to substitute for both green (present, but sparingly used) and blue, the chief colors employed being black (also used for more objects than normal),

white, red, yellow, and gray.[13] The reasons for the near-absence of green are not clear, but the distribution of colors can be understood as the result of scarcity or restriction, not of unusual terminology or classification. Among the earliest uses of gray for large areas of figures are gray donkeys of the 1st intermediate period (ca. 2150–2040 B.C.; e.g., Baines and Málek 1980:82; Stadelmann 1962:57 with n. 1; New Kingdom example: Mekhitarian 1954:26). In contrast with the earlier cases, the representational purpose of gray here is straightforward.

The Old Kingdom repertory of painted colors thus corresponds neatly with Stage V of the Berlin and Kay encoding sequence for language (Figure 1).[14]

Little suitable colored material from the Middle Kingdom (ca. 2040–1640 B.C.) has been well published. In this period the general character of coloring is not very different from that of the Old Kingdom, but there may be one significant development. Red is differentiated more frequently and in an increasing number of shades. On the coffin published by Terrace (1968), several reds occur, including a dark one used for copper, which might better be described as a brown (e.g., pls. 15, 16, 19, 20), and in at least one case there is a very pale tone that looks like a distinct pink.[15] Possible browns are found in other paintings of the period (e.g., Davies and Gardiner 1936, I: pl. 5 [copper, as on Terrace's coffin], pl. 6, mid right and lower, pl. 9 [tree]). This sparse evidence for the division of red into distinct colors—as opposed to shades of the same color—is suggestive, because it follows the sequence of Berlin and Kay, in which the four "primaries," red, yellow, green, and blue, are distinguished before "secondary" colors, and the first "secondary" division is in the most salient primary color, red (see also Turton 1980:331–332; Sahlins 1977:168, 175). If brown is a distinct color, it enlarges the previous repertory without changing the basic approach to coloring.

In New Kingdom (ca. 1540–1070 B.C.) material, the use of color becomes richer and more diverse and develops within the period, especially from 1400 to 1250 B.C. Restricted and specialized color repertories occur.[16] Pink is found in this period[17] and is not always a lighter red, which would often be a beige because of the basic shade of Egyptian red (Lucas and Harris 1962:346; see also note 7 herein). Brown becomes rather more frequent.[18] The extended range is black, white, red, green, yellow, strong blue, light blue, gray, brown, pink. Of the 11 basic colors of Berlin and Kay, only orange and purple are absent. Thus, in more elaborate works, New Kingdom *paint* usage is a partial parallel for their Stage VII in language (Figure 1).[19]

According to Berlin and Kay (1969:20), languages that have progressed beyond Stage VI (addition of brown) and include any of the Stage VII colors, purple, pink, and orange, normally acquire all three rapidly. Both the division of blue noted above and the absence of purple and orange should therefore be considered, but for purple I can offer no specific explanation. The New Kingdom painted set is not among those attested in Berlin and Kay's tables (1969:3, table 1, 21, table 3). However, this point does not seem to have any theoretical significance. As Berlin and Kay (1969:3) note, only 22 out of 2,048 logically possible patterns were known at the time of composition of their monograph; whereas some new patterns would speak against their hypothesis, this one does not.

I have included the division of blue in the list of New Kingdom colors because it is very noticeable[20] and because blue divides into two, and not, like red, in a variety of ways. The different blues are not, however, normally used to differentiate between classes of object, and there is no reason for thinking that the second blue is an important extra category as, for example, in Russian. Rather, it is a mark of the prestige of blue in Egyptian polychromy. It occurs so much and is the object of so much attention that it is subdivided. Colored inlays, in which the use of color is more varied and more arbitrary than it is in paint, can also have two blues (Manniche 1982).

Orange is not a distinct color, but Egyptian yellow is often half way to orange, and so might not easily have been divided; pigment production could also have been difficult. There are, however, notable subdivisions of yellow that show how orange could develop, and costly new pigments are used as well as the traditional yellow ochre (Feucht, personal

communication). Where objects of gold are depicted, their color is often different from, and more orange than, other yellow in the same composition (e.g., Davies and Gardiner 1936, II: pl. 53). Such objects are outlined in a darker color that is not otherwise used and could be seen as a dark orange or brown. In this area, differentiations comparable with yellow/orange/brown can be observed, but they do not correspond with the normal foci of these colors and are too closely tied to the depiction of particular objects and materials to be generalized. They are comparable with secondary color terms in language, but they demonstrate the potential, as it were, for the introduction of orange in painting; the question remains whether there could be a classification including orange (and purple) that was not realized in paint or in language.[21]

As is clear from blue and "orange," late 18th–19th-dynasty coloring is at the limit of polychromy. Further elaboration would take the system, which is already far outside Egyptian basic color terms, beyond "basic colors" altogether. Polychrome color operates like a conceptual classification, in keeping with the "conceptual" character of Egyptian pictorial representation. There is a fundamental kinship between polychromy and nonperspective representation, and, conversely, between perspective and what would in Western art be called "painterly" coloring. If there is a "painterly" accommodation to the visual image, in which shading is used and the incidental effects of light may be recorded, this will render inappropriate any attempt to see classification in painting as related to discrete colors. For this reason, an investigation of Classical color terminology in parallel with preserved wall paintings, for example, would not show whether Classical color classification went beyond the rather restricted color terminologies of the time (for Homeric Greek see Berlin and Kay 1969:70–71; Maxwell-Stuart 1981 does not consider theoretical issues). As color use moves away from a few clearly demarcated categories, its role in symbolism may decline. In "realistic" representation, the classificatory and symbolic use of color can become anomalous.

In later-18th-dynasty (ca. 1400 B.C.) material, in which the most striking developments occur, coloring in narrowly religious contexts—principally temple relief—diverges from that of the most sophisticated works in other areas; in one case the "nontemple" style even occurs in another part of the same wall as "religious" temple painting (temple of Amenhotpe III at Wadi el-Sebuᶜa). The nontemple coloring scarcely survived the general decline in nonreligious art in the 19th–20th dynasties, which is part of a tendency visible in many cultural spheres. At least in their artistic context, the new colors and treatments acquired "secular" associations that contributed to their later rarity.

In consequence, New Kingdom innovations do not seem to have been built upon in later periods, except in a tendency to use special ranges of shades. Coloring differs in "secular" and "religious" works, but the basic colors are the same in both. The general color effect of Greco-Roman period reliefs (332 B.C.–ca. A.D. 250) is much more pastel than that of the New Kingdom, but there is still no shading, so that it should be possible to analyze the repertory in terms similar to those employed above; the transition to a "painterly" treatment is not made.[22]

As noted above, in all periods painted color can be used in a symbolic rather than realistic or narrowly classificatory fashion. Because of the divergence between terminology and paint, this symbolic use is necessarily different from color symbolism in texts, but there are many correspondences. Blue is the most prestigious painted color; it is also employed in the most obviously nonrealistic way. Among symbolic references that can be discovered for blue are water, as when the body of a figure is in one example covered with water lines and in another blue (Baines 1985a: Appendix z), and air and sky, which are probably the referents of the blue body color of the god Amun. The ceilings of New Kingdom royal tombs are also dark blue, symbolizing primarily the night sky. In the Greco-Roman period, blue abrogates distinctions hallowed in texts and on the monuments: there are blue painted examples of both the white and the red crown of Egyptian kings (Edfu birth house, south exterior wall; Esna, column south of axis; Kom Ombo, column in forecourt). Here blue appears to be used for its own prestige and perhaps for

a general association with the premier semiprecious stone, lapis lazuli. Such cases are valuable in showing that blue acquires a discrete symbolism as well as pictorial functions, even though there is no basic color term for blue.[23] This contradicts statements like Landsberger's (1967:140, n. 7 from 139) that although the Babylonians perceived colors as we do, "they could not see [lapis lazuli] as blue, because they simply did not know what blue is." Like Egyptians, Babylonians could have known "what blue is," but "simply" did not say so.

This use of blue suggests that experiments such as those of Heider (1972; see also von Wattenwyl and Zollinger 1979; Jernudd and White 1983), in which people with restricted color terminologies learned to "activate" additional Berlin and Kay categories and showed greater aptitude for "focal" than for "intermediate" tones, essentially replicate processes that can take place without external stimulus or change in the basic color terms in a language. (Here the attempt of Lucy and Shweder [1979] to controvert Heider's and Berlin and Kay's results is unconvincing.)

Discussion—Cognitive Implications

If the Egyptian language is at Stage IIIa of the Berlin and Kay sequence, and painting in the Old Kingdom is at Stage V, in the Middle Kingdom perhaps at Stage VI, and in the New Kingdom at a partial Stage VII, language will be ill adapted to describing some of the different, for the most part clearly demarcated, colors used in paint—although descriptive phrases or terms for pigments could no doubt be employed.[24] Here the main point is the demarcation of the colors: if they shaded gradually into one another, no terminology would be adequate, as the compilers of color charts know only too well. The Egyptian basic color terms cannot be the stimulus to increase the range of colors in paint. Still less can they provoke the movement from the narrower Old Kingdom repertory to the wider one of the New Kingdom. In the Old Kingdom, yellow, blue, and gray were produced in response to nonlinguistic requirements, the case of blue being noteworthy because an artificial pigment was invented.[25] The polychrome evidence therefore suggests that the seven-color "Stage V" set existed before any verbal representation of it, and that it formed a set of foci corresponding approximately to those of Berlin and Kay.[26] Its visual elaboration must be in response to stimulus from artists or patrons, so that logically it will have existed in some other form, if not in an explicitly recognized set, before it was painted. Art was central to Egyptian high culture, and it is not surprising that resources and creativity were exploited for the production of new pigments, but it remains significant that those pigments had no major linguistic correlates except words for minerals and their names as pigments (note 24 herein).

The date of origin of the classification of 7 (or more) colors cannot be investigated; it can only be said that it coexisted with a Stage III 4-color terminology for a very long period. I add "or more" to allow for the possibility that the 7-color "Stage V" set was excerpted from a larger acknowledged number of foci—up to the "universal" 11. This is, however, improbable, because of its correspondence with a stage in the Berlin and Kay encoding sequence, which is unlikely to be coincidence. A better hypothesis would be that, within the constraints of pigment production, interest in expanding the color repertory follows roughly the same line as the encoding sequence (evidence is insufficient for a stronger formulation): where possible, distinctions in paint emerge in the same order as in language. But whereas language is generally ahead of pictorial representation in recording visual phenomena, such as the diminution of scale with distance, explicitly (cf. Schäfer 1974:82–83), in the case of color, language lags behind, at least in Egypt.[27] Color is more easily painted than talked about. Simple considerations of representation and recognition must play some part here, and probably also relate to the encoding sequence. At a minimum, representation in black—or some other color—and white ("Stage I") is comprehensible and very efficient, and has been the point of departure for pictorial representation in most of the world.[28] At the other extreme, a system that concentrates on

the Stage VII colors, pink, purple, and orange, will be affected, to say the least. Egyptian Old Kingdom works seem so natural that one does not miss the Stage VI and VII colors.

Like the Old Kingdom set, the slightly richer New Kingdom set should be seen as reflecting a preexisting larger visual repertory of color foci. The question is whether the new colors were devised in response to a long-felt need for those colors or more directly as a result of artistic developments we can see were taking place. This issue is similar to, but narrower than, that of the stimulus to increase the number of basic color terms, which Berlin and Kay relate tentatively to increasing "cultural complexity" (1969:16; see also Kay 1975; Friedl 1979; Turton 1980:331–332; Witkowski and Brown 1981:15). Such an explanation could apply to Egyptian New Kingdom culture, which was probably more plural, sophisticated, and technologically advanced than that of the Old Kingdom, with wider horizons of knowledge and experience. It is, however, initially more cautious to view the development within its context and assume that artistic and partly representational goals were being pursued. The new colors are not an isolated phenomenon, and in combination with other considerations this approach has suggestive, if speculative, implications.

The increase in the number of colors coincided with a proliferation of special techniques and unusual color effects. This diversification may have been favored by a concentration on the medium of painting, and by much painting for "secular" contexts such as private houses and palaces; much of the finest work at this point was painting. This contrasts with the Old Kingdom, when the normal medium was painted relief, of which coloring was the final stage, often not reached. Painting encourages a freer treatment, and may have influenced other contemporary developments in conventions of representation. Examples of these are the occurrence of some full-face figures, occasional indication of the second breast on women, and the depiction of all the toes on the backward foot (cf. Schäfer 1974; Baines 1985b). The most characteristic is perhaps a new treatment of drapery, in which the underlying color of a figure is partly seen through cloth in a paler form, in some cases forming the distinct color pink. Where this technique is combined with elaborate folding or pleating, there may be an approach to shading. Taken together, changes such as these show a slight but definite tendency away from conceptual representation toward "realism," or accommodation to the visual image; in the case of drapery, the development is a fusion of the representational and the "painterly," and is especially interesting because of parallels with drapery in Classical art.

I argue elsewhere (Baines 1983, 1985b) that in the 18th dynasty, detailed changes in private inscriptions and elsewhere attest to a relativization of viewpoints, which suggests that the Egyptian elite approached the brink of a cognitive transformation comparable to that of archaic Greece, but that the breakthrough did not occur, and later periods show little sign of the approach to it. Here the approximation to a Stage VII color classification in *paint* is significant in offering a remote parallel for the assumption that such systems in *language* are typical of "highly industrialized . . . peoples," and that "the sequence of elaboration of color lexicon is an evolutionary one accompanying, and perhaps a reflex of, increasing technological and cultural development" (Berlin and Kay 1969:16). If this parallel has any merit, it suggests that development toward more detailed classification of basic colors should be related as much to cognitive or intellectual change—in Egypt attested only for a tiny elite—as to social evolution. This need not always be the case; if and when color terminology reflects color classification accurately and is common to the speakers of a language (but see Kay 1975; Friedl 1979), in complex societies it will be used by people and sectors who vary in their intellectual attainments. In Egypt, the extended color classification could have been confined to the elite (including artists and craftsmen), while the rest of society had the simpler set known from the language, but here it should be remembered that other methods of organizing color and secondary color terms may complicate the picture. Changes in color classification are also more easily diffused, and relevant to more people, than the law of the excluded middle. Whatever the color terminology and classification of Classical Greece, where that law was formulated,

the cautious statement of Berlin and Kay (1969:16) that their Stages I–III are found in languages "spoken by peoples with small populations and limited technology" can be pursued a little further, because, at least in their material, few large, complex societies have languages at Stages IV–VI either. I therefore doubt whether the distinction of societal complexity that Witkowski and Brown (1981) use for Stages II–IV is fundamental. Rather, I suggest that Stage VII, and in some cases perhaps Stages VI (Javanese and Malayalam in Berlin and Kay 1969) and V (Hausa; Mandarin; Plains Tamil) show a more important change, but that such a change is not obligatory. The Egyptian material shows how uncertain such correlations are, because they use only one indicator of color classification.

No society closely comparable with ancient Egypt exists today, and the development of Egypt cannot easily be matched with that of other societies, so the parallel I propose between changes in color classification as recorded in paint and other changes is uncertain. The model it implies is a multilayered one in which paint may reach its terminus in polychromy long before language attains a comparable stage.[29] The society in which this transition occurred is far removed from modern complex societies. Despite the indications of a possible transformation mentioned above, it was also far from the societies of the Greek Classical and Hellenistic periods, in which the next transition, to a "painterly" use of color, took place.[30] These societies in their turn did not possess Stage VII color terminologies and were very different from Berlin and Kay's "highly industrialized . . . peoples." It is unlikely that any societies with Stage VII color terminologies in language have a homogeneous polychrome painting system; thus it may be impossible to investigate parallels there. However this may be, the transition to a Stage VII set is probably an indicator of linguistic or, conceivably, cognitive change rather than of basic color classification, which may reach an analogous point at a much earlier juncture. There will be a number of stages on the way to the Stage VII set, not all of them detectable in language.

Since color classification may expand and be used for pictorial representation independently of language, its evolution should reflect the active dissection of the environment and the elaboration of midrange abstract categories rather than a "response to an informationally richer visual environment" (Berlin and Kay 1969:16)—itself the product of a complex, active process of change and not a simple "response" (compare also Sahlins 1977). It is not so much that the environment is informationally richer as that an informationally richer model of it is constructed, whether in language or in some other medium. If, as in Egypt, partly incommensurable sets are used in different media, the selection and manipulation of them must be complex. Their coexistence is evidently a routine matter for their users, but the choice between them should again be "active"; the nature and significance of this routine would repay investigation.

Growth of midrange abstractions of this sort seems fundamental to cognitive change. Abstractions of the highest order are found in societies of almost any type; as abstractions proliferate, their range lessens and their cognitive utility is enhanced. Dynamic evolutions such as these are more difficult to account for than "responses."

All this leaves open the original question of how universal the "eleven basic perceptual color categories" are and whether they are all put to nonlinguistic use. The Egyptian polychrome evidence shows that the finding that more color categories than are used in language are available to those who have a restricted terminology can be valid for very long time periods, and demonstrates that the larger range can be employed actively and expanded in order to represent and classify the world. This is bound to be true of other societies as well. The Egyptian material includes most of the 11 color categories, but because they undergo much the same "evolutionary" development as language, they may not exist beforehand ready to be made visible in an expanding system. The simultaneous occurrence of diverging systems in language and in paint supports the hypothesis of a fairly full range of categories. If the color solid were not focalized, the discrepancy between the systems would surely be awkward. The solid is therefore probably focalized,

but areas of it are not closely mapped in language or in paint. If these, too, are always "perceptual color categories," they may not be easily available to their possessors, but could become available through progressive differentiation (see also Kay and McDaniel 1978:638–644). In other words, a sudden large increment of explicit color categories is unlikely except, possibly, with the change to a "painterly" use of color.

Conclusion

The evolution of color classification and color use is an active process and the Berlin and Kay theory need not imply any simple "determinism" (e.g., Wald 1978). The Egyptian evidence supports the analysis of Sahlins (1977) and implies some revisions in the original theory. In exploring and ordering color, people discriminate progressively between foci and construct increasingly complex models, which may differ in different media. These developments are strongly constrained by physiology and by the "logic" of the color solid, but they are motivated by social and cognitive factors, rather than "determined" by laws.

Egyptian material confirms that the Berlin and Kay encoding sequence pertains to other areas beyond language, supporting the general hypothesis of "perceptual color categories" and extending it beyond the "primaries" discussed, for example, by Sahlins (1977) and Kay and McDaniel (1978). It also highlights other questions that must be tackled before a comprehensive theory of color categories can be formulated.

Notes

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Since completing this article, I have related the conclusions to some universals in pictorial representation that are comparable with those in color terminology and, I argue, in polychromy; ancient Egypt provides particularly good evidence in this area (see Schäfer 1974). This gives added significance to the New Kingdom developments discussed here. See Baines (1985b).

[1]Witkowski and Brown (1977) have proposed a "weaker" version of the encoding sequence (repeated in Witkowski and Brown 1981; see also Sun 1983). As Turton remarks (1980:333), this may go too far in accommodating particular languages within the general scheme when other arguments could be used to explain exceptions. Here I use the 1975 reformulation of the Berlin and Kay sequence (as presented schematically by Turton), which is in harmony with the Egyptian data and differs less from their original proposal than does that of Witkowski and Brown. Except in the use of gray, the Egyptian material is also compatible with the 1969 sequence. The 1969 discussion remains fundamental.

[2]Landsberger did not use any particular theory of color terminology; the revised readings of the Sumerian terms given here were provided by Norman Yoffee. For Old Testament Hebrew, also a Stage III system, see Brenner (1982).

[3]For a comparable "anomalous" use of "green" see Bender (1983). Helen Whitehouse (personal communication) remarks that some alternations of green and blue stones in Egyptian inlay work imply a basic color term under which they would be grouped; the only candidate for such a term is *w3d* (see also below). Schenkel (1963:146–147) analyzed Old Kingdom painted colors with the same general point in mind and concluded that basic color terms influenced alternations of blue and green and of red and yellow (he now believes that his statistical presentation was not valid [personal communication]). As he states, there is also a certain visual logic in the alternations; the relevance of this evidence to the status of *w3d* remains uncertain (compare the approach of Lucy and Shweder [1979]). Manniche (1982, with a sequel announced), who does not consider *w3d* a "genuine" color term, relates colored inlays to color classification. Her argumentation, however, is not theoretically informed and several of her conclusions are implausible.

[4]Another pointer to a three-term set might be the black, white, red, and variegated calves in the ritual of "striking the calves" (Blackman and Fairman 1949–50; the scene type is known from the

Old Kingdom on: Borchardt 1913:115–116, pl. 47). Cattle do not, however, provide a good "model" for green (compare Turton 1980:333–334), and there could be other reasons for this choice of colors. In one Ptolemaic commentary, the "red" and "variegated" are glossed as "green" and "blue" (?—*jrtjw;* Blackman and Fairman's [1949] no. 4), which shows that there was no simple understanding of the colors.

[5]*mroš* may derive through Greco-Roman Egyptian *mrš* from earlier *mnš(t)*, possibly a word for red ochre (Harris 1961:146–147; Schenkel 1963:145; Westendorf 1965–77:100; Černý 1976:89). There are various words for ochre pigments (Harris 1961:141–162), and one could have become specialized for yellow ochre, but this would have to be a post-Egyptian development.

[6]In the description, I mention few works earlier than Schenkel (1963). Where possible, I quote well-published monuments in order to ease verification.

[7]Ransom Williams (1932); Davies and Gardiner (1936, III: xxxvii–xli); Smith (1949:255–272); Lucas and Harris (1962:338–346); Schenkel (1963:131–132).

[8]Both the differentiation of red and the complex question of skin color would repay further study (cf. Staehelin 1977). The same basic convention occurs in Classical painting, from as early as the 7th century B.C. (Pfuhl 1923, I: 498).

[9]A slab stela of the 4th dynasty (Junker 1929:pl. 27, Hildesheim, Pelizaeus-Museum 2145, checked on original) has three different reds, on the human figure, bread, and standards. See also, for example, Moussa and Altenmüller (1977:frontispiece, top left: men and desert animals; top right: men and boat).

[10]Brown, mentioned by Smith (1949:255–256) among other authors, is of uncertain status and much too rare to be included among standard colors.

[11]Harris (1961:149) suggests that this does not refer to the normal pigment but to the very rare azurite; I assume a contrast with green.

[12]The color in the original publication (Petrie 1892) is unreliable.

[13]Iunu (Junker 1929:pl. 27); Wepemnofret (Robert H. Lowie Museum of Anthropology, University of California, Berkeley, no. 6.19825); Louvre, stela of Nofretiabet (Woldering n.d.:55, pl. 7). On the last of these, green seems to be entirely absent; a special pale yellow/cream is used for the woman owner's skin.

[14]The restricted 4th-dynasty repertory resembles Berlin and Kay's Stage IIIb (yellow acquired before GRUE), but this is probably coincidence.

[15]Terrace (1968:41) stated that pink occurs "throughout," but neither his plates nor his comments on them support this assertion. Only on plate 19 does there seem to be a clear pink, and even this is uncertain.

[16]For example, Davies and Gardiner 1936, I: pl. 39: black, white, and red only; also southern extension of the temple of Sety I at Abydos. There are entire "monochrome" 19th-dynasty tombs that use black, white, yellow, some red, and, very occasionally, blue (Bruyère 1952; on pp. 9–10, Bruyère suggested that the yellow was in substitution for gold).

[17]For example, Davies and Gardiner 1936, I: pl. 44: shirts over torsos; II: pl. 70: jars on right; pl. 102: human body in contrast with desert.

[18]For example, Davies and Gardiner 1936, II: pl. 76: papyrus umbel bases; pl. 78: Nubians and horses.

[19]Painting palettes add an ambiguity (Glanville 1932; Carter 1933: pl. 23A; Hayes 1959:256, fig. 154; Grand Palais 1982:345, no. 293; Helck 1982). They are intended for miniature vignettes, and have holes for blocks of ink and painting pigments. Two of those cited have 6 holes, for the 6 canonical colors (gray being made by mixing black or black and blue with white), one has 7 (6 plus 1 for black ink?), one has 14 (two rows of 6, with a larger pair for ink), and one, 11 (2 for ink and 9 for colors). The ones with 7 and 11 holes have inscriptions for draftsmen. Only the latter (Glanville 1932:pl. 8, no. 3) has a suitable number of holes for the enlarged color repertory. This suggests that the new usage of colors was not widespread, or that it did not much influence the design of traditional equipment (see also Schenkel 1963:147).

[20]For example, Davies and Gardiner 1936, II: pls. 87–89, 104; also, temple of Ramesses II at Abydos, offering series in first hypostyle hall.

[21]For orange and yellow among representational glass inlays of the 4th century B.C., see Scamuzzi (n.d.: pl. 109).

[22]There is probably enough colored material for a study of the native temples of this period, but no painting is adequately published. These temples are fully Egyptian and a good source of evidence, whereas much from the period fuses Egyptian, Greek, and sometimes other elements.

[23]Waltraud Guglielmi remarks (personal communication) on the common occurrence of words

for blue in Greco-Roman temple texts. In some cases, this seems to be an arbitrary extension, as when the sun god is said to "make the fields blue *(ḫsbḏ)*" (de Rochemonteix 1892:71, line 11; 106, lines 2–3). Such usages may parallel the vast extension of blue in temple reliefs. They did not produce a general basic color term for blue. The dead language in which these texts were written (Middle Egyptian of some 1,500 years earlier) may have come to use *ḫsbḏ/ḫsdb* and/or *jrtjw* as a basic term for blue, but the context is highly specialized.

[24]Words for pigments are attested for yellow and blue, which lack basic color terms (Harris 1961:160–162). The evidence for pigment names appears to be incomplete.

[25]Although Lucas and Harris are cautious (1962:342), there seems no good reason for doubting the 4th-dynasty examples of Smith (1949:256). The text quoted is an instance of blue coloring for prestige and symbolism, but Smith's material includes earlier conventionally representational cases. For a 4th-dynasty painting in which blue is already used more widely than demanded by representational logic, see Dunham and Simpson (1974:frontispiece; note that this is in a queen's tomb).

[26]Here the status of gray is uncertain. Before the 1st intermediate period it appears to signify simply "colored" (as discussed earlier). In view of the problematic status of gray in the Berlin and Kay scheme and in the general organization of color, this uncertainty is not surprising.

[27]True in a different sense in Hellenistic antiquity, when a full range of colors was used in a different form of representation (partial perspective); no classification can be derived from this (see also note 30).

[28]Here it might be worth investigating paleolithic painting, which also uses a very restricted set of colors. It could be argued that the availability of pigments was what determined their choice, but other approaches need not be ruled out.

[29]It follows that the process of enlargement of color vocabularies described by Kay (1975) and Friedl (1979) need not necessarily reflect change in color classification. In Egypt, color classification appears to have been refined without any change in color vocabulary (except words for pigments).

[30]"Four-color" Classical Greek painting used a restricted range of colors, black, white, red, and yellow, but not always so few pigments (Pfuhl 1923, I: viii, x; Robertson 1959:13; Bruno 1977). This restriction came after a time when at least blue and green were used in addition. Bruno suggests that it was the first stage in the notation of shading and perspective. It would then lead to the more fully "painterly" coloring of the Hellenistic age.

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