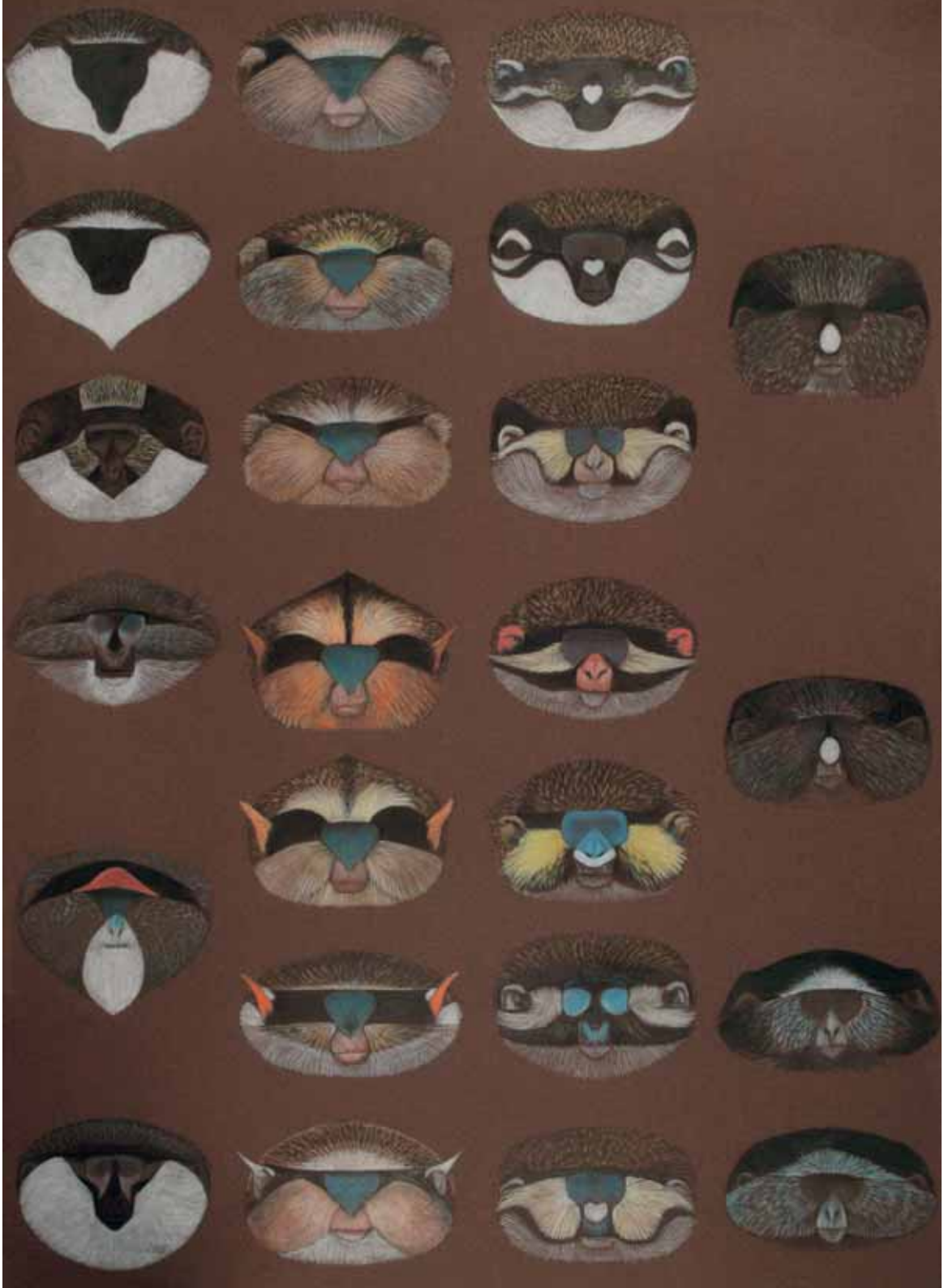
‘Pinstripes and Polka Dots’

Animal Signals

Jonathan Kingdon

2004



Signals of the Animal World

'Bearing in mind how carefully the male Argus pheasant displays his plumes before the female, as well as the many facts rendering it probable that female birds prefer the more attractive males, no one who admits the agency of sexual selection, will deny that a simple dark spot with some fulvous shading might be converted, through the approximation and modification of the adjoining spots, together with some slight increase of colour, into one of the so-called elliptic ornaments.'

So wrote Charles Darwin in his book 'The Descent of Man' in 1871. He was referring to a perfect natural illusion – the series of 'ball-and-socket' images that lie along the gigantic wing feathers of the male Great Argus pheasant from the jungles of Borneo. Each image is carefully shaded to appear like a shiny ball lit from above. Darwin's critic, the Duke of Argyll, had insisted that no argument could persuade us that such ornaments aided the survival of the bird. True, Darwin conceded, but they could possibly aid the reproduction of the bird instead – by allowing it to seduce a mate with a preference for certain kinds of beauty. Thus Darwin first glimpsed the idea of signals co-evolving with senses, a theory that lay dormant, not to say despised, for much of the twentieth century but has now been triumphantly revived and thoroughly tested in ingenious experiments.

More than anybody alive, I believe Jonathan Kingdon understands this subtle idea because, as he says, he thinks not through the 'waggle of my tongue' but through the 'wiggle of my hands'. Jonathan is a truly great artist but he is also

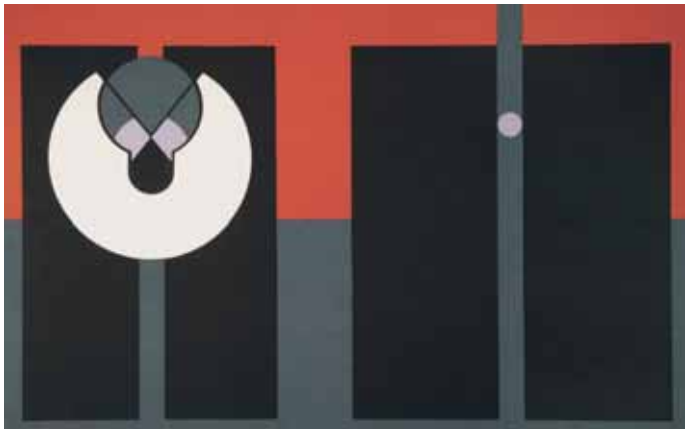
opposite **Guenon face signals** *coloured pencil on paper*

a consummate craftsman and a leading scientist. He combines an ability to observe nature that rivals Darwin's; a talent to portray what he sees in lifelike strokes that Durer would envy; a capacity to abstract the essentials of an image that approaches Picasso; and on top of all of these, a scientific understanding that is all his own. For Kingdon, the aesthetic and the reductive go together. It is precisely because he knows that nervous systems deal in signals, and that visual systems abstract simple essentials from images, that he can begin to see why some images 'intoxicate' us. He can hold the 'why', the 'how' and the 'wow!' in his head all at once.

Africa is, of course, the origin of Jonathan Kingdon. He has written eloquently of how living close to the people, the land and the animals of that continent gave him his astonishing ability to see, to interpret and to portray nature. His books on the evolution and habits of Africa's animals, 'Island Africa' and 'East African Mammals' will never be bettered and his exploration of human origins does so much more than catalogue dry bones and stone tools. Only somebody who has lived barefoot in the savannah could reconstruct the life of Pleistocene foragers as he has done in 'Self Made Man' and 'Lowly Origin'. Africa is the origin of all of us, in a sense. Less than 10,000 generations ago the ancestors of all people alive today were living in that continent and were sophisticated ecologists, brilliantly reading the signals of the animal world, from the 'don't touch me' colours of honey badgers to 'follow-me' calls of honey guides.

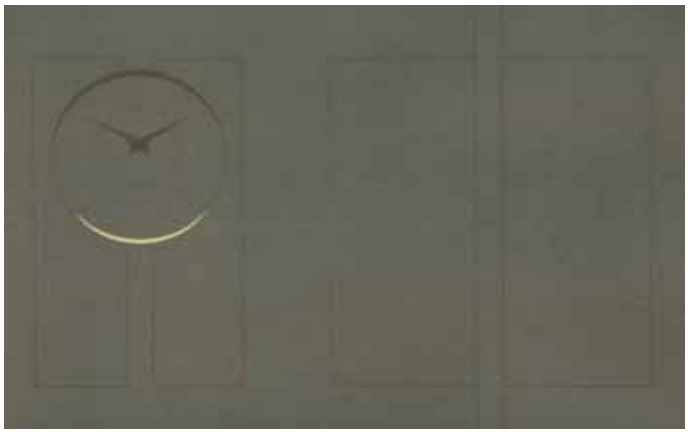
So it is fitting that most of the exhibits in this show are from Africa, showing the patterns of stripes and spots, of colour, of landscapes and animals that would

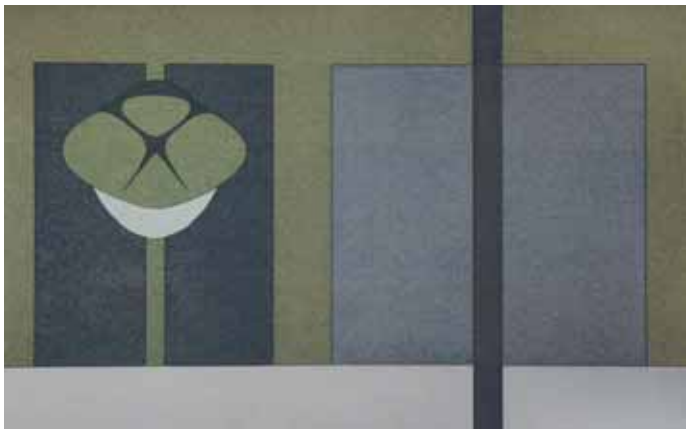
opposite **Okapi** *pencil on paper*
overleaf **Visual Algebra** *Guenon evolution screen prints*

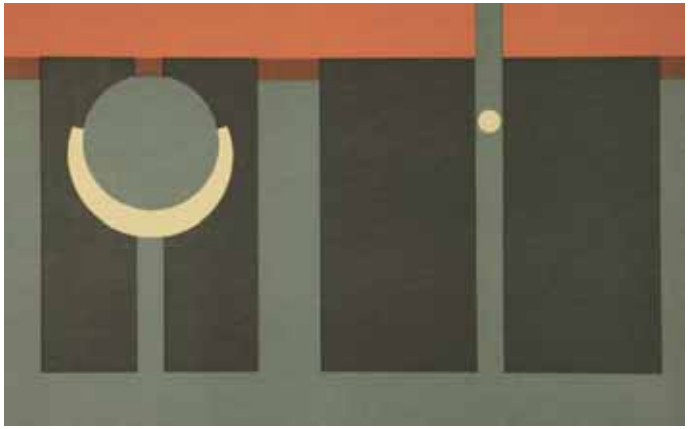


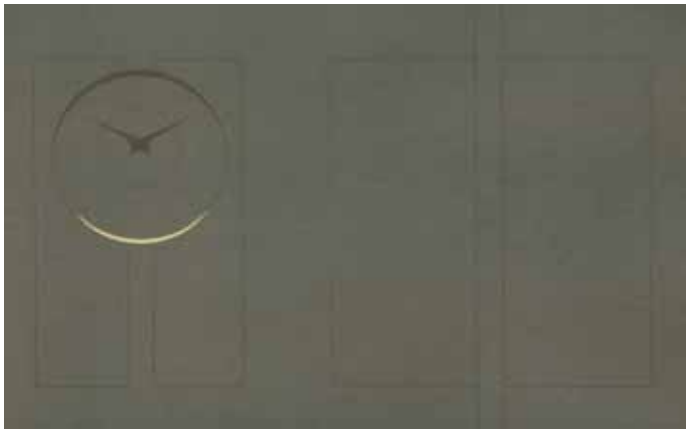
have tingled the aesthetic senses of our ancestors. Many of us were first made aware of Jonathan's ability to use art in the service of science by the extraordinary images of monkey facial patterns that he used in 'East African Mammals' – illustrating speciation and signalling, but using abstraction. It is exciting to see the guenon evolution screenprints derived from that series in this exhibition.

Animals signal many things to each other apart from the desire to seduce and be seduced: social cohesion, species recognition, dominance and submission, danger, food.









The eyespots on moths scare away birds. The white rumps and white wing flashes of many small birds, visible only in flight, serve as a general alarm signal to other birds nearby. The blue wings of the fastest butterflies in the rainforest tell birds not to bother chasing them. The black and white or black and yellow patterns of many animals tell predators that they are toxic, bad-tasting or can sting – though sometimes the bearer is merely a harmless but deceiving mimic. It is probably no exaggeration to say that cuttlefish speak to each other of anger, love, excitement and playfulness in colourful semaphore painted on their flanks. All these signalling systems are the products of how brains work. 'A neurally driven susceptibility to stripes has evolved in the eye/brain system of

fellow zebras' writes Kingdon. Gradually learning to read this visual grammar has been the privilege of naturalists for more than a century, and translating it for public understanding through science and art has been Jonathan Kingdon's genius.

It is however, the sexual signalling game that produces the best aesthetic displays: the birds of paradise, peacocks and nightingales, the tragopans and agama lizards. In its full form, sexual selection theory holds that by chance some male animals stumbled upon a form of display that appealed to a pre-existing preference in females of their species and then, by selection, gradually exaggerated that display over many generations. At the same time, females gradually evolved a stronger and stronger appreciation for that display, probably with a higher and higher threshold for what was an acceptable performance. Why? Either because to display extensive, clean, colourful ornaments in an energetic co-ordinated way was a test that only the best males could pass, so females could get the best genes for their offspring, or more simply because females needed to have sons who were capable of seducing other females, a clever near-circular argument first enunciated by Sir Ronald Fisher in 1915.

In the case of the Argus pheasant, or the peacock, the pre-existing preference probably began with a neural fascination with eyes. Not only do the eyes of a hawk or an owl startle a chicken, the eyes of their fellow chickens fascinate them too. This may be why so many of the ornaments on wild pheasants either draw attention to real eyes (as in the Golden pheasant, which unfurls a concentric ruff around its eye, narrowing the identically coloured pupil at the

opposite **Bullfinch display** *pencil on paper*

same time), or mimic circular, shiny objects – the ocelli of Argus and peacock and peacock-pheasant.

Kingdon talks of animals intoxicated by rituals, but I wonder if hypnosis is not a better analogy. When a peacock turns his full radar dish of a feathered fan upon a female – a sudden and perfectly timed movement when she is close enough – she often appears almost frozen to the spot for a few seconds while he shivers the iridescent feathers for maximum effect. This is followed, rarely, by an undignified 'pounce' as the male tries to take advantage of her immobility to grasp her neck and begin to mate. Her immediate attempt to escape seems genuine and is often successful. Could it be that the most successful males are those that induce the deepest trance in their victims and that female 'choice' actually consists in this species, of female-least-resistance? It is a politically incorrect thought but one that many artists would probably understand!

Delving deep into the brains of birds will one day reveal how this eye fascination happens, how it is that circular objects catch the attention. But we know enough already about the visual system of a human brain to see an extraordinary thing: it works like an artist. It does not just record what is going on; it abstracts features of the image and constructs a picture from them. It finds luminosity edges and exaggerates them (which is why line drawings work so well, even though objects rarely have black lines around them in real life). It makes startling assumptions about the brightness and colour of objects by reference to what else is present in the scene, correcting perceived colour for the calculated bias in the colour of the light – so that a yellow banana looks

Jackson's Hornbill *pencil & coloured pencil on paper*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much the same colour in the orange light of sunset and the blue light of midday. These assumptions are embarrassingly exposed by optical illusions and they have long been ruthlessly exploited by great artists.

The techniques of artists often unconsciously recreate the mechanisms of the mind but in Jonathan Kingdon it is at last becoming conscious. The brilliance of Jonathan is not just that he understands all this at the intellectual level, but that he feels it too. 'For me,' he writes, 'biology helps impart meaning to the images I try to extract from nature but it is as a child of nature, as its ever-curious student, that I am motivated to celebrate its wonders through drawings.' He speaks of his 'childlike intoxication with colour and shape'. He is still trying to 'create or recreate butterfly-induced trances' of his childhood.

Ideas such as these have always fascinated me and it was a joy to discover how much they fascinated Jonathan too, when he began to discuss the themes of my book 'The Red Queen' with me, and when he then translated some of the words in that book into abstract elements of a painting. For Jonathan, scientific understanding deepens the mysteries of perception and evolution even as it explores them.

Matt Ridley
Northumberland
April 2004.

opposite **Twinspot** *oil pastel on paper*

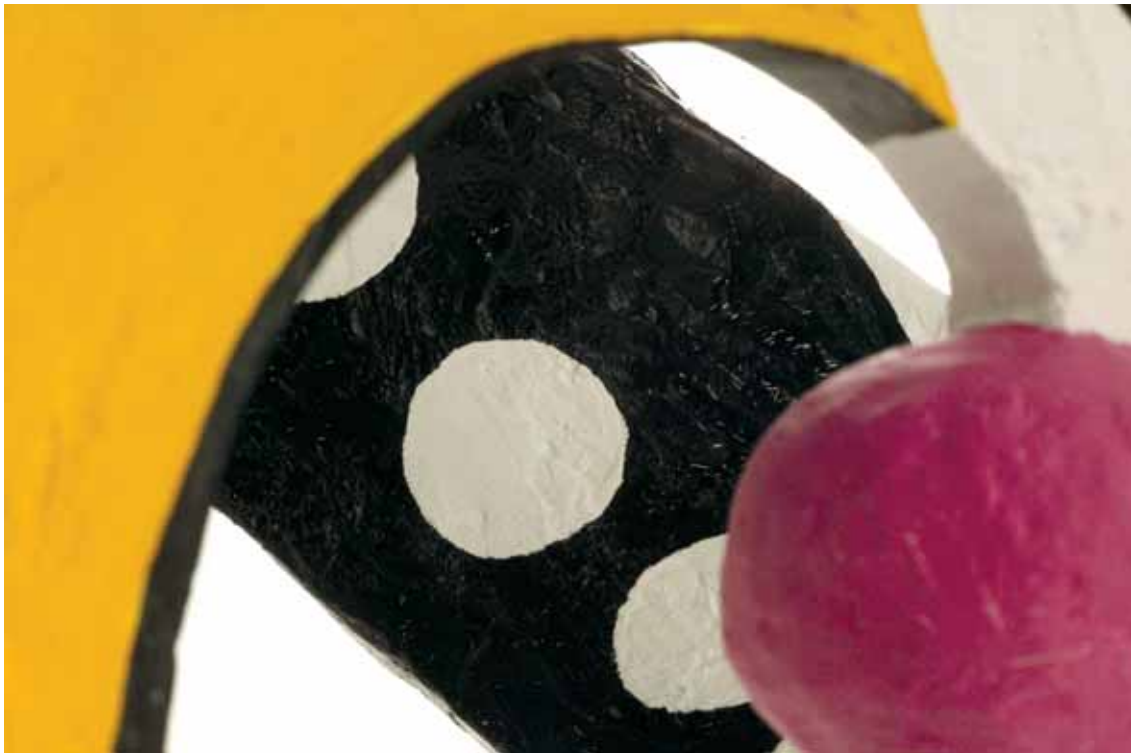
above **Chameleon** detail
opposite **Chameleon** *bronze edition of 10 29cm high*

above **Cassowary** detail
opposite **Cassowary** *bronze edition of 10 55cm high*

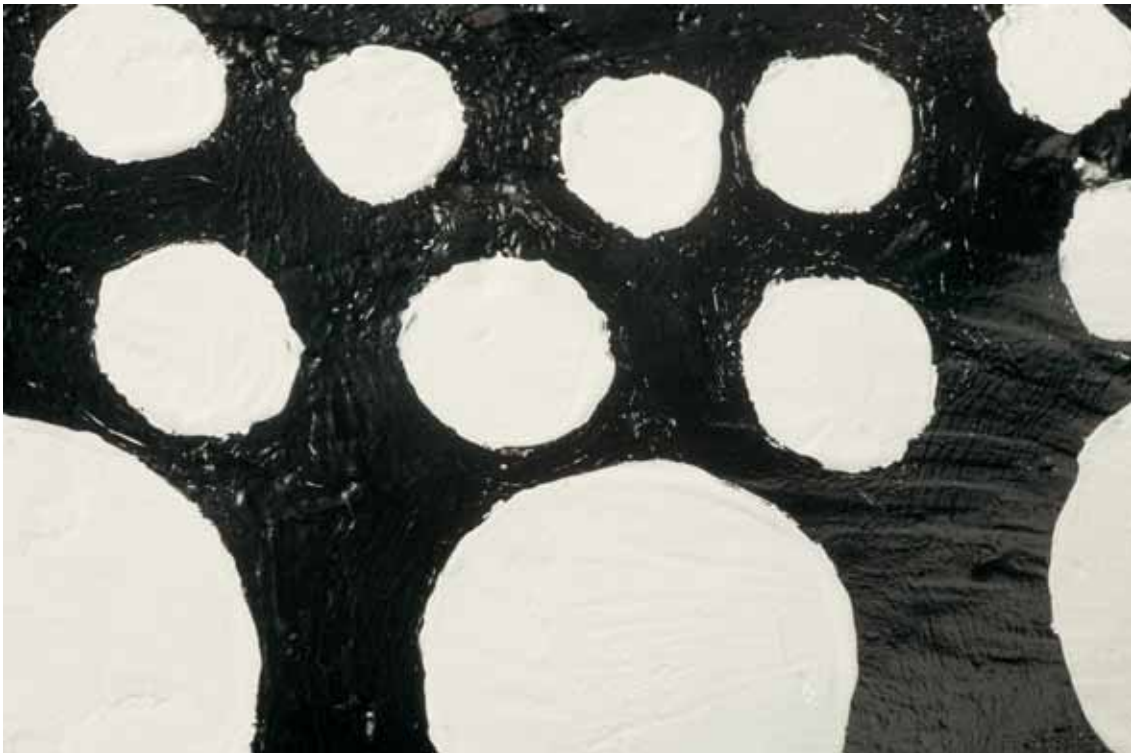

Hornbills
J. Kingdon

opposite **Hornbills** *pencil on paper*
above **Great Indian Hornbill** *pencil on paper*

Hornbill Origami *acrylic on board*



Displaying Hornbill detail



Displaying Hornbill detail

opposite **Displaying Hornbill** *bronze edition of 10 45cm high*
above **Hornbill** *bronze edition of 10 15cm high*

Hartmann's Mountain Zebra
bronze edition of 10 65cm high

Hartmann's Mountain Zebra
bronze edition of 10 65cm high

Helmeted Guinea Fowl *bronze edition of 10 17cm high*

Vulturine Guinea Fowl *acrylic on board*

Pinstripes & Polka Dots: Dressing Up Signals

Where does our love of flowers, birds and butterflies come from? Did our ancestors respond to beauty in Nature?

Meaningless questions: what is beauty? How far back do we go and, most pertinently, how do we know there was any response at all? What we do know is that all the colour and vivacity of Nature existed long before there were people to observe, let alone enjoy them. We know that Nature's expressions exist for reasons that have nothing to do with us but somehow, some of us are both seduced and curious about it all.

Today we know that patterns in Nature and the behaviours in which they find meaning are part of a structured Universe. Quite suddenly we have begun to find the tools and mental aptitudes to explore the meanings of patterns in Nature, indeed, we are living in the greatest period of discovery about Nature there has ever been.

This Age of Discovery is partly led by genetics and by restructuring some of the questions scientists ask of Nature itself. Instead of simply stripping her down to her smallest parts we are asking how the energy and information that is stored in every organism flows from generation to generation and from one individual to another. To understand that we have had to revisualise many of the most fundamental biotic entities as packages of information: Signals.

The signals of animals and plants are the subject of a vast literature.

Contemporary biology tells us that every little item of 'information', from a gene for blue eyes to a flower's scent, can be understood and rendered as a coded signal. To transmit and register signals animals enlist all the obvious senses and a few invisible ones too. The latter can be visualised as chemical or electric locks and keys or codes that have been designed by natural selection to fit pre-structured templates.

When it comes to visual signals, the subject of this exhibition, the field narrows to just one sense. It is the one channel of communication that is best designed to impress. Furthermore, the one context in which 'making an impression' is most explicit is the process of reproduction. While it is true that animals, if they can, use the whole works, movement, sound, vision, scent, touch to impress mates or rivals or lay claim to a home parade-ground, it is the visual channel to which we, as primates, are most sensitive. It is also the one in which humans of all cultures set out to 'impress' one another.

It is here that science, culture and plain human appetite may find common ground but however much intellectual insight, scientific rigour or comparative anthropology we bring to bear on the analysis of visual signals, natural or man-made, we will continue to have innate responses that register and enjoy shapes and colours in the world around us.

For me, biology helps impart meaning to the images that I try to extract from Nature but it is as much as a child of Nature as its ever-curious student that I am motivated to celebrate its wonders through drawings, paintings and sculpture. In answer to the question I began with, it is an article of faith with me

opposite **Blue Monkeys** *gouache on paper*

that a living child can thrill to a butterfly no less than one that lived in Africa quarter of a million years ago. (Or, perhaps, millions of years before that?)

When my mother taught me to draw before she taught me to read and write she did not simply invert the conventional sequence of schooling. Without fully realising the implications she effectively relegated language and its ragbag of arbitrary symbols to second place behind a mode of communication that also relied on manual skill but enlisted that skill towards very different ends. Drawing, of the sort she taught, involved an effort to engage me, the learner, in a direct relationship with my surroundings. My fingers were introduced to pencils, chalks and brushes which, under an observant but selective eye, attempted to mimic, on paper, a few of the countless interesting things that surrounded me.

It could be said that this was a sort of recapitulation of the evolution of alphabets: that she was going back to first principles and starting me off with glyphs and icons rather than a fully evolved tongue with all the letters and syntax to go with it. But that would be wrong because she actually forced me to engage directly with what I was observing: 'Splendid! But haven't you noticed how that knee bends?' or 'See how the petals of that flower peel back from its conical tube. How are you going to get that down on paper?'

She was allying direct, first-hand experience of my surroundings with an analytical eye, a selective mind and an increasingly skilled hand. Instead of receiving the bulk of my experience at second-hand, through print, I was encouraged to use my hands to make some sort of first-hand record of what

Water Chevrotain *pencil on paper*

I experienced. I learnt to think as much through the wiggle of my hands as through the waggle of my tongue and the wampum of printed pages.

Thus it was my mother who cultivated simple skills in observation and pictorial mimicry but it was my tropical environment that surrounded me with 'subject matter', a biological Tower of Babel, a cacophony of signals. Furthermore, the accident of an eccentric home education had some peculiar side effects. One was to become sensitised to the visual languages of all the babbles that surrounded me. On the terrace agama lizards danced to me with frenetic bobbings of their scarlet heads above blue bodies. Every morning, in the frangipani bush outside my window, a Woodland kingfisher flashed his azure wings and clattered his vermilion and black beak in a choreographed reveille. Mixed flocks of waterbirds would suddenly alight on the shoreline below our house, spend a while fishing and probing the shallows and then disappear for weeks or months at a time; why, I wondered, such rare and privileged visits, why all at once and why were such an assortment of different birds all dressed in white, like a congress of brides?

Courting butterflies mesmerised me with combinations of colour and movement that still induce an almost trance-like admiration but also an intense wish to 'understand' such visual magic. Watching an animal's

above **Plovers and Coursers** detail *pencil on paper*
opposite **Harlequin** *pastel on paper*
overleaf **Decoy panels** *acrylic on board*


JK

intoxication with its own rituals suggests nothing less than a wholesale subversion of all the senses. All taken over, so science tells us, by the imperative to reproduce.

As for me, at six years old reproduction was certainly the last thing on my mind but my senses were as fully engaged as if listening to music. It was the visual not the aural channel that my mother cultivated and with it an altogether other area of the mind was engaged. I am still trying to create or recreate butterfly-induced trances so I am convinced these childhood reminiscences are relevant to the task of understanding how simple representations of colour and pattern can combine the authority of raw animal senses with a far from raw, indeed, rather novel scientific sensibility.

Another memory: as an enthusiastic schoolboy naturalist living beside a lake in Singida, Tanganyika, I was asked by a friend of Peter Scott to net some Pygmy geese and African teal for the wildfowl collection at Slimbridge. Knowing a little about decoys, my first act was to carve a couple of miniature versions out of a sort of balsa-like wood and paint them in Pygmy goose liveries, one male, one female.

Persuading the geese to tangle themselves in the nets was another matter altogether so while I soon caught some Hottentot teal, (perhaps their descendants are still paddling about in Slimbridge) the little geese seemed to see the net and I never succeeded in catching one in spite of birds returning to the decoys again and again.

Painting those decoys was one of my earliest lessons in the mimicry of signals. I had to visualize what that decoy looked like from up in the sky and from half a mile away. What unique combination of coloured blobs said 'Pygmy goose'. Even more significant, painting those geometric outlines introduced me to the idea that patterns have templates in the eyes of their beholders. It is only with hindsight that I see a connection between making decoys and trying to understand how signals evolve, how they are 'put together'.

A few years later, at Art School, I spent time splashing gouache onto neutral sugar paper in attempts to match the visual impact of patterns as they were displayed on living birds. I pursued Egyptian shelduck, Lilac-breasted rollers and Melba finches in Tanganyika and, during the winter, became a regular in the tropical birdhouses at London Zoo.

I was searching for pictorial/structural regularities that I envisioned might provide 'clues to the game', clues as to the extraordinary intricacy and geometry that was so spectacularly typical of bird plumage.

Some years later, while putting together an 'Atlas of Evolution in Africa', I tackled one of the most refractory of biological conundrums: what are zebra stripes for? After months and years of observation in many parts of East Africa, and quantitative experiments with painted stripe-panels, (which could be likened to flat black & white decoys!) I concluded that stripes, for zebras, had become a sort of 'bonding device'. I deduced that stripes had elaborated through a series of evolutionary changes that transformed one-on-one grooming at favourite sites on the croup or withers into an all-over pattern that served to make ANY zebra attractive. An important quality in the progressive socialization of a famously curmudgeonly mammal.

The most important conclusion to come out of this research was that signals evolve and are made 'in the eye of the beholder'. In this case a neurally driven susceptibility to stripes has evolved in the eye/brain systems of fellow zebras. That discovery helped shape the way I went about decoy making ever after and, incidentally, stripes and dots have become a sort of signature in much of my work.

Another objective in writing my 'Atlas' was an open challenge on how mammals could be represented. Some of my drawings were of species that had only been seen by museum collectors and the odd hunter but others were of animals that were ostensibly well known but were victims of stereotypy.

opposite **Kisima Airstrip** *acrylic on canvas*

'Sneaky hyenas', 'blood-thirsty wild dogs', 'stupid giraffes' and 'camouflaged zebras', are all denigrations or assumptions that confirm how difficult it is for humans to look at Nature without anthropomorphism and with a fresh pair of eyes.

Today, perhaps more than ever, photography and television have straitjacketed the way in which we visualise what an animal is. Among the many evolutionary unknowns is how one species has acquired, say, a spotted coat, another, closely related, is striped. Yet those external patterns have to be wrapped around an anatomy in ways that often seem highly contrived but offer a fascinating exercise in the study of evolution's techniques in tailoring.

Now, many years later, I know that my images still revert to a childlike intoxication with colour and shape but I have spent these years refining my skills and, through a selective reading of scientific literature and much direct observation of animals and plants, tried to feel my way towards composing a 'Grammar of Signals'. These always remain a work in progress, some may still be close to species-specific mimic-decoys, some may extract and re-mix some of the basic ingredients of signal construction, others may hint at the struggle for scientific insight or pictorial coherence. All seek to combine sybaritic delight in my primate sense of vision with my human curiosity about why the world is so full of signals, signals that were designed in the eyes of viewers. Wonderful things to see, wonderful things to think about!

Jonathan Kingdon
March 2004

opposite **Leopard coat variations** gouache on paper

Afterword

Renowned both as an artist and a scientist, Jonathan Kingdon is exceptional in combining these two disciplines so deftly. An inventive mind and a deep understanding of evolution allied with acute observation expressed through exquisite and powerful draughtsmanship set him apart.

This exhibition is merely a window onto the vast landscape in which Jonathan roams and focuses on his graphic explorations of animal signals through drawing, painting, print and sculpture. We are proud to present this one-man show which celebrates the exuberance and versatility of this extraordinary man.

Jane Buck
Claude Koenig
May 2004

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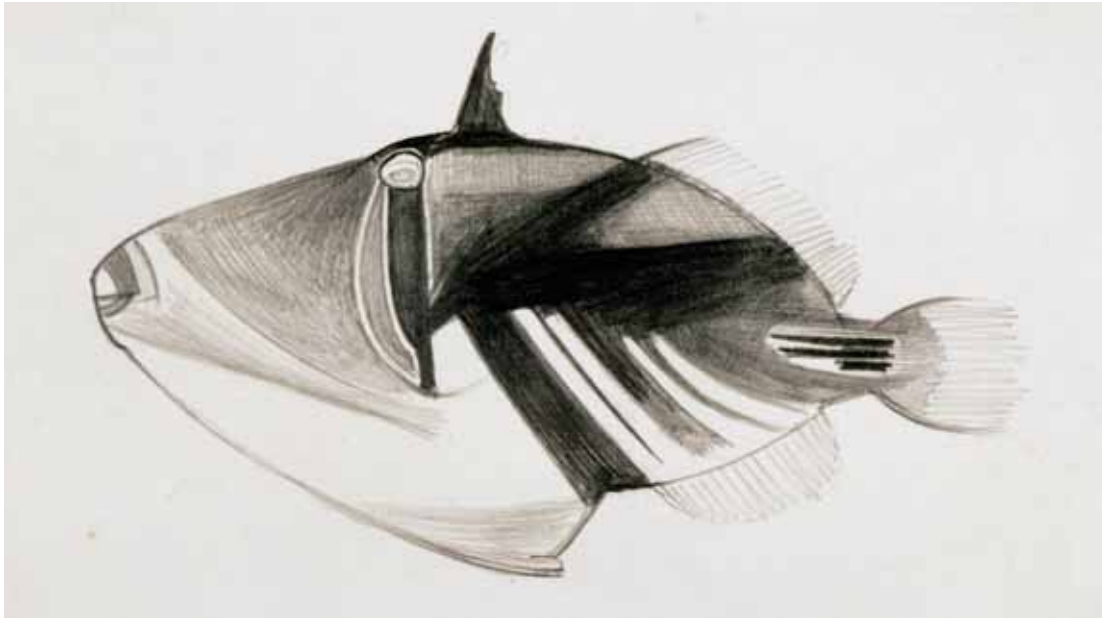
opposite **Picasso Fish** *pencil and coloured pencil on paper*




This fish has white phosph. stripes on belly
which are thrown up in strong relief
when the animal is aggressive
Colors instantly when
a sudden noise
is made
red on this one
represents the phosphorescent
areas

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