Preamble

The IFRAO (International Federation of Rock Art Organi sations) Standard Scale was first pro posed in IFRAO Report No. 6 (Bednarik 1991). Consultation of researchers and various specialists in the following years has led to progressive evolu tion of the design (cf. *Rock Art Research* 8: 156) until it was finalised in 1993.

Purpose of the Scale

There are many millions of photographs and col our transparencies of rock art in exis tence world wide. Many archives have in the order of hun dreds of thou sands of images, while thousands of individ ual researchers each possess collections of many thousands of colour slides or photographs. We also know that this enormous collective record is irrepla ceable, and yet it is doomed to eventual destruction. No known photographic dye is fade-proof, and we still lack any form of fully perdurable photographic or digitised storage of imagery (Dickman 1984). In short, this enormous effort of creating a visual re cord of world rock art is ultimately in vain. Even with rapid rock art deterioration it will be sur vived by most rock art ¾ fortunately. But there is a sim ple way of rendering this massive record perma nently useful: digitised colour reconstitution or re construction.

In scientific photography it is essential to know the size of an image, and for this purpose, Taylor et al. (1979) designed a simple ten-centimetre scale for rock art recording. A scale has other roles too. It serves as a general indication of a photograph's sharpness, by showing how well it was focused and processed. Manual focusing is often difficult with rock art, because of the typical lack of straight or well-defined lines, and the operation of a camera with viewfinder focusing is much easier by selecting one of the lines on a scale.

More important than the black and white scale markings are the colour chips. The colour properties of an object are always distorted in a photograph, by such factors as optics, film type, paper type, tempe-rature and, most particularly, lighting conditions. Therefore a colour photograph cannot be expected to be a true record of chroma, value and hue. How ever, by checking the colour distortion on a scale photo-graphed with the rock art we can obtain an indication of its severity. Some rock art researchers (a very tiny minority) have been using a variety of colour scales, including the Munsell Soil Colour Chart, the Kodak Colour Separation Guide, the Letraset Pantone col our chart and a variety of oth ers. These colour standard charts are all expensive, they are all different, and standardisation would ob viously be desirable.

{rokbox}images/stories/estandares/Escala_IFRAO.jpg{/rokbox}

The main reason for needing a standard photo graphic scale, however, is its function as a **COL OUR CALIBRATION DEVICE**

for a variety of computer-supported uses. Electronic colour en hancement methods have been used in rock art studies for many years (Rip 1983). In 1994, electro nic colour re-con stitution of rock art images was first achieved at the National Museum of Man in Bhopal, India, calibra ted with the IFRAO Standard Scale as the profile device (Bednarik and Seshadri 1995). This has led to the development of colour-reconsti tution software at the Museum.

The original colour values of colour-distorted and even faded rock art photographs can now be auto mati cally reconstituted almost in an instant. The only precondition is that the photograph must bear a colour standard against which the computer can cali brate. The greatest advantage is that the computer does not recover the colour properties of the original photograph, before it faded, but goes beyond that — all the way back to the true colour of the rock art image at the moment it was photographed. It recon stitutes the actual colour properties of the subject at the time, even if this was several decades earlier. Colour reconstitution thus compensates for photo graphic distortion as well as for the subsequent fad ing of dyes.

This technology opens enormous possibilities in research, recording, documentation storage, com puterised image manipulation, publishing and con ser vation studies. For instance, such techniques can facilitate mathe matically precise monitoring of dete rioration of rock art pigment or patinae over any period of time (Pager 1992; Ward and Maggs 1994). They permit the recovery of objective colour infor mation, free of the ‘technical subjectivity’ of con ven tional photography. They facilitate the digitisa tion of real colour information, which can then be used in many ways: it can be permanently stored, it can be used as the basis of enhancement proce dures (Rip 1989), or it can be cross-checked in intra- and inter-site studies for various purposes by engaging com puter search functions. Such information can also be used in conservation, retouch, graffiti and lacunae repair, comparative pigment studies, sourc ing stud ies, dating work, recovery of very faint im ages, printing of colour plates and so forth. It pro vides a reliable and standardised base for numerous applica tions, and while some of the technologies re-quired may still have to be developed, it is most rea son able to expect that they will be available within a few years. **All that is required at this stage is that every photograph taken of rock art for scientific purposes must hear the same colour calibration standard scale.**

The long-term effect of the use of the IFRAO Standard Scale will be a standardisation of the pho tographic record of world rock art. Our archival re cord will become a permanent record by virtue of its digital retrievability. The greatest fear of all rock art stu dents, that the art will deteriorate beyond ar chival recovery, can be met by the knowledge that the sus ceptibility of our photographic record to col our cali bration will lead to an ‘ultimate conservation method’. We will have the means of preserving rock art in pristine condition forever, at least in our ar-chives.

Use of the IFRAO Standard Scale

The IFRAO Standard Scale bears the printing date and will be periodically reprinted to guard against it fading. It should be stored in a dark, dry and cool place when not in use. It includes a grey scale for comparing tone values. The patches corre spond with reflection densities of 0.0, 0.70 and 1.60 respectively.

The Scale must never be placed over rock art, or very close to a motif. Preferably it should not be attached to the rock face. In vertical or overhead locations, the Scale should be hand held. A very useful technique is to attach the Scale to a car radio antenna that can ten be extended in the field. Only where definitely unde corated and structurally sound rock surface is available may the use of small dou-ble-sided adhesive pads be considered, or the inser tion of small metal pins through the Scale to affix it to soft rock surfaces (e.g. in lime stone caves); but this is to be avoided whenever possible.

The Scale should be positioned parallel to the predominant plane of the rock art motif and the same distance from the camera lens. Ensure that the Scale does not directly reflect the light ing source, be it the sun or artificial lighting. One Scale should be used for distances of up to 1.5 m. Between 1.5 and 4.5 m, two Scales are required. The Scale cannot be used with precision at distances exceeding 4.5 m, using lenses of standard focal length. Best results will be achieved at distances of under 1 m. Where artificial lighting is required, place the Scale on the upper left corner and light the image from the same direction. However, natural light ing is preferred to artificial. The small scale on the left-hand end of the IFRAO Scale is intended for close-up photographs. For best digital results, slides or negatives are pre ferred to prints, but digital cameras obviously are the best choice.

The IFRAO Standard Scale is distributed free to all rock art researchers of the world (the members of the forty IFRAO-affiliated organisations). In addi tion, specialists in numerous other fields are rapidly adopting it. Specimens of the Scale are available from the IFRAO Convener's office (P.O. Box 216, Caulfield South, Vic. 3162, Australia). The sale of the IFRAO Scale for profit is not permitted.

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REFERENCES

BEDNARIK, R. G. 1991. The IFRAO Standard Scale. *Rock Art Research* 8: 78-8.
BEDNARIK, R. G. and K. SESHADRI 1995. Digital colour re-constitution in rock art photography. *Rock Art Research* 12: 42-51.
DICKMAN, J. L. 1984. An image digitising and storage system for use in rock art research. *Roc k Art Research*
1: 25-35.
PAGER, S.-A. 1992. Deterioration of the rock paintings in Botha's Shelter, Ndedema Gorge. *Pic togram*
4(2): 1-2.
RIP. M. R. 1983. Digital recording and image processing of rock art by computer. *South African Archaeological Bulletin*
38: 77-9.
RIP. M. R. 1989. Colour space transformations for the en hancement of rock art images by computer. *Rock Art Research* 6: 12-16.

TAYLOR. J. M.. W. BOKMAN and I. N. M. WAINWRIGHT 1979. Rock art conservation: some realities and practical considera tions. In D. Lundy (ed.). CRARA .77. Papers from the Fourth Biennial Conference of the Canadian Rock Art Research Associ ates pp. 293-323. *Heritage Record* No. 8, The British Columbia Provincial Museum, Victoria.
WARD. V. and T. MAGGS 1994. Early copies as an indicator of rock art deterioration. *Pictogra m* 6(2): 36-7.

The scale can be downloaded here .