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## PREFACE

These Work Papers are being produced in two series by the Summer Institute of Linguistics, Australian Aborigines Branch, Inc. in order to make results of SIL research in Australia more widely available. Series A includes technical papers on linguistic or anthropological analysis and description, or on literacy research. Series B contains material suitable for a broader audience, including the lay audience for which it is often designed, such as language learning lessons and dictionaries.

Both series include both reports on current research and on past research projects. Some papers by other than SIL members are included, although most are by SIL field workers. The majority of material concerns linguistic matters, although related fields such as anthropology and education are also included.

Because of the preliminary nature of most of the material to appear in the Work Papers, these volumes are being circulated on a limited basis. It is hoped that their contents will prove of interest to those concerned with linguistics in Australia, and that comment on their contents will be forthcoming from the readers. Papers should not be reproduced without the authors' consent, nor cited without due reference to their preliminary status.

Views expressed by the authors are not necessarily those of SIL.

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## INTRODUCTION TO SERIES B VOLUME 8

SIL is primarily an applied-linguistics organisation, with goals in translation and literacy. As such, it cannot ignore the cultural context of language, particularly since SIL fieldworkers carry out their research and goals in an ongoing language-culture situation. For these reasons it is appropriate that SIL-AAB personnel share some ideas and insights in a 'language-culture' work papers volume. We are also pleased to include two papers by non-SIL contributors, Judith Stokes and John Harris, both of whom have had much experience in the Aboriginal language-culture context.

In the first paper Jean Kirton shares insights she has gained during the dual process of learning Yanyuwa language and culture at Borrooloola. Though not claiming that she is expressing an emic (insider's) viewpoint, Jean has been careful to check out her observations and tentative conclusions with a Yanyuwa speaker, Nero Timothy. In exploring the interrelationships between language and culture, there are always the dangers of stating the obvious and/or making unwarranted statements of causation. Jean has aimed to underscore the importance of relating language study to the local culture, demonstrating that linguistic data can be better understood when its cultural context is known.

Long before the use of such interdisciplinary labels as 'cognitive anthropology', 'sociolinguistics' and 'anthropological linguistics', both linguists and anthropologists were interested in kinship terminology as an interface of language and culture. Helen Geytenbeek's paper on Nyangumarta kinship has grown out of her need as a field linguist to speak and act correctly in the Nyangumarta community. Helen shares the view of Nyangumarta kinship which she has had to learn—that of a female member of the group.

Cross-cultural education in mathematics has often been a frustrating experience for both teachers and students. Part of the problem has been the lack of knowledge of, or appreciation for, non-Western approaches to mathematics. Judith Stokes' paper is an extensive description of Anindilyakwa mathematical language and its cultural context which refutes popular generalisations about the limited counting ability of Aboriginal people. Judith is to be commended for the amount of data she has collected and for her efforts to gain due recognition for Anindilyakwa mathematical language and concepts.

John Harris believes that Judith's paper is 'the first substantial discussion of the mathematical concepts of an Aboriginal group which has ever been published', and he finds fault with linguists and anthro-

pologists who have had access to such data for other Aboriginal groups but for various reasons have not made it known. Their neglect has allowed prejudiced views of Aboriginal mathematics as 'primitive' to continue unchecked, often with the accompanying view that 'primitive mathematics' is primary evidence of cultural inferiority. John's paper outlines how biased statements about Aboriginal mathematical abilities have developed and continued to the present day, and he cites data from several Aboriginal languages to correct such biases.

However, a deeper understanding of Aboriginal mathematics does not mean that differences between Western and Aboriginal approaches to mathematics are henceforth discounted. As Barbara Sayers' paper recognises, there are still frustrations and problems for many Aboriginal children learning mathematics in school. Barbara believes that the 'problems' are primarily cultural rather than linguistic: a hunting and gathering people have no need for highly developed and precise mathematical calculations and therefore should not be expected to have developed them. The perceptual and cognitive skills will be in different areas more appropriate to a hunting and gathering way of life. Barbara offers several suggestions to those teaching mathematics to Aboriginal children, suggestions which take into account the concepts and teaching styles of Aboriginal culture. Though their approaches are quite different, both John and Barbara are concerned that Western educators know more about Aboriginal culture and that they accept Aboriginal mathematical concepts and language on their own merit rather than judging them from a Western ethnocentric viewpoint.

As this introduction has indicated, the first five work papers in this volume illustrate the interdependence of language and culture. The reader will have to judge how much the final paper illustrates that same interdependence. It is a partial report of a research project undertaken to find out to what extent the development of colour terminology is culturally determined. The data gathered from five Aboriginal languages by SIL fieldworkers are inconclusive as to the relationship between culture and colour vocabulary, but they certainly illustrate the complexity of language-culture research.

Susanne K. Hargrave  
Volume Editor

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## A REPORT ON COLOUR TERM RESEARCH IN FIVE ABORIGINAL LANGUAGES

Susanne Hargrave

### INTRODUCTION

In 1978 SIL (Summer Institute of Linguistics) field linguists working in five Australian Aboriginal languages participated in a colour term research project which was carried out by SIL fieldworkers in over 100 languages around the world. The project was directed by Paul Kay and Brent Berlin of the University of California at Berkeley and William R. Merrifield of the Summer Institute of Linguistics and the University of Texas at Arlington, and was funded by National Science Foundation Grant No. BNS 76-14153.

Following the completion of the field research, the data were analysed by the use of computer facilities at the University of California. A final report of the project is not yet available. The purpose of this report is to briefly outline the background of the research project and to present a preliminary, limited analysis of the data from the five Australian languages. Those interested in the more extensive computer analysis will have to await the project final report.

### BACKGROUND FOR THE RESEARCH PROJECT

In 1969 Berlin and Kay (hereafter B&K) published a book *Basic Color Terms* which presented data on the basic colour terms of ninety-eight languages from diverse language families. The purpose of this research was to refute a widely held view in linguistics and anthropology, namely that every language has its own unique way of categorising and naming reality, and therefore speakers of different languages actually 'see the world differently'. This hypothesis has been termed the Sapir-Whorf hypothesis, after two of its most articulate proponents. Evidence for this hypothesis has often been cited from colour vocabularies. The colour spectrum is a continuous gradation of colour, with no natural divisions. Yet every language arbitrarily divides the spectrum by its colour terms; one language may have three

terms which label three divisions of the spectrum, while another language may divide the spectrum with ten terms. Thus, the argument goes, colour terms cannot be translated across languages but reflect a totally arbitrary and unique 'cutting up' of the colour spectrum.

In brief, B&K's data supported their doubts about the arbitrary nature of colour classification and revealed some further unexpected regularities:

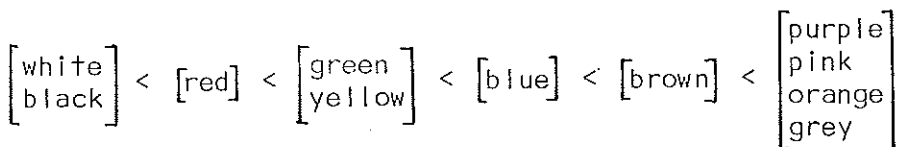
It appears now that, although different languages encode in their vocabularies different *numbers* of basic color categories, a total universal inventory of exactly eleven basic color categories exists from which the eleven or fewer basic color terms of any given language are always drawn. The eleven basic color categories are *white, black, red, green, yellow, blue, brown, purple, pink, orange, and grey.*

A second and totally unexpected finding is the following. If a language encodes fewer than eleven basic color categories, then there are strict limitations on which categories it may encode. The distributional restrictions of color terms across languages are:

1. All languages contain terms for white and black.
2. If a language contains three terms, then it contains a term for red.
3. If a language contains four terms, then it contains a term for either green or yellow (but not both).
4. If a language contains five terms, then it contains terms for both green and yellow.
5. If a language contains six terms, then it contains a term for blue.
6. If a language contains seven terms, then it contains a term for brown.
7. If a language contains eight or more terms, then it contains a term for purple, pink, orange, grey, or some combination of these. (B&K 1969:2-3)

See figure 1 for a diagram of this colour-encoding sequence.

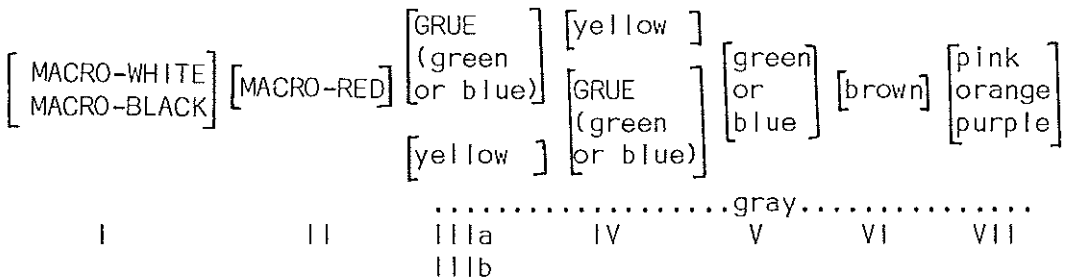
Figure 1. B&K 1969 Colour-encoding Sequence



The data supported a further hypothesis that the number of colour terms in a language correlates with the technological complexity of that language group, i.e. languages with only two or three colour terms are characteristic of groups with small-scale social and political organisation and low-level technology, while languages with eight to eleven basic colour terms are associated with complex industrial societies (B&K 1969:16)

B&K's book gained much attention. Though there were critics of the research methodology and/or the conclusions, subsequent research has largely corroborated the 1969 findings. B&K themselves, based on their own and others' research, have revised their original colour-encoding sequence, as in figure 2:

Figure 2. Revised B&K Colour-encoding Sequence  
(Witkowski & Brown 1977; Kay & McDaniel 1978)



This revised sequence has been summarised by Witkowski and Brown (1981:14):

Stage I languages . . . encode two categories, "macro-white" and "macro-black." "Macro-white" includes whites and most warm hues (reds, yellows, oranges, browns, pinks and purples) and "macro-black" includes blacks and most cool hues (blues and greens). At Stage II "macro-red," which includes most warm hues, is encoded. With the addition of "macro-red," "macro-white" is reduced to white and very light hues. Either "grue" or "yellow" may be added at Stage III as a fourth category. "Grue" is a category including most cool hues. The encoding of "grue" restricts "macro-black" to black and very dark hues. If "grue" is added at Stage III, "yellow" is added at Stage IV and vice versa. The lexical encoding of the remaining color classes involves subdividing "macro-red" and "grue."

In this revised sequence, new colour categories are not formed by adding new colour foci, but by successively splitting up already existing categories. B&K proposed an extensive testing of their revised hypothesis, using SIL fieldworkers to gather data from

language groups with which they already worked. The data were collected from 1977 to 1979.

## RESEARCH METHODOLOGY

Each field linguist (or team) was asked to interview twenty-five people, preferably monolingual. Each person was first asked to name, one by one, 330 'color chips' (squares of colour, each enclosed in a glass slide case).<sup>1</sup> The responses were noted on a data sheet. However, since the purpose of the research was to discover basic colour terms, these responses were subject to the following criteria which defined for B&K a 'basic color term'. Examples from English colour terms are given which are excluded by each of the criteria:

- (i) It is monolexemic; that is, its meaning is not predictable from the meaning of its parts. (*bluish*, *blue-green*, *lemon-colored*)
- (ii) Its signification is not included in that of any other color term. (*scarlet* and *crimson* are excluded because they are kinds of *red*)
- (iii) Its application must not be restricted to a narrow class of objects. (*blond* is eliminated because it is restricted to describing hair, complexion, furniture)
- (iv) It must be psychologically salient for informants. Indices of psychological salience include, among others,
  - (1) tendency to occur at the beginning of elicited lists of color terms,
  - (2) stability of reference across informants and across occasions of use, and
  - (3) occurrence in the ideolects of all informants. (*scarlet*, *mauve*, *burnt sienna*)

These criteria (i-iv) suffice in nearly all cases to determine the basic color terms in a given language. The few doubtful cases that arise are handled by the following subsidiary criteria:

- (v) The doubtful form should have the same distributional potential as the previously established basic terms. (*red* and *white* can take the suffix *-ish*, but *aqua* and *chartreuse* cannot)
- (vi) Color terms that are also the name of an object characteristically having that color are suspect, for example, *gold*, *silver*, and *ash*. This subsidiary criterion would

exclude *orange*, in English, if it were a doubtful case on the basic criteria (i-iv).

- (vii) Recent foreign loan words may be suspect
- (viii) In cases where lexemic status is difficult to assess (see criterion (i)), morphological complexity is given some weight as a secondary criterion. The English term *blue-green* might be eliminated by this criterion.  
(taken from B&K's 'Instructions to Fieldworkers')

Following the lengthy task of naming the 330 colour chips, each test participant was then shown a colour chart, a piece of cardboard on which 410 circular colour patches were glued; 330 of these corresponded to the colour chips in the naming task and the remaining eighty were forty copies each of the pure white and pure black colour chips. In this 'focus mapping task', the person interviewed was asked to select the best example of each of his basic colour terms. (If the fieldworker had difficulty applying the criteria for basic colour terms, he was to include any term used by the person to name five or more chips.) These responses were noted on a 'focus mapping code sheet'.<sup>2</sup>

The purpose of the naming task was to indicate both the basic colour terms and the extension of each colour term (i.e. how large an area on the colour chart is designated by each term). The mapping task, on the other hand, aimed to record the focal colour(s) for each basic colour term. Research by B&K in twenty languages had shown that colour foci were concentrated in small areas on the colour chart, which indicated a high level of agreement on colour foci across languages (see figure 3).

#### RESEARCH FINDINGS IN THE FIVE ABORIGINAL LANGUAGES

The colour term research was carried out in the following Australian Aboriginal languages: Kuku-Yalanji, Murrinh-patha, Martu Wangka, Warlpiri and Kriol. This report is based on a limited analysis of that data. Evidence is examined for determining 'basic color terms' in each of the five languages, and a comparison is made between the focal colours chosen for each term as compared to the focal areas outlined by B&K and reproduced in figure 3. No attempt has been made to determine the extension of each colour term, since neither the facilities nor the necessary information were available for plotting each of the 330 responses made by every participant in the naming task onto the colour chart.<sup>3</sup>

The data for each language are summarised as follows:

Location:

Investigators: SIL fieldworkers

Test Participants: number (male and female), age range

Other languages spoken: some indication of the extent other Aboriginal languages and English are used by the test participants

Range in the number of colour terms used at least 5 times by individual test participants

Colour terms: vernacular term; English colour-term gloss; any other known meaning of the vernacular term; no. of participants who used the term 5+ times (in brackets); only terms used by over half of the participants are listed

Colour term foci: For each vernacular colour term, a summary is given of the foci selected by the participants, in comparison with B&K's outline of focal areas (fig.3). The following example explains the notation used:

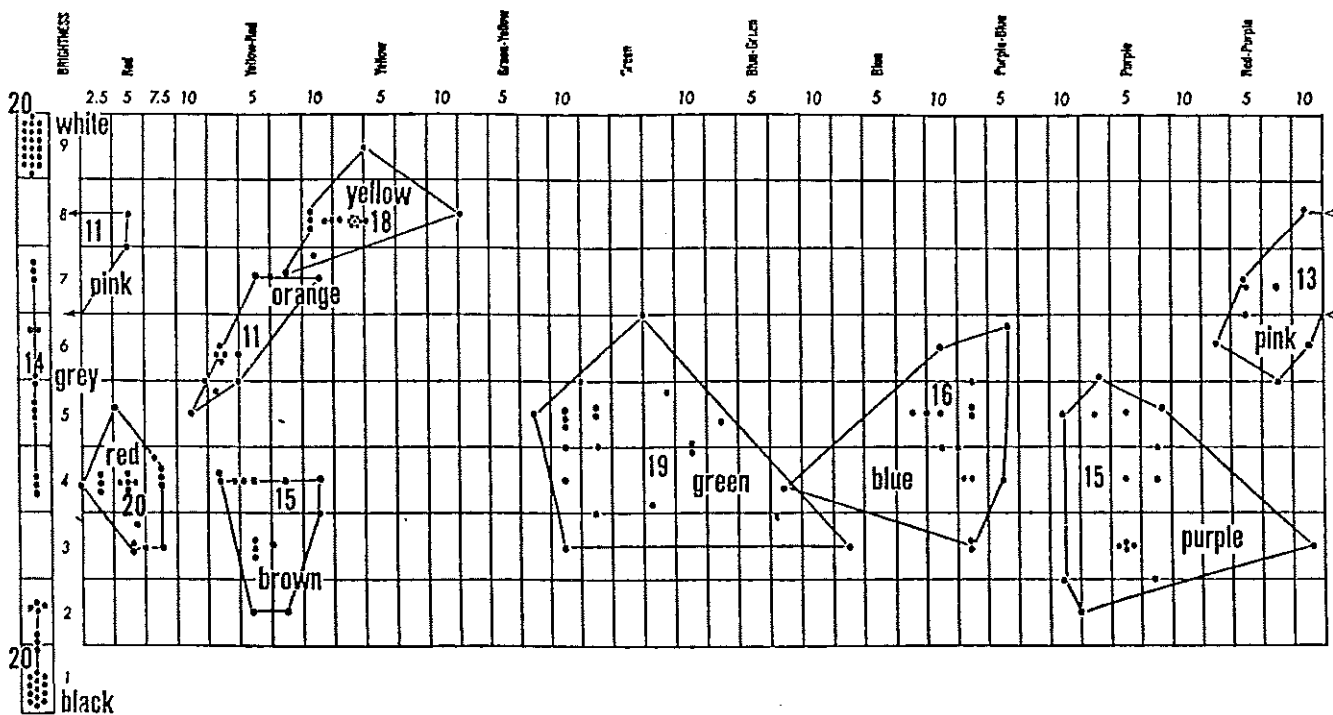
*ngala-ngala*: 13 f. red, 1 f. orange; 4 red. This indicates that 13 participants chose a focal colour for *ngala-ngala* which is within the red focal area shown in figure 3, and 1 chose a colour within the orange focal area; 4 chose a colour which immediately borders that red focal area; selected colours which are neither within nor bordering any focal colour area shown in fig. 3 are not noted.

Discussion: Colour terms and foci are discussed with reference to B&K's hypothesis. Additional information from the fieldworkers is noted, both from comments recorded on the data sheets and from recent personal communication.



Figure 3. Normalized Foci of Basic Color Terms in Twenty Languages

Note: Numerals appearing along the borders of the chart refer to the Munsell system of color notation. Numerals appearing on the body of the chart refer to the number of languages in the sample of twenty which encode the corresponding color category. The smallest possible number of lines are used to enclose each color area. (B&K 1969:9)\*



\*The colour chart used in the research project which this paper describes differs from the above chart in having an additional row of pure white at the top (40 additional white) and a complete row of pure black at the bottom (39 additional black).

Kuku-Yalanji

Location: Wujal-Wujal (Bloomfield River), Queensland

Investigators: Hank and Ruth Hershberger

Test Participants: 20 (9 M, 11 F), ages 30-70+

Other languages spoken: All 20 spoke English to some degree, but only 1 fluently. A number spoke related 'kuku-' dialects.

No. of colour terms used by individuals 5+ times ranged from 3 to 9.

Colour terms:

<i>bingaji</i>	'white, light' (20)
<i>ngumbu</i>	'black, dark' (20)
<i>ngala-ngala</i>	'red' (20)
<i>burrkul</i>	'dirty, nondescript' (14)
<i>kayal</i>	'green, unripe' (11) <sup>4</sup>

Colour term foci:

<i>bingaji</i>	19 f. white (1 person did not select a focus)
<i>ngumbu</i>	19 f. black (1 person did not select a focus)
<i>ngala-ngala</i>	13 f. red, 1 f. orange; 4 red, 1 pink, 1 no focus
<i>burrkul</i>	2 f. grey, 2 f. brown, 1 f. black; 2 blue, 2 yellow, 2 black
<i>kayal</i>	8 f. green; 1 green; 1 no focus

Discussion:

Both the investigators' comments and the data support the conclusion that the Kuku-Yalanji have three basic colour terms. This would place them in Stage II of B&K's colour-encoding sequence, with the three categories of white-light, black-coal ('macro-black'), and red-warm ('macro-red').

Two women responded with only three colour terms, those for white, black and red. The one woman (age 30-35) responded 'none' in Kuku-Yalanji for chips which she considered outside the range of these three terms. This participant was the only one noted as fluent in English, and the investigators felt that she was 'too sophisticated to give a color a name if there was no name for it'. Her response could well indicate a mapping of these three English colour categories onto Kuku-Yalanji basic colour terms.

According to the investigators, *bingaji* and *ngumbu* mean 'light' and 'dark' as well as 'white' and 'black'. Several participants appeared to name chips light or dark in comparison with the frame around the chip or in comparison with the chip just shown them previously. Terms denoting light and dark have been recorded by other researchers in Australia. Jones and Meehan, carrying out an investigation of Anbarra (north-central Arnhem Land) colour concepts, concluded that there were only two real colour terms, those for light and dark. Four additional 'colour terms' were names for mineral pigments and could only be used to describe a limited range of objects (Jones and Meehan 1978:26-30). Davis found that children at Milingimbi, also in Arnhem Land, first classified all colours as *watharr* 'light' or *mol* 'dark'. As they got older, they added further terms which classified colours by hue and saturation as well as brightness (Davis 1982).

The term *burrkul* seemed, according to the investigators, to be used for colour chips that could not be classified under other colour terms. One person indicated on the colour map display that *burrkul* covered all colours not in the white, black or red areas, and the investigators noted the same extension of this term for another participant.

The fifth term, *kayal*, could become in time a basic colour term for green (or blue-green 'grue' if B&K's sequence is followed). Several people used *kayal* 'unripe' as well as *kulbul* 'ripe' to name various colours depending, according to the investigators, 'on the fruit or leaf being thought of'. But it is significant that nine out of eleven who used *kayal* focused it in or bordering B&K's green focal area.

### Murrinh-patha

Location: Wadeye (Pt. Keats), NT

Investigators: Chester and Lyn Street

Test Participants: 25 (10 M, 15 F), ages 35-75

Other languages: a variety of other Aboriginal languages spoken fluently or to some degree; all participants spoke English 'a little' or to some degree, but none fluently.

No. of colour terms used by individuals ranged from 3 to 10.

#### Colour terms:

<i>bamam</i>	'white' (25)
<i>thipmam</i>	'black' (25)
<i>bukmantharr</i>	'red' (25)
<i>wudanil</i>	? (23)
<i>ngatin</i>	? (20)
<i>tumamka~tupmamka</i>	? (19)
<i>wipma(na)narri</i>	? (16)

#### Colour term foci:

<i>bamam</i>	25 f. white
<i>thipmam</i>	25 f. black
<i>bukmantharr</i>	15 f. red, 1 f. orange; 1 red, 2 pink, 1 purple, 1 brown
<i>wudanil</i>	4 f. yellow, 3 f. orange, 1 f. pink, 1 f. green; 4 purple, 2 pink, 1 green, 1 orange
<i>ngatin</i>	12 f. yellow, 3 f. green, 2 f. orange
<i>tumamka~tupmamka</i>	6 f. blue, 3 f. green, 1 f. brown, 1 f. purple; 2 blue, 2 purple
<i>wipma(na)narri</i>	2 f. yellow, 2 f. brown, 1 f. red, 1 f. orange, 1 f. purple; 1 black, 2 brown

## Discussion:

The data, along with the investigator's statement that '*bamam*, *thipmam* and *bukmantharr* are the only words that apply solely to colours', support the conclusion that the Murrinh-patha have only the three basic colour terms. If the foci selected for *bukmantharr* (all of which are warm hues, including the four not noted) are an accurate reflection of the extension of this term, then *bukmantharr* designates a macro-red (red-warm) category, as in B&K's Stage II.

It was not possible to assign an English colour-term gloss to the other four terms, nor did categories such as light/dark, warm/cool accurately describe the variety of foci chosen. Chester Street, in further correspondence, supplied the following meanings for the four terms:

<i>wudanil</i>	(verb form) 'sandy/ginger colour, used for describing fairish hair as on Aboriginal people etc.'
<i>ngatin</i>	'unripe (fruit), raw (meat)'; also used for green grass
<i>tumamka-tupmamka</i>	'blurry vision'; indicates the colour is not clear or good
<i>wipma(na)narri</i>	'brownish, like the back of a kangaroo'

## Martu Wangka

Location: Jigalong, WA

Investigators: Jim and Marjorie Marsh

Test Participants: 25 (12 M, 13 F), ages 19-70+

Other languages: Martu Wangka includes 2 closely related dialects: Mantjiltjarra, spoken by 17 participants, and Kartujarra, spoken by 8. Seventeen spoke English 'a little' or 'very little', and a few other Aboriginal languages were also spoken.

No. of colour terms used by individuals ranged from 2 to 12.

Colour terms:

<i>maru-maru (~maru)</i>	'black' (24)
<i>miji-miji</i>	'red' ( <i>miji</i> 'blood') (24)
<i>yukuri-yukuri</i>	'green' ( <i>yukuri</i> 'grass') (22)
<i>karntawarra</i>	'yellow' ('yellow ochre') (16)

## Colour foci:

<i>maru-maru</i>	24 f. black
<i>miji-miji</i>	19 f. red; 4 red, 1 pink
<i>yukuri-yukuri</i>	11 f. green, 1 f. yellow; 6 green
<i>karntawarra</i>	12 f. yellow, 1 f. orange, 1 f. white

## Discussion:

The Martu Wangka data do not present a clear-cut distinction between basic and non-basic colour terms. However, there is evidence that traditionally the basic terms were those for black and red. The SIL fieldworker, Jim Marsh, has stated (pers. comm.) that these are the only terms he has heard used as general colour names. There is greater agreement in the use of these two terms and also in their foci. (The one participant who did not use *maru-maru* used another term, *mungapuru*, adjective form of *munga* 'night, darkness', which he focused in the black focal area, and the one participant who did not use *miji-miji* likewise focused another term, *miny-miny*, in the red focal area.) One woman age 60+ used only the terms for black and red to name all 330 colour chips. (See Appendix for an idea of the extension of these two terms in her naming task.)

Two participants used only three terms. A man age 19 used the terms *maru-maru*, *miji-miji* and *yukuri-yukuri*, and a woman age 65+ used the terms *maru-maru*, *miji-miji* and *pirilypa*, the latter focused in the white area.

The primary question raised by the data in comparison with B&K's colour-encoding sequence is the absence of a basic term for white—or even for 'macro-white'. According to the sequence, a language with two basic colour terms has the categories 'macro-black' and 'macro-white' and foci for the latter can be expected to vary between white and red, while the former may have foci in black, green or blue (Kay & McDaniel 1978:639). The Martu Wangka data, however, show clear categories focused in black and red. Twenty-two participants did focus a colour term in the pure white area, but a variety of terms were used, and five participants used two or three terms. In all, twelve different terms were used which were focused in white (in addition to *karntawarra*, noted above). For some of these terms the investigator could supply the meaning, or a possible meaning or derivation:

<i>piily-piily</i>	'dusty, as of someone white from dust'
<i>piirl-piirl</i>	'white sediment in a salt pan'
<i>pira-pira</i>	(may be variant of <i>piila-piila</i> or may come from <i>pira</i> which is resin [dark reddish] from a tree with white bark)
<i>warla</i>	'salt lake'
<i>mirta-mirta</i>	from Nyangumarta <i>mirta</i> 'grey-haired'

The other terms were unknown to him though several (e.g. *piila-piila*, *pirilypa*, *pilya*) appear to be related to known words.

The woman mentioned above who used only *maru-maru* and *miji-miji* was asked by the investigator about the colour of ashes and the colour of a 'stark white gum tree'. She replied with the term *piinta* (meaning unknown) 'but she still considered this colour absent from the chips'.

This same lack of agreement on a term for white is found in the Warlpiri data, though to a lesser extent (see below). Both Martu Wangka speakers and the Warlpiri are traditionally desert dwellers, from the same general area. The Martu Wangka dialects, Mantjiltjarra and Kartujarra, are dialects of the 'Western Desert language'.<sup>5</sup> In a dictionary of another Western Desert dialect, Pintupi, a number of terms are given for 'white', referring to specific entities such as white animal, white gum tree, white stone. A general term for white (*tjulkura*) is listed first, but this term also appears to have specific references, as it is 'also used of white ochre, white animals' (Hansen & Hansen-1977). Douglas (1976), writing briefly of colour classification in 'the Western Desert language area', lists two 'specific colour words': *maru* 'black' and *pirntalpa* 'white, shiny'.<sup>6</sup> However, the designation of the latter as a basic colour term may be questionable since *pirntarlpa* in Martu Wangka refers to the white meat of a goanna (J. Marsh, pers. comm.).

The above data suggest that Aboriginal groups who were traditionally desert nomads did not abstract the colour white as a separate property of a variety of natural phenomena, and therefore it cannot be considered a basic colour term in their language.

Another possibility is that the lack of agreement on a term for white in the colour research may have been due to the testing material which was foreign and unnatural to the participants. Jones and Meehan, in their colour research among the Anbarra (Arnhem Land), noted the reaction of one man to the Munsell colour chart: 'At first, Gurmanamana said there were no *-gungaltja* ('light, white') colours there at all and pointed from the chart to a piece of reflective foil used for cooking, lying on a bench in the tent, "That one there, properly number one *gun-gungaltja*, no more this mob"...The true *-gungaltja* colours require a touch of brilliance or "animation" as well as a high degree of brightness' (Jones and Meehan 1978:27). One criticism of B&K's research is that the colour chips are all in the 'surface mode' and lack the three-dimensional quality of the real world. Perhaps if the Martu Wangka (and Warlpiri) participants had been shown white objects rather than flat chips there might have been greater agreement on a term for white.<sup>7</sup> Note that the gloss given by Douglas for *pirntalpa* includes the meaning 'shiny' as well as 'white'.

Twelve Martu Wangka participants used the term *parnaly-parnaly* or *parna* 'earth', which they focused in brown, orange and pink areas of the chart. Compare this with Warlpiri *walya-walya* (*walya* 'earth') below.

### Warlpiri

Location: Lajamanu (Hooker Creek), NT

Investigators: Steve and Bev Swartz

Test Participants: 23 (14 M, 9 F), ages 30-70+

Other languages: 4 participants were monolingual, 7 spoke another Aboriginal language (Gurindji, Walmajarra, Pintupi), 16 spoke Pidgin English or English but none fluently.

No. of colour terms used by individuals ranged from 3 to 12.

Colour terms:

<i>yalyu-yalyu</i>	'red' ( <i>yalyu</i> 'blood') (20)
<i>karntawarra</i>	'yellow' ('yellow ochre') (20)
<i>maru-maru-maru</i>	'black' (19)
<i>walya-walya</i>	? ( <i>walya</i> 'earth') (16)
<i>kardirri</i>	'white' (15)
<i>yukuri-yukuri</i>	'green-blue (grue)' ( <i>yukuri</i> 'green plants') (14) <sup>8</sup>

Colour term foci:

<i>yalyu-yalyu</i>	8 f. red, 3 f. pink, 1 f. purple, 1 f. grey, 1 f. black, 1 f. blue; 4 red, 1 pink
<i>karntawarra</i>	10 f. yellow, 4 f. orange, 1 focused in both yellow & orange, 2 f. white
<i>maru-maru</i>	13 f. black, 1 f. brown, 1 f. grey, 1 f. blue; 2 purple
<i>walya-walya</i>	3 f. brown, 3 f. purple; 3 brown, 1 yellow, 1 orange
<i>yukuri-yukuri</i>	9 f. green, 1 f. blue; 1 green, 1 blue

Discussion:

On the basis of the above compiled data, it is difficult to determine basic colour terms for Warlpiri. No term was used by all twenty-three participants and there is a fair bit of overlap in the focal colours. As mentioned in the discussion of the Martu Wangka data, the Warlpiri participants also used several terms which they focused in pure white. Of the fifteen who used *kardirri*, four gave no focal colour for it and five used an additional term which they also focused in white. Of the eight who did not use *kardirri*, three used another

term which they assigned a white focus. In all, five terms were used for white. The investigator was not sure of the meaning of these terms but suggested that they might be dialect differences referring to 'anything shiny'. Or it may be, as in Martu Wangka, that they refer to specific natural phenomena such as salt pans, white clay.

Two men age 70+ used only three terms 5+ times: *yalyu-yalyu*, *maru-maru* and *parkarra* (meaning not known). The one man assigned no focus to the last term, and the other man focused it in the grey focal area, along with *maru-maru*. The second man was present while the first man was interviewed, which may be responsible for the agreement on these three terms. (A third man, age 65+, used five terms which indicated periods of the day such as night-time, sunset and sunrise.) Again, the evidence is not clear for determining traditional basic colour terms.

In summary, the data appear not to support B&K's hypothesis but to reflect the influence of culture upon colour nomenclature, namely that the colours important to desert Aboriginals are those first encoded: yellow-orange (*karntawarra*), reds (*yalyu-yalyu*), black (*maru-maru*) and brownish earth hues (*walya-walya*). Or one might argue that the Warlpiri (and others) have no basic colour terms, no term universally used to name a colour category common to a variety of phenomena. This would again reflect the interaction of language and culture, that those distinctions not important to a group may not be encoded in their language.

### Kriol

Location: Ngukurr (Roper River), NT

Investigators: John and Joy Sandefur

Test Participants: 25 (12 M, 13 F), ages 18-65+

Other languages: 12 spoke 1 or more traditional Aboriginal languages fluently; 9 spoke English fluently, and 11 spoke some English.

No. of colour terms used by individuals ranged from 3 to 11.

Colour terms:

<i>red</i>	'red' (24)
<i>blu</i>	'blue' (24)
<i>grin</i>	'green' (24)
<i>blek</i>	'black' (23)
<i>yela</i>	'yellow' (23)



*wait* 'white' (22)  
*bran* 'brown' (22)  
*pingk* 'pink' (21)  
*pepul* 'purple' (21)  
*orinj* 'orange' (17)  
*grei* 'grey' (16)

Colour term foci:

*red* 17 f. red, 2 f. purple, 1 f. orange; 2 red, 2 pink  
*blu* 18 f. blue; 5 blue, 1 green  
*grin* 22 f. green; 1 green  
*blek* 22 f. black; 1 blue  
*yela* 17 f. yellow, 1 f. orange, 1 f. both orange & yellow;  
 3 yellow, 1 white  
*wait* 21 f. white (1 no focus)  
*bran* 15 f. brown, 1 f. both brown & grey; 2 brown, 1 black  
*pingk* 7 f. pink, 4 f. purple, 1 f. both pink & purple, 1 f.  
 red; 5 pink, 1 red  
*pepul* 14 f. purple, 2 f. pink, 1 f. orange; 3 purple  
*orinj* 11 f. orange, 2 f. yellow, 1 f. pink, 1 f. purple, 1 f.  
 brown  
*grei* 10 f. grey, 1 f. white; 2 grey, 2 white, 1 pink

Discussion:

The Kriol data reflect a situation of cultural and linguistic change, in which English colour terms are at different stages of incorporation by Kriol speakers. There is no evidence for a division into basic vs. non-basic colour terms. Seven of the participants used all eleven colour terms, and eight used all but one. In charting the eleven terms for the twenty-five participants, there were significantly more 'blanks' at the bottom of the chart: twenty-seven blanks in the *bran-pingk-pepul-orinj-grei* group as compared to ten in the *red-blu-grin-yela-blak-wait* group. A few participants used other terms to denote colour, such as *dak* 'dark', *lait* 'light', *shaini* 'shiny' and *chokoleit* 'chocolate'.

It appears that the incorporation of English colour terms into Kriol has been accompanied by an incorporation, to a high degree, of their focal referents. (English is one of the twenty languages whose colour foci are represented in figure 3.) One might have expected a more confused picture in terms of the foci chosen. The computer analysis could reveal considerable differences between Kriol and English in the extension of the eleven colour terms, i.e. Kriol *grin*, for example, might well extend into hues that most English speakers would label 'blue', or vice versa.<sup>9</sup>

The investigator noted on the data sheets that six of the participants

had learned Kriol as a second language. Five of these used from nine to eleven of the eleven colour terms. However, one woman age 20, whose mother tongue is Wagalak, used only three terms: *wait*, *blek* and *red*. These may have reflected the basic terms in Wagalak. A woman about 55 years old and a mother tongue Kriol speaker offered the comment that *red*, *wait* and *blek* are the main colours, adding that '*yela* is the head colour for *grin*, *blu*, *orinj*, *bran*; *red* is the head colour for *pingk*, *pepul*; *wait* is the head colour for *grei*'.

## CONCLUSION

In summary, the data presented in this report appear to have cast a 'tie vote' in regard to B&K's hypothesis: 2 supporting (Kuku-Yalanji and Murrinh-patha), 2 questioning (Martu Wangka and Warlpiri) and 1 neutral (Kriol, with its English borrowings). The further analysis undertaken by B&K, in mapping the extension of all terms used by all participants, could well change this conclusion. It may be that the focal data is misleading and that comparison of the colour categories as a whole for each participant may agree with B&K's colour-encoding sequence. But at this point we must conclude that the Martu Wangka and Warlpiri data do not support either B&K's 1969 colour-encoding sequence or the revised sequence (Kay and McDaniel 1978:639) in regard to Stage I colour categories.

B&K, in their research proposal, stated their plan to have the research carried out in 'languages spoken by peoples who have had little contact with the Western world'. They recognise that such contact may affect the colour-encoding sequence—and had been criticised for using bilingual test participants with a great deal of Western contact in their earlier research. Though most of the Aboriginal participants in the research reported on here spoke limited English (and a number spoke no English, particularly among the Martu Wangka and Warlpiri), yet these language groups have had considerable Western contact. Therefore the validity of the research results as a test of B&K's hypothesis may be questionable. For example, there is little evidence of the 'macro' categories in the foci chosen for basic colour terms, i.e. terms for black are focused in black, not in black and/or cool colours, and 'white' is focused in white rather than white and warm (or 'red' focused in red rather than red and warm) for those languages having only two or three basic terms. At a number of points the data suggest a culture change situation in which Aboriginal people are using vernacular terms (quite often names of particular natural objects) to name colours which they recognise are basic colour categories in English, rather than a situation in which vernacular basic colour terms are being developed according to B&K's sequence. It seems reasonable that such a process (adapting vernacular terms to English categories) would be even more apparent in a testing situation using foreign material such as colour chips. The Kriol data indicates how quickly colour categories from a

dominant culture can be incorporated into the vocabulary. (Cf. the Kriol colour-term lists with those of the English speakers in the Appendix.)

This report has not touched upon a basic question which comes to mind in comparing colour categories cross-culturally: do differences in the number of colour terms reflect differences in perception? It seems plausible that there might be different levels of skill in colour perception, as there are differences in other areas of sense perception. For example, Aboriginal people are known for their highly developed skills in perceiving and interpreting visual clues in animal tracks, a skill important to a traditionally hunting and gathering people. Following this line of thought, people in technological cultures, in which a multitude of colours are man-made, would develop greater skill in perceiving colour differences.

This explanation of cross-cultural differences in colour categories was accepted in the early days of colour research. However, it is now generally discounted (though not entirely disproven). In Appendix II of *Basic Color Terms* B&K cite the research of Magnus in 1880 which specifically aimed to separate colour-discernment data from colour-naming data. They accept Magnus' conclusion that 'the ability to perceive color is no less developed in primitive peoples' but that there are 'considerable differences in the development of the color lexicon' (B&K 1969:140-1). B&K (1969:16) suggest the following possible reasons for the development of larger colour lexicons in technologically more complex cultures: 1) there is an overall increase in vocabulary as a culture becomes more complex, and this increase is reflected in colour terminology; 2) the greater use of man-made dyes and the proliferation of colours in man-made products results in colour being more in focus and more important in identifying objects; 3) for people who live closer to nature, there is little adaptive value in abstracting broad colour categories such as 'green'; it is more important to recognise the fine shades of green which are peculiar to individual plants.

Recently B&K's findings have been used to support a particular theory of human colour vision, the 'opponent color theory' of Hering (proposed in 1874 but then abandoned) which stated that 'colour vision is based on three pairs of opponent processes': the perception of dark and light, red and green, blue and yellow (Wattenwyl & Zollinger 1979:280). This correlates with the early encoding of these colours in B&K's sequence. Such use of the colour-encoding sequence to support a theory of human colour vision further indicates the complex of factors involved in colour term research. Colour vocabulary is not just language data, for it relates to cognition and perception, to language, culture, culture change, and human physiology. And the data gathered in colour term research may not fit so neatly into a single, simple model.

## FOOTNOTES

- <sup>1</sup> The 330 chips from the Munsell Color Company are based on a classification of colours in terms of hue, brightness and saturation. In layman terms, hue is what we commonly refer to as 'color', i.e. red vs. green vs. yellow. Brightness refers to 'dark' vs. 'light', such as dark green vs. light green. Saturation refers to intensity, or 'strong' vs. 'weak' colours ('best exemplified by the extremes of psychedelic art' Collier 1973:246). For a summary of a more technical description of colour, see Jones & Meehan 1978 or Davis 1982. On the mapping display used in the second part of the research, the 330 Munsell colours are arranged vertically in eight degrees of brightness and horizontally in forty equally spaced hues. All colour chips are displayed at maximum saturation.
- <sup>2</sup> Those familiar with the difficulties of translating such concepts as 'best' and 'colour' into Aboriginal languages may wonder how the field investigators communicated what they wanted the test participants to do. Use was made of the English loan word 'colour' (already present in Kriol as *kala*), and English or known vernacular colour terms were cited as examples. For the mapping task, which involved selecting the 'best' example of each colour, the investigator phrased the question as, for example, 'Which one is the boss of the reds?'
- <sup>3</sup> The 330 chips were not arranged, of course, in any order corresponding to that on the colour chart, since this would have made colours with minimal distinctions follow each other and thus made the naming task difficult. The research material contains no key which identifies a colour chip with that same colour's position on the chart.
- <sup>4</sup> In the Kuku-Yalanji dictionary compiled by Hank and Ruth Hershberger (1982), the following meanings are given for the colour terms listed:
- |                    |   |
|--------------------|---|
| <i>bingaji</i>     | (adj) 'white or light coloured'<br>(n) 'a white-haired man or woman'  |
| <i>ngumbu</i>      | 'black, charcoal'   |
| <i>ngala-ngala</i> | 'red' in the Kuku-Nyungkul dialect; the Kuku-Yalanji word for red is given as <i>mula-mula</i> ( <i>mula</i> 'blood') |
| <i>burrkul</i>     | is listed as <i>burkul</i> with the meaning 'not clear, not clean, murky, dirty, dusty'                               |
| <i>kayal</i>       | 1. 'unripe, green'. 2. 'raw'  |

- <sup>5</sup> 'Western Desert language' is the cover term for a number of dialects which include, among others, Pitjantjatjarra in South Australia, Pintupi in the Northern Territory, and Mantjiltjarra and Kartujarra (Martu Wangka) in Western Australia.
- <sup>6</sup> In addition to the two specific colour words, Douglas lists five 'pigment names', terms for charcoal, white pipe clay, red ochre, yellow ochre and blood. He also gives a general name for colour: 'All pigments . . . come under the general name of *walka*. This is also the word for "colour," "paint" and the finished painting' (Douglas 1976:6-7). Jim Marsh has commented (pers. comm.) that *walka* in Martu Wangka means 'mark, design' and the verb form *walkajunu* means 'to paint, decorate'. It does not have the general sense of 'colour'.
- <sup>7</sup> Jim Marsh (pers. comm.) points out that Western Desert dialects characteristically have many synonyms. This language feature reflects a past demography in which small, scattered groups developed their own dialects (or even 'idiolects') but also shared a great deal of vocabulary through such contacts as ceremonial gatherings. Thus a Martu Wangka speaker could know and use a variety of terms, even a variety of basic terms, for a colour such as white.
- <sup>8</sup> Warlpiri, Martu Wangka and Kuku-Yalanji all have some colour terms formed by reduplication of a noun which is the name of something having that colour. The Warlpiri investigator, Steve Swartz, has commented that reduplication in such instances appears to change the noun into a colour adjective. Douglas gives the same explanation for several 'colour adjectives' in the 'Western Desert language area' (Douglas 1976:8). Jim Marsh states that one of the functions of reduplication is to abstract a quality of the unduplicated noun.
- <sup>9</sup> John and Joy Sandefur have mentioned (pers. comm.) a few examples of Kriol speakers labeling colours differently than they themselves perceived them: 1) a horse they would describe as 'grey' was described by a Kriol speaker as a *bluwan* 'blue one'; 2) a 'black and tan' dog was described as being *blu* 'blue' and *rili kaladwan* 'really coloured one' by an older Kriol-speaking woman; 3) 'white people (i.e. Anglo-Saxons) have been referred to by a number of people as being *redbala*' ('red person'), though the Sandefurs note that this may describe Whites who are reddened by the sun.



## APPENDIX

To give some indication of the variety of responses recorded in the colour chip naming task, the colour terms given to name the first fifty-six colour chips (the first row of chips in the test) are listed for two participants from each of the five Aboriginal languages. A male and female participant have been selected from each language, and an attempt has been made to select both a younger and an older participant. Two English speakers (one Australian and one American) were also asked to name the colours of the first fifty-six chips, and their responses are recorded for comparison.

To make comparison easier, vernacular terms that have been tentatively identified as basic colour terms in this report are represented in the lists by their English colour-term gloss; all Kriol colour terms are represented by English glosses. Vernacular terms whose meanings are known either from comments on the data sheets or from personal communication with the investigators are as follows:

Kuku-Yalanji:	<i>kayal</i>	'green, unripe'
	<i>barrkal</i>	'dirty, nondescript'
	<i>janbal</i>	'var. of quondong' (bluish in colour)
Murrinh-patha:	<i>wudanil</i>	'sandy/ginger colour, used for describing hair'
	<i>tumamka</i>	'blurry vision' (colour not clear or good)
	<i>ngirrwu</i>	'salt water clay' (red-orange in colour)
	<i>wipmanarri</i>	'brownish, like the back of a kangaroo'
	<i>ngatin</i>	'unripe (fruit), raw (meat)' also used for green grass
	<i>wudanwuwu</i>	'yellow-brown colour as dried grass' (the word is made up from the word for one of the spear grass types)
Martu Wangka:	<i>yukuri</i>	'grass'
	<i>karranjiyal</i>	'something clean'
	<i>karntawarra</i>	'yellow ochre'
	<i>pujurr</i>	'red ochre'



Warlpiri:	<i>kardirri</i>	possibly means 'something shiny'
	<i>kunjuru-kunyjuru</i>	'smoke'
	<i>walya</i>	'earth'
	<i>karntawarra</i>	'yellow ochre'
	<i>yukuri</i>	'green plants, wet season'

The following abbreviations and notations are used:

brwn	brown	prpl	purple
grn	green	ylw	yellow
org	orange		

A raised 2 at the end of a vernacular term indicates that the term is reduplicated:

*yukuri*<sup>2</sup> = *yukuri-yukuri*

A question mark indicates the term used could not be clearly deciphered from the data sheet.

	Aus. English		Amer. English		Kuku-Yalanji		Murrinh-patha		Martu Wangka		Warlpiri		Kriol	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M
1.	blue	blue	janbal	tumamka	black	tumamka	black	tumamka	black	tumamka	black	black	black	blue
2.	light blue	light blue	(?)	white	white	tumamka	white	tumamka	black	yukuri <sup>2</sup>	black	black	grn	blue
3.	red	red-org	red	red	red	ngirrwu	red	red	red	red	rtiri <sup>2</sup>	red	red	org
4.	mauve	prpl	black	red	red	tumamka	red	red	red	red	red	kunjuru <sup>2</sup>	brwn	prpl
5.	sea grn	light grn	kayal	white	white	wudaniil	white	white	black	yukuri <sup>2</sup>	parkarra	kunjuru <sup>2</sup>	grn	grn
6.	apricot	flesh	burrkal	white	white	wudanthewu	white	white	red	karranjijyal	parkarra	walya <sup>2</sup>	brwn	pink
7.	grass grn	ylw-grn	kayal	black	black	wudaniil	black	black	black	yukuri <sup>2</sup>	kuru <sup>2</sup>	yukuri <sup>2</sup>	grn	grn
8.	maroon	mauve	red	red	red	tumamka	red	red	red	red	red	red	red	red
9.	brwn	light brwn	burrkal	red	red	wigmanarri	red	red	black	karranjijyal	red	walya <sup>2</sup>	brwn	brwn
10.	junior blue	navy blue	black	red	red	tumamka	red	red	black	black	black	kunjuru <sup>2</sup>	blue	blue
11.	dark grn	dark grn	red ?	white	white	black	white	black	black	black	black	kunjuru <sup>2</sup>	grn	blue
12.	ylw	ylw	burrkal	red	red	ngatin	red	red	red	karrantawarra	parkarra	karrantawarra <sup>2</sup>	ylw	ylw
13.	dark grn	dark grn	black	white	white	black	white	black	black	black	black	yukuri <sup>2</sup>	grn	grn
14.	dark blue	blue-grey	black	white	black	black	white	black	black	black	black	kunjuru <sup>2</sup>	blue	blue
15.	pink	pink	burrkal	white	white	ngirrwu	white	white	red	karranjijyal	red	rrapa	pink	pink
16.	off-white	white	white	white	white	white	white	white	black	karranjijyal	kardirri	kardirri	grey	white
17.	tangerine	red	red	red	red	ngirrwu	red	red	red	red	red	red	red	red
18.	dark brn	black	black	black	black	black	black	black	black	black	black	black	black	black
19.	blue	aqua	janbal	white	white	wudaniil	white	white	black	black	black	kunjuru <sup>2</sup>	blue	blue
20.	grass grn	ylw-grn	kayal	white	white	wudaniil	white	white	black	yukuri <sup>2</sup>	black	yukuri <sup>2</sup>	grn	grn
21.	pink	pink	red	red	red	red	red	red	red	red	red	red	pink	pink
22.	sunshine ylw	pale ylw	white	white	white	ngirrwu	white	white	red	karrantawarra	parkarra	karrantawarra <sup>2</sup>	ylw	ylw
23.	mauve	violet	burrkal	red	red	tumamka	red	red	red	red	red	kunjuru <sup>2</sup>	prpl	prpl
24.	olive green	dark olive grn	black	black	black	wipmanarri	black	black	black	black	black	black	grn	brwn
25.	aqua	turquoise	janbal	white	white	wudaniil	white	white	black	black	black	yukuri <sup>2</sup>	blue	blue
26.	blue	blue	janbal	black	black	tumamka	black	black	black	black	black	kunjuru <sup>2</sup>	blue	blue
27.	beige	pale pink	white	white	white	white	white	white	red	karranjijyal	parkarra	kardirri	white	white
28.	pink	pink	red	red	red	ngirrwu	red	red	red	red	red	red	pink	pink
29.	sea grn	light grn	kayal	white	white	wudaniil	white	white	black	yukuri <sup>2</sup>	black	yukuri <sup>2</sup>	grn	grn
30.	burnt org	org	?	white	white	wudanthewu	white	white	black	karranjijyal	red	walya <sup>2</sup>	brwn	brwn
31.	light blue	pale blue	white	white	white	tumamka	white	white	black	yukuri <sup>2</sup>	parkarra	kunjuru <sup>2</sup>	blue	blue



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32. mauve	violet	burrkal	red	ngirruwu	red	red	red	red	pink	pink	.32
33. lime green	ylw-grn	kayal	burrkal	wudaniil	white	black	yukuri <sup>2</sup>	black	grn	grn	.33
34. turquoise	blue	kayal	white	tumamka	white	black	black	black	blue	blue	.34
35. tangerine	pink	red	red	ngirruwu	red	red	karranjijyal	red	orange	orange	.35
36. dark grn	dark grn	black	white	wudaniil	black	black	black	black	grn	grn	.36
37. blue	pale blue	burrkal	white	tumamka	white	black	black	black	blue	blue	.37
38. maroon	mauve	red	burrkal	red	red	red	red	red	red	red	.38
39. grass grn	green	burrkal	red	wudaniil	black	black	yukuri <sup>2</sup>	black	grn	grn	.39
40. sky blue	aqua	white	white	wudaniil	red	black	yukuri <sup>2</sup>	black	blue	blue	.40
41. maroon	deep red	red	burrkal	ngirruwu	black	red	red	red	red	red	.41
42. ylw	ylw	burrkal	red	wudanuwu	white	red	karrntawarra <sup>2</sup>	black	grn	ylw	.42
43. navy blue	navy blue	black	white	tumamka	black	black	black	black	blue	blue	.43
44. off white	pale prpl	white	burrkal	white	white	black	karranjijyal	parkarra	white	white	.44
45. sea grn	grn	kayal	white	wudaniil	black	black	yukuri <sup>2</sup>	parkarra	grn	grn	.45
46. grey	grey	burrkal	red	tumamka	black	black	karranjijyal	black	grey	grey	.46
47. dark grn	dark grn	burrkal	white	wudaniil	black	black	black	black	grn	grn	.47
48. ylw	ochre	white	burrkal	wipmanarri	white	black	karrntawarra <sup>2</sup>	red	ylw	ylw	.48
49. sky blue	aqua	white	red	wudaniil	white	black	yukuri <sup>2</sup>	black	blue	blue	.49
50. prpl	prpl	black	white	tumamka	red	red	red	red	prpl	prpl	.50
51. brwn	brwn	white	burrkal	wipmanarri	white	black	karranjijyal	red	brwn	brwn	.51
52. off white	very pale grn	white	white	white	white	black	karranjijyal	parkarra	grn	white	.52
53. violet	mauve	black	red	red	red	red	red	red	red	pink	.53
54. olive grn	ylw-grn	black	white	wudaniil	white	black	yukuri <sup>2</sup>	black	grn	grn	.54
55. blue	aqua	white	burrkal	tumamka	white	black	yukuri <sup>2</sup>	black	blue	blue	.55
56. apricot	flesh	white	red	ngirruwu	white	red	pujurr <sup>2</sup>	parkarra	pink	pink	.56

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