ROYAL INSTITUTE LECTURES

The Language of Animals – Part IV
Given by: David Attenborough

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OPENING SEQUENCE

APPLAUSE

David Attenborough:

Well, so far we have been talking about, for the most part, pretty simple languages. We have been talking about simple signals, like a spot on a herring gull's beak, and simple reactions. But of course some animals have much more complicated signals than that, and I'd like to show you, to start today, a film of one of them which, if you are lucky enough to live near a lake, or perhaps a flooded gravel pit, you may see for yourself at this very time — great crested grebes.

Now in the spring the great crested grebes go through this marvellous, beautiful display. They go through many displays, and I am only going to show you a few of them on this film, but I want you to look at them very closely. You see they shake their heads, they lower their beaks, they swim round one another.

Now keep careful note of what they do, because what we want to do is to try and explain why they do it.

More head shaking. Notice they have got tufts on their heads. That one pecked its wings. This sort of dance goes on for a great part of the year.

Now look — it's got its beak open. That could be important, and so was that. Both shake their heads. And these dances, these displays, go on for long periods of time. I mean, one single display may last many minutes. Head bobbing there.

They don't always go in the same order, but there are several acts, as it were, to this bit of theatre, and the last act, which doesn't always happen, but which we are going to see now, involves diving. Now watch this one.

Dive.

And up it comes close to another one and, in its beak, a weed. And then the two — you see they are treading water here in order to get high up out of the water — they are treading water, and both… that one has weed in its beak, and this one doing this particular dance. The other one often has weed as well, and the two of them stand up facing one another with weed in their bills.

Well now, that dance happens every spring. Those birds were once nearly extinct in this country. Happily there are many more of them now. But it happens every spring and, of course, we know in the

sort of terms of what it's for. If you say "What is it for?", it is something to do with courtship, it is something to do with nesting, it is something to do with mating. We know that because that is the time it happens, that it leads up to that.

They then nest, rear their brood, and then they lose a lot of their lovely tippets on their heads and their crests. They become much plainer in plumage and they don't dance until the next late winter, early spring.

But the question is: why should they do that complicated series of gestures and dances and rhythms?

Now the reason I picked that particular bird and that particular display is partly because it is British, because it is the most sensational display which I think you can see in any British bird, but also partly because it was the study of one of the greatest living British zoologists, Sir Julian Huxley, who was the first man to look at that display sixty years ago, in 1914. Sixty years ago, and to analyse it and work out that, in fact, almost every movement in those displays was developed from a perfectly ordinary movement that the birds make as part of their everyday life.

Ordinary movements that have been taken out of their normal part of life, put into a dance and changed, elaborated in some way.

What I am going to try and do — and it is really quite difficult — is take that dance to pieces and try and see which bits are derived from what sort of behaviour.

Now, these sorts of behaviour that are ritualised weren't necessarily signals at all. They may come from ordinary everyday life. And so, in order to see what is the raw material, as it were, for displays of this sort, let's do one or two experiments.

You — will you come and sit there?

I am going to sit opposite you, Jonathan.

David Attenborough:

Right, Jonathan. Now what I am going to do is to ask you a series of questions. I am going to keep you in conversation. But actually I want you to imagine that just through that door there are free ice creams going, you see, and that unless you get there within the next couple of minutes you will miss the ice cream. So that you actually don't want to know what the questions are, you certainly don't want to answer them — you want to get out there. Do you understand? Right.

Now, did you have a good Christmas, Jonathan?

Jonathan:

Yes I did, thank you, by the way—

David Attenborough:

Jonathan... did you get some nice presents?

Jonathan:

Yes I did. I am very sorry—

LAUGHTER

David Attenborough:

What sort of presents did you get?

Jonathan:

I got some very nice books, sir. Yes—

David Attenborough:

Do you have to go right now?

Jonathan:

Yes, I am very sorry—

David Attenborough:

Oh, I see. Thank you very much. You go.

Very good. I hope you were watching some of the things that he was doing.

Children:

He kept trying to get out.

David Attenborough:

He kept trying to get out. He kept doing that, didn't he?

Children:

He gave very short answers.
He talked quickly.
He kept pointing towards the door.
He made his answers boring so that you wouldn't—

David Attenborough:

I think he would deny that, but I think you are right. Any more?

Children:

He moved his hands.
He glanced towards the door.
He tried to keep his eyes off you.
He wanted to get out.

David Attenborough:

That is right. Absolutely right.

Now let's just sort that out. One of the things he was doing was trying to, as it were, break contact with me, so that he wasn't looking me in the eyes. He kept turning, trying to sort of break away from me. So he was withdrawing from me in a sort of way, trying to get away. That's one thing, and that is important.

And the other thing that he was doing, as you said, was that he kept lifting himself up off his seat, didn't he? But he didn't actually go, partly because I had stopped him, partly because naturally, being

a splendid chap, he didn't want to be too rude about the whole thing. And so politeness to me kept him sitting there. And he was making what biologists call intention movements, or incomplete movements. Putting his hand up — that too was an intention movement.

So what we noticed were two things. He kept turning away from me without actually going away from me, and he made intention or incomplete movements as though he was going to leave.

Right. Now animals do just the same things. Let me show you a beautiful starling.

The royal starling.

Now I won't go too close because the bird is a little disturbed, but if you watch him, he is very upset at the moment. But he is making intention movements — particularly flying intention movements.

If you ever try to make natural history films, and you have a bird sitting on a perch rather motionless, you may sit there for hours and hours and hours waiting for something to happen, and it's costing money and it's very boring. So as a naturalist you learn to recognise when the bird is going to fly.

Now watch — now he jerked his head. You see? That means he is going to fly. You see? Jerking and looking around. Now if I back away he will probably fly.

There. Intention movement.

Now you may think that is just ordinary behaviour from a bird, and so it is. It is perfectly normal intention behaviour.

Thank you very much. If I don't come too close to him, he won't fly at all for us.

Thank you, Royal.

Right, now we have got intention movements and movements of breaking away, which we demonstrated amongst ourselves and amongst the birds.

Now there is another whole collection of movements which I have been making since I came in. Do you notice I have been walking up and down? It's got nothing to do with what I am saying, and you may think that it's something to do with the fact that I might conceivably be nervous. And you may be right.

And actually sometimes you may even see me, as it were, do that — that's got nothing to do with what I am trying to say to you either. That too is nervousness. And even actually, lots of speakers will, while they are talking, suddenly actually decide that they want a drink, and that too could be a sort of nervous behaviour. Of course it could also be that I was getting rather dry, and if I was getting rather dry, I don't normally get rather dry — it's only because I am rather nervous.

So there are a selection of movements which you do which have got nothing to do with the message which you are trying to get across, but which you do out of nervousness or trying to keep yourself in good condition. Ruffling your hair, walking up and down, having a drink.

Now those sometimes are called displacement activities, in the sense that they are activities which don't normally have much to do with the action that is going on, and which are, as it were, accidental — have been displaced from where they normally take place, let us say in your toilet, and have been put into another part of the activity.

For example, if you watch birds fight — I mean ritual fighting that we have been talking about in other talks — you often see them break off and preen. It could be that they are just preening because they like to keep their feathers in good condition, but one way or another those are whole sets of activities which occur when creatures are in a nervous situation.

So now we've got two series. For the third category I'd like another demonstration.

You two chaps sitting there — come and sit down there. Face one another.

Now you have got to watch these lads. Now I want you to argue with one another about something. I don't want you actually to smash one another's face in, you understand. I don't want you to reach across and pick him up by the shirt front or anything like that. But I want you to argue fairly vehemently, fairly powerfully.

Do you have a football team that you think is the best?

Oh.

What subject do you feel strongly about?

Boy:

Pollution.

David Attenborough:

All right. You tell him that pollution is a load of rubbish. Now carry on.

Boys:

Well there's a lot of pollution about these days.

Boy:

Oh no, it's not really as bad as that.

Boys:

It is if you go down to the Thames now, very far from here. You see pollution everywhere. There's no fish there at all.

Boy:

Oh rubbish, it doesn't really matter, does it?

Boys:

It does. If there's no fish, you can't eat fish. It is bad for you—

Boy:

Oh rubbish, come on, come on—

Boys:

Even they are getting clogged up with—

LAUGHTER

Boys:

You go down to Brighton beach, you see oil—

Boy:

Oh what's the matter with beaches? You only use them for swimming—

Boys:

Yeah, but they come out from the middle of the English Channel—

Boy:

The English Channel is not for fishing—

Boys:

You get fish from everywhere. Pollution everywhere—

Boy:

Oh rubbish.

LAUGHTER

David Attenborough:

Fine, before blood's shed, thank you very much.

APPLAUSE

I'm on your side.

Now I am sure you were watching naturally, but you see, what did they do?

Children:

They waved.
They thumped their fists on the table.
They moved closer.
They got progressively louder.
Went red in the face.

David Attenborough:

Very good. First rate. Absolutely first rate. Anything more?

Children:

Put their hands up.
Voices got higher.
Got closer together.
Interrupted each other.

David Attenborough:

That's quite enough to be going on with.

Now let's try and sort that out. They got closer together, and that is an aggressive movement. And what's more, as they got closer together they looked deeper into one another's eyes — absolutely the reverse, you notice, from what Jonathan did to begin with. He was turning away. Instead of that they looked deep into one another's eyes.

And lastly, out of that particular collection of bits of behaviour — he pounded the table instead of pounding him, the other fellow. Why is that?

That is because, partly because naturally he is such a well-mannered chap that he wouldn't actually smash the face in of the chap opposite him, and also there are other inhibitions. It might have been that he thought he was a bit strong anyway and wouldn't want to take him on.

So what he was doing was actually pounding the table instead of pounding him. In other words, he was redirecting an action from where he really wanted it to go into something else where it wouldn't harm.

There is a much older story, a joke which you sometimes hear told, about how a chap who has a bad time at the office comes home and is very bad-tempered with his children because he's had a row in the office and he has redirected his irritation and his anger. So he comes home: "I've had a bad day in the office, dear," and so he's perhaps not quite as well-tempered as he might otherwise be.

But that's redirection.

Now you see birds do exactly the same thing. Here are a couple of herring gulls having a row.

See? Arguing. "That's my land," he says. "Clear off." "No it's not, it's my land."

Now watch there — you see? Pounding the table. That's what he is doing. He's tearing at the grass instead of tearing at the other gull's throat.

See? They both look at one another. They both put their heads forward, just as you two did, and look — heads forward and tearing at the ground.

So we've got more desk-pounding.

What we've got is another collection of gestures, all of which themselves were not done because you wish deliberately to convey a piece of information as a piece of language, but because you just do it as part of the circumstances in which you find yourself.

We've had turning away, we've had redirection, we've had these other curious preening activities when you are nervous.

So now that's quite enough, as it were, for the raw material, for the vocabulary of these gestures, for us to be going on with.

David Attenborough:

And I wanted to make that particular circumstance special, so it becomes a special occasion. Not only is it a special occasion, but I want everybody to see it, and I want everybody to know exactly who I am. Now what do I do, in Sir Julian Huxley's terms? I ritualise that.

And I now would like to look at a few bits of ritualisation that all of us do, or at least all of us watch.

Just take the simple action of walking up and down. Now I can walk up and down in a perfectly ordinary way like this and it doesn't convey anything. It doesn't convey anything to you, does it?

Absolutely not, I quite agree. You might wonder why on earth I am walking up and down, exactly, and it's got nothing to do with what I am doing. I am just walking up and down.

But if I were to march...

MARCHING MUSIC

...you would say immediately that that had a very different significance.

What did those guardsmen from the audience do? Tell us one or two things about their walking up and down.

Children:

Much more regularly.

David Attenborough:

Ah, you mean rhythmically. Quite right.

Children:

They both walked at the same pace.
They didn't move with the music.

David Attenborough:

Yes. The point is that they were very rhythmic. Yes.

And in the Guards, of course, you actually have sergeant-majors and all sorts of people whose jobs are to tell you exactly how far you should lift your feet so that it is made absolutely uniform and rhythmical. They had busbies on — in other words, conspicuous objects in order to catch everybody's eye.

But of course you may say, "Well naturally, if you want to march and you have all got to march together, you naturally do it that way."

Not necessarily. There are other ways of marching. Look at this.

This was film that was shot in the 1930s in Nazi Germany, of goose-stepping. And here they are throwing their feet way up in the air, you see.

Now that's not actually — it's an old piece of film because that was when it was shot — but actually there are soldiers of today who march like that, who goose-step. In South America they goose-step. And I would suggest that what they are doing is actually emphasising how virile and how strong and how aggressive they are.

But there is yet another way of marching that we could do.

MARCHING MUSIC

Thank you very much.

APPLAUSE

Now that is called slow marching, and as you will see it is a highly — and I am going to use this word now because we have been looking at it for some time — highly ritualised way of marching.

And what is involved is sticking your foot out first — I am sure the Guards wouldn't say this, it's much more complicated than that — but anyway, to me it looks like that.

See?

Now there is no reason why that should give a message of mourning, of sadness, except for the fact that we have ritualised that perfectly ordinary piece of behaviour in order to give, by custom and usage, a particular message.

And so when there is a state funeral, the Guards, or whoever is taking part in that funeral, will actually march in that way, and we will take from that ritualised piece of behaviour the knowledge that it is in homage and it is in mourning.

Right now, I want to show you one more...

Oh, there are two other bits about marching. Did you notice when they ended they very ceremoniously saluted?

I mustn't attempt to salute because I don't know how to salute, but they did. And of course, what does that mean?

There will be arguments about this, but it could well be that what that is derived from is a time when you took off your rather aggressive crest — your hat — out of politeness and sort of submission, and that this is just a ritualised simplification of the taking off of the hat. So it's just a quick touch and down again.

Now just as one last example of our ritualisations before we go back to the animals, have a look at this.

Many years ago I was lucky enough to be in the South Pacific island of Tonga, and in Tonga you don't drink tea, you drink kava. And kava is made from a particular root which you take home and you pound up with a bit of stone on another piece of stone, and then you pour on a bit of water, just like mashing tea, and you swirl it around in a bit of a bowl and then you strain it and you drink it.

As a matter of fact, it tastes rather like mouthwash.

But that is not the sacred ceremony that I am going to show you. This is the big Royal Kava Ceremony.

You don't drink it as you would do if you were thirsty. You drink it like this.

This ceremony was held...

First of all, the mixer lifts his hands very high, much higher than is actually necessary. A specially large kava bowl is brought in to make it very conspicuous, and the kava mixer is a very special man, sits in a special position with his arms out to either side.

You watch the way that he mixes this kava. After all, it is a question of pouring on a bit of water just as though you were making tea.

Water is poured on and now he starts. Right high up, far more than is necessary simply for the function of mixing kava. The motions are highly elaborate, highly exaggerated, highly stylised.

And what is he doing? Why is he doing all that in this sort of way?

Why does the Chairman, or whoever it is who gives a particular speech, speak in a stylised way rather than in the stylised way of ordinary conversation?

In order to suggest to you — or to whoever it is listening — that this is a very important occasion. This isn't just drinking a cup of kava. This is something quite different.

Now he squeezes it. It doesn't look very attractive.

Now a woman comes along and she takes a cupful and she gives it to Queen Queen Salote Tupou III, who was the Queen of Tonga and is now dead, and this is an historic piece of film.

She carries it across there and you will see something very curious.

There is Queen Salote, and she takes the kava cup. She just pretends to drink it, you see? What she does is to give a pure symbolic touch of the lips and put it down again. She wasn't drinking kava in order to quench thirst. That has got nothing to do with kava. That has something else quite different. It is a symbolic part of the ritual in which the Queen takes part. So instead of drinking the cup she doesn't drink it — she just lets it touch the lips and down it goes.

Right. Well now, enough about us. It's now time that we turned what we have been talking about in terms of intention movements, redirection and all the rest of it, and see how it applies to animals.

Now bear in mind—

Excuse me while I just have a little bit of a displacement activity, will you?

DRINKS

What we want to do is to see how you take those kinds of motions and enable them to signify — to carry the message — that this is going to be a very important occasion, like for example breeding or courtship.

And what you have to do with them is, as I said, to make them conspicuous and to make yourself easily recognisable, and to signify that it is a special occasion.

And there are many ways we may do that. We may take these ordinary actions and turn them into something special.

Now then, I need more help. I want two young ladies this time. Volunteers? There, two — splendid. You two come down.

Now you stand there, and you come over here. There we are, that's fine.

Now there are a lot of bulbs on there and I am going to turn this board on in a minute and the lights will go on, you see, and they will start flashing. And what I want you to do is to see if you can find one that you think is special, that your eye is particularly drawn to.

Right. Here we are.

Can you see one that is special?

Girl:

This one, is it?

David Attenborough:

No.

Girl:

The one next to that one.

David Attenborough:

This one? What is so special about that?

Girl:

It is going on more than all the rest.

David Attenborough:

What is going on about it?

Girl:

It is flashing quicker, not going on for so long.

David Attenborough:

Well that is true. Is there another way of describing it?

Girl:

Regular.

David Attenborough:

Regular. Correct.

In other words, that is a regular rhythmic flashing light. All the rest are just going at random, but that one is going on, on, on, on, on.

Thank you very much.

APPLAUSE

So one of the things that you could do if you wanted to take a perfectly normal action and make it conspicuous, to make it special, is to make it regular.

Now we do that all the time. In the busy high street on an evening there are lights flashing all the time — traffic lights, car lights, advertisement lights.

Now of course it is very interesting, is it not, that if you want an advertisement light to be conspicuous, advertising agents tumbled to this a long time ago: what you do is put a rhythmic flasher on it.

And it is not only advertising agents. The police know perfectly well that if you want to be conspicuous you make a thing rhythmic. Ambulances know that if you want to make a thing conspicuous you make it rhythmic. And of course birds know that if you want to make a thing conspicuous you make it rhythmic.

Watch these teal.

Watch. You see? This is a courtship. A rhythmic bob of the head. You see? It's very short so we'll run it backwards, but it doesn't make any difference running it backwards because the bob is uniform, you see.

LAUGHTER

All right, run it the right way round now.

Here we go. A regular rhythmic bobbing.

So that's not just an ordinary bobbing of the head which you certainly can do as part of your everyday life. That's a rhythmic bobbing.

But there is more yet that we can do.

You remember about these particular activities: you can take displacement activities and you can insert those into your behaviour, into your breeding behaviour.

Let me show you some Bermuda albatrosses.

Bermuda albatrosses have a particular way of courtship. They sing.

But you see the rhythmic bobbing. See? And a preen, you see? Rhythmic and a preen.

Now watch this one. Rhythmic and a preen. Rhythmic—

Thank you.

So there what the bird has done is to take the preening and make that conspicuous by making it rhythmic, and have taken the preen — which is a displacement preen, sometimes called, or at least a preen which happens when you are in courtship behaviour — and incorporated that regularly into their courtship displays.

Well now, the preen itself in that particular instance is perfectly clear to see. It lifts its wings and it preens.

But you remember what happened to that salute. The salute no longer was, as it were, taking off a hat. It had been reduced to a little touch of the brim.

Similarly with Queen Salote's kava. She didn't drink it, she just touched the lips.

Now preening the wings, for example in ducks — if you watch mallard and garganey and shelduck — they actually have little patterns on their wings which they preen, and always preen in the middle of their courtship.

But you see what a mandarin duck does.

A mandarin duck has a special sort of little preening thing on the edge of its wing there, a great sort of peak which is orange. And what it does when it courts is first of all—

Above its head and then very quickly, do you see, just touch that part of its wing.

That's again — you see, very quick.

Now that is Queen Salote putting the kava cup to the mouth. Now we've stopped it in mid-action so that you can see it. And that is the Guardsman's salute.

And of course we would have no idea that that had got anything whatsoever to do with preening were it not for the fact that we were able to see a whole series of different ducks which have a whole series of wing behaviours in their courtship leading up to that.

Let me show you one other bit of displacement activity — or perhaps not. Perhaps functional activity.

Now you will recognise that delicious bird, which is a favourite of mine.

Oh, I am sorry. That is a Gouldian finch, and next door to it, down there, are zebra finches. Now these are Australian finches.

Now did you see the Gouldian then? It wiped its beak on the perch.

Is it going to do it again? Oh, do do it again.

Thank you very much, it did it again.

Did you see? It just wiped its beak on its perch.

Now that bill-wiping is something which a whole lot of birds do — zebra finches and Gouldian finches and many other finches. And you may say it comes just, obviously, from a desire to clean the bill. Correct.

But it may also be that in courtship the bird did get a rather sort of dry mouth, as you might say, or indeed a wet mouth. There is something going on in its mouth so that whenever it went into courtship it wanted to clean it.

And what happened was that this perfectly normal activity became ritualised into part of the standard behaviour. And what happens is that when the zebra finch, for example, does its courtship display, it always wipes its bill on the perch or the twig that it is sitting on.

But the Gouldian finch, which has that delicious chick which is so marvellously coloured, naturally does something rather special and I want you to watch this.

This is the courtship of the Gouldian finch.

Here he goes. You see? He does the bill wipe, but he does it very, very fast, and he does it high up. So that what he has done is to take this bill-wiping motion and completely remove it from its function.

Now—

He does a marvellous little jump. And that is probably an intention movement to fly away.

The female then does a low little bill wipe, again removed from the branch.

Now the male is going to do it again. You see?

And off he goes on his dance.

Now this is so delicious that I want to show you just one more thing which is very, very strange.

We are now going to slow it down and listen to his song, because we are going to slow down his song as well.

Now if you listen to his song now, he is whistling about four songs at the same time.

A low one, and a very high one, and a middle one.

So what it has done is to take his bill-wiping and ritualise it by taking it away from the branch where it happens and speeding it up very fast.

David Attenborough:

Right, well now I think we have seen enough of those source materials, of these bits of actions from everyday life, and the way in which you can speed them up or simplify them, or make them rhythmic, to have another look at the grebes, which is where we started.

So now we can see the great crested grebe.

But first of all, this is the early stages of courtship and the birds are anxious to show one another that they are mates and they are not going to fight one another, so they both avert their gaze from one another, as Jonathan did.

What's more, they have then — having got that movement in as part of courtship — ritualised it by becoming speeded up and rhythmic. So they are averting their gaze with this marvellous head-shaking.

Now what will happen next?

They have got crests — did you see that? That was a preen, and that always happens, the preen. So the preening has again become part of the courtship display, part of the dance.

Now this one has got its bill open, and both of them have their bills open then, and that may again be that business which is rather akin to bill-wiping.

And having done that they then will make an intention movement, or they will do a display which is derived from an intention movement — the intention movement of nest-building.

Again, something that would normally happen in this particular context at this particular moment in their lives, of building up towards courtship. But what has happened is that the movement of diving down to the bottom of the pond and picking up a bit of weed has become ritualised. It has been put into a whole series of dance movements.

Now let's see them do it.

Watch. Dive. Come on. There we are.

And up they come carrying nesting material. But now that's got nothing to do with nesting, or very little to do with nesting. Now this has become part of the dance.

And just to show you what can happen, which is even more exciting than our own great crested grebes, in North America there is the western grebe, which is this one.

And this does a weed dance in just the same way. Again it is probably an intention movement of nest-building. Then it treads water in a rather elaborated version of our own great crested grebe's weed dance.

But then, having discarded the weed, they then go in for rhythmic preening. But you see they hardly preen at all. Again, it is taking that particular activity — you see they are doing it together rhythmically — of preening. They are not actually preening any more than Queen Salote was drinking kava.

And then, what about that?

That is the particular speciality of the western grebe.

Watch.

That is a really delicious movement.

And he is going to do it just once more.

They come together this time looking with their heads towards one another, doing a bit of dipping, and then — watch.

Up they go.

Now so we know what we have seen, I hope, so far, is that we have seen that the courtship dance of the grebes — which is an important part of their language to one another, which helps them say "I am your mate, we are going to mate together, we are going to make a nest, we will raise a family, this is our patch of the lake" — says all those things, has been built up from all these other movements from their everyday part of life by ritualisation.

Now in order to do that there is just one further characteristic of the grebe which I ought to mention to you.

You will have noticed perfectly clearly that the grebe had these feather tippets and crests on it. Now they serve, of course, to emphasise those actions that we have been talking about. The head-shaking, the head-lowering, the dipping, the preening, have all been emphasised because of these feathers.

And if you were a good enough naturalist — if you had never seen this grebe alive, never, but simply saw the skin — if you were good enough you would say, when you looked at these feathers on its head here, you would predict, I think with reasonable luck, that it must use its head in its language of display, because it has those feathers on it.

And indeed it is one of the pleasures of natural history that you could go to a natural history museum — and this comes from the Tring Natural History Museum, a branch of the British Museum up in Tring — if you go to a natural history museum you could look at any of these animals and you ought to be able to try and work out why it is coloured in the way it is coloured.

Perfectly ordinary animals which you are familiar with, for example a lion.

A lion has a black tuft on its tail, and what's more it has black spots behind its ears. They are nothing to do with camouflage. But if you actually watch films of lions display, what do they do?

They hoist their tail, with its black patch on the end, over their back and wave it when they are angry. And what's more they turn their ears round and show the black spots on the backs of their ears.

So that one of the things you ought to be able to do — or which is a great pleasure to do — is to try and work out what these patterns are on animals and how they will give you clues as to what their behaviour patterns are.

But there is one animal which has managed to separate those sorts of reinforcing patterns from its body and make them, put them in a quite different place in a way which I find almost unbelievable.

Let me show you a model.

This is Mr Coates' masterpiece number one.

Now that is a model of something which you could see in the forests of central New Guinea in the mountains. And when you come across it all I can tell you is that it is unbelievable.

You walk through thick forest and suddenly you find a sapling — this is about half scale — a sapling about five or six feet high, and round the side of it it had been plastered with bits of twigs, and there is a sort of hedge round the bottom, and this part is absolutely clear.

Now these were only seen by Europeans about a hundred years ago and when they were seen people said they must be made by pygmies or they must be made by some of the local people. I mean, what animal could possibly make that? Because there was no sign of an animal there at all.

In fact this is the display ground of a bowerbird.

Not, mark you, the nest — nothing to do with breeding. Well, that's not quite true. Nothing to do with nest-making, nothing to do with rearing the young.

But bowerbirds are relations of those birds of paradise that we saw, and there is the clue.

Now Heinz Sielmann, one of the greatest natural history filmmakers there is, has secured some simply magnificent film of a bowerbird — maypole bowerbirds, as these ones are called — actually in the wild.

And I want to show you some of it.

Here is the bird at the bottom of its bower. It has a little orange crest there. And that orange crest is important.

Now there is the bower, and there is the female which has come to visit it, the male bowerbird.

And what does he do?

He suddenly exposes the crest, you see, like an orange flame, and he chases and displays in front of the female who has come to visit him.

And this is a display just like the birds of paradise display, in the sense that it is clear that the female comes to see, as it were, what the male has got to offer. How splendid is he?

And mating will take place here. Then the female will go away and build her own nest quite separately and rear her young.

There are many different sorts of bowerbirds in New Guinea, and Heinz Sielmann, with enormous skill, got shots of another one.

This is not a maypole, and this is a different one. This one is decorated with orange berries, orange pods, orange flowers.

And the bird does that itself. The bird collects all these little orange bits and pieces and decorates its bower — again, not a nest.

And it seems to do it — and this is chancing my arm a bit — but it seems to do it almost as though it had artistic sense.

Because when it comes along it will bring a particular flower in its bill and spend, as it has here, a lot of time just seeing where to put that particular flower.

Maybe... no, not quite right, you see. We had better go over and probably that is the place to put it.

So here you have an animal that actually has developed a way of making its display quite separate from itself.

And this is the time for me to introduce to you Mr Coates' masterpiece number two.

That is a model of the bower which you have just seen. You see? It has a sapling in the middle, it's got a roof, and it goes right the way round.

Mr Coates' masterpiece number three.

This is a bower of a species of bowerbird which, to my knowledge, has never been filmed. I have been lucky enough to see these two. I have never seen this in the wild, and I have never seen any film of it.

But the reason I have got those three bowers to show you is because I have here, again from the natural history museum, skins of the bowerbirds that make bowers like this.

Now this is the skin of the maypole bowerbird. This is the skin of the bowerbird that makes that. And this is not actually, but very closely related to, the skin of the bird that makes this most complicated bower of all.

Decorated — that's decorated with flowers — but this one is even more elaborate and has an even more thorough roof to it, and even more elaborate bowers.

Now what do you notice about those three?

Boy:

As the nests get more complicated the crests get smaller, as though they transfer it to the other.

David Attenborough:

Have I asked you that question before?

I'm delighted. That is exactly right.

And what's more, only ten years ago there was an ornithological book published by a very distinguished scientist who said that nobody knew why that happened.

What you have just said is something which indeed was first pointed out by the greatest ornithologist of New Guinea, who tragically is dead.

And indeed what we have here is an example of how a bird — a relation of the birds of paradise, mark you — has, in some miraculous way of evolution, replaced the beautiful feathers that it had by beautiful objects which it can put separate from itself.

So they become something which it can keep in a different part of the forest.

And of course that has got lots of advantages, because having big plumes is a rather dangerous business because it attracts attention to yourself.

And so these birds have managed, as I say, to produce separate objects of splendour and beauty for themselves to show off to the rest of their community — show off to other males and indeed to females.

And of course that is actually what we do.

I mean, we will put up art collections or big libraries — and thank goodness that people do this — to show how benevolent they are, and how altruistic they are, and how much they care for other people.

And they do it by putting monuments to themselves.

And that is what these are.

Monuments to the creators — the birds.

And just as one final demonstration, let me show you now the behaviour of another bowerbird — the great grey bowerbird — which isn't actually as closely related as these three, but which lives in, not New Guinea, but northern Australia.

Now he builds a rather simpler bower as far as the sticks are concerned, but he collects lots of white objects — white and silver and shining.

And he will collect anything of this sort.

There is a story about an Australian bush-whacker who had a glass eye, who actually went bathing and took his eye out and left it on a tree stump. And when he came out of the river it had gone.

But being an experienced bush-whacker he knew where to go. He went to the nearest bowerbird's nest and there was his eye staring up at him from the middle of the bower.

But you see this bird — what he does is to use these particular objects which he has collected, these jewels which he has gathered together from all over his territory.

And when the female comes he… well, you had better watch what he does.

He is rearranging them just at the moment.

Now.

FILM

Here he is. Now you see he's got one of his jewels in his beak. The female has come into the bower prepared to be impressed by him.

There she is.

And what he does is to tip his head, and actually he has a tiny remnant of a crest, just a little lilac flash on the top of his head there. All that is left, as it were, of the ancestral memory of the bowerbird's long crest that we have just seen there.

And he tips his head forward as though to show it, to demonstrate to the female, while he is showing the jewels.

Thank you very much.

An excellent film again by Heinz Sielmann.

All right. Well that is something about ritualisation. All I can tell you is that we have just pecked at the very fringes of a very complicated subject.

Next time I will tell you about foreign languages that animals speak.

APPLAUSE