XXVI. *Four Letters from Mr. T. S. Kuckhan, to the Preſident and Members of the Royal Society, on the Preſervation of dead Birds.*

Sir and Gentlemen,

Read May 24, 1770. CONSIDERING the number of vertuoſi, who apply themſelves to the collecting natural curioſities of the inſect, bird, and beaſt kinds, it is ſurprizing that ſo few have endeavoured to diſcover effectual means of preſerving their curioſities, when collected; one would imagine that thoſe Gentlemen, in particular, who write on natural hiſtory, would be exceedingly deſirous of ſuch effectual methods, which, if once diſcovered and communicated to the public, would be the means of their receiving many rare ſubjects, and even non-deſcripts from different parts of Aſia, Africa, and America, which would afford infinite pleaſure to naturaliſts, and greatly encourage the ſtudy of natural hiſtory. But inſtead of this, it is too common to ſee people, for want of knowing better methods, perſevering in thoſe which their own experience, and that of their acquaintance, daily convinces them are ineffectual: although they have the mortification of ſeeing their collections, which have been made with great trouble and

and expence, continually dropping into decay. I think I have tryed moſt, if not all, the methods that have been publiſhed or practiſed for many years paſt, with all the care and attention I could, and it was not till after the loſs of much time and many fine ſubjects, birds in particular, that I ſet myſelf to find out ſuch methods, drugs, and liquors, as would effectually penetrate and perfectly cure all the parts, ſo as to keep them plump and full.

Before I proceed to deſcribe my method of preſervation, I ſhall beg leave to ſet down the objections I have to the preſent ways and the materials made uſe of in them: and firſt, with regard to that in which raw allum, common ſalt, and black pepper, are applied, I never could find thoſe materials ſufficient for a perfect preſervation. They never fail to become humid in moiſt air and long continued wet weather; ſuffer the fleſh to rot, and even corrode the wires made uſe of to confine the birds in their natural attitudes, till the whole drops to pieces on the leaſt touch or motion. Salt naturally degenerates to a pickle; if the bird has been killed by ſhot, it will ouſe through the ſhot holes. If it has been killed by hand, an inciſion muſt be made, in order to extract the intrails and put in the materials that are to effect the preſervation. Now it is impoſſible to cloſe that inciſion ſo tight, as to confine the pickle from creeping out, and whenever it does get out, it will infallibly ſpoil the plumage; or if, to prevent that, we hang up the birds by the feet, then the pickle will deſcend to the neck and head, before the upper parts in that ſituation are ſufficiently cured; the certain conſequence of which (in ſummer here, and at all ſeaſons in hot

hot climates) will be, that maggots will be generated in ſuch uncured parts, and of courſe the birds deſtroyed. Suppoſing however for a moment (what will ſcarce be found to happen once in a thouſand tryals) that the pickle ſhould penetrate and cure every part, we have then, What?—a bird preſerved in its natural ſhape, dimenſions, attitude, and colours. No, but we have a poor ſhriveled-up dried carcaſe of a bird, in which neither the natural ſhape, dimenſions, or colours, are preſerved, and which continullay excites the diſagreeable idea of the poor thing's having been ſtarved to death on purpoſe. It is true the eyes look lively and in full preſervation; and no wonder, for they are glaſs: they ſerve, however, by the contraſt, to ſhew more ſtrikingly the miſerable condition of the reſt of the body. One would have imagined that ſo palpable an abſurdity, as the placing a fine full gliſtening eye in the head of a body, not only manifeſtly dead, but appearing to have periſhed by ſickneſs or famine, would have been obvious to every body; to have kindly ſuffered the languid eyelids to cloſe, would have at leaſt avoided ſo ridiculous a contradiction. Laſtly, experience ſhews that birds thus treated are ſeldom or never ſo cured, but that the fleſh grows rank; that rankneſs invites the inſects, and of courſe the bird is ſoon deſtroyed. A ſecond method of preſerving birds is, by immerging them in ſpirits, and if the barely keeping the carcaſe of birds from putrefaction is all that is required, I muſt own this method is an effectual one, and congratulate the naturaliſts on the facility with which they may now procure foreign birds. We have

nothing

nothing to do but ſend by ſailors bound to different parts of the world, a few kegs of ſpirits, and we ſhall be ſure of birds enough preſerved in this manner; but then what becomes of their proportions, attitudes, graces, and in ſhort, of every thing that gives them life and motion?

Another method is that of ſkinning birds; they had no other way in Germany and Holland, and it was generally practiſed in France till very lately, when the method of preſerving by allum, ſalt and pepper, was publiſhed and recommended, of which I have already given my opinion. Skinning, compared with the other methods which I have mentioned, is no bad way, but yet it is ſubject to many objections: 1ſt, there is a great difficulty in ſkinning, eſpecially ſmall delicate birds, killed perhaps by large ſhot; 2d, moſt people will find it hardly poſſible to reduce the ſkins to their natural proportions and attitudes, particularly the necks which are often twice as long, when ſeparated from the vertebræ as before; 3dly, the fleſh and bones of the wings and rump muſt, after all, be left with the ſkin, and are as difficult to preſerve as any other parts of the body. However, thoſe who chuſe to continue this method will find their intereſt in making uſe of the materials I ſhall recommend by and by, when I come to treat of my method of preſervation, which I apprehend is more perfect than any of thoſe which I have mentioned, not only in point of preſervation, but alſo as it keeps the natural plumpneſs and proportions. Theſe particulars I ſhall reſerve for other letters, having already made this too long, which I yet muſt encreaſe by begging the candour of the Society for both,

as I am writing in a language of which I have very little knowledge. I am,

Learned Sir and Genlemen,

Your moſt obedient,

and very humble ſervant,

London, May 22, 1770. T. S. Kuckahn.

LETTER II.

Sir and Gentlemen,

Read June 21, 1770. IN my former letter to the Society, I took the liberty to make ſome obſervations on the common methods of preſerving birds; in this, and two ſucceeding letters, I ſhall endeavour to give a plain deſcription of my method, previouſly requeſting the candid indulgence of the learned Society, for the many inaccuracies which muſt inevitably ſlip from the pen of a foreigner, when writing in a language he is ſo little acquainted with. Before I deſcribe the liquor and other materials which I make uſe of in preſervations, it will be proper to premiſe ſome cautions and give ſuch directions

tions as are neceſſary for preparing the birds that are to be preſerved.

Thoſe who ſhoot birds for that purpoſe, ſhould always be provided with a quantity of cotton or fine tow, with which to ſtop the ſhot holes, and alſo the throat of the bird, to prevent the blood from fouling the feathers, which infallibly ſpoils them. If the birds are not quite killed by the ſhot, they ſhould be immediately diſpatched by preſſing the thumb nail hard upon the wind-pipe, and care ſhould always be taken to confine the wings as ſoon as poſſible, to prevent their fluttering. The birds when dead are to be carried by the legs, and not be crammed into nets or held by the neck, in which laſt poſition the weight of the body would ſtretch it beyond the natural proportion. When they are brought home, they ſhould be hung up by the legs, and the ſtop of cotton taken carefully out of the throat, and a ſmall ſtick put acroſs between the bill, to keep it open, that the blood and ſlime may be diſcharged by the mouth without damaging the plumage. It is alſo neceſſary to obſerve the proper ſeaſons when the birds are in the beſt condition for preſervation, and when not: during the time of incubation, the breaſts and bellies are without feathers, and the ſkin of thoſe parts is extremely tender; again, while birds are moulting or caſting their feathers, they are not fit for preſervation, the quills are full of blood, and the plumage not of its proper colours. The beſt ſeaſons are in the Spring and Autumn; but, if we meet with rare birds, we muſt not loſe the opportunity at any ſeaſon, but do as well as we can.

Young birds are not proper for preſervation till the ſecond year, becauſe they do not, till then, acquire their proportions and colours, which may occaſion their being miſtaken for other ſpecies; neither is it always poſſible in the firſt year, to diſtinguiſh the ſex of birds, which is very eaſy afterwards when they arrive at maturity; however, by grouping young birds in their neſts, we may preſerve them at any time, and when managed in that way they certainly add greatly to a collection.

This naturally leads me to what, in my opinion, is by much the moſt ingenious and entertaining part of this kind of ſtudy, I mean the attitudes and actions of birds; all the reſt is merely mechanical, but this admits of fancy, taſte, and judgment. Without a proper attention to this, however ſound your preſervation, how vivid ſoever the plumage may be, your birds are ſtill nothing but meer dead birds; but by a ſkilful management of attitudes and actions, you, as it were, animate them, they ſeem alive, moving and acting, we

"Liſten attentive, wond'ring, that no ſound
"Eſcapes the buſy throng."

Though this part certainly depends in a great degree on taſte and judgment, yet an accurate obſerver of Nature will derive much information from noticeing the appearance of living birds, in the attitudes and actions which he wiſhes to expreſs in his preſervations: the moſt pictureſque attitude ſhould be fixed upon, and propriety obſerved in chuſing ſuch as are moſt expreſſive of the particular qualities of each bird,

bird, as ſtrength and courage in eagles and hawks, &c. In grouping birds of theſe kinds with their prey, regard ſhould be had to the particular part at which they begin to devour it: ſome begin at the breaſt, ſome at the head, ſome at the back, and others extract the entrails firſt; the feeble ſcarce-reſiſting efforts and extreme terror of the proſtrate bird, the exulting audacity and triumph of the victorious one, if properly managed, create a fine contraſt. Picking, ſtretching, feeding, fear, ſurprize, and fighting, afford peculiar and ſtriking attitudes. I fear the word *attitude* does not ſufficiently expreſs my idea; I mean the particular poſitions of the legs, wings, head, body, the manner of the feathers, and in general whatever contributes to expreſs and mark a particular action and paſſion of the bird. Thus, in ſurprize attended with fear, the legs are extended, the body leans forward out of the equilibrium, ſupported almoſt on the toes, the wings are half expanded, the bill turned to one ſide, the top (if creſted) ſpread, and the feathers, particularly thoſe of the neck, ſtanding perpendicular to the ſkin. When any part is not made to co-operate in the expreſſion, we not only loſe the additional ſtrength which the proper action of that part would have given to the general expreſſion, but, what is worſe, the poſition of ſuch deficient parts may convey an idea directly contrary to that general expreſſion, and ſo make the whole unnatural, contradictory, and ridiculous. It is not unfrequent to ſee this abſurdity in a degree that at once ſurprizes and offends a judicious obſerver. Birds put in ſuch poſitions as are intended to expreſs the ſtrongeſt emotions

emotions and paſſions, with their feathers perfectly ſmooth and unaffected,

" Rage with unruffled plumes and fear with falded
" wings,"

and this abſurdity is the more ſtriking, and therefore the leſs excuſeable, as the action of the wings and feathers are more intelligible and expreſſive than thoſe of any other parts in birds. Great attention ſhould always be had to the poize of the body: in ſuch poſitions as a live bird may be ſupoſed to continue ſome time in, we muſt take care that the body appears in equilibrium; on the contrary, in fighting and other violent actions, where a forceable motion is to be given, the appearance of equilibrium muſt be as carefully avoided, for it always conveys the idea of ſtillneſs, as do the legs when placed by each other, and in the ſame ſtraight direction, which they ſhould ſeldom if ever be in. Bending, advancing, or retiring, one leg a little more than the other, not only gives a more graceful but a more lively and and active appearance; and it is obſervable that living birds, ſtanding on a plain ſurface, almoſt always turn the foot of the leg on that ſide to which they are looking in the ſame lateral direction with the head. I cannot help obſerving here one fault very common with moſt preſervers; that is, the ſtretching the legs of their birds down ſo as to bring the thigh almoſt perpendicular, which not only gives the bird an ungraceful but an unnatural appearance; for we ſeldom or never obſerve this in living birds, except in ſome particular ſpecies.

Birds

Birds appear to great advantage when picking their feathers; the tail is then expanded, the wing on that ſide to which the bill is turned lifted up, the other drooping down, and ſomewhat extended from the ſide, in order to balance the body. Birds when fighting afford endleſs variety of attitude and expreſſion; but certainly never any ſo affecting as when grouped with, and feeding their young, whoſe clamorous hunger, expreſſed by their gaping mouths and extended pinions, occaſion that anxious perplexity and tender joy of the mother bird, ſo ſtrongly marked by the ſpreading tail, the drooping wings, and peculiar poſition of the head.

Having now ſet down all that I have to ſay on theſe matters, I ſhall, in my next letter, go immediately upon the method of preparing and applying the materials which I uſe in preſervations. I am,

Sir and Gentlemen,

Your moſt obedient humble ſervant,

May 31, 1770. T. S. Kuckahn.

LETTER III.

Sir and Gentlemen,

Read July 5, 1770. I NOW proceed to deſcribe the materials which I uſe, in preſerving birds, beaſts, &c. and the methods of preparing them, *viz.*

For

For the liquid varniſh, take raw turpentine 2 pounds
camphor 1 pound
ſpirit of turpentine 1 quart

Break the camphor into very ſmall pieces, and put the whole into a glaſs veſſel open at top, place it on a ſand heat till thoroughly warmed, then increaſe the fire gradually till the ingredients are perfectly diſſolved and mixed, which will be done in about half an hour. Great care muſt be taken that the materials do not catch fire: to prevent accidents, it would be better (eſpecially where the proceſs is made in the houſe) to place the glaſs veſſel in another of any metal, two thirds filled with cold water, which place over a gradual fire till it boils, keep it ſo, till the ingredients are diſſolved and incorporated; then take the glaſs off and let it ſtand to cool, and the liquor will be fit for uſe. This varniſh is the only liquid which I uſe in making preparations.

For the dry compound take, *viz.*

corroſive ſublimate	¼ pound
ſaltpetre prepared	½ pound
alum prepared	¼ pound
flowers of ſulphur	½ pound
muſk	¼ pound
black pepper	1 pound
tobacco ground coarſe	1 pound

Mix the whole well together, and keep it in a glaſs veſſel, ſtopped cloſe and in a dry place. To prepare the alum, place it on an iron plate over a fire, till it ceaſes boiling and becomes dry and hard; then take it off, and when cool pulverize it. This method

evaporates the aqueous parts of the alum, and alſo renders it much leſs corroſive. The method of preparing ſaltpetre is the ſame as that of alum; only the plate on which it is done muſt have an upright rim all round it, to prevent the ſalt running off into the fire.

In my next letter I ſhall go through the method of diſſecting birds and other ſubjects, and give directions for applying the varniſh and compound, with whatever elſe appertains to a perfect preſervation.

I am, with great deference and reſpect,

Sir, and Gentlemen,

Your moſt obedient humble ſervant,

28 June, 1770. T. S. Kuckahn.

LETTER IV.

Sir, and Gentlemen,

Read July 5, 1770. IN my laſt, I gave directions for preparing the materials, which I uſe in preſervations. I ſhall now proceed to deſcribe the method of applying them. If a bird is killed by hand, a ſtop of cotton muſt be put into the throat; and if by ſhot, into each of the ſhot holes alſo,

for reaſons heretofore mentioned; then lay the bird on its back upon a table covered with ſeveral folds of ſome ſoft cloth; ſeparate the feathers of the breaſt and belly very carefully, ſo that you may come at the ſkin, in which, about the middle of the breaſt, make an inciſion juſt big enough to introduce the end of a quill-barrel, which enter and blow ſtrongly through, until the ſkin is entirely detached from the fleſh. Continue the inciſion down along the belly to the anus, and contrary-wiſe up to the craw; double back the ſkin on both ſides, carefully guarding the plumage with cotton to prevent its being ſoiled during the operation; and take out the craw. This done, run a ſharp ſmooth ſkewer croſs-ways through the breaſt, and lifting the bird up by it with the left hand, introduce with the other, one point of a ſharp ſtrong pair of ſciſſors cloſe by the edge of the breaſt-bone, and clip along by it, till the breaſt, together with the fleſhy parts of the belly, are entirely ſeparated, taking great care not to cut the inteſtines. Theſe muſt be next extracted, and all the blood and other moiſture dryed up with cotton, ſpunge, or tow, with which the cavity of the body is to be filled. Then draw down the neck within the ſkin until you can come to the back of the ſkull, out of which cut a ſmall piece, and extract the brains; and having dried the cavity well with cotton, dip a hair pencil in the liquid varniſh and waſh it well therewith, and over it ſtrew ſome of the dry compound and fill it up with cotton. Next apply the liquid to the outſide of the ſkull cloſe down to the root of the bill, and over that alſo ſtrew ſome of the powder; proceed in the ſame manner with the neck,

and

and then draw the ſkin back to its proper place, having firſt moiſtened it on the inſide with the liquid.

We now proceed to the wings, the boney parts of which muſt be drawn ſo far on the inſide of the ſkin as that we may come at the whole length. Cut out the moſt fleſhy parts, or only make ſome longitudinal inciſions into them, and apply the liquor and powder as before; then connect the two wings by ſmall wire or ſtrong thread well waxed; then (having removed the cotton that was put into the cavity of the body to imbibe the moiſture) proceed in the ſame manner with the thighs, obſerving, if you cut away the fleſh, to ſupply its place with cotton moiſtened with the varniſh. In order to cure the rump, make as many inciſions in it as may be, without weakening it too much, and having applied the materials as in the other parts, a ſharp wire muſt be run into it, and continued along the under ſide of the back-bone, to about two thirds of the length of the body, in order to ſupport the tail; then, with a pencil, varniſh over the back and inſide of the ſkin, and apply the powder. Stuff afterwards the cavities of the craw and body with the following herbs, *viz.*

Tanſy
Wormwood
Hops and Tobacco } of each an equal quantity well dryed,

and cut ſmall. The next thing is to take particular notice of the breaſt. Out of any ſoft free wood, cut an artificial one as near the ſhape of it as poſſible; which being fitted to its proper place, and moiſtened

with the varniſh, muſt be overlaid with cotton; and the ſkin be drawn over it, being firſt varniſhed on the inſide. In ſewing up the inciſion, obſerve to ſtick the needle always outwards; as you proceed, moiſten the ſeam with ſome of the liquid; and when finiſhed, diſpoſe the feathers into their natural order. The eyes, muſt be extracted, as no art can preſerve them, ſo as to look full and lively, for the aqueous humour will dry up and of conſequence the outward tunica become ſhrivelled and without luſtre. In extracting them, great care muſt be taken that none of the humour drop on the plumage, as it would ſpoil wherever it touched; the beſt way is, to ſtick a ſharp pointed awl through each of them and pluck them out together. They muſt be laid aſide in order to finiſh the artificial eyes by. Chuſe for that purpoſe beads of as large ſize as you can conveniently introduce into the orbits; take a long ſlender needle threaded with ſtrong ſilk waxed over, and run it through the hole in the upper part of the mouth and out at one of the eyes, leaving three or four inches of the ſilk hanging out at the bill. This done, put one bead on the thread, and run the needle out at the other eye; draw the bead into the orbit, at the ſame time lifting up the eye-lid with a ſharp needle, and place it over the edge of the artificial eye in a natural poſition; then, with a pencil introduced from the other ſide, varniſh all the cavity with the liquid, and fill the ſpace between the eyes with cotton, ſo as to keep the bead already placed, in its proper place. Put on afterwards the other bead, and returning the needle through the orifice in the upper part of the mouth, draw in the other eye, to its proper orbit,

lifting

lifting up the lid as before. If the eyes are not ſufficiently protuberant, you may introduce more cotton by the orifice, through which the threads lead; and when you have by this means fixed the eyes properly, tye the ends of the ſilk, and cut them off. There is another method of ſetting the eyes, which is by introducing the beads by the orifice in the roof of the mouth, and when they are placed, ſtuffing cotton through the ſame paſſage to keep them firmly in their places. The ſtop of cotton muſt now be taken out of the throat, and ſome of the ſame material thruſt down very carefully by little at a time, with a quill, to ſupport the neck in its plumpneſs when it becomes dry. We now come to the methods of placing and retaining the birds in the attitudes we would have them; and firſt, we muſt provide the legs with wires ſufficient to ſupport the weight of the body, which is done in this manner. Take a braſs or iron wire of a proper thickneſs, and made ſharp at the point; which run through the foot up the leg and thigh, through the cavity of the body, on the inſide of the wooden breaſt, and ſo up the neck, and out at the upper part of the head, juſt above the bill. The point being then made very ſlender, and turned back like a hook, take hold of the other end of the wire below the foot, and draw it back till the hooked point has fixed in the head, and by it you may adjuſt the length and poſition of the neck and head. (N. B. the wire which is put through the other foot and leg, &c. need not extend to the head, half way along the body will be ſufficient). Next prepare a piece of wire for ſupporting the tail; this muſt be about two-

thirds

thirds the length of the whole body; ſharpen it at one end and bend the other like a hook, run in the ſharp end juſt below the rump, and puſh it along under the back-bone till the hook is firmly fixed over the rump, amongſt the large feathers of the tail. The next thing is, to fix the bird on the perch or branch, on which you would have it ſtand; in this you will make two holes at the diſtance you propoſe the feet to be, and after having inſerted the wires which are run through the feet and legs, bend the legs and every other part into the attitude you would have them. The wings muſt alſo have a wire to themſelves, in order to keep them in the deſigned poſition; this is done by ſharpening the wire at one end and running it firſt through one wing and through the body, out at the other wing, both being in their proper places: then the feathers muſt be diſpoſed in the manner moſt proper to the poſition of each part, and the expreſſion intended to be conveyed. The feet and bill may be varniſhed over with the ſame ſort of varniſh that is uſed for the preſervation. The bird muſt then ſtand for a day or two in an airy place for the varniſh to penetrate and fix; and laſtly, the bird muſt be baked in an oven, it is not abſolutely neceſſary, but as it makes them dry, and finiſhes the preſervation immediately: moreover if the bird has been ſome time dead and has any diſagreeable ſmell, this method makes it perfectly ſweet; but care muſt be taken not to put them into the oven while it is too hot, as it would bliſter the bill and nails. The beſt rule to know when the oven has a proper degree of heat is this: while the oven is cooling, throw in now and then a tail feather taken from any fowl, which

which muſt be placed about the middle of the oven. If it is too hot, the feather will have a motion and be bent: we muſt therefore wait a while, and put in another feather, till we obſerve there is no motion or bending; then upon taking it out, and bending it with our finger, if it breaks, the oven is ſtill too hot, and we muſt wait till feathers that have been in for a few minutes will bend without breaking. When the oven is thus fit, the birds muſt be put in, and the door of the oven cloſed, till it is quite cooled. The birds in this manner will be perfectly preſerved; but as there ſtill remains ſome oily matter in the feathers, the moths and other inſects will depoſit their eggs and generate their young in the plumage, if the birds are not carefully caſed up. The caſes muſt be firſt well waſhed on the inſide with the following camphorated ſpirits, *viz.* Take one pound of camphor and boil it in half a gallon of ſpirit of turpentine till well diſſolved; and while hot, waſh all the inſide of the caſes by means of a bruſh, and, as ſoon as dry, place your birds in, and cloſe it up, and guard the joints of the doors or ſeams with paper or putty. N. B. Though the room, in which the caſes of birds, &c. are kept, cannot be too dry, the ſun ſhould not be permitted to ſhine in, as it will certainly diſcharge the finer colours of the plumage.

Baking is not only uſeful in freſh preſervations, but will alſo be of very great ſervice to old ones, deſtroying the eggs of inſects; and it ſhould be a conſtant practice once in two or three years, to bake them over again, and to have the caſes freſh waſhed, as above, which would not only preſerve collections from decay much longer, but alſo keep them ſweet.

I ſhall probably find ſome other opportunity to communicate my method of preſerving quadruped animals, fiſhes, and the halves of birds, for pictures.

I am, with great deference and reſpect,

Sir, and Gentlemen,

Your moſt obedient

humble ſervant,

London, July 5, 1770. T. S. Kuckahn.

XXVII. *Deſcription*