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THE INTELLIGENCE OF ANIMALS

By the same Author

ANIMAL MIND
WATERSIDE CREATURES
WOODLAND CREATURES
WILD CREATURES OF GARDEN AND HEDGEROW
MOSES, MY OTTER
ETC., ETC.

'THE FOX . . . IS UNDOUBTEDLY AN ANIMAL OF INTELLIGENCE'

The Intelligence of Animals

Studies in Comparative Psychology

by

Frances Pitt

with sixty-eight photographs by the author

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"It seems to me that there is, perhaps, more popular misapprehension on the subject of animal behaviour than on any other biological subject. You usually either find the idea that animals are a simple type of reflex machine, or more usually the idea that they are little human beings with just the same thoughts and emotions as ourselves, which they are, for some reason, unable to express. Both these attitudes are completely wrong, and lead one into serious error."

PROFESSOR JULIAN HUXLEY, *February* 8, 1930, *in an address to The School Nature Union*

PREFACE

In this book I have set forth detailed studies of various birds and beasts, some in the wild, some under domestication, and some under semi-domestication, with a view to illustrating the supreme importance of the mental factor in biology.

These studies in comparative psychology have been undertaken in the hope of obtaining light on the distribution, survival and extinction of species. Why, for instance, should a mouse, only differing from the mainland form in what to the lay eye seems the unimportant details of cranial and dental characters, be confined to one small island? The museum worker tells us this island mouse is a well-defined species, allied to a type formerly prevalent on the mainland of Great Britain, and to the bank-vole of the Channel Islands, and of the mountains of Norway, for the mouse I am referring to is the bank-vole found on Skomer Island, off the Welsh coast, namely, *Evotomys skomerensis*.

As far as outward appearance goes, and as far as the work of the systemist will take us, there is no reason why this mouse, or forms similar to it, should have given ground before any other bank-vole. Yet we find it has been replaced throughout the wooded lowlands and uplands of the greater part of Europe, including England and Scotland, by *Evotomys glareolus* and its subspecies. The latter, which to the ordinary eye merely looks a trifle smaller and darker than the Skomer vole and its allies, is a successful mouse, being one of the most plentiful small rodents in Western Europe. Why?

The pains-taking systemist, with his elaborate work on the structure of the species, his tables of cranial measurements, and dental formulæ, cannot supply an answer. He can but say *E. glareolus* is found from Great Britain eastward into Asia, while *E. skomerensis* is confined to the paltry nine hundred acres of Skomer Island.

It is reserved for the student of the live creature to find a clue to the riddle, a clue necessarily denied to the student of skins and bones—namely, the mental factor. In a later chapter I will give full details of my observations on the common and Skomer voles. It will be sufficient to say here that when I captured half a dozen of the latter alive and unhurt, brought them home and observed their ways, I found they were far less wary, "wide-awake" mice than the *glareolus* individuals I had under observation. They were comparatively slow, and would permit one to pick them up. Moreover, they were not so quick to take alarm. There was a confidingness about them that was in marked contrast to the behaviour of the common voles, which were particularly alert mice.

This is what I mean when I claim that observations on the living creature may reveal factors of considerable, indeed of great biological, importance, for I believe in the case of these mice temperament is the factor which has had survival value, and determined that one shall become a successful and widely-spread species, while the other merely survives as a refugee on a small island.

Hence I shall endeavour in this book to analyse the behaviour and mental characteristics of certain

birds and beasts, with especial reference to the question of whether these attributes are useful, or a handicap to them, in the stress of life.

I am using the word "mentality" to cover all the mental acquirements, characteristics and predispositions of the creature, from such a characteristic as tameness and confidingness, with its opposite extreme of wariness and shyness, to a mental disposition such as that which causes an animal (or, more often, a pair of animals) to desire a large territory to itself, with again the opposite social tendency, and the toleration of neighbours near at hand; in fact, all the behaviour by which the animal adjusts itself to its environment, both living and inanimate, from the pressure of, and competition with, its fellows, to the effects of climate and temperature.

It is my quarrel with the museum systemist that by the very nature of his work he is unable, when differentiating species, to take into account the creature as a living entity, and that he neglects the fact that behaviour is as specific as shape and form.

Yet in connection with the above generalisation, it must be remembered that individuality looms large in nature, and no two birds, and no two mammals, will behave exactly alike, intelligence and experience playing their part in the life of each individual, and so modifying inherited predispositions as to produce widely differing results. So I repeat, though the generalisation that each species has its specific behaviour is undoubtedly true, one must always qualify it, at any rate among all the higher and

intelligent animals, with the reservation that it will be modified by individual personality and experience.

In this connection I shall give considerable space to accounts of semi-domesticated creatures, such as the decoy or call duck, as in them can be seen the clash between hereditary behaviour, alteration in the conditions of life brought about by contact with man, and the results of the experience acquired by the individuals. Then I shall go at some length into the mentality of certain domesticated animals, particularly the horse and the cat; which will be contrasted with that of various wild mammals and birds that have never come under the hand of man.

Giving in each case personal observations, I shall try and analyse the springs of conduct, and ascertain why the animal watched acted as it did, whether it was moved by intelligent anticipation, or merely by thoughtless impulse.

In fact, the object with which this book is written is to throw light, however scanty, by means of personal observations, on animal ways, and thereby on the great problem of animal mind; and, lastly, though not leastly, on the even greater problem of the survival of species.

But in doing so I have avoided, so far as possible, the use of technical terms, for I cannot believe any fact loses value from being stated in plain words, and much of the psychological literature of the present time is written in language only comprehensible to those who have made a study of it.

FRANCES PITT

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PART I

THE MALLARD AND THE CALL OR DECOY DUCK

Being a Study of the Effects of Domestication on Temperament and Inherited Modes of Behaviour

CHAPTER I

THE MALLARD AND THE CALL OR DECOY DUCK

The call or decoy duck is a domestic race of the mallard, *Anas platyrhyncha*, which it closely resembles in size, shape, colour and markings, only differing in one particular, namely, temperament, for it is as tame and confiding as the true wild duck is wary and alert. It might be thought that this is a mere matter of rearing and education, but the mallard is undoubtedly wild in the hereditary sense, and even when brought up under precisely the same conditions as the decoy duck never acquires its amiable confidence in us and in things in general.

The placid temperament of the call duck gives it, when seen in company with mallard, a more round, comfortable appearance, and though, as I said above, it closely resembles the wild duck, so closely indeed that dead specimens cannot be distinguished, and not even the most confirmed and determined sub-species maker could split them, yet in life they are easily told apart. The keen, alert head of the mallard, its watchful

eye and tight-held feathers, are instantly noticed. Any person acquainted with the two can distinguish them at a glance, and that without hesitation or doubt.

The origin of the call duck must undoubtedly be referred to tamed wild ducks kept on ancient decoys to lure their truly wild relatives to their doom. From these an especially tame, stay-at-home race of ducks was evolved, by, we may surmise, the simple process of keeping the tamest. Any that reverted to the wary, roaming mallard temperament eliminated themselves by going off. I have seen this take place.

The material on which this part of my book is based is a strain of decoy ducks that has been in my family for fifty years or more. They were my father's pets, and for a long period, over twenty years, no out-cross was introduced, but they became so delicate and the ducklings so difficult to rear that two hand-reared wild drakes were obtained, with amazing results on the vitality of the breed, which became as hardy as it had previously been delicate. Though it is now ten years since the fresh blood was introduced, the effect is still marked, not only in the vitality of the stock, but in the behaviour of many of the ducks. We have at the time of writing, ducks which in appearance and manners (if we may use the word "manners" to denote general carriage and behaviour) are undoubtedly wild ducks, and whose keen, wary look betrays the nervous disposition inherited from their mallard ancestors.

In my book *Animal Mind*[1] I laid stress on the fact that there is no such thing in Nature as fear of man

[1] London: George Allen & Unwin Ltd.

"DUCKS AND DRAKES . . . IN ONE HAPPY, SOCIABLE PARTY"

apart from experience, i.e. there is no instinctive knowledge of man and his ways—often so abominable! —and these wary ducks illustrate this very well. They are keen, alert and distrustful, but it is not us they distrust, merely anything that moves suddenly, from a door banged by the wind to the spaniel rushing unexpectedly round the corner of the house. Such things will cause them to jump up in affright and fly off to the pools, whereas the rest of the ducks just look up with a surprised quack and then go on feeding.

Before going into details concerning these ducks, their ways and mentality, it is desirable to describe the pools on which they dwell. These are four in number, and consist of small ponds, surrounded by reeds in the one case and bushes in the other three. The two biggest are each about sixty yards in length. There is a woodland stream a quarter of a mile to the east, with the Severn, at this point a considerable river, also to the east, and about a mile away as a duck flies. To the westward, after crossing some rising ground, there are one or two small cattle ponds and a valley wherein lies a few acres of marsh.

As the decoy ducks are full winged—we do not pinion them or interfere with their powers of flight—there is nothing to prevent them visiting any desirable spot. However, up to the time of the out-cross our ducks never went off—they have done so since!

We keep as a rule about twenty adult birds, i.e. an allowance of a drake and four ducks per pool. When this allowance, especially as regards drakes, is exceeded, trouble begins, for the strict monogamy that characterises the mallard suffers in the case of the decoy

duck from the deteriorating influences of man and domestication.

Having thus given a rough survey of the call duck and mallard, of our breed of decoy ducks and the conditions under which they are kept, I will embark on a more detailed account of these ducks, with particular reference to their behaviour at different times and under different conditions; my purpose being to elucidate, if possible, the various influences that govern their conduct, and show how domestication affects their habits, ways, and even morals—at this point the reader will probably exclaim at the use of the word "morals" in conjunction with an investigation into bird behaviour, but it certainly means what I want to express, so used it must be. I shall, further, try and elucidate the extent to which the ducks are governed by predispositions due to hereditary factors—what we commonly call instinct—and how far, if at all, they are governed by intelligence.

A convenient starting-point in the twelve-month cycle of duck behaviour is at the end of November or beginning of December, when the score or more of ducks and drakes are living in one sociable, happy party, which spends its day swimming about the pools, flying around, returning to the water and waddling up to the buildings each morning and evening in search of corn. Whether feeding, swimming or resting the community seems a happy and contented one; one duck may peck another, or a drake may bow aggressively towards its neighbour, but there is no fighting,

and seldom even petty squabbling, "peace on earth" being the rule.

There is a certain pecking order among the ducks. If you watch them carefully when feeding, it is soon obvious that some individuals, sometimes young ducks, sometimes old ones, peck the others without incurring any retribution. They have established a right to bully (mildly) their friends, and these in their turn pass on the pecks; but, as said above, it is not very serious, and the party gives the observer the impression of peace and happiness.

There is no difficulty in telling the individuals apart, as though remarkably uniform in colour and markings, they do differ slightly in shade, to say nothing of bearing and gesture. When you know them well you can identify each one. This remark is made apropos of certain ducks having acquired the right to peck, for the reader might wonder how one could be sure it *was* the same duck each time. Intimacy reveals their individualities and personalities, which in some cases are marked.

Just as the tame ducks and drakes go about their affairs in a large social party, so the wild mallard congregate on meres, broads and estuaries, but in these latter flocks ducks and drakes are present in about equal numbers, for they are not subject to the interference of man as regards reduction of the male sex, and their gatherings differ, too, in their restless disposition, the wild duck flock being ready at any moment to wing its way to a different district, or even migrate overseas.

Certainly the most striking effect of domestication

on the call duck has been the elimination of the roving impulse; the tame ducks stay about their nesting-place all the year round, but the mallard has no sooner moulted and re-acquired the use of its wings, than it leaves its breeding-grounds and goes off to large sheets of water, if not the seaside. Food may be a factor. The tame mallard are, of course, independent of a natural food supply, being well and regularly fed. But I attribute their "stay-at-homeness" to the loss of the migratory impulse. Ducks of a wild disposition and with the inherent desire to fly away have gone, those without it have stayed. The crossing of our strain of decoy ducks with wild mallard showed at once that it was not merely tradition and upbringing which kept our birds at home, for many of the cross-bred birds left as soon as they were strong on the wing.

But I am wandering from the winter behaviour of our ducks, and must return to the point where I was describing them as a happy party of some score or more in number, of which four or five are drakes. They feed, they fly, and they swim together, when they keep up an incessant "conversation" of quacking, in which the drakes join in their husky whispers—for the drakes have not such loud voices as the ducks. It is only at night that they are quiet, and even then not for long, as any unusual sound, etc., will start them quacking again. They roost at the water's edge, ready to slip into the pool on the least alarm. Their dangers arise from prowling foxes and visiting otters. Sometimes a great din is heard in the dark, a pandemonium of quacking, telling something has alarmed the ducks, but they are wary, and as long as the pools are not

frozen they do not come to much harm. Soon the quacking dies down and we know the danger has passed.

Though they are confidingly tame their confidence is easily broken, and we never allow a shot to be fired at them. It is astonishing how quickly a nervous bird conveys its fears to the others. When it is necessary to kill a duck or two we lure the doomed ones into an outbuilding, and always try to avoid a survivor escaping, as if it does it will effectually scare the flock. Its nervous air and general attitude of alarm proving as infectious as the plague. I do not believe that it goes to its fellows and says in hard concrete words, "They have done two of our number to death in yonder loose-box." But I am convinced it conveys its fears, or, rather, its emotion, to its friends. No person closely watching ducks and other creatures would subscribe to that antediluvian phrase "dumb animals", for it is obvious they manage by means of tone and gesture to convey a great deal to each other, but I certainly think that what is conveyed is feeling and emotion rather than concepts of formal facts. The escaping duck lets its fellows know that it is frightened, and of a certain place; just as the angry duck lets them know it is cross; but *why* it is cross or frightened is another matter.

Apropos of the celerity with which the lesson of fear is learnt, and the certainty with which the emotion of fear is conveyed from one duck to another, take as an instance the effect of otter raids upon the ducks. During the autumn and winter of 1926 a wild otter came nightly to our pools, primarily to visit my

pet otters in their enclosure, and secondly to do some duck-hunting. During the moult, when ducks and drakes lose their flight feathers and are unable to fly, it captured and ate several; but as soon as the birds recovered their wing powers they were safe, though they showed the effect of their midnight adventures in a great display of nervousness—as well they might, poor things! At the least sign of anything unusual they were on the *qui vive*, their heads going up, while they uttered anxious quacks. A cat running out of the bushes, or a dog bounding round the corner, was sufficient to make them jump into the air and fly off.

That this behaviour was the result of bitter experience is proved by their usual attitude towards strange cats, dogs and other creatures, which is that of intense curiosity. A strange dog causes considerable excitement, the ducks drawing together and following it in a quacking throng. If it runs along the bank, then they follow it upon the water, which trait in their characters was the basis upon which duck decoys were worked, a trained dog being employed to lure ducks into the pipes and to their death. Of course they do not interest themselves in the dogs and cats with which they are familiar. It is only strange ones that provoke their curiosity. A good example of the intense inquisitiveness which characterises the duck was the episode of the fox. Toby, the little tame vixen, delighted in running about the garden, when she greatly excited the ducks. They would follow her, as she raced up and down the banks of the pond, quacking loudly, and even came ashore to waddle after her. There was no trace whatever of recognition of a dangerous foe, no

trace of fear of an hereditary enemy, no innate impulse drove them from her, but an intense curiosity drew them like a magnet towards her. So dangerous, to them, did their inquisitiveness become, for the young fox showed signs of recognising them as prey, making playful rushes towards them, that I had to stop her going near the water.

A further example of the inquisitiveness of the duck tribe, combined with an entire absence of instinctive recognition of danger, occurred when Madame Moses, my old pet otter, and Tom, her mate, escaped from their enclosure in the spring of 1930. I saw Tom run across the roadway between two pools, as did a party of ducks (consisting of four full-winged mallard, two pinioned tufted ducks and two shelducks), all of which started off after him. They waddled as fast as they could go across the lawn and down to the pool, a distance of forty yards, and then stood and watched, their demeanour, as they eyed the otter, being a mixture of curiosity and faint, very faint, alarm.

Certainly with the mallard fear is an acquirement, the result of being frightened in some way or other, whether by being driven into a building, shot at, or harried by otters. Yet, as I have said, one duck can and often does alarm the rest. A duck of nervous disposition—by stating that specified fear is acquired, that fear of any particular thing is the result of experience, I do not mean to contradict what I have already stated as to individuals differing in temperament and some being more innately nervous than others—will by her frightened quacks alarm other ducks. Yes, temperament varies widely between

individuals. I have seen a very confiding duck bring her young ones up to feed, standing over them watchful and wary, but allowing them to eat until their crops bulged; only to be followed by another duck with a family, which duck also stood guard over her youngsters, yet hardly let them shovel up a few beakfuls before she gave an urgent quack, that sent them hustling back to the pools.

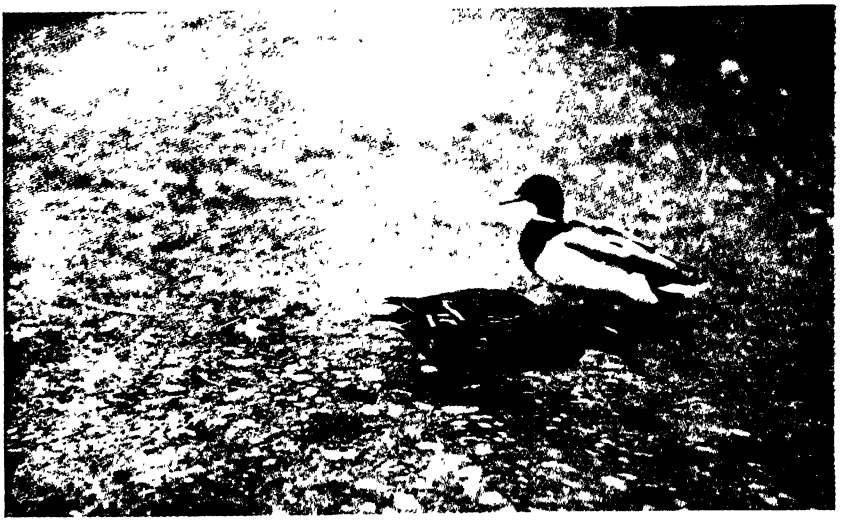
This alarm quack is an imperative one, and is not only instantly recognised by all ducks within hearing, but is equally obviously a danger signal to our ears.

Of course these remarks on fright, its effects and the alarm-call, apply to duck behaviour at all times of year, as well as during the winter season.

The outstanding characteristic of their winter behaviour is certainly sociableness, and watching the ducks one cannot but believe that each individual derives pleasure and comfort from being with its friends. A duck or drake that gets accidentally separated from the others has an air of uneasiness and nervousness, quacks loudly and loses no time in rejoining the flock.

Severe weather has no very marked effect on the ducks. Shortage of natural food keeps them near the house, where they can always get plenty, and the fact that the ice is invariably broken for them upon the garden pool makes them loath to leave the one piece of clear water. But when a thaw is impending an air of excitement becomes apparent. The ducks quack continuously, and then take wing, flying round and round in large circles, to return, and, sliding down invisible aerial planes, land with resounding splashes

THE "COURTSHIP" CEREMONIAL



"THE MALLARD . . . RETIRES WITH HIS SPOUSE TO SOME QUIET PLACE"

in the water. We always consider this flying around as an infallible token of a change in the weather, and can only suppose the ducks are affected by the rise in temperature and the moisture in the atmosphere.

As regards early hints of the coming breeding-season, much depends on the weather; mallard, whether wild or domestic, being like other birds much influenced by temperature. But in an open winter some excitement becomes apparent as early as January. It is first noticeable in the form of night quacking. The whole flock will break forth into loud and prolonged conversation. I have heard this quacking at all hours between sunset and dawn, having often been awakened by it in the middle of the night. This "talking" is distinct from the alarmed quacking at fox, otter or strange dog, and has an excited note. They quack in the day, too, but whether the noise is not so noticeable among the medley of daytime sounds or whether the outcry that arises in the stillness of the night is really louder and more prolonged I am not quite sure.

Then follows the actual courtship and mating, an elaborate and amusing ceremony. By the way, under favourable circumstances I believe old mated couples remain together, more or less faithful to each other, over a number of years. For many seasons we had an old brown farmyard duck that had somehow attached to her side a mallard drake. He looked a pigmy by comparison, but they were a devoted couple, and remained paired until the old duck died, though his devotion to her did not prevent him pursuing other ducks belonging to different drakes; however, *she* was his mate.

Returning to the early signs of breeding, the next thing after the quacking and excitement that herald the advent of the nesting-season is what has been alluded to under the term of courtship. Many authorities whose opinion merits careful consideration object to the term courtship, as implying more than can actually be observed, and say that it should not be used with regard to the behaviour leading up to the union of two birds for breeding purposes. They aver that the whole series of actions exhibited by birds from the time their reproductive organs begin to function to the attainment of reproduction and the rearing of the young, is as much part of the hereditary make-up of the bird as the pattern of its plumage. That the breeding impulse compels the duck or drake to a certain line of action is undoubted, that their behaviour is in many ways stereotyped is equally certain, but, because certain behaviour is undoubtedly instinctive, it does not follow the performers are automatons, or even wanting in comprehension and understanding. As a matter of fact, courting ducks—I adhere to the term, for it does so exactly express what they do—seem to ooze awareness, and, one might almost add, self-consciousness. The last few words of this latter sentence send me off at a tangent to observe that excepting our supremely self-conscious selves, it is probable only the higher apes are truly self-conscious. But courting ducks have the appearance of it. The performance takes place upon the water, where the flock, well fed for the moment and otherwise unemployed, are floating idly. Suddenly a duck will quack and bow her head at a drake, whereupon he

quacks huskily in reply, and other ducks quack and bow, making threatening gestures to their nearest female neighbours, as if about to peck them. Then one of the ducks, stretching out her neck so that it lies along the water, swims forward, followed by others, when several of them circle around the drakes, making occasional sideways pecks at their sisters that are not taking part, especially those near the drake at which the performing duck is aiming her show. As the ducks circle round, one of the males bows towards the duck nearest to him, raising his hind part from the water, so as to display his curly tail, etc., at the same time giving his whispering quack. The watcher sees that certain ducks circle about a particular drake, and display more than a tendency to drive other ducks away from him. During this ceremony it seems that the ducks choose their mates (the mallards being more or less passive) *or reaffirm old choices*. And henceforward each drake goes about with his duck or ducks, or rather, I think, they go about with him, jealously keeping off rival ducks. Their jealousy of other females is marked, as is the active part taken by the duck in securing and keeping a mate.

Now, however, comes in what I have already alluded to as the deteriorating influence of domestication. In the case of the wild mallard, where man has not interfered with the numbers of each sex, ducks and drakes are equally numerous, instead of there being five or even six females to a male, with the inevitable consequence of polygamy. In the wild state there is only a duck to a drake, and monogamy is perforce the rule. Not from any especial virtue or

faithfulness to his mate on the part of the drake, but because as soon as the pairing is settled each couple betake themselves to some secluded pond, backwater, tarn, or corner of a mere, where they can conduct their affairs undisturbed by other individuals of their own species.

In many species, the various warblers, for example, the breeding territory is selected by the male before mating, the female finding him and taking up her abode with him, but in the case of the mallard, the birds pair first and annex a breeding area immediately afterwards. Exactly what may be the impulse that drives them from the society of their fellows and annuls the pleasure in society which they evidently feel during a portion of the year, is another matter. How far it is a conscious desire on the part of the duck to find a secluded nesting-place, and how far the drake consciously wishes to get his duck away from the persecution of other drakes, we cannot say. There is nothing so difficult as the attempt to determine where instinct ends and intelligence begins, especially when we are dealing, not with well-defined instinctive actions such as the series that enables a spider to weave its snare, but with those indefinite inclinations and impulses that constitute a predisposition to behave in a certain way under certain circumstances, with an alert intelligence in control of the situation, ever aware, and ever modifying action to meet the changing needs of the moment. Now the mallard, whether the true wild duck or its domestic form, the call duck, is no fool—in fact, I do not hesitate to dub it a highly intelligent bird; and my belief,

after many years watching it, is that a certain need of intelligent anticipation, combined with an inclination for solitude, which is an impulse innate in the hereditary outfit of the bird, coming into play at a particular period of its annual breeding cycle, leads the paired duck and drake to act as they do, leave their fellows and retire to an unfrequented spot. This innate impulse to seek solitude may have arisen with reference to the need of the future family for a feeding area to themselves, but this will be more fully considered later.

I have said that the drakes are apt to persecute other drakes' ducks, and under the adverse conditions of domestication this is marked. The pairing ceremony does not lead there and then to coition, which may take place at any time without any foregoing display, but under wild, otherwise normal, conditions, it (the pairing ceremony) would be followed by the retirement of the mated couples to unfrequented spots, where the drake would not be subject to temptation nor the duck to unwelcome attentions from other males. It is patent to the observer that though the duck encourages her mate, she is not a wilful flirt, and flees from the pursuit of the rest of the drakes. Her flight is usually futile, nor are her mate's efforts to defend her any the more successful. The husband, if we may use this conveniently descriptive term, will fight hard, pushing and shoving the offending drake, but all in vain.

No wonder that some couples of decoy ducks leave home and go off to quiet places where they will be able to make their nesting preparations unharassed by

their friends. The only wonder to me is that the stay-at-home impulse should be sufficiently strong to keep the majority here.

Though the duck flees from other males, she certainly does not from her mate, and my remark that coition was not preceded by any ceremony needs qualification. It is certainly not preceded by the elaborate ceremony that leads to the selection of mates, but I have seen the duck swim around the drake with neck extended and head upon the water in an attitude of invitation, which produced immediate response. I have never seen a duck invite the attentions of any drake but her mate.

From this we see that the mallard duck, even of the domestic race of call ducks, with the many temptations thrown in her way, has no inclination to infidelity, but the drake has every inclination, and generally makes use of his opportunities to transgress.

It may here be objected that the word "transgress" implies a code of right and wrong, and that to endow birds such as ducks with ethical ideas, or even any moral sense whatever, is manifestly incorrect. It certainly is in the abstract sense. Watching ducks on the water and on land, with their mates and their young, in their social relations, etc., one sees in their case, as one sees in the case of other birds and beasts, instances of behaviour where indignation based on a feeling that we can but term that of "being in the right" animates the aggrieved individual so strongly that it fights, or repels an attack, twice as strongly as when it is what we term "in the wrong". Just as moorhens that invade the nesting territory of another pair are

repelled with what looks like righteous indignation, so a duck bringing her young ones on to that portion of a sheet of water reserved by her rival, lays herself open to bitter attack. We need not suppose that the attacker says to herself, "This is mine, it is wrong of that other duck to come here", or has any sort of formal concept of rightness or wrongness; but I do think we may credit her with an emotion of anger based on a feeling, vague and indefinite, of "being in the right". And that the trespasser, knowing perfectly well it is trespassing, has also a guilty emotion. I have digressed to this question of trespassing, because it is in this case that one can "see" that an individual feels it is in the right; but when one has seen a duck, as I have done, run another duck away from her mate, and return bowing and quacking to his side, one feels that any dogmatic assertion that ducks cannot have any feeling of wrongness or rightness would be rash indeed, and that the word "transgression" may well be used for any conduct that is against the interest of individuals and of the species.

But once again I must emphasise that the infidelities of the call drake are the direct outcome of our interference with the social economy of the breed; and that the mallard that retires with his spouse to some quiet place, not only secures her from molestation, but himself from temptation.

CHAPTER II

NESTING BEHAVIOUR

Soon after mating, the ducks begin to consider the question of nests, and if the spring be mild the flock quickly breaks up into little parties, each consisting of a drake and his two, three, or four ducks. In the wild it is, of course, a drake and a duck. Temperature has a great effect on their behaviour; cold weather inhibits the nesting impulse, warm weather quickens it; in a mild time they get to work early. The end of February usually finds the breeding areas allotted—that is to say, a drake to each pool, with the respective ducks looking about for nesting-sites. The nest-hunting is chiefly done in the early morning when it is getting light, and the drakes take considerable interest in it, attending the duck as she waddles around the bushes, peeping under this one, peering into that, and exploring every likely and unlikely nook and corner. The drake, meanwhile, stands beside her, quacking softly, and wearing what one can only describe as a mysterious air. If some other duck comes up, he bows at her, quacks, and, if she does not take the hint, administers a sharp peck. Despite the fact he drives off the other nest-hunting couples and single ducks, he will take out two of his own ducks at a time. I have often seen this happen. During the spring of 1927 I observed a decoy duck fly up on to the backyard wall. This is about twelve feet high, wide at the top, covered with ivy and other plants, including nettles and snapdragons. The ducks have often nested upon it. Well, this duck flew up, and

uttering little throaty, husky quacks, as of encouragement. The first duck found a place beneath an extra large spray of ivy. She pulled at a leaf or two, and then pressed forward into the space, where she turned round once or twice, meanwhile pushing away the surrounding leaves. After a few moments she emerged, wearing a look of satisfaction and contentment, waddled up to the drake, make a gesture, half-bow, half-peck, at him, quacking as she did so, then turned, raised her head, spread her wings and flew off to the pool, followed by her mate and duck number two.

Subsequent examination showed that she had roughly shaped a nest. It was never used, because the ivy on the wall had to be clipped next day, and the situation was then too exposed. Cover and shelter are essential in a nesting-site. Nests are often placed against the butt of a tree, or at the foot of a wall, beneath bushes, or an overhanging tuft of grass or rushes; and a favourite situation will be resorted to year after year. With regard to this there are apparently two factors at work: first, that particular spots have especial attractions in the eyes of the ducks; and secondly, in the case of the elder individuals they are returning to their old quarters where they have nested before, for they usually go back to their previous nesting-places. For several seasons a duck nested beneath a bay-tree in the kitchen garden, and another beneath a yucca by

the drawing-room window, but when these ancient dames came to grief the sites remained vacant. During the past spring the latter spot was annexed by a young duck, and another duck made her nest on the opposite side of the window, where some plants made the corner a very snug and sheltered one. Provided they meet with no mishaps I expect to see these ducks back in their old quarters next season.[1]

So much for the selection of nesting-sites, which it will be seen is indeed *selection.* No doubt the urge to look for a nest is truly instinctive, an impulse that comes into play at a certain stage of the reproductive cycle, but no one watching her behaviour could doubt that the duck brings much intelligent awareness to the satisfying of the instinctive desire, and that she deliberately selects the spot where she will make her nest.

The preliminary nest-making is slight; the duck merely turns round and round, scraping with her feet, and forming the nest by pulling the surrounding vegetation about her. Thus a rough and ready wall, or rim, is formed about the scrap, but there is no attempt at weaving the material together, or at lining the hollow. We here see the most primitive and simple form of the nest-making impulse, in which the bird scratches a slight hollow in the ground and gathers about her any material she can reach. The male does not assist her, though he looks on, or, as we might phrase it, "stands on guard", but I do not believe he keeps watch for *purpose* of giving alarm. At this stage in the breeding cycle the birds go every-

[1] This expectation was realised.

where together, and I think the drake just waits for the duck when she is nest-making or laying, until she has arranged the nest to her satisfaction, or laid her egg, as the case may be.

The first eggs are usually, i.e. in normal seasons, laid early in March. Even if one has not found the nests, one can tell when the ducks begin to lay by seeing the drakes idling about in the early morning, for the ducks lay soon after daybreak. Then it is that one sees the drakes waiting for their mates, often near the nests, but sometimes a little way off.

The initial eggs do not receive particular care from the duck, but as the clutch increases she covers them up most carefully on leaving the nest, placing leaves, grass and moss over them, so that they are quite hidden and the nest is admirably concealed.

So far the nesting behaviour of the decoy duck is a perfect parallel to that of its wild relative, the mallard, and would continue to be but for human interference, but at this point we invariably upset things by taking the first clutches of eggs. The normal clutch is from ten to twelve eggs. When the nests hold nine or ten we take them, for if the ducks are allowed to hatch early broods, before there is any insect life on the water, and while the nights are yet cold, they lose the majority of their ducklings.

Now the wild mallard, secure from interference, hatches its first brood about the middle of April, and the young have a hazardous time, but of that more anon; for the moment we must return to the decoy duck, which, deprived of her early sitting of eggs, quickly lays again, and is this time permitted to

go ahead with her task. By the middle or end of April she has another nest full of eggs, about which nest scraps of grey down show she will shortly be sitting, moreover, the duck herself betrays the fact by her ruffled feathers, fussy mien and excited quacking—in fact, she has become "broody". The end of April finds her sitting hard, cuddled down upon her eggs, with a wall of grass, moss, leaves, and last, but not least, down from her own breast arranged about her. When she leaves her treasures, to snatch a few hasty beakfuls of food, she buries them beneath a warm quilt. In her, as in the true wild duck, a host of instincts and impulses have been brought into play by the broody condition, desires that are not manifest at other times. One of these is the determination to defend the nest against aggression if it is possible to do so. Under ordinary conditions even a decoy duck, let alone a mallard, is a timid and apprehensive bird. Do anything unusual or startling and the tamest of the call ducks will fly off in alarm, but a sitting duck, and later a duck with young ones, is changed into a determined and pugnacious creature, that only gives ground before something too terrifying to be withstood.

As long as a sitting duck thinks she is unseen she stays very still, when her tabby plumage blends perfectly with the shades and shadows among the undergrowth, making her exceedingly difficult to distinguish. Certainly the plumage of the female mallard is most admirably adapted for camouflage, and when one contrasts it with the handsome uniform of the drake, one can but consider it evidence in support of the theory of protective resemblance. But when a duck knows she

is seen and thinks the intruder is going to disturb her, she puts up her feathers and hisses like a snake. It is extraordinary how hissing enters into the defensive bluff of many small and comparatively defenceless creatures, from a little tit surprised upon its nest—I was once quite frightened by a great tit that hissed when I put my finger into its nest hole—to larger animals such as the cat.

A duck can and does hiss most effectively, adding emphasis to her hissing by sudden lunges with her beak, when she pecks and bites surprisingly hard. But if this is not enough, she will rise from her eggs and buffet the foe with beak and wings, being no mean antagonist, as I have often experienced.

It must be remembered that prior to incubation she would not have attempted to render herself invisible by "freezing", nor, when discovered, would she have attempted to attack a foe—she would simply have flown away. In short, this behaviour is intimately connected with the broody condition.

There is also something else which a broody duck may manifest, i.e. one that is incubating or has young and helpless ducklings, namely, ability to perform the "broken-wing trick", when she flutters away along the ground as if maimed and unable to fly, and thus draws after her and away from the nest whatever foe has alarmed her.

I believe the "broken-wing trick" to be a truly instinctive performance, that when startled the bird acts in this way without stopping to think, for you find it exhibited by so many and such different species, under such various conditions, and by young, inex-

perienced birds breeding for the first time, as well as by those full of years and guile; but I do not mean by that statement that I consider birds behave in this way without understanding what they do. They are almost certainly conscious of what they are about, for instinct in the higher animals is nearly always accompanied and modified by awareness, and when a bird following its first alarm repeats a performance of the broken-wing trick, as a golden plover did to try and draw me from the neighbourhood of its chicks, returning and shuffling off some half a dozen times, one may be sure that purpose and intention have taken control of the situation.

This digression from the decoy duck, and her version of the old trick, is because I shall show that her behaviour in this respect is evidently based on an innate response, and I do not wish it to be thought I underestimate that most powerful co-operating factor —namely, intelligence.

Now to give a concrete instance, I cannot do better than restate that which I described when discussing the broken-wing trick in *Animal Mind* and tell how Madame Moses, my old pet otter, surprised one of the ducks upon her nest. Moses, a mighty hunter, no sooner winded the bird than she sprang forward and made a grab at her, fortunately missing the duck, which flustered from her nest in great alarm. The decoy was a very tame individual, and had I disturbed her would merely have hissed or pecked at me. It is improbable that she had ever been attacked by fox or otter before, yet she was thoroughly frightened now and floundered from her eggs, to scramble,

flapping, towards the water. The otter, of course, dashed after her, while the duck splashed across the pool, apparently unable to fly, though making a great commotion, quacking and floundering, splashing water far and wide, while the deluded otter swam her hardest in the vain endeavour to catch the duck, only to see the latter arise and take wing at the end of the pond. "The duck's ruse was completely effective as a means of drawing the foe away from the eggs, and the otter was thoroughly deceived" (*Animal Mind*, p. 166), but it is noteworthy that it was performed on the "spur of the moment", and could not have been better done by a true mallard, or any other wild bird, such as the golden plover on the Norwegian fjelds, which returned again and again in order to try to draw me from the neighbourhood of the young ones. In the case of the latter we see intelligence using experience to modify behaviour, but in the duck we have frantic alarm pulling the trigger of instinct for the first time, and causing the duck to act, without "staying to think", according to the age-old responses embedded in the make-up of her nervous system.

Thus we see that despite partial domestication the decoy duck has the *majority* of its instincts, its innate dispositions to act in a certain way under certain circumstances, unaltered and unspoilt by its new environment, most particularly those connected with incubation and the rearing of the young. The female mallard sits her eggs just like the decoy duck, and when frightened by an enemy performs the broken-wing trick, while her mate, left in solitude by her desertion, seeks the company of other drakes in like plight,

precisely as the decoy drakes congregate together as soon as their ducks desert them.

The moment the mallard—using the word "mallard" to cover both decoy and wild drakes—finds himself left alone he seeks the company of his fellows, his social disposition becoming once more the principal factor in controlling his behaviour. His craving for society is apparent, as already hinted, while the ducks are but laying, for even during their temporary absences the "grass widowers" may be seen together. And when the ducks begin to sit in earnest, the drakes put aside all territorial considerations and jealousies, join forces and become a group. From this time forward they take no part nor interest in the family life, for they have nothing to do with rearing the young, but when the latter are full-grown the old drakes amalgamate with the general flock.

As some readers may think that the above remarks are based entirely on observations upon domesticated decoy ducks, I will give a concrete instance showing the reassertion of the social impulse in wild mallard when their ducks were sitting. In the spring of 1927 I visited the Norwegian Dovre Fjeld for the purpose of studying bird life on its marshes and fjeld-tops. The marshes abounded with ducks, particularly the common mallard. When I arrived in early June the mallard were in pairs: you continually flushed a duck and a drake, but never parties; towards the middle of the month the ducks disappeared (they were very late beginning to sit, owing to the abnormally cold spring—the marshes were still frost-bound at the end of June!) and you surprised two and three drakes

together. On June 24th, when watching cranes, which were feeding on a small patch of cultivated ground between the bog and the farmstead, I saw six mallard, all drakes, in full plumage, feeding with them. The birds were searching for the newly-planted oats, the cranes a little apart from the wild ducks, and the latter in a party. While feeding they kept within touch, and finally waddled off together. They were behaving precisely as the tame drakes behave under the same circumstances.

Although the drakes revert to each other's society there is one thing which shows they do not forget their mates—namely, the way they endeavour to defend them when pursued by other males. When the broody decoy duck leaves her nest to feed, she is liable to be harried by the drakes; if they see her on the water, or upon the land, one or more of them invariably pursues her, and her mate as invariably tries to drive off the aggressor. He will fight most determinedly on her behalf, but it is usually in vain. I have no evidence that true wild ducks are worried, harried and molested in the same way. Man's influence on wild creatures is, alas! generally a bad one, and as I have repeatedly said, domestication means the deterioration of their "morals".

We now come to the period when the eggs are about to hatch, a perilous time for the ducks, even the tame decoy ducks, for as the actual moment of hatching approaches they sit more lightly, fidgeting about on the eggs, thereby spreading and distributing their scent, which is likely to be winded by any passing fox. It is commonly supposed that a sitting

duck, or other bird, gives off no scent, but the fact seems to be that during incubation they sit so still that the odour is not spread around, which comes to the same thing from a practical point of view. Certainly the twenty-four hours preceding hatching are more dangerous than any other part of the twenty-six to twenty-eight days of incubation, and many are the ducks I have known that have met with disaster at the last moment.

All being well, the duck does not hurry her family away from the nest, but waits for a few hours before taking them down to the water. When at last she rises and leads them away they toddle after her like a swarm of large bumble-bees, their dark olive-brown and yellow-spotted down irresistibly reminding one of these insects. Even at this early stage, and even in the case of the more or less domesticated decoy duck, the young have certain characteristics of behaviour. If the party should be attacked or alarmed and the old bird driven to defence or flight, the ducklings scatter and run, to disappear in the nearest herbage, where they crouch motionless until the old bird calls them forth. They respond from the first to her loud quack, which means danger, gathering close about her, and then, as described above, scattering for shelter. They equally promptly respond to her quite different note, which signifies "all is well", and come forth to follow her once more. It is an interesting point whether this response is purely instinctive, an unthinking, unregulated reaction to the stimulus of the call, or whether they have already and so early learnt to know her voice. I would not like to exclude

experience as a factor in the case. For they learn quickly. Ducklings hatched under a hen soon respond to her vocal signals; moreover, hand-reared decoy ducklings very soon associate the call, "Dill, dill, dill!" or any other adopted by their feeder, with the supply of food, and come racing up at the sound of his voice.

Having got her young to the water, the old duck leads them into it, the little things following her without pause or hesitation, paddling off automatically, for they respond perfectly to the new element. If they do not *know* what water is—and I seriously question whether you can have knowledge apart from experience, i.e. whether instinct can at any time or in any creature carry foreknowledge of what is coming—they are at any rate so well equipped with regard to this inherited mode of behaviour that they respond perfectly to the new stimulus.

It is necessary here to revert for a moment to the conduct of young ducks hatched in nests on high places. I mean such situations as upon walls, pollard-trees, a ledge on a steep bank, and other sites involving a considerable descent for the ducklings. I have known nests from which there was a twelve-foot drop to the ground. How do the ducklings get down? The popular theory is that the mother helps them, some persons say she carries them down. Like many another popular belief this is wrong. The young manage their descent in the simplest manner—they just tumble! Being very light and clad in thick down they take no harm from the adventure, no more than do eider ducklings when they tumble down the rocks into the sea after the old eider duck. I have seen eider ducklings, that had

been hatched on the top of a high cliff, left there, while their mother flew down to the water, but in a few seconds they had all cast themselves over the edge, to fall on the rocks below, where they picked themselves up, not a bit the worse for the seemingly perilous descent. The tumbles sustained by young mallard are nothing by comparison.

I have devoted a paragraph to this because it so well illustrates one of the most marked traits in the behaviour of the newly-hatched duckling—namely, its instinctive desire to follow its mother, a desire so strong that it overcomes even the instinct of self-preservation, and impels the baby to tumble blindly in her wake. An older, heavier and more experienced duckling would only take such a risk under the influence of blind panic. As long as it was not alarmed it would seek cautiously for a safer means of descending. But, at any rate for a day or two, the little ducklings follow unhesitatingly wheresoever the old one leads. She takes them to some sheltered nook of the marsh, pond, or stream. In the case of the domestic decoy ducks it will be one of the pools near the house, where they pick up flies and water-insects. The first hatched mallard have a hard time, for early in the year this sort of fare is scarce and difficult to find. They also suffer much from such foes as big pike (this freshwater shark takes heavy toll of the young water-birds), the otter, the common rat and other predatory creatures that hunt the water-side, to say nothing of the jealousy of other duck families, and of moorhens, coots, etc., that have young on the same reach.

The tame ducks suffer most from rats and rivalry between the broods. The old ducks are exceedingly jealous on behalf of their families, and their behaviour throws much interesting light on their mentality and intelligence, so much so that I will devote the succeeding chapter to the subject.

CHAPTER III

FAMILY LIFE AND THE SOCIAL ORDER

Now the supreme necessity of the mother, whether bird or mammal, is to secure sufficient food for her young. Even the vixen still suckling her cubs must have plenty to eat or she cannot feed her little ones well; while young birds are dependent on fare transferred directly from the feeding area to their beaks. Territory is a necessity of life. I do not mean to suggest that the mother is conscious of this, that she definitely visualises the fact, but the need is there, and is one of great consequence. It is this which has probably led to the evolution of the territorial impulse in birds, mammals, living creatures in general and the mallard in particular. Indeed, we find in it a feature of behaviour of the greatest biological importance, any failure of which means the failure of the species as a whole.

In the case of the wild duck, if the brood cannot find plenty of food, the ducklings are doomed. They can only find enough when they have a piece of well-stocked water to themselves—by "well-stocked" I mean water teeming with insect life and full of other lesser creatures.

Our pools, which, in consequence of artificial conditions, have far too many ducks upon them, are now almost devoid of water-plants and the pond life that finds shelter among their leaves, so the only certain means of rearing ducklings is by hand. Yet, despite

the unnatural conditions, the ducks display the territorial impulse in a marked degree, and are as jealous on behalf of their ducklings as any wild duck defending a secluded pond, or a snug backwater on a reedy stream.

It will be remembered that in previous allusions to the territorial impulse, I said that it was exhibited long before the ducklings were hatched, as soon as the ducks had paired, and I pointed out that it was partly attributable to the desire of the couple for peace and quietness, but the root of their action evidently lies in the food problem and the need to provide the young with a feeding area free from competitors.

Yet, as it is so extremely improbable that an innate fundamental impulse or instinct like this will carry any foreknowledge with it, we are compelled to ask what are the actual feelings that animate the mother duck, convoying her brood into the water, when she sees a second duck with likewise a brood at her heels? They are probably emotions of anger and jealousy.

We see her ruffle her feathers, a sure sign of irritation and annoyance, and drive at her rival with angry quacks. If the other duck gives ground, all is well, and this she will probably do, unless she has nested near, and likewise looks upon the pool as her sheet of water.

When both feel that they have a lien upon an area the matter is serious, for neither will give way, and they fight persistently, catching each other by the breast feathers, shoving and pushing furiously, but usually without doing any great damage. It is

worse with regard to the ducklings, for here hatred leads to murder. During the first few days, while the little things stay close to their mother's side, they are not in much danger from the animosity of rivals, but when they begin to range further afield, swimming off after flies and water-grubs, paddling far from the old duck, paying little heed to her anxious quacks—for they are independent mites—they run grave risks. Not only do other ducks peck at and drive them, but often seize them and hold them under water until they are drowned. Many a murder is committed by the leaders of the rival clans, all from maternal jealousy, and from the impulse derived from that deep-seated desire to keep the water free for their own brood.

The warfare extends to other species. Moorhens, for instance, are vindictive birds. The ducks drive them, and they drive the young ducks, even assaulting and killing them. The young duck has indeed a perilous time! No wonder that the mallard seldom rears large broods.

In the case of the tame ducks the number of ducklings reared depends entirely on the assistance they receive. If the old ducks are captured soon after the ducklings are hatched, and the broods kept off the water for a few days, during which time they learn where to come for food, every duckling will grow up. In three or four days the young ones know the food call, and where the coops are, and in less than a week will go off to the ponds by themselves, to return, when tired and hungry, to their imprisoned parents. The old ducks may then be released, as the independent

"THE ANXIETY OF THE OLD BIRDS IS VERY KEEN"

ducklings will come for food, with the anxious parents quacking unwillingly in their wake.

The anxiety of the old birds is very keen. They keep watch while the ducklings feed, standing beside them with raised heads, and eyes glancing this way and that, doing their best to hurry the feeding brood. The ducklings pay little heed to the parents' fussy quacks, but should an old duck espy a speck in the sky, or something strange about her, and give the real danger-signal, they respond instantly, either dashing for shelter or crouching flat to the ground, where they lie, remaining "frozen" until she gives an "all clear" signal.

A "pecking order" is soon evolved between the various ducks and their broods, the less pugnacious ducks giving way before the more energetic ones. But the order of hatching has a good deal to do with the matter. When two or three ducks bring their broods off about the same time, and are penned up for a while next to each other, their broods amalgamate into one large family, and the old birds declare an amnesty, behaving quite good-naturedly to each other and to the ducklings, but woe to the later broods. The spitefulness exhibited by the mothers of the older ducklings must be seen to be believed. While the latest broods have to endure persecution from all the matrons in command of earlier hatched families. Sometimes a duck that hatches late in the season will take her family away, presumably in order to escape trouble. During the past summer one of the ducks walked her newly-hatched ducklings from the house, across a twelve-acre field of long mowing-grass, over a

highroad, to a small pool, where they would be certain of peace and comfort.

It is always possible to explain behaviour in terms of stimulus and response, but the conduct of this duck is as easily explainable on the assumption of intelligent purposiveness, and such it appeared to me to be.

The pecking order persists throughout the time the ducklings are growing up, and long afterwards, the seniors retaining their right to drive the juniors, and the latter submitting to it, but passing on the pecks to others, junior to them. In fact, the social order thus established persists when all are adult and the various families have amalgamated into a flock. But before going on to consider the behaviour of the flock, I must revert for a moment to the conduct of half-grown ducklings. It will be remembered I said that they were independent and paid little heed to the old duck. This only applies as long as they are on the home pool, for when they go out slugging in the meadows on a dewy morning, or the old dame takes them to another pool, they fall at once under her leadership, following at her heels, while she hurries on ahead, with her head up, and her keen dark eyes looking this way and that. The old duck has eyes for the whole party, and her unflagging alertness leaves them free to pick up slugs as they go. But when crossing from pool to pool, she does not let them dawdle by the way, hurrying on at a fast waddle that soon becomes a run. It is evident that she feels no security away from the water, at any rate not at this stage in the life-history of her young, when they are yet unable to fly.

The young ducks are nearly full-grown before they

gain the use of their wings. The first hint of their coming powers is when they are seen flapping and running along the turf, within a few days of which they are able to fly. But as the immature ducks acquire powers of flight, so the parents become helpless, moulting their primaries and being unable to fly.

The drakes, who have had no part in the family life and have been taking things easily in a bachelor party, are also in mid-moult, and are very shy and retiring, in consequence. The next three weeks are a critical period, for the old birds have no means of escape from otters by water or foxes on land. However, the new feathers come down quickly, the old ducks acquiring a glossy dark livery so exactly like that of the young birds that it is only by behaviour you can tell them apart. The drakes, too, moult into the eclipse uniform in which only their green beaks distinguish them from the ducks and young drakes.

Now that all have the full use of their wings, and the old drakes are beginning to emerge from the eclipse, the social impulse asserts itself even more strongly. Family ties are still felt, for when you know the birds intimately you can see that the members of the different broods keep together, to say nothing of their respective matrons indulging in a good deal of driving and pecking, but the desire for company brings all together to join and make one large flock.

Under wild conditions the ducks of a river, or of a lake, join forces, to go out feeding on the stubbles on moonlight nights, and eventually migrate to river estuaries and other desirable feeding-grounds; while our semi-domesticated ones, from whose outfit

of instincts the wander-impulse has been eliminated, content themselves with forming a large party, that goes out acorn-hunting in the autumn, that takes short flights around, and during cold winter weather congregates about the hole which is broken in the ice for it. The ducks vary things by playing in the cold water, when they dive and splash, chase each other under water, come up and again splash madly about, so that we might paraphrase the famous line from *John Gilpin*, and make it run "like unto a trundling mop, or a wild duck at play", and only leave off to come up to the stable-door in search of the grain always provided for them.

And thus time passes, until spring is within sight once more and the annual cycle begins again with courtship, mating and that desire for territory and solitude which wars with and quells the social impulse.

Having now followed the call duck through its twelve-month cycle of behaviour, it remains only to draw attention to the difference a mental factor makes in its existence. By selecting stay-at-home individuals we have eliminated the wandering and the migratory impulse, turning it from a "wild" duck into a "tame" duck, which, as far as the majority of individuals are concerned, is quite content to stay all the year round upon one or two small pools, despite the fact it has wings at its command, and could, if it liked, join its cousin, the mallard, and wander far over the waterways of many countries.

PART II

THE PEAFOWL

Being a Study of a Semi-Domesticated Bird

CHAPTER I

Types of Peafowl, The Peacock's Display, Etc.

The common domestic peafowl is the Indian one, *Pavo cristatus*. There is also a form known as the "black-shouldered" "Japanese", or "japanned", bird, which is believed to have originated under domestication as a freak or mutation from *cristatus*. It is true it has been given a specific name, *P. nigripennis*, but it is not known in a wild state. When it first appeared is another matter. Darwin[1] speaks of a hen of this variety having appeared in a flock of common peafowl, "which during more than twenty years had not been crossed with birds of any other strain". He refers to other "well-authenticated cases in Great Britain of japanned birds having suddenly appeared within recent times in flocks of the common peafowl",[2] but goes on to say: "This variety must also have formerly appeared in Europe."

It is evident, to use the language of livestock breeders, that *P. cristatus* is apt to "throw" this form.

In appearance it is strikingly different from the

[1] *Variation of Plants and Animals under Domestication*, vol. i, ch. viii, p. 355.
[2] Ibid.

type, the adult male being more melanic—whereas in the common bird the shoulders, i.e. scapulars, wing coverts and secondaries are mottled and variegated, in the japanned bird they are a lustrous black; *but* the hen is greyish-white, in contrast to the tabby-coloured common hen, and the chicks of both sexes are also white, or, to be precise, cream-coloured. I have not seen chicks of the white (albino) form of the peafowl, but believe they are indistinguishable from those of the japanned bird. Were it not for the adult cock one would not hesitate to dub this variety a semi-albinistic form, depending for its appearance on the loss of a pigmentation factor. Yet what do we see? The young male starts life almost devoid of colouring, but gets steadily darker at each moult, until, when three years old, he is a remarkably handsome fellow, though still not as dark as older japanned cocks. However, by five years old he is indistinguishable from them. The female does not get any darker with age, if anything she gets lighter!

It is said that the japanned form is smaller and feebler than the parent race, but this I believe to be mistaken. At any rate, all the individuals I have met with belonging to the mutant type have been as large, robust and virile as the typical specimens, and I shall have to recount presently how a *nigripennis* cock defeated a *cristatus* male in fair fight.

Before going on to speak of individual birds, it only remains to say that the *nigripennis* coloration appears to behave in heredity as a simple recessive to typical coloration (which would indicate a single factor mutation), but peafowl being shy breeders, and

THE PEACOCK (*Pavo cristatus*) PHOTOGRAPHED IN THE ACT OF SCREAMING

THE BLACK-SHOULDERED PEACOCK (*Pavo nigripennis*)

extremely difficult to rear in any numbers, the evidence is insufficient for a positive statement on the point.

Now for some account of my birds and their ways, in description of which I propose to use the names by which the peafowl were known to us. To speak of male number one, or of female number twenty-two, may sound more impressive, but does not, I feel sure, aid the majority of readers to retain a clear idea of the individualities of the birds. This I wish to emphasise. First must come General Tom, otherwise Old Tom, the eldest cock of the common Indian type; and Jane, a typical hen. They were obtained as adult birds from a farm where peafowl had been kept for a number of years, the flock containing both types, i.e. *cristatus* and *nigripennis*. So far as I could ascertain there had been no outcross over a considerable period, and the stock was supposed, and I have no doubt correctly, to have been inbred for fifty years or more.

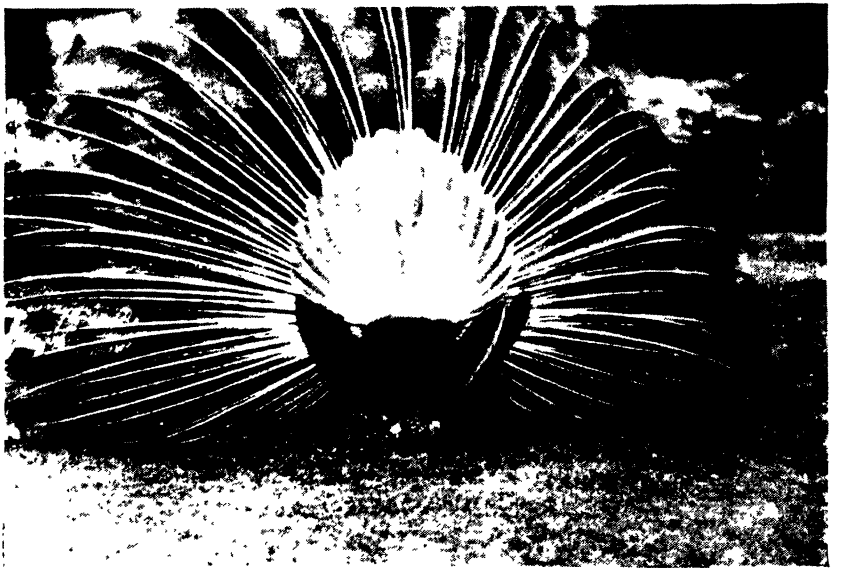
The General, as I have said, was an adult bird, judging by his plumage and the length of his spurs, of some seven or eight years of age. The hen, too, was no pullet. This made the difficulty of getting them to settle in a new home all the greater. The cock straightway gave a demonstration of the fact that a peafowl which means to travel does not use its wings, but *walks*. Tom walked with a vengeance. First he strolled off eastwards into the woods—where the metallic vividness of his blue-green neck betrayed him amid the magentas of the flowering rhododendron bushes—then westwards, northwards and to the south. He was brought back from all points of the compass.

Tom's old home lay about six miles, as "the crow flies", to the north-west, and well within reach of such an active bird, *but* he betrayed no knowledge whatever in which direction he should seek it. The hen, Jane, a much less adventurous bird, likewise showed no sign of knowing in which direction to look for her old quarters. She made one or two attempts to wander away, but when brought back soon settled down; as did General Tom in course of time.

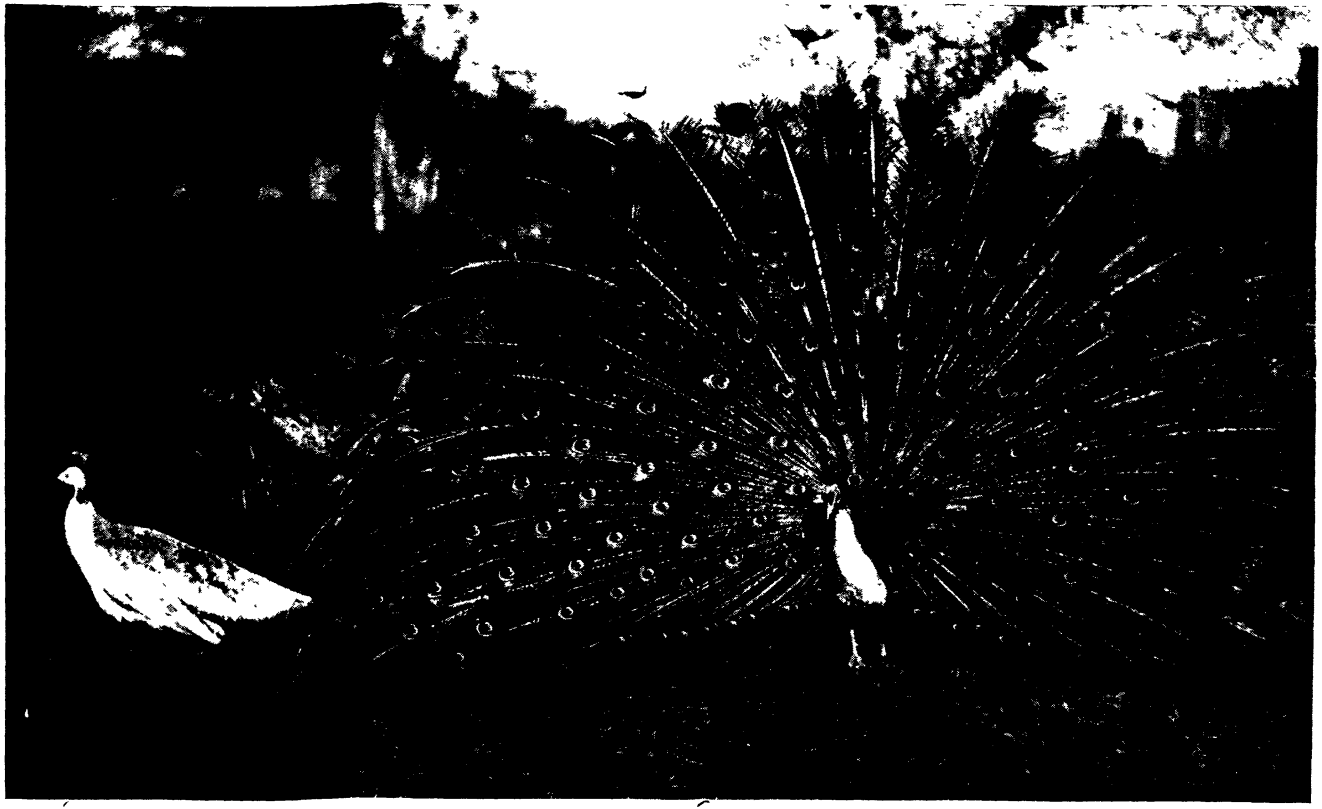
Later additions to our stock of peafowl betrayed the same restless wish to get home, and equal lack of knowledge or instinct to guide them in doing so, but their behaviour and doings shall be fully dealt with under the respective birds.

Having got Tom and Jane comfortably settled I added the Grey Hen to the strength. She was, as her name indicates, a light-coloured hen of the *nigripennis* form. As she came from the same source as the other two, and already knew them, *she* gave no trouble, but settled down at once.

The most noteworthy thing about the peafowl at this stage in their history, was that all three made use of a big walnut-tree at the back of the house as a roosting-place and headquarters. I say "noteworthy" because when my grandmother, thirty years before, had kept peafowl, they too had used this tree, and even the same branches of it, indicating it had some peculiar virtue or advantage. We could not see wherein this lay, the tree being an exposed one, especially to northerly winds. But there the fact was, the new peafowl straightway made for the tree that had been the favourite roost of the old birds.



SIDE AND BACK VIEW OF PEACOCK WHEN DISPLAYING, SHOWING THE TRUE TAIL BEHIND THE TRAIN FEATHERS



THE PEAHEN TAKES "LITTLE NOTE OF THE ANTICS OF THE COCK"

Apropos of the psychology of the peafowl it must be mentioned that they are an extraordinary mixture of timidity and boldness, and their domestication is but partial. Exceedingly tame and fearless in many respects, yet they are very nervous of entering buildings, and cannot be induced to roost under cover. Moreover, if they have once been trapped in a shed it will be a long time before they will enter it again, so that catching a peafowl is a work of art and patience, and if the wary bird becomes suspicious, the attempt is likely to be labour in vain.

As with most social birds and beasts their intelligence, predispositions and hereditary tendencies are only fully displayed when there are sufficient individuals to form a society. The peafowl, by the way, *is* a social bird. Except in the breeding-season they go about in a flock, or, as the writers of old termed it, "a muster", and roost near together at night, their affairs being largely governed by the family clan system, of which more anon.

Even in the breeding-season, when the flock breaks up, the fact that the species is a polygamous one means that there is still a society, for several hens are attached to one cock.

With one cock and two hens, only a general idea of their behaviour could be obtained. Of course, as spring advanced, the General began to display in great style, raising his magnificent train in a shimmering halo of iridescent eyes that glittered in a five-foot-high glory about him. The gorgeous beauty of the peacock's train when he raises it in his display is indeed a marvellous thing. No wonder popular belief ascribes vanity to the

bird. Such loveliness ought to be vain. Yet it is doubtful if in reality the bird ever gives his looks a moment's consideration. But before going on to consider details of the peacock's display behaviour, a few remarks must be devoted to the train, or so-called tail. The long eyed feathers are not tail feathers at all, but tail coverts, and spring from the back, just above the tail, the true tail being behind and below them. It consists of shorter plain grey feathers. These latter, however, help to hold up the ornamental ones, as will be seen in the illustration facing page 56, which clearly shows the tail keeping the train in position.

If the actual weight of the feathers is but a few ounces, that gives little idea of the strain of erecting and keeping erect so large a fan, to say nothing of the additional strain imposed by every air that moves, for the outspread fan catches the breeze like a sail. Then, not content with raising this fine fan, the bird, when strung up to a sufficient pitch of emotional ecstasy, can set the feathers quivering, until the quills rattle like rain on a window-pane, and the beautiful eyes vibrate like living things. It is indeed a wondrous display! And calculated to raise admiration in any eye not absolutely blind to colour and pattern. No wonder that "vain as a peacock" has passed into a proverb, for the strutting cock appears to ooze with self-satisfaction and self-admiration. No wonder, too, that the suitor's magnificent garb should be supposed to ravish the heart of the insignificantly clad hen. For years the peacock's display has been one of the standard cases quoted in support of the theory of sexual selection—the male displays his finery to charm the

female; she notes his beauty, and falls in love with him, becoming a willing victim of his loveliness, but she is critical, and eyes her suitors with a keen eye, awarding her favours to the handsomest, hence the evolution of the ornamental tail coverts of the peacock, a matter of the selection of the finest birds by the discerning females.

What an attractive theory, *on paper*. Unfortunately, observation reveals many facts that do not fit in with it. It assumes that the hens are interested in the performance, but are they? Also, that the cock does it because he wishes to please them, but is that really so? When the spring came and the weather became fine, Tom began to display, showing off for the first time to some ducks when there were no peahens present. The tame mallard were being fed by the front door, when up came the peacock, anxious to get some corn; however, when he saw the ducks picking it up he paused, put up his train, shook it into place and turned to face them. They took no notice, at which he ran forward two or three steps and set his fan trembling like an aspen. He continued to display before the feeding ducks until they had finished eating and went off. I have seen precisely the same thing take place many times since, both with Tom and other peacocks. Neither in the incident described, nor in the other cases, was there any question of pleasing the hens, for they were not there to please!

But when they are there, are they interested? My opinion is they are merely bored! And take little note of the antics of the cocks. Tom soon chose his strutting-grounds; one beneath the sunk wall that divides the upper lawn from the lower tennis-court, where an

overhanging tree makes a sheltered nook; a second where the birds are fed at the back door; and the third in the stackyard, in a sunny corner by a rick. Later the pressure of territories belonging to other cocks caused him to alter his places, but such were his original choice when there was only himself and the two hens.

Many a time have I seen him at parade-ground No. 1, strutting all to himself, the females being out of sight round the corner, but if Jane or the Grey Hen came up, a perfect gust of passion swept through him, and he turned towards them, quivering from his topmost feathers to his toes, yet never did I see a hen turn *half* an eye of attention towards him; they invariably strolled by in cool indifference, and left him to carry on by himself. It was the same at the other "pitches", especially that in the stackyard, where the peahens were fond of sunning themselves and would lie basking in idle indifference to Tom's most earnest displaying.

The reader may think that their inattention was due to the absence of competing cocks. Apart from the fact that peacocks are *not* in the habit of showing off side by side, there was no alteration in the behaviour of the females when two more cocks were added to the strength.

Watching this cock and his two hens brought home to me the fact that the peacock's display is an outlet, through which is vented the overflowing emotion, resulting from the supercharged state of the physical system as it reaches the climax of its annual cycle and attains the reproductive phase. Its biological function is probably that of advertisement, so the female may know the whereabouts of the male, and *especially her male.* The latter remark may seem somewhat sur-

prising to people who, knowing the peacock to be a polygamous bird, assume it breeds promiscuously. The latter is far from being the case. The hens are faithful to their chosen cock, and do not consort with others during the breeding season. Later our hens had the choice of two other adult cocks, both of whom defeated Tom in fair combat, but this did not affect their staunchness in the least. It was only when the old cock got feeble and decrepit that they turned to other males.

But now, with regard to the question raised a few pages back, whether it is possible the cock has, after all, an inkling of his own charms, we must first remember that he does not see them, for squint as he will, he cannot see much of his encircling train, and secondly, that he is not in the habit of seeking a reflector in which to view his image. I have never seen a peafowl stay to look into a puddle of water or resort to the pond-side to stare at its reflection. Thirdly, such self-consciousness and self-knowledge would imply a degree of mental development far in excess of that of the peacock, or any other bird, and approaching that of the higher apes, if not our own. The peacock is far from a fool, in fact it has a considerable meed of shrewd intelligence, but to credit any bird with the power of forming abstract concepts, of forming a mental image of itself, and saying to itself, "See, what a fine fellow I am!" seems to me to be asking too much of the avian mind. Besides, if the peacock can form an abstract conception of its own beauty, how do we account for the hen erecting her plain unadorned tail, ditto young cocks in immature plumage and quite

small chicks of both sexes, not one of which has any reason to be proud of his or her appearance? While last, but not least, if the bird *is* conscious of his own looks, why should a shabby, moulting cock, all his splendid tail coverts shed, put up his few grey tail feathers in front of a hen?

During the season of 1927 one of our hens, which had lost her summer clutch of eggs, laid again in the autumn, which threw the cocks into a fever of excitement, and I saw Tom, then in full moult, behaving as described above. He was strutting with all the fever and excitement inseparable from his best display, emotion seemed to quiver from him, yet all he had left to show his lady were a few of his shortest tail coverts and his slate-grey tail.

I have seen chicks not ten days old erect their diminutive tails, holding back their heads in the same attitude as their sire and strutting with all his importance. The cause of their display (if one can use such a word to describe the babyish performance) was the sudden appearance of Joe, the tame raven.

Between Joe and the peafowl there was an old feud, and his appearance caused angry excitement among them. I have watched a *hen* strutting at Joe for ten minutes or more, ditto a yearling cock, both raising their tails and erecting their tail coverts precisely as if they had a full-length train to show off. They each indulged in the quivering gesture, which in the case of an adult cock would have set his magnificent plumes vibrating. In fact, the showing-off attitude of the tiny chicks, of the young birds of both sexes and the old hens, is the same as that of the adult male. *Under stress of emotion they all behave in the same manner.*

CHAPTER II

TERRITORY AND STRIFE

The subject of this chapter is the strife, and the ultimate settlement of the territorial question, between Tom and his rivals, Black Joe and Young Tom; but the reader will find it easier to grasp the situation if we take the events as they occurred and describe first the rearing of a young cock and then the arrival of Joe.

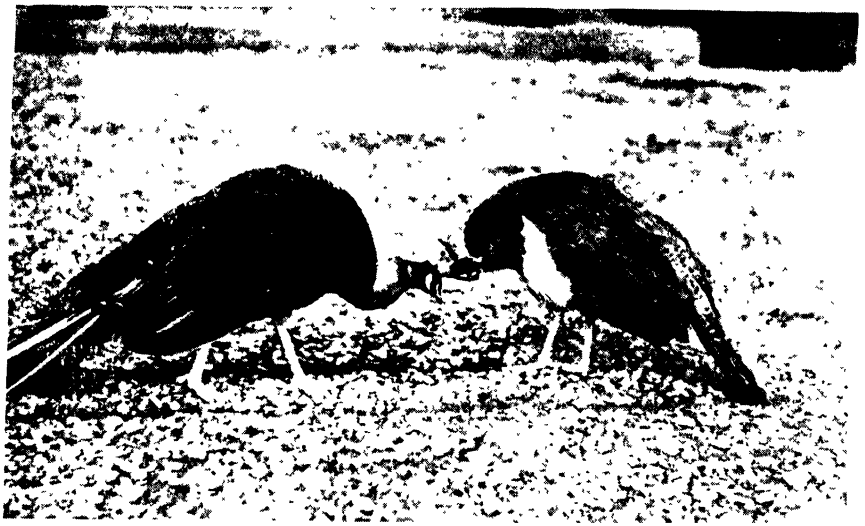
Jane, the first hen, laid a clutch of five eggs, of which three hatched, the chicks being a pullet and two cockerels—the green sheen on the neck feathers soon distinguishes male chicks from female—but one met an early death by drowning in a water-tub. The surviving chicks did well, which was no more than they should have done, seeing how their mother looked after them. She was indeed a devoted parent, escorting them to good feeding-grounds, searching diligently for food and carefully presenting it to the chicks.

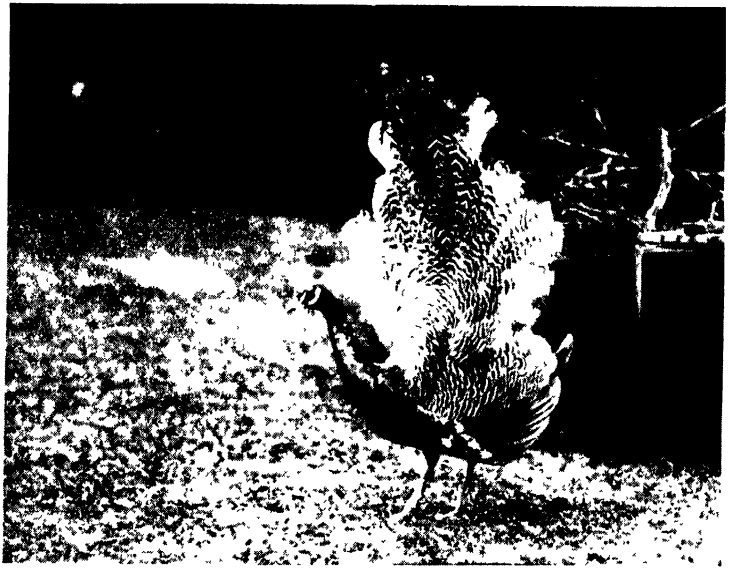
At first she had to brood them on the ground, but the lively, active chicks were soon able to fly well, when she led them up to roost, flying first on to the roof of a low shed that sloped to within 3 ft. 6 in. of the ground, thence to a higher building, then on to the lowest branch of the tree, whence the way to her roosting-place was as easy as stepping up a ladder. Under normal circumstances she flew straight from the ground to her favourite perch. It was evident that this roundabout journey was for the purpose of showing the chicks an easy way up. And when I say "the purpose" I mean the words, for her actions were

most purposeful, and no one watching her could doubt that she acted with deliberate intention. She *chose* the easy steps, and demonstrated by her example how the chicks were to come up. This had all the appearance, not of instinctive, unthinking behaviour, nor an automatic response, but of intentional action. When she got aloft she called the chicks. They flew readily enough on to the lowest shed, but there they hesitated. The cockerel, after some minutes of anxious cheeping and peering aloft, fled on to the next building, and took the succeeding steps with little hesitation, so that he was soon at his mother's side and cuddling under her wing. The pullet took longer, peeping and cheeping most plaintively, but at last she too fluttered up, gained the old bird's side, and sought shelter beneath her other wing.

Henceforward the chicks went up to roost with the old bird each night, but after the first two or three evenings the hen flew straight up and no longer demonstrated the easiest route. All through the winter, until the following spring, when the two were as big as their parent, the chicks sought the shelter of her wings, roosting one on either side of her, snuggled close to her, though so big she could hardly cover them.

These chicks were Young Jane, otherwise known as Jenny, who will again enter this history, and the cockerel that was exchanged for Rachel, and therefore does not figure in it. As peacocks do not reach maturity until three years old, he did not upset his sire when, spring returning, the latter again began to display. But something else did, for now came Black Joe!





(1) THE PEAFOWLS' GREETING

(2) THE DISPLAY OF A JUVENILE PEACOCK

Joe was a nice male of the black-shouldered type, probably some seven or eight years old, and had been a great pet of a gentleman who was leaving the neighbourhood. Wanting a good home for the bird, he asked us to take him, and Black Joe duly arrived.

He was straightway turned into the garden, rather dishevelled and perturbed after the trying ordeal of the journey, and we, thinking he would quite likely want to get home, watched him lest he should walk off.

Tom and his two hens hurried up, but as they got nearer their pace slowed, and it was with very dignified steps that they approached Joe, who was standing staring about him. Tom came to a standstill and surveyed the stranger from some fifteen yards away. The Grey Hen likewise stood and stared, but Jane walked up to him. They inspected each other minutely, rather like suspicious dogs, holding their heads low. There was no hurry about the proceedings. Long minutes passed, while Jane inspected the new cock, and Joe looked at her. They got a little nearer. Joe held his head still lower, somewhat sideways, and towards the lady; when she bent forward and pecked him extremely gently upon the white kid-like skin below the eye. The photograph shows Jane in the act of "kissing" Joe. Though it may spoil the anecdotal quality of the episode, it must be stated that I believe this "kissing" consists of the removal of lice; nevertheless it was significant.

I have seen this action repeated many times since, by little chicks to their mother and by hens to the cocks, and it appears to be a sign of affection, or at any rate friendly greeting. Presumably it was the latter in the case of Jane and Black Joe.

Was it this that galvanised Tom into action? At any rate he came stalking up, sidling towards Joe with his neck crooked in a way that I knew meant mischief. But still there was no hurry, nor did Joe attempt to beat a retreat; he merely watched Tom's approach with a patient stare. It was quite a long time—over half-an-hour—before anything definite happened, but whenever Joe moved a step Tom moved too, and now his air of aggression was more decided than ever. And well it might be—had he not long held undisputed sway over all his territory, and now a strange cock had been dumped in the middle of it!

An air of tense excitement brooded over the scene; it was like a storm upon the horizon, black and forbidding, threatening to break in crashing peals of thunder, yet holding off, keeping the spectator waiting with tense nerves and bated breath for a climax that did not come. The peahens got bored and began to pick about—and at that Joe took a few steps forward, and Tom walked after him, almost stepping on his long train. Joe whisked it out of the way and turned about, so that he, in his turn, almost trod on Tom's train, when there followed five minutes of slow waltzing, each bird apparently trying to tread on the other's finery, and each appearing most anxious to keep his train out of the way. Since then I have seen many peacock duels, and now know that this revolving is a preliminary that must not be dispensed with, being their system of manœuvring for position. The desired position is to the rear. Unlike most gallinaceous birds that wear spurs, the combatants do not face each other, and then fly at one another, but each cock tries

to get *behind* his foe, fly over him and strike him from the rear; likewise each cock tries to prevent his enemy getting to the rear, though very anxious to take him from behind—hence the dizzy performance as the two birds circle around one another.

Poor Joe was at a grave disadvantage. Not only had he been thoroughly upset by a journey, but he was a stranger in a strange place and he did not even want to fight. He had no grievance, was not viewing an aggressor trespassing on his pet preserve, and he had not that feeling of "being in the right" which animates a bird in defence of its territory.

But Tom undoubtedly felt all this, if not more. He had every reason to! What could be more annoying than this invasion of his peaceful privacy? No wonder that he was a walking vision of righteous indignation. No wonder either that Joe did not feel equal to a duel with him. I only marvel he had enough spirit to sustain the preliminaries. But, however that may have been, after a little waltzing Black Joe took advantage of a moment's pause to walk off—Tom walked after him. Joe went this way, so did Tom; the stranger turned, but his follower was close at his heels; Joe broke into a run, and Tom, tightening his feathers (ridiculously like an old lady picking up her skirts), ran too. They ran round the house and back on to the lawn, up the kitchen garden and down it, until their beaks were open and their breath came in panting gasps. Back around the house they came, across the lawn, down the drive, and Joe, flying over the drive gate, disappeared into the mowing-grass. Tom, flying up on to the gate, instead of over it, sat

there and shrieked and shrieked. Where he found the breath for those yells of triumph is another matter, but find it he did.

We watchers were wondering what to do, for we were afraid that poor Joe, driven into the outer wilderness of the meadow, might wander off and get lost. We saw the flash of his gorgeous metallic breast and neck feathers in the long grass, and so did Tom, who stopped his triumphant clamour, fled down from the gate and stalked spitefully through the grass towards the fugitive. It was a case of "move on, please!" Once again the chase was resumed, and round and round, up and down, until both birds were panting with exhaustion, and poor Black Joe was so "done" that he crawled head first into a bush and lay there.

Then we interfered. I chased Tom, again screaming his triumph, and hurried him away from the scene of his victory, while others picked Joe up, carried him back to the house and shut him safely into a shed. We then lured Tom into a loose-box and left him a prisoner therein. Joe was given his liberty and plenty of time to "feel his feet" and make friends with the hens. They were most amiable, and there was a good deal of mutual "kissing", i.e. white-skin pecking. Joe showed no disposition to roam, and all was well until the imprisoned Tom was released.

He came forth in a more aggressive mood than ever (it must be conceded that he had good cause for annoyance) and straightway made for Joseph, who attempted no more defence than he did the first time. In a short while he had taken to his heels and Tom was pursuing him for all he was worth. This time the

chase was longer and sterner, but after some hours it ended, as before, in the bushes, Joe hiding himself beneath the briers. Again Tom had to be shut up, and so it went on for the rest of the summer, it being impossible to get the two to settle down together, peace reigning only when one or other was in prison. But at last the moult came, the General dropped his finery, so did Black Joe, and the two shabby cocks forgave and forgot their differences. The erstwhile enemies, as completely shorn of their long trains as any girl with shingled tresses, met in the most friendly spirit and went out walking together, sometimes alone and sometimes in company with the hens. They were exemplifying what we see in the autumn finch flock, the friendly social spirit coming into play as the breeding-season jealousy wanes.

But while all this had been happening something else had occurred. The Grey Hen had laid a clutch of eggs, from which, after various mishaps, she reared one chick, an insignificant white cockerel, that held little promise of future development; yet had I been able to see into the future, he would certainly have been named "Nemesis" rather than "Young Tom", for it was the former he proved to be as far as his proud sire was concerned. Fondly tended by his mother, this youngster was slowly transformed from a dirty, yellowish-white chick into a speckled cockerel with some greenish feathers down the neck, and from that to a speckly piebald bird that often felt the peacock urge to erect his train, especially at the decoy ducks, an old white bantam, or the raven, despite the fact that his train was as yet merely represented by tail

coverts no longer than those of the hen. All the time, and at every moult, the bird was getting darker, each new feather showed a further increase of pigment, and by the time he was a two-year-old he was quite dark. The autumn two-year-old moult saw young Tom further transformed, but still he was but a juvenile, quite inoffensive, and of no account in old Tom's eyes.

I mentioned that with the arrival of moulting-time Tom and Black Joe dropped their enmity and became good friends. Strife and trouble were things of the past. They walked out and roamed the meadows together, returned to feed side by side, roosted on the same bough of their favourite tree and spent snowy days in mutual misery together, sometimes too depressed to come down from roost. At last spring came, the peafowls looked more cheery—is there any sight more incongruous than the tropic splendour of a peacock in the dirt and slush of an English thaw?—and raised their voices, not in song, but in that far-carrying scream which takes its place. They yelled and yelled, from early morn until late at night, their shrieks echoing far over the country-side, and their companionable strolls were abandoned. Tom began to strut, first at the feeding-places, where the hens were picking up grain, and then upon his old favourite displaying-place, under the fir-tree upon the front lawn.

The same desire had come to Joe, who was seen, with his great fan shimmering about him, standing in the middle of the strawberry bed in the kitchen garden, a spot that he had not been invited to use! Though driven away several times, he returned so persistently

that we gave in and allowed him to strut there. He did not do much harm, as the actual size of the plot of ground upon which he strutted was hardly two yards in diameter. Tom's favourite pitch under the fir-tree was equally circumscribed; and additional displaying-spots subsequently chosen by Joe, one out in the field and the other by the pool in the garden, were no larger. Tom had, as in the previous season, a second strutting-ground in the stackyard, and he often erected his fan near the front door, as Joe did by the stable.

How the principal strutting-places came to be chosen I cannot say, but they were all well sheltered and out of the wind.

So far so good, but trouble soon supervened. Both males were becoming highly excited. Their shrieks and screams were continuous, and Tom would indulge in that laughable run which is characteristic of the breeding-season fever. With feathers held tight and head up he paused for a few moments, when suddenly drawing back his head a little, so that a peculiar bend appeared in his shimmering blue-green neck, he rushed forward and raced madly across the lawn, running like a hare for fifty yards or more, to pull up short on the edge of a "ha-ha" wall and burst into a series of yells, when the hot breath poured from his beak like steam from a kettle.

And trouble was brewing. I was urged to shut up one of the cocks, but refused, saying it would be better for them to fight it out, having a suspicion Joe was in better fighting trim than he had been the previous year—and he was!

One morning the crisis came. The two birds met in

the stableyard, both eyed each other with anger and pugnacity written upon every feather. Tom, ever the aggressor, began to sidle up to Joe, but Joe showed no sign of giving ground, merely stepping sideways so as to get behind Tom, and did it so smartly that Tom had to jump for fear *his train* should be trodden upon. Then they were at it. Sometimes slowly, sometimes faster, sometimes waltzing deliberately round and round, just at walking pace, and then speeding up. Suddenly there was a great flustering of wings, a flashing of a myriad colours, and a moment's breathless confusion. Black Joe had caught Tom off guard for an instant and had flown up from behind, trying to fly over and deal him a blow; but Tom had turned in time to spring aloft, so the two clashed in mid-air, wings and trains spread, and the sunlight dazzling upon the combatants was reflected in every shade of metallic blue and green, bronze and purple. Oh! what colours flashed in that dizzy instant! Next moment the two birds were facing each other, rather ruffled and winded, but not daunted. Again they were at their slow circling, sometimes one seeming to give ground, sometimes the other. Then Tom flew over Joe, right over him, but did not touch him—what an immense bird a peacock looks when in the air with its train streaming behind it—and a little while later saw them clash face to face. Yet so far no real harm had been done. Each had an eyed feather broken, but were personally unscathed. I saw no reason to interfere. At last Joe broke away, and ran off—was this the end? Oh dear, no! He ran around the house with Tom hard at his heels, and back to the spot where they had

"WHAT COLOURS FLASHED IN THAT DIZZY INSTANT!"

begun, when he turned ready to renew the fray. Far from the fight being finished it had barely begun. Hammer and tongs they went at it, for Joe, unlike the previous season, was now fighting as heartily as Tom. He was no longer a newly arrived, much upset bird, not wanting anything in particular, but a peacock with a stake in the country, otherwise a territory to defend, and, what is more, and what counts for much in bird fights, as in other fights, an immense emotion of angry indignation.

As for Tom, animated by similar feelings, he fought well, but as the afternoon waned I began to doubt his victory. They were a well-matched pair, though perhaps Tom was slightly the bigger, but Joe seemed the more active. Tom, however, did not fly up at his enemy so often as hitherto. He panted hard, and when he turned and ran it seemed to me he wanted a respite.

And yet he would not give in; but when the evening shadows began to creep across the barn, a strange sight was seen: two peacocks running as fast as tired legs and want of breath would let them, the leader being Tom, and he running not because he wanted to, but because he had to!

How Joe chased him. He ran him round the house and the farm buildings, over the stackyard gate and away down the meadow. Only then did the victor turn and leave the vanquished, pausing as he strolled back to sit on the gate and scream his triumph.

It was almost dark when Tom crept home and flew swiftly to roost, *not* in the walnut-tree with the other peafowl, but on the roof of the cowshed. Joe had

the tree to himself, and it was many months before Tom ventured back to it.

After this there was no trouble to speak of. Tom had learnt his lesson and kept to his own domain—namely, the front lawn and the stackyard. Joe annexed the lawn by the pond, the kitchen garden and the fold-yard; the stableyard was neutral, though Joe showed off there now and again.

But despite his defeat Tom kept his harem. The hens were faithful to him.

CHAPTER III

"*RACHEL*"

In describing the warfare between Tom and Black Joe, I have skipped the arrival of Rachel, a brown hen (i.e. a typical Indian female) that we received in exchange for a cockerel. Jane, our first hen, had come to an untimely end, being found dead one morning in the stackyard. Her neck was broken, and some tiles had been knocked off the stable-roof, so it was assumed that something had frightened her during the night, that she had flown in panic from the walnut-tree, to blunder against the building and kill herself.

Peafowl are given to these sudden frights, when with frantic screams (quite different to the yells of the breeding-season) they take wing and fly off. Sometimes the reason for the panic is obvious, as when a strange dog appears, or an unknown car drives up. For instance, a motor-lorry came down the drive making a considerable rattle and noise. Young Jenny, who at that time had four chicks, was feeding in the stableyard, but startled by the rattle and din of the Ford, she gave a harsh cry and sprang into the air, her chickens doing the same, and flying in all directions. They scattered to "the four corners of heaven", and it was some time before they reassembled. It was then discovered that the biggest and strongest chick was missing. We searched high and searched low, but nowhere could it be found, and it was still missing when night fell.

My two pet otters, Tom and Madame Moses, were then living in an enclosure fenced by high wire-netting, some five hundred yards from the house and the spot where the peahen and her chicks had taken wing. That night the two otters were not so hungry as usual. Moses, in particular, seemed in no hurry for her evening meal. This rather alarmed me, and I feared she was unwell. My anxiety was needless, the reason of her loss of appetite being only too apparent when I came to examine the enclosure next morning. Brown and grey speckled feathers littered the banks of the pool—Moses, assisted by Tom, had eaten the pea-chick. Flying wildly from the fearsome motor, it had blundered not only into the otters' place, but to its doom.

This considerable digression on the subject of peafowls and panic has led us from Rachel. She duly arrived and was as duly released to join the other peafowl, but we kept a cautious eye upon her, knowing the peafowl tendency to wander, and feeling sure she would try to get home, but she seemed fairly sedate. Young Jenny was not too friendly towards her, but there was no disturbance equal to the fighting between the cocks. She ran after the new-comer once or twice, or walked sideways at her, and Rachel retreated. That was all. The stranger went off down the fields, but was soon brought back, this abortive effort being in a south-eastern direction. When evening came she went to roost with the other peafowl, and we thought all was well, but the next morning she had gone. The rest of the birds had not come down from roost, yet the new-comer had vanished. We hunted for her far

and wide, but it was not until a week later, after her loss had been advertised in a local paper, that the peahen came home under the arm of a man who had caught her in his garden upon the outskirts of a little town three miles due north. He was suitably rewarded and refreshed and the wanderer shut up.

Thinking she would settle down better if she had a friend, we drove Black Joe in to share her imprisonment and kept the two shut up for a week. However, it was the same story as soon as they were let out. Despite a careful watch being kept upon her, Rachel vanished within twenty-four hours of being released. We heard of her at a neighbouring farm, a quarter of a mile to the south, but by the time I got there she had moved on, and then she was reported at a farm four miles as the crow flies—it should be as the peafowl walks!—to the west. Here she had been visiting the stackyard and feeding with the poultry. I hurried to the place, but again she had left, though she had been there at 3.30 the previous afternoon. I returned home declaring I would not bother any further about her, but the next day she was brought back, this time by a keeper, having been captured in a trap set to catch hen pheasants in a wood three miles east of my home, or seven from the spot where she was previously reported. To get to this spot she had had to cross the Severn, here a river of some width. She was returned to durance vile, and kept shut up for a fortnight.

Once more she was set free, and I said, as we let her out, "Wherever she goes I won't bother any more about her." For a day or two she stayed quite contentedly, and we began to congratulate ourselves that

she really had at last settled down—and then she was not there! She vanished before nine o'clock in the morning, and at two o'clock the telephone rang. "Had Miss Pitt lost a peahen? If so, she was at Stockton."

This was a village about three and a half miles to the east. Despite my resolutions I said I would motor over at once, for the bird was undoubtedly the wandering Rachel and I did not like to let her go without a struggle. Going out of the house to get the car, I paused at the sight of a peahen, by herself, strolling up the meadow. It is unusual to see a peafowl alone after the breeding-season is over. Could this be Rachel? It not only could be, but was! Here was the wanderer coming home quite coolly and collectedly! Her jaunt had again taken her across the Severn and over, or through, many big woods, as indeed had her previous trips, which were through a rough and wooded country. She went off once or twice afterwards, yet never so far, and she always came home again, but these later trips had more the character of outings, whereas the earlier ones were obviously serious attempts to find her way home.

She had come from a spot more than a hundred and fifty miles due south, but her wanderings were to all points of the compass, her first serious effort being in the diametrically wrong direction—namely, due north. She certainly showed no vestige of homing instinct; that is to say, great as was her desire to get back, she showed no sign of knowing in which direction to make off. She fully confirmed the conclusion I had come to from the evidence supplied by Old Tom—namely, that whether or no the homing instinct really exists in other

animals the peafowl does not possess it. What it does possess is a great devotion to home and an intense desire to get back when taken away from home, so that it will strive over a period of many weeks to reach the place where it was born and bred.

Though the end of Rachel's career should really form a later chapter in the history of our peafowl, I shall deal with it now, so that the episodes in which she figures may be related together. It might fitly be termed a "Study in Filial Devotion", with the sub-title "A Tragedy of an English Summer"!

The spring of 1927 was late, cold and wet, the summer that followed surpassed even the worst efforts of previous Junes and Julys in its continued wet, cold, dreary days. Now peafowl are natives of India and find such conditions peculiarly trying; however, both the hens, that is, Rachel and Young Jane (the Grey Hen had fallen a victim to a fox), laid eggs early in June, the one upon some straw beneath the barn, where she was quite comfortable, but Rachel chose a site in the shrubbery, beneath a bush, where she was well hidden by nettles and long grass, though exposed to the worst efforts of the elements. It rained and rained, pouring down day after day, and the unfortunate peahen was saturated. When the poor thing came off to feed, which she did with ruffled feathers and much raucous shrieking, after the manner of her kind when broody, she was as wet as the proverbial drowned rat. Yet she stuck to her task, through four long weeks of the worst efforts of the British climate, and, what is more, hatched her five eggs. One chick

was too weak to leave the nest, but the four followed her forth into the world, when she led them with slow and feeble steps into the kitchen garden, for she had paid dear for her devotion to her eggs, and it was obvious she was very ill, too ill indeed to feed, however tempting the food offered her, or do anything but stroll feebly about and pick up bits to give the chicks. She ate nothing herself. All efforts to save her failed. She lingered on for a fortnight, during which time two more chicks joined the great majority, really from want of the insects on which the old hen would have fed them had she been able to walk about and find such fare. The survivors were strong chicks, and it was pathetic to see them cuddling to their dying mother, pecking her closing eyes, and chirping to her in their endeavour to get her to take notice and give them dainties.

We had feared for some time that there was no hope, suspecting that she was suffering from coccidiosis. She had no doubt contracted the disease while sitting when her vitality was lowered by the cold and wet and her system especially liable to infection. At any rate she died, and I found the two chicks sitting on her limp body, cheeping because she did not get up and let them creep under her.

The end had for some days been inevitable, and spurred by the recollection of Sir J. Arthur Thomson's story of the cow and her calf, I determined to try to save the chicks. The episode I am referring to is that in which a cow lost her calf. It died, to the grief of the mother, who would not give any milk, despite the utmost efforts of the cowman. She did nothing but fret and moo for the dead calf. However, her owner

(1) "THE POOR REMNANT THAT HAD ONCE BEEN RACHEL"

(2) THE CHICKS "CONTINUED TO BEHAVE AS IF THE MISERABLE REMNANT . . . WAS THEIR LIVE MOTHER"

DARBY AND JOAN

had an inspiration: he skinned the dead calf, put the skin over a frame and stuffed it with hay, after which he placed the dummy before the cow. She exhibited every sign of pleasure and satisfaction and began to lick it. There was no further trouble as regards milking her. Day after day, when milking-time came, the dummy calf was brought forth and placed before the cow, when she licked it as if it was alive. At last this continuous licking began to have an unlooked-for effect. She was licking a hole through the hide. She went on licking and came to the hay, *which she ate!*

This history is vouched for by Sir Arthur Thomson and is no leg-pulling yarn; it was with it in mind that I skinned the peahen and stuffed her as well as I could in my hurry to get the job done. It was not a very lifelike effort, and despite a wire up the neck the head had a tendency to fall over; however, it was the best that could be done under the circumstances, and I took the dummy to the shed wherein the two chicks were shut up. I arranged it on some straw in a corner, where Rachel had been accustomed to brood her family, setting it up as naturally as possible. Not that that was natural; in fact, the poor cotton-wool-stuffed remnant was a most extraordinary object, with a drunken, rakish air and little likeness to the deceased peahen—yet it satisfied the chicks. They ran straight to it, jumped on its back, and made little peeping sounds as they pecked gently at the lop-sided, drunken head. It was all right—this was mother! They began to preen their growing wing feathers—by the way, Rachel had lingered so long that they were now nearly three weeks old—and showed every sign of

happiness and contentment. I gave them some food, hard-boiled egg and bread-crumbs, but having picked up what they wanted they hurried back to mother, in the corner, making little contented sounds, just as they had done when she was alive. I could detect no difference between their behaviour to her alive, dead, or as a stuffed dummy, but oh! how distressed they had been when I took her away, "peeping" most plaintively, refusing to look at food, and wandering up and down the shed. But the moment the dummy was returned all was well, everything was right, and the chicks' mien showed clearly that they felt their mother had come back.

As evening approached, the chicks cuddled closer to what was really nothing more than a feather quilt, for they were anxious to get beneath her wings for the night. I raised the dummy, so that there was space beneath it, and one chick crept under, but No. 2 could not arrange itself as it wanted to, and got very peevish. It squeaked impatiently, pecked mother's head quite hard and then tried again, at last creeping beneath her neck ruffle and cuddling up to her.

In the morning the chicks came out from beneath their "eiderdown" looking bright, sharp and well. They fed excellently, and when some ants' "eggs" were obtained, stuffed themselves until their crops bulged. From now on they were fed chiefly on cheese and ants' "eggs", a little soft dog-biscuit, bread-crumbs, and, later, grain being taken when they could not get cheese, of which they were exceedingly fond. I knew a difficult task was ahead, for apart from the fact that peafowl are extremely delicate and that peachicks are

especially difficult to rear by hand, there was the danger of infection with coccidiosis. We had lost all our chicks the previous season from it, but I hoped that, given fine weather and good feeding, they might be tided over the most dangerous period. During their early growing stages the least lowering of vitality, such as arising from a chill, means immediate contraction of the disease. However, I resolved to look after Darby and Joan, as they were named, so carefully that they should have no excuse for catching chills, "grouse disease" or anything else.

Their names were unfortunate, in so much as it soon became apparent that Joan was a cockerel, but this is anticipating matters a little and some description of the chicks' behaviour with their dummy mother is first necessary. Their devotion was amazing and amusing, not to say pathetic. Under normal circumstances the two would have been roaming the fields, for peahens, in their search for insects, take their offspring for long walks. On a fine day they start off as soon as they descend from roost, and are often not seen again until late in the afternoon, when they come to the door for food.

But Darby and Joan, despite the fact they had complete liberty to do as they pleased and go where they liked, never strayed far from the shed and their mother who stayed so still and quiet in the corner. Did they ever wonder about her? Did any questions concerning her ever pass through their limited minds? It is impossible to say; I can only state the fact that they would not leave her for long. They might stroll out to pick green food from the flower-bed by the shed

door or catch flies on the lawn, or they might run round to the backyard, and even, later on, make an expedition up the kitchen garden, but they did not stay away very long, and if anything startled them they ran back as hard as they could go, putting up their neck ruffles, stretching out their necks, and sprinting for dear life.

After an outing like this they usually rested for a while, sitting side by side upon the top of the poor remnant which had once been Rachel. It was now less like a peahen than ever, having become much flattened and more unnatural-looking. The head lay to one side, with beak open, and, horrid fact, the bluebottle flies buzzed suggestively around. The skinning, done so hurriedly, had been badly done, and parts of the dummy were putrefying. The flies came in scores, to the satisfaction of the chicks, who sat on the flattened-out skin and picked them off as quickly as they alighted. But even this horror did not affect the attachment of the young birds, both of which continued to behave as if the miserable remnant, now more a miserable remnant than ever, was their live mother.

That they distinguished her from other peahens, and had done so all along, was shown by the way they ran from Young Jenny, though the latter was so like their mother that it had always taken me a minute or two's careful scrutiny to be sure which was which. But the peachicks would not go near Jenny. There was good reason for this, for she had had misfortune with her eggs, and in consequence had no chicks. At first she was well-behaved towards Darby and Joan, and we

had some hope she might, they being willing, adopt them, but they were not willing, and she became desperately spiteful where they were concerned, never losing an opportunity to peck and ill-treat them. She nearly killed Darby, but after that the two gave her a wide berth.

What emotions really caused her bad behaviour it is difficult for a mere human mind to penetrate, but it *looked* just as if frustrated love had turned to hate, and, after all, I do not know that the explanation is so unreasonable.

The days and weeks passed, Darby and Joan growing and doing as well as peachicks brought up in a normal manner. Still they clung devotedly to the horrid mummy on the straw in the corner of the shed, sleeping under or upon it at night, and even spending part of the day beside it, peeping and cheeping to the shrunken brown head and treating it in every way as "Mother". It was now too mummified to interest the flies, it was flattened as flat as the proverbial pancake, and adorned with the young birds' droppings. "Loathsome" fails to express its appearance! But the chicks were satisfied.

They now showed symptoms of wishing to go to roost, so "Mother" had to go aloft, upon an old bench, where the chicks followed her with every appearance of delight, but they had to sit upon her, and in the twilight I saw them cuddled there, sitting side by side on what had once been her back, making little confidential sounds, and pecking with gentle kiss-like pecks the silly, open-beaked head that swung to and fro.

And so things went on, Darby and Joan growing

rapidly and doing remarkably well, as, indeed, they had reason to, seeing the quantity of ants' "eggs" (ants, their larvæ and cocoons) they consumed, to say nothing of cheese and other dainties. By the middle of September they were more than half-grown and were moulting into the dark, speckled plumage that marks the next stage in the life-history of the peafowl. It is a critical time, and the growing chicks are then especially susceptible to disease; however, these two were so well and happy that I had no uneasiness concerning them. To see them stand on tip-toe, stretch and flap their wings, spring up in the air and, descending, run after one another, was to have no doubts as to their health and joyousness. Then one morning Joan (who should have been John!) stayed up at roost beside the mummy hen instead of flying down with Darby. He seemed listless, and when he did descend had little appetite. Four days later he was dead, and when his carcase was submitted to expert examination, the report, as expected, was infection by *Eimeria avium*, or coccidiosis.

The two chicks had been inseparable, and had gone everywhere and done everything together, so that I was almost as much distressed for the sake of the survivor as I was at the loss of Joan, but Darby showed little sign of grief or disturbance. He walked round the garden calling for his brother, but when the latter did not come he returned to Rachel, or, rather, her worn and tattered remains, flew up beside them and began to preen his feathers in a perfectly contented and businesslike manner. Of course, the bird may have been deeply grieved, but his behaviour did not show it. He seemed at first to miss the companionship of the

second peachick, but the exceedingly worn and disreputable skin that once was his mother seemed to satisfy his craving for something to cling to. Far from fretting, or pining away, Darby continued to flourish, and my hopes rose high that I should at any rate rear him. By the first days of October he was a big bird, quite two-thirds grown, with a glossy green neck to denote his sex. Then he suddenly began to ail, refusing the food he had before sought so eagerly and greedily. The same fell disease had him in its grip. It would have been wiser, of course, to have destroyed him at once, but I had not the heart to do it. He made a better fight for life than the other chick, but it was no use, he only lingered on to succumb in the end, but to the very end he clung to the pitiful remains of the old bird, and the last night he made a feeble effort, flapped and fluttered on to the perch, to creep up to her and sit down on the now featherless back that once had been his living mother. They were buried together in the morning.

CHAPTER IV

TEMPERAMENT, TEMPER AND FIGHTING

Reference has been made to Jenny's spiteful conduct towards Darby and Joan, so I must mention that neither she nor the peacocks nor previous hens were spiteful towards other creatures under normal conditions. The popular idea is that peafowl are apt to attack poultry, especially young chickens. Under certain circumstances they may do so, but it is exceptional; usually they are as good-natured as any other birds. The cocks always take a great interest in young things, especially chickens and ducklings. A coop containing a hen and chickens draws them like a magnet and they peep and poke and gaze earnestly at the little fluffy things, but I have never known them to do any harm. They are a nuisance, however, for a big bird peeping in alarms the hen, who flusters about and probably treads on the chicks; hence the peacocks are usually driven off and sent about their business. Prior to nesting the peahens are equally inquisitive about young things, also quite as good-natured towards them. It is only when something has soured their temper that their attitude changes. After Jenny had lost her second lot of eggs in the summer of 1927, she became a perfect vixen. Not only did she pursue the unfortunate Darby and Joan and any ordinary chickens that came near, but pecked ducks, hens, cats and dogs. "Croo, croo!" she said softly, uttering a little growl quite different from ordinary peafowl con-

(1) "YOUNG TOM WAS A FINER SPECIMEN THAN EITHER OF THE OLD COCKS"

(2) "THE BATTLE WAXED FASTER AND MORE FURIOUS"

versation, at the same time stepping stealthily sideways and forwards towards her intended victim, suddenly making a dash at it and giving it a shrewd peck that usually sent it running off in a hasty retreat. It appeared as if she had a grievance against the world and meant to vent it.

Prior to this she had had a vendetta with an old terrier. The dog had annoyed her by annexing some food she was about to take (I was feeding the dogs, the peafowl and the tame raven with soaked dog-biscuit), and for months afterwards she made for him whenever she saw him, pecking him so viciously that at last he bolted to his kennel when he saw her coming. He tried to defend himself, but when he snapped at her she merely flew over him and alighted out of reach, so there was nothing left for it but an ignominious retreat. She also had a feud with the house cat, arising from the same cause, and again I had the luck to witness the beginning of the trouble. Here is the account I gave of it in *Animal Mind* (p. 70): "The cat came up and tried to snatch a piece" of meat. "The peahen stepped sideways towards her—a sure sign the bird meant mischief—but the cat did not give ground. A moment later, however, she was fleeing, having had a shrewd peck on the nose. Since then, and at times when there is food about, I have repeatedly seen that same peahen stalking the cat, sidling up to her, to give her a peck, or else fly over her. The cat now bolts whenever she sees the peahen coming towards her. Previous to the food-stealing episode they had been quite indifferent to each other."

The cocks are not so ready to take offence or wage

war upon offenders, but they will not stand any nonsense. There was a cheeky and aggressive young Wyandotte cock that one day affronted old Tom. The peacock was feeding peacefully upon a rick beneath the Dutch barn when the fowl flew up, stood in front of him, put his heckles up, and sparred at the peacock. Tom regarded the impudent young cock quite quietly for a moment, when his head shot out in the lightning lunge of the peafowl, and he seized the cock by the neck. His wings came down heavily on the struggling Wyandotte's body and it was only when impudence had been thoroughly punished that he let him go.

Thus we see the peafowl as a normally good-natured bird, but one with a long memory for a grievance, and a vindictive temper under some circumstances, as when a hen has been deprived of her eggs.

It is interesting to speculate as to her feelings and emotions under the latter conditions. Does she think of, regret and grieve for, the eggs that have gone, or does their absence merely leave her with an unanalysed sense of blankness and an angry, thwarted feeling, to be vented on anything feeble and weak, or at any rate weaker than she and unable to retaliate? How difficult such speculations are—we can only say for certain that a peahen deprived of eggs or chicks is a soured and spiteful bird.

But a peacock without territory is also liable to be bad-tempered, as was apparent in the case of the young cock.

Young Tom's fourth spring arrived, to find him a magnificent adult black-shouldered peacock. The transformation had been gradual, spread over three

years, but was none the less complete. It was hard to believe that this was the same individual as the insignificant white chick that had followed the Grey Hen about. Some authorities, as has been mentioned, say that the dark peafowl is a somewhat smaller bird than the typical form, but Young Tom was a finer specimen than either of the old cocks, and when he erected his train he was a truly wonderful sight, with that halo of iridescent eyes gleaming around him, not a feather out of place, not an eye wrong in the symmetrical pattern of the gorgeous fan.

But he was in a difficult position, for he was without territory or strutting-place, and when he wanted to show off he had to do it in some retired corner, with merely wild ducks or barnyard hens as an audience. This certainly affected his temper. He was not so definitely bad-tempered as young Jane when she lost her eggs, but he pecked pettishly at ducks and fowls feeding near him. Was he nerving himself for the great deed, was it rebellion swelling within him?

It seemed like it, for the day came when he did rebel. He strolled round to the front door, where the peafowl generally found food awaiting them. Tom Senior was already there and in a jealous mood. He moved towards his son, stepping somewhat sideways and crab-like, and according to precedent Young Tom should have walked away, when Papa would have walked after him, and the former breaking into a run, the old bird would have run his son as hard as his corns permitted him. But what really happened was quite different: no doubt surprisingly different for Tom. Young Tom did *not* retreat, he did not even give ground. Instead he

advanced towards his sire, trying, peacock fashion, to get behind him and tread on his train. A moment later they were revolving in the slow waltz of fighting peafowl, Old Tom going round and round, not because he wanted to, but because he had to if he was to avoid Young Tom getting behind him and flying over him. Old Tom, as has been hinted, suffered from corns that made him very lame, but it was astonishing how he forgot them now. The battle waxed faster and more furious. They began to fly up in the air at each other, and it was obvious that this was no passing sparring match, but a serious affair, one of those battles that have to be fought to a finish, and I knew that if I interfered and separated the combatants they would begin again at the first opportunity.

On the whole, like all peafowl duels, it was a slow affair: for five and ten minutes at a time they only paced round and round; but when a clash came it was a dazzling display. So the fight went on, through a long afternoon, and Old Tom, far from trouncing his insubordinate son, began to show signs of weakening. He was panting, open-beaked, and several of his long feathers were bent and broken. Young Tom also bore signs of conflict; he too had a couple of his train feathers broken, and was bleeding slightly on his left leg, but he was full of fight. Once or twice he turned and ran, but it seemed only a strategic retirement, for he turned about and recommenced the fray, more determinedly and in better trim than ever. Next time it was Old Tom who ran, and seeing it, I said, "The old bird is beaten." He was! He turned once more upon Young Tom, but it was his last stand, and then he ran

because he had to. Tom Junior did not spare his sire; he ran him hard and he ran him far, taking him at last away through the stackyard and off towards the wood.

Then Young Tom came back to sit on the gate of the stableyard and shriek and shriek. Old Tom came sneaking quietly home behind him, very stiff and sore, to retire to roost without any shouting or shrieking or triumphant noise.

From that time forward Old Tom let his son alone, keeping to his own strutting-grounds and not interfering with Young Tom. The latter had a lesser affray with Black Joe, after which Joseph also accepted the changed status of Young Tom, and there was practically no more trouble. The three cocks were now established, each in his own territory, and all was well; but, so far as I could see, the hens remained faithful to Old Tom, now lame and elderly, and by no means so magnificent as the gorgeous Young Tom. Yet it was the old cock to whom they attached themselves and with whom they always consorted. In fact, their latter behaviour confirmed my belief that peafowl, though polygamous, are not promiscuous, the hens being faithful to their mates, and only turning to other cocks when fate parts them irrevocably. All this, I am only too well aware, does not fit in with the theory of the evolution of the peacock's train through sexual selection—if the females always attached themselves to the finest male they would not have remained faithful to Old Tom when he became third-best cock, and lame at that!—but then many facts in nature refuse to square with accepted theories, and it will not help us to reach the truth to wilfully shut our eyes to these facts.

PART III

FOUR DOMESTIC BEASTS

CHAPTER I

THE HORSE AND ITS BEHAVIOUR UNDER NATURAL CONDITIONS

In *Animal Mind* I devoted a short chapter to the horse, describing it as an animal whose abilities were usually overrated, it being of a somewhat low type of mentality compared with many other creatures. I pointed out that this popular misconception was due to several factors, one being the long domestication of the horse and its association with man in myth, legend and heroic story, owing to which the so-called noble beast has become invested with a romantic glamour, so that its most ordinary performances have been seen in a false light and its behaviour ascribed to springs of action which would be far-fetched in the hero of a sentimental novel. Then there is the fact we have a tendency to think well of any creature with which we are associated—"our animals" must be superior to "wild animals". Beside which many persons are obsessed with the idea that animals, especially wild ones, are little more than automatons, so when they find a horse showing signs of intelligence they immediately jump to the opposite extreme and attribute to it an almost human understanding, considering it

a mightily superior creature. It must not be forgotten in this connection that when you are in intimate association with any animal you are especially favourably placed to note its displays of understanding and intelligence, and that as the horse is, next to the dog, the animal most frequently the companion of man, man sees more of such intelligence as it has, than he does of that of other animals. Moreover, the persons in a position to note such displays are not usually students of comparative psychology, nor even intimately acquainted with many other animals, so it is no matter for surprise that they attribute too much to such manifestations of intelligence as are displayed by the horse.

All this was referred to in *Animal Mind*, bringing down on my head the anger of many lovers of the "noble animal", who rose in their wrath and smote me; being, however, unrepentant, and only desirous of disentangling truth from fairy-tales, I return to the subject, with the intention of dealing with it more fully and at greater length, regarding the problem of the mentality of the horse from different standpoints, and, I hope, throwing some illumination on the dark recesses of that dim mysterious intellect with which our mind has so little in common.

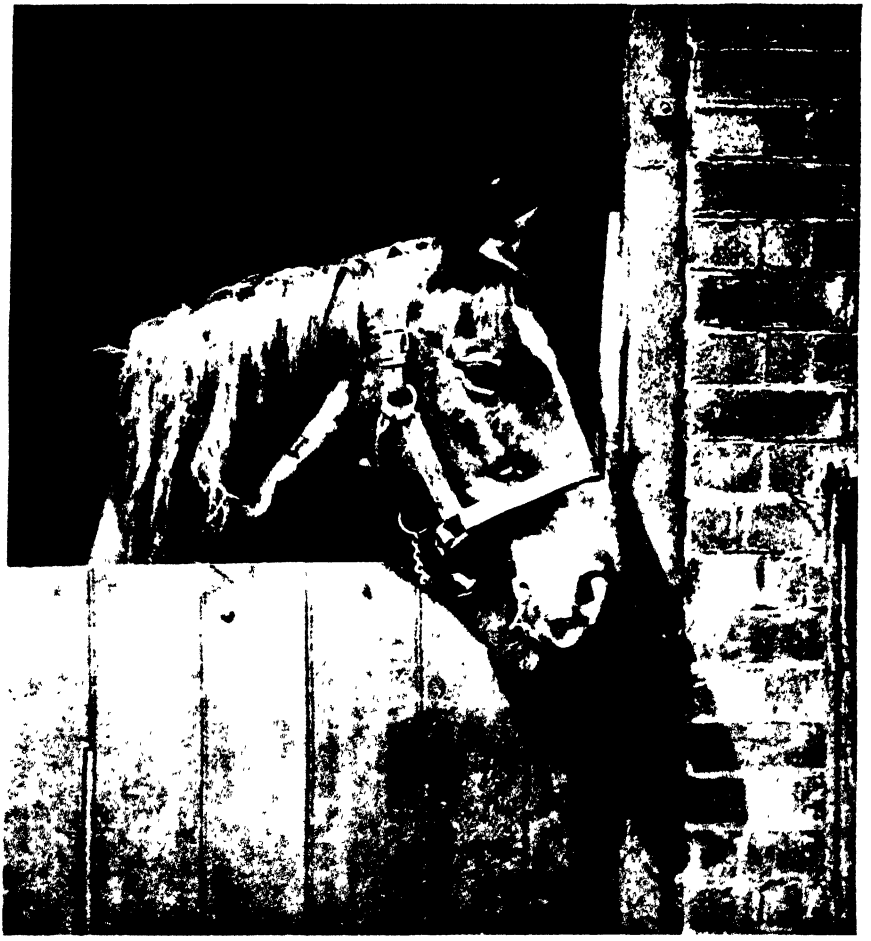
Let us take first the natural life of the horse; I mean what it does, how it occupies its time, and how it behaves when free from the compelling influence of man; for it is in the natural uncramped actions of free horses that we may expect to find clues to the real likes, dislikes, preferences and *mind* of the horse.

In the British Isles the only approach to natural

horses are the semi-feral ponies that roam Dartmoor, Exmoor, the New Forest, the Welsh hills, and other wild places. But in many parts of the world, such as the plains of South America, there are large numbers of feral horses; however, there is little difference between the behaviour of the horses of the Australian bush, the American pampas, and the ponies of an English moorland. Let us consider for a moment the salient facts of their habitual conduct—they are essentially social animals, assembling in small herds, consisting of a stallion and a number of mares accompanied by their offspring. The size of the herd depends on the ability of the stallion to gather and retain the mares, a vigorous stallion collecting a considerable harem, while a young one may only be able to keep two or three mares. Under stress of circumstances, such as want of food or water, these small herds may amalgamate into one large one, and the entire company travel to a district where the drought is not so severe. In writing the latter sentence, I have in mind the horses of the South American pampas and New South Wales bush country, but the same thing may be seen in a round-up of the Welsh hill ponies or Dartmoor ponies, when force of circumstances, i.e. driving the ponies, compels the groups to coalesce into a drove. But as soon as the pressure is relaxed, whether that of the drovers or the need to travel to food and water, the concourse dissolves into its units, i.e. the herd groups.

We may state it thus: the horse is a herd animal with a strong social impulse, its social system being that of the lordship of a strong male over a number of females and such immature males as are attached to

WELSH HILL PONIES AT HOME



"DOES ITS BEHAVIOUR IN ANY WAY BETOKEN AN ACTIVE AND ENQUIRING BRAIN?"

the latter. The colts are soon expelled by the dominant stallion, who will not tolerate any rival within the harem, but their desire for company is very strong, and they hang about the fringe of the society or seek solace in each other's company until such time as they can secure mares for themselves.

Each herd keeps apart from the others and has its home territory, and it is rare for any trouble to occur, though now and again the stallions do fight. I once saw a fight between two ponies on the Church Stretton Hills. These hills lie in western Shropshire, that portion of the English border abutting on Wales, which in recent historical times was termed the Welsh Marches, and embraces a largish area of more or less barren land only suitable for sheep and ponies. A considerable number of the latter are turned out upon the hills, where they lead a semi-feral existence under practically natural, if severe, conditions. They go their own way, save for the periodical "round-ups", and flourish amazingly, considering the inhospitable nature of the terrain.

I was upon these hills one day, lying beneath the shelter of a boulder, watching the play of sunshine upon the grey and brown of the mountain-side, on the grey, roan, chestnut and bay coats of a troop of grazing ponies that were advancing in scattered formation down the hill, and on the far-off hazy, purple plain of central Shropshire, when one pony, a grey, left the herd, and with a shrill whining advanced, head up and ears pricked, towards some rocks. It was the stallion, and a handsome little fellow, too. For a moment I could not see the cause of his excitement,

and then some more ponies appeared from between the rocks, consisting of several mares and foals and a bay stallion. The new-comer advanced towards the grey; their ears went back, they skirmished around each other, reared, struck at one another, wheeled about, kicked, rushed in again, tried to bite, parted with a flourish of heels, rushed upon one another once more, met with simultaneous rears and striking fore-feet, and for five minutes or more fought on with a hearty good will, biting and striking like fiends. Yet the mares paid little attention, grazing placidly in seeming indifference to the antics of their lords and masters. Suddenly, however, the little bay horse turned away from the combat, and with a flourish of his heels and a toss of his head bolted down the hillside, followed for a short distance by the grey stallion, but the latter quickly gave up the chase, turning back to his harem, while the bay, followed by his troop of mares, clattered off at a brisk trot up a stony path.

The impression I derived from the scene was that a trespasser had been repulsed, the bay pony and his troop having wandered on to a part of the hill the grey regarded as his own.

Well, we have now got a picture of the natural horse as a social creature living in troops upon localised areas it regards as its territory, but we have not yet considered how it passes its time when free to do exactly as it pleases, nor in what lies its pleasure and perfect enjoyment. By the way, I am using the word "enjoyment" in its usual and popularly accepted sense, to convey to the reader what may be termed "pleasurable experiencing", and not in the sense that it is employed

by certain writers on psychological subjects, who use "enjoy" and its derivatives to signify experience both pleasurable *and the reverse*—I am using "enjoy" to signify pleasure obtained from that which is experienced.

Now what does the free horse enjoy, and how does it pass its time? In warm sunny weather it feeds in the early day, grazing steadily for some hours, until satisfied, when the troop either seeks shade or a breezy point, where the company stands in a group, in what one of the most brilliant of sporting writers has termed the "monumental idleness" of the horse.[1] Here they rest for several hours, standing often head to tail, so that the restless fly-whisking tail of one, swaying to and fro, brushes its own flanks, and brushes likewise the nose of its comrade. As the sun sinks and the air cools they begin to graze again, continuing to do so until satisfied, a business that takes considerable time. Their needs attended to, the younger members of the troop may indulge in a little play, mock fighting, biting, rearing, striking and kicking, but with the deepening twilight they all seek rest, lying down or going to sleep in a standing position.

Such is a typical summer day in the life of a horse free to please itself as to where it shall go and what it shall do. Winter days are spent in a somewhat similar fashion, but as there are now no worrying flies, and grass is scarce, a horse spends more time in grazing. Severe storms make it pause in its everlasting biting and nibbling, when it seeks the lee of a hillside, a sheltering rock, a high fence, or some trees, turns its tail to the blast, and with drooping head waits for the

[1] E. Œ. Somerville in *Dan Russel, the Fox.*

weather to improve. Horses do not mind dry cold weather, but wind and rain are another matter.

If a horse was gifted with a mind of the human type, and the power of forming mental images unconnected with recent happenings, can we doubt it would picture its paradise as a plain clothed with sweet grasses, with a warm sun for ever shining, a temperate breeze to waft away the flies, and nought to do but graze and rest? Because, left to itself, a horse does little else, and such appears to be the acme of its enjoyment.

But at this point the reader may object that we are dealing with semi-domesticated horses, and that truly wild horses would surely show more energy and desire for action. Well, the only truly wild horses in the world without admixture of domestic blood (the "wild" horses of America and Australia are, of course, all descended from escaped domestic horses) are those donkey-like ponies found in Central Asia, commonly called the tarpan, and in particular the ponies from the borders of the Gobi Desert to which the name *Equus przevalskii* has been given. These dun-coloured, big-headed horses, with their upstanding manes, are all small of stature, and of hardy nature, having, as regards appearance, little in common with the horses of domestic breeds, yet their habits seem to be similar.

Various explorers have related that they are found in troops upon the wide open plains, each troop consisting of a company of mares headed by a stallion, but that these troops will sometimes combine into a large herd. We are also told that the old stallions expel the colts from the herd as they reach maturity, and these young stallions hang upon the fringe of the troop until

such time as they can secure mares for themselves. Furthermore, we learn that these horses spend their time grazing, often in lines, upon the plain, usually with their heads to windward, and are ready to take fright and gallop off at the least alarm.[1]

Now whether Przewalski's horse is in fact the ancestor of our domestic horse, whether *E. caballus* and *E. przevalskii* are descended from a common ancestor, or whether they are not very closely connected after all, is a matter upon which I do not propose to enter; all I wish to point out here being that in these wild ponies from the borders of the Gobi Desert we have a member of the genus *Equus* in its natural state, with its inherited aptitudes and instincts, to say nothing of its predilections, unaffected by the influence of man, either through breeding and selection or actual education. And what do we find? That their social system and their way of life is so similar to that of feral and domestic horses when they can do as they like, that we cannot doubt that their likes, dislikes and desires, otherwise their pleasures, are the same in both cases. It seems that the only important respect in which the domestic horse differs mentally from its Mongolian relative is in the absence of timidity, which bolder disposition is probably due to selection and individual education combined.

If we turn from the Mongolian horse, from the Welsh hill pony or the English moorland pony, the latter going its hardy and more or less natural way, to the hunter turned out to grass for the summer, do

[1] R. Lydekker, *The Horse and its Relatives*, ch. ii, "The Wild Tarpan and its Relations".

we find any greater evidence of intellectual development or the display of more ambitions—has such a horse any wish to do more than graze and enjoy itself in the sunshine? Does its behaviour in any way betoken an active and inquiring brain?

Before considering this we must turn back for a moment to the horse roaming moor or plain under natural conditions and consider again its social system. It will be remembered that this was the primitive one of the polygamous herd, in which a male gathers a company of females and keeps them just so long as he can, and in which there is no particular allegiance of the females to their lord and master, they being rather his property than his mates, and there is nothing approaching family life or the formation of either a matriarchal or patriarchal clan. The mare displays considerable affection for her foal as long as it is being suckled, but loses interest in it as soon as it is weaned, and as for the stallion, he only notices the younger generation when colt foals grow up and reach such an age they may become rivals—then his interest is of the inimical and not the fond parental description!

This digression was necessary, before going into the life of horses turned out in meadows, that we might realise to what extent, if any, the absence of the natural social system was upsetting the behaviour of the animals and affecting their mentality. It has been seen that the equine herd system is a simple one, depending on two factors—a gregarious impulse and the dominance of a stallion. Now under domestication the latter is usually absent. I do not think, however,

that the absence of a dominant herd leader makes any difference, nor that the animals lapse into more slothful ease, or are spurred to great exertions by this deficiency in their natural group system.

The companies of horses we are generally able to observe are mixed parties of mares and geldings, the emasculated males differing little in behaviour from the females, save that they are somewhat more placid and easygoing. Now the question is, whatever these animals may be in their workaday life, whether they have been trained as hunters, chargers, polo ponies, carriage horses or cart horses, how do they choose to pass their time?

They occupy themselves in grazing, resting quietly in a sheltered, shady spot or an open, breezy one (according to the weather), seeking water and occasionally indulging in a little play. That is all they attempt to do, save on the rare occasions when something rouses them, an unexpected sight or sound sending them galloping in panic or pleased excitement, such as a traction engine in the former case or the passing of a pack of hounds and attendant horsemen in the latter. Their pleasure appears to lie in idleness, in standing and flicking their tails in the sun or seeking shelter from the flies in a shady place—given ease, food, water and companionship, horses are perfectly contented. A solitary horse, however, even if possessed of the first three ingredients of an equine paradise, is *not* happy. A herd animal by heredity, he finds keen satisfaction in the society of his fellows and is uncomfortable alone. The horse's strongest impulse is to be with and go with his friends. When one horse moves

off the others soon follow it. When a leaf fluttering down from a tree causes one horse to snort, jump aside and gallop off, the rest immediately canter after it. So strong is this desire to be with others of his kind that a horse turned out in a field without companions of any description is restless and ill at ease, and does his best to get out and find comrades. But he may find consolation in the society of cattle, sheep and even goats. So great is the horse's need of companionship that it affects the health of the animal. Many a trainer of thoroughbreds has taken pains to provide some especially valuable racehorse with a stable-mate.

This craving for companionship is so strong that a horse which has been ill-used by its fellows will still seek their society. I have known cases where a mare that had been kicked and bitten by the other mares still sought their company.

A group of horses are seldom friendly towards strangers, usually greeting a new-comer with snorts, nose sniffing, squeals, striking and kicking; but these demonstrations soon pass off, and the stranger is received into the little community. Occasionally, as in many animal societies, a poor-spirited individual is badly treated by the others, and sometimes you meet with bullies that appear to delight in punishing the weaker or more easygoing horses. I remember a cart mare that made a practice of getting her fellow-horses into a corner of the field and there kicking them.

Thus we find the domestic horse enjoying its ease, like its semi-feral relatives and its wild cousin, an animal of few desires and but two or three primitive emotions. Highly-strung in the sense of being easily

"ENJOYING THEIR LAST"

aroused to fear or excitement, both no doubt valuable attributes in its wild state, when the ability to take quick alarm and flee swiftly must have often been of survival value, but showing little evidence of an inquiring disposition or any of those attributes that indicate an animal which is dependent on its wits for a living.

CHAPTER II

THE HORSE AS A DOCILE SLAVE

Now let us turn to the horse as we know it best, in its capacity as a most useful servant of man, serving him in agriculture in the shape of the heavily-built farm horse, in military operations as charger and artillery horse (though nearly obsolete in the latter capacity), in civil affairs as carriage and riding horse, and in pleasure as the hunter, polo pony and, last but not least, the racehorse. In all these and many other ways the horse works with rarely failing docility, putting forth his energies in such divergent tasks as pulling heavy weights, the swift scamper of a five-furlong flat-race, the four and a half miles of a Grand National Steeplechase, with its many formidable jumps, show-jumping over obstacles that will fall flat if touched, the hunting-field, with its galloping and jumping over all sorts of fences, the performance of circus tricks and, last but not least, the type of exercises known as "haute école", etc.

This is merely giving a vague indication of the varied tasks which horses of different types, from the heavy farm horse to the lightly-built thoroughbred, may be set to perform, and, what is more, do perform. The reader will be able to add a hundred and one more examples of work done by horses, such as the performances of those ridden by the gauchos of South America when rounding up cattle, or the little Shetland pony trained to carry children. Wherever and in whatever way we find horses used we find two things:

first, that the animals are carrying out their tasks because they have got to, because they are compelled (that the compulsion is usually mildly applied is neither here nor there); and, secondly, that if they could please themselves they would not, with one or two exceptions, go on with their job. The old saying is that "the exception proves the rule", and the exceptions I allude to are those of the hunter and the thoroughbred used in flat-racing, which shall be fully dealt with later. No, the rule is that a horse works because its master makes it, hence the description of it as a slave of mankind is a simple statement of fact. I have been upbraided for using this term, with its unpleasant savour and associations, in connection with a creature so much loved and admired as the horse, but as the horse is bought, sold, compelled to work whether it will or no, and is, more often than not, slaughtered in its old age, I cannot see that any other word accurately describes its state of life. A slave it is, sometimes willing, sometimes unwilling, more often a merely passively enduring one. Compare its conditions of existence with those of the dog, compare the manner in which it performs its tasks, and can you find in its behaviour anything analogous to the joyous co-operation of the latter, whether the dog be merely going out for a walk with its master or assisting him in a rat-hunt?

With the two exceptions referred to above, the racehorse and the hunter galloping after hounds, can you find any task in which a horse is a really willing co-operator, and with which it would go on were the *pressure of long training* and the presence of its rider or

driver eliminated? Most of the activities to which our horses are put are unnatural, and therefore, like all acquirements, an effort to the performer. It is natural for a dog to hunt, but it is not natural for a horse to draw heavy weights or any weight at all, nor to carry anything on its back. The horse is not even a natural jumper. It is a plain-dweller and has no inherent aptitude to leap over obstacles. Jumpers are made, not born, and made by schooling; some horses take less schooling than others, and some never learn to jump well, but not even the most accomplished product of some fine horseman's long training can be said to really "jump like a deer", an animal that *is* a natural jumper and will leap over anything on very slight provocation.

I was recently watching the jumping competition at a show of the Royal Agricultural Society of England, there being some thirty competitors in the class, all "old hands", as one of the spectators expressed it. I am certain that not a horse brought into that ring would have jumped a single obstacle had he not been compelled to by his rider. Many refused the first one, some plain rails; and all were put at the fences by their riders in a way that showed that they had to be made to take them. From the horse's point of view it must have been a perfectly senseless piece of work. To come into a great ring on a hot summer afternoon, surrounded by large numbers of people, and all by itself be taken up to a fairly high jump, without even the presence of a second horse to add fun to the business, and then expected to jump, must, to that horse, have been incomprehensibly stupid. If it could understand

that, unlike the fences it was practised over at home, these could be hit with impunity, as they would fall flat, the futility of the proceeding would be heightened.

Then take a polo pony's work. What joy can a horse derive from being ridden hard after a ball, pulled up short, turned and twisted about?—to it, with no comprehension of the game, the whole thing must be just unmeaning, senseless exertion.

Or take a farm horse's day at the plough or other agricultural implement, dull, wearying toil, without any meaning for the worker. What understanding can the farm horse have of the need to turn over the soil, or that its long trudging to and fro will result in good crops next year?

But when we come to the thoroughbred horse employed in racing the matter is different. We know that the natural horse enjoys galloping in company, and as long as he is not unduly "pushed" we may believe the racehorse does likewise. The quivering excitement of horses lined up at the starting-post, even their "freshness" on their way to the post, may be cited as evidence of joyous anticipation, but beyond that I should not like to go, still less to assert that horses take any pleasure in racing for racing's sake or understand that they are raced to win. Even if their cerebral development was such they could understand the conditions of the race, it must be remembered that to the horse there will be little difference between a trial with "colours up" and a real race.

Even old horses with considerable experience can only have the vaguest notion of the meaning of a race, but, so long as going to the fore is not associated with

punishment, there can be no doubt they enjoy the gallop, the ages-deep herd impulse to go with the rest of the troop making an urge the fulfilment of which will be highly pleasurable. But, as is only too well known, many a good young horse has been spoilt for racing purposes through too much pressure applied in a tight finish, and has shown some memory, and a power of associating getting ahead with the whip, that has rendered him useless for future racing.

In speaking of horses taking pleasure in racing I am only referring to short flat-races. Whether the longer and more severe races give them any pleasure I doubt, and I gravely question whether steeplechasers derive the least enjoyment from their often considerable exertions.

At this point I can imagine the reader protesting, "But that cannot be correct; look how often a riderless horse has completed the course."

The fact of a horse having gone on without his rider is no proof, as horses are creatures of habit, and steeplechase horses are schooled to such an extent that the habit of galloping on and taking the fences as they come is too deeply implanted to be lightly discarded—that is, as long as there is another horse or horses to give the riderless one a lead. You rarely see a loose horse going far ahead of the field. It is the impulse to follow, combined with habit, which takes a loose horse on over the Aintree fences.

The secret at the back of the horse's actions, trained performances and its great utility as our slave, is its aptitude for forming habits and retaining these habits. Its habitual memory is as good as its intelligent

memory is poor. It behaves according to rote, and the training of horses consists in implanting habits useful to us but often most unnatural ones for the horse.

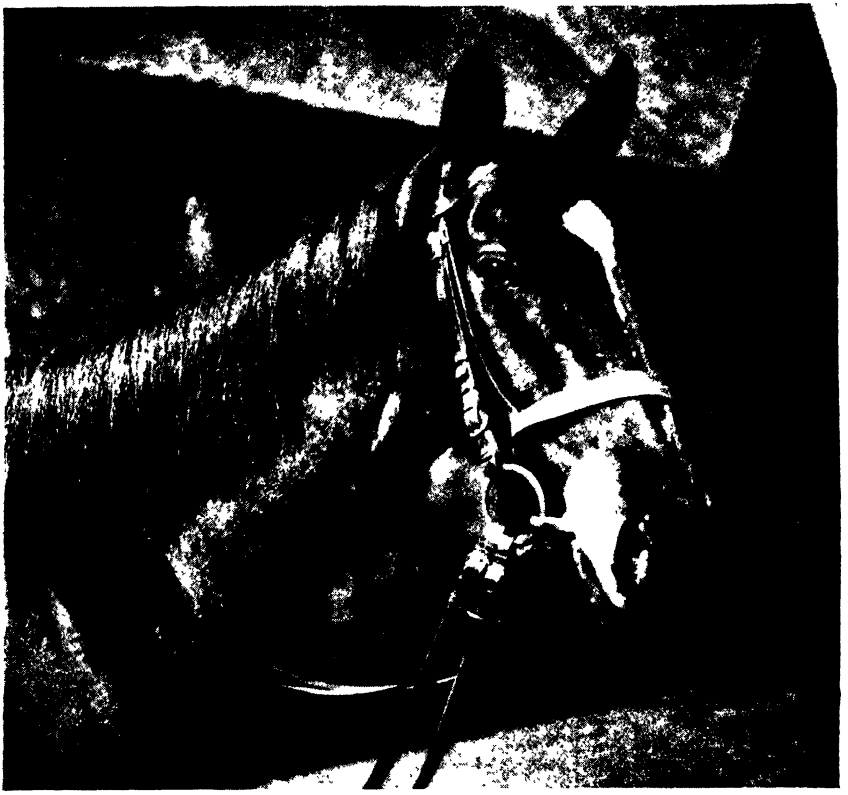
But I am getting on too fast, passing to general considerations before completing my critical remarks on the activities of horses as we see them about us, so must turn back and deal with the hunter. This is an animal that gives us some useful light on equine mentality, for its business is done under such diverse conditions it has a chance of using and exhibiting what wits it has got; moreover, as has been hinted, it shows signs of enjoying its work.

There is something about the sound of a hunting-horn and the music of a pack of hounds that is more thrilling than anything else. Of course, as the sounds impinge on the human ear they raise a train of memories concerning past hunting with its joys and excitements, of stories read and told and thoughts of sporting deeds—at least that is how one analyses the effect when considering it in "cold blood", but in actual operation one does not realise all that, nor stay to analyse anything. The effect of the horn is magical indeed, young and old dropping their tasks to run and "see the hounds", in utter forgetfulness of the business in hand.

Now hounds have the same exciting effect on horses. Many a time have I seen some unfortunate ploughman trying to hold a pair of great plunging shire horses, excited out of their placid selves by the hunt galloping past; which would be left shaking, shivering and sweating with excitement when the last horseman had gone. And the lighter types of horses. usually more

highly-strung than the heavy farm horse, are proportionately more excited by hounds, *especially young ones seeing them for the first time.*

The fact that young horses are so much, if pleasurably, upset when taken hunting for the first time, has led an eminent authority on the making and breaking of horses to suggest that they have an instinctive knowledge that the fox is a predatory animal and therefore enjoy seeing it hunted and destroyed. Apart from the fact that a pack of harriers hunting the harmless hare have precisely the same effect on a horse, such a suggestion seems to me a good example of the confused thinking with which we envelop much that the horse does. It presupposes, to begin with, that there is such a thing as instinctive *knowledge* —a totally different thing to instinctive behaviour. The latter is mechanical response, varying from simple reflex action, such as the blinking of an eye when any object is suddenly brought near it, up to the complicated series of actions performed by a spider spinning its exquisite snare, all of which can be proved to be independent of consciousness, knowledge and experience. Now for a horse to know what a fox was at first sight would be akin to a child having instinctive knowledge of the written word and being able to read at its first sight of a printed page. Moreover, if the horse is to have an instinctive aversion to any creature it should be to the hounds, for dogs are almost certainly the descendants of wolves, yet young horses show more inclination to follow than avoid a pack of hounds. Of course, a "green" horse will frequently (supposing his rider has been so foolish as



'TOMMY,'' ''WHOSE HEART BEGAN TO BEAT VIOLENTLY AS SOON AS HE SAW ANYONE IN A PINK HUNTING-COAT''

SHETLAND PONIES, WHICH ARE "MUCH MORE INTELLIGENT CREATURES THAN THEIR BIGGER RELATIVES"

to give him the opportunity!) kick at a passing hound, but this seems to be the result of high-strung nerves rather than of any wish to damage the hound as a hound.

Horses soon learn to associate a holloa, a pink coat, etc., with the excitement of hunting. I had a horse, an exceedingly good hunter, whose heart began to beat violently as soon as he saw anyone in a hunting-coat. Many a time have I felt it. It was my practice to mount before my father came out to the stableyard to get on his horse. When Tommy saw him coming he began to tremble, and then I could feel his heart thumping. But this was only when my father wore a pink coat—the horse did not associate dark clothes with hunting. This same horse was always thrown into violent excitement by a holloa even in the distance, and I have seen him standing in the stable, head up, ears cocked, trembling and sweating, because somebody had holloaed outside.

But the interesting point for us is, did this gelding, or does any hunter, really understand fox-hunting? My opinion, after thirty-two seasons in the hunting-field, during which my mounts have varied from ponies up to thoroughbreds, and from raw youngsters up to made hunters, is that no horse *can* really understand, and I greatly doubt if any horse knows what a fox is when it sees it. Why should it? What it *does* know is that being saddled and bridled and mounted by a man in a pink coat means seeing a lot of other horses, with which it will have the pleasure of galloping after a number of dogs, the "music" of which is highly exciting, as is the sound of the horn; the whole thing,

until the horse gets tired, being most pleasurably thrilling, making him feel ready to jump about and throw his heels in the air, and even be keen to jump fences—a thing that under ordinary circumstances he only does because the master on his back gives him the indication that he has got to do it.

I can count on the fingers of one hand the number of times I have seen a horse jump without the slightest compulsion. The first instance was a black hunter mare, a very fine jumper, who was turned out alone in a paddock, when she saw her stable companion being ridden across the adjoining field. She neighed to him, he replied, whereupon she trotted towards the nearest gate, an ordinary five-barred gate hung rather high, and jumped it neatly and comfortably, trotting on to join her comrade. Then there was a gelding, Charlie Chaplin by name, who would not stay in any field by himself, but would jump out. Against the example of these two, how many animals I have seen turned out at grass, hunters and steeplechasers, that despite their great experience over fences never under any circumstances, whether of excitement or desire to reach other horses, attempted to jump an ordinary little hedge.

It is, as I have said earlier in this chapter, seldom realised that horses work and go through their performances under fear of punishment. The reader is probably repeating an indignant denial of that! Nevertheless, it is the bare fact, if an unpleasant one. Consider for a moment even the pampered hunter we have just been dealing with, who certainly enjoys some part of his work, if not all of it, but even so is com-

pelled to do it according to his rider's wishes, under penalty of suffering if he disobeys the command conveyed to him through bit, leg or heel. The rider wishes to increase the pace, and if slight leg-pressure does not have the desired effect, a touch of the spur will. The horse breaks into a gallop, but the pressure of the bit on the sides of his jaw, which increases to what must be a painful extent if not immediately heeded, steadies him to a canter. He then, turning at the behest of a one-sided pressure on his mouth, finds himself going towards the fence. If a keen horse that knows what is expected, he will quicken his pace and jump at it. If otherwise and he begins to hesitate, leg-pressure and possibly a touch of the heel urges him on, when the most primitive of instincts, self-preservation, makes him jump at what is before him, and so he finds himself on the other side. Whatever he does while his rider is on his back, he does because if he did not do it he would be uncomfortable. It is his inclination to take the line of least resistance, i.e. his docility, that makes the horse such a perfect slave. He just does what he finds the least uncomfortable to do; hence the trap horse trots on, mile after mile (though his inclination would be to pull up and graze on the roadside), because if he did not he would feel a whip upon his flanks. That horses can be driven without a whip does not invalidate this argument. When broken as colts they were taught they had to go on, and that early lesson, deeply implanted, has become part of the horse's habitual make-up.

When we turn from the trained horse to the raw colt we find his education based on two principles. the

one that he must be mastered, and the other that disobedience to his master's signs will have unpleasant results. In the generally accepted system of horse-breaking (note that word "breaking"!) reward for good behaviour has no place, only punishment for what according to our code is bad behaviour. Contrast this with the usual method of training a dog, wherein reward, if it is no more than a kindly word and an encouraging pat, has the largest place.

The reader will probably here object that horses ought to be trained in the same manner. Perhaps they should be, but the bare fact remains that different peoples in countries far apart, over periods extending to the earliest historical periods, have found it necessary to forcibly impress their mastery upon their young horses—to be a really useful slave, with no will of his own, the horse must never have a glimmer of an idea that his strength is vastly superior to that of the puny creature which makes use of him. Hence the desirability of mastering young horses, and instilling into them the habit of unreasoning, unthinking obedience to their owner's signs. The perfectly broken and trained horse is he of whom it is said, "Oh! that animal is an absolute machine, he never puts a foot wrong or does an unexpected thing."

And how is such perfection achieved? First, by making the horse believe himself quite helpless to resist his master, and, secondly, by the repetition and repetition of lessons, incessant schooling in first one action and then another, until the animal has formed the habit of responding to a certain signal in a certain way and does so mechanically. Horses form habits with

so much readiness that they are easily trained for performances which can be gone through without intelligence, such as circus tricks. But let any detail in a set performance be altered so that the sequence of actions be varied and the animal is completely nonplussed.

Compared with its wild ancestor, the present-day horse is, no doubt, a mental degenerate. The wild horse did not need any great outfit of brains to maintain existence, but yet must have had sufficient meed of intelligence to adapt its actions to the emergency of the moment, keep a wary look-out for danger and generally look after itself. For thousands of years the more improved breeds of horses have been independent of natural selection, and human selection has tended to eliminate all individuals not absolutely docile, i.e. with enough intelligence to be self-willed. The only breeds that have had the tonic of living under natural conditions for any length of time have been the various races of moorland, island and mountain ponies, and these, as we should expect, are, in fact, much more intelligent creatures than their bigger relatives. Whenever you hear of a "horse" doing something unusually intelligent, and take the trouble to investigate, the result is nearly always the same: it was either a pony, or an animal with a cross of pony blood.

CHAPTER III

THE MENTALITY OF THE HORSE

Now to come to the question of the horse's mentality as it emerges from the considerations set forth. We see it as an animal of few desires, peace, society and good feeding being the chief, naturally easygoing and indolent, but of quick emotions, hence easily roused to fear or excitement, valuable attributes in its ancestral life, but often the reverse under domestication, as when horses break away in a stampede, or are so fear-struck they will not move from a burning stable. We see it also as a creature with but little understanding and with none of that power of instant perception and quick decision characteristic of the predatory mammals, nor that intelligent curiosity which is also the characteristic of the hunters—contrast the curiosity displayed by a cat or an otter with that of a horse. When the latter sees a strange object, such as a wheelbarrow, standing in the meadow, it shies snorting from it and passes on. The cat has to investigate that barrow and look it over. It is the same with that mighty hunter the otter. Anything strange must be inquired into, and if it appears harmless, examined inside and out.

The shying of horses is interesting, as it seems to be a survival from ancient days, when the impulse to jump aside from anything strange may have been of survival value with regard to predatory beasts. The horse that jumps across the road because a wren flies out of the fence may be responding to the same impulse that saved its ancestor thousands of genera-

tions back, but whether shying at a particular white stone day after day can be attributed to the instinct to jump aside from possible danger is another matter. Sometimes shying appears to be simply high spirits, and certainly underfed and overworked horses are rarely guilty of it. But in no case can we attribute it to any *purpose* on the part of the horse.

No, we find the horse a creature of "nerves" and impulse, but with little purpose, for rarely can we read forethought into its behaviour, while no animal "loses its head" so completely when in a "tight corner". Should a horse get fast in anything it will probably plunge and kick until it cuts itself to pieces. Take the case of a horse I saw jump into barbed wire. Had it stood still or plunged backwards it would have escaped with some scratches, but it plunged madly forward and injured itself so fearfully that it had to be destroyed as swiftly as a gun could be fetched. Every person who has had much to do with horses knows that such an episode is not exceptional but typical, and that the exception is to find a horse which does not go crazy when in difficulties or when anything exceptional befalls it.

Rarely indeed can we ascribe *purpose* to the conduct of a horse, and least of all when anything unexpected takes place. The only two instances of purposive behaviour I can bring forward (and that out of hundreds of horses observed) are: first, a *pony* which acquired the habit of opening the paddock gate, which involved pulling the gate towards him, and walking through into the rickyard to get hay from the haystacks; and, secondly, the old hunter, Charlie, who

would make his way home if turned out alone in a meadow some way from the stable. The pony affords the best evidence, but then he *was* a pony.

It is well known that horses have a fairly good memory for country, and at the end of the day show an inclination to turn for home, quickening their steps as they do so; but this is hardly proof of especial intelligence. An ability to find their way home is an attribute of most wild creatures. Even insects, such as the social wasps and bees, *learn* a considerable area of country about the nest or hive. While wolves, foxes, otters and cats are especially good at finding their way. That a horse should remember a road previously traversed, and the general direction of home, is no more than do scores of species, if as much.

But however poor a horse's memory for things in general may be, I must repeat once more that no creature more readily forms habits, or is more difficult to break of a bad habit. Thus we find the average horse chiefly a creature of habit, acting to a considerable extent without thought, whether responding almost automatically to his master's signals or responding to his own impulses. He lives for the moment, and is never so happy as when standing peacefully in a meadow, with one or two others of his kind, idling his time away. Yet he has no idea of resisting the task-master, and docilely submits to his fate, otherwise work.

As for that docility, it is partly the result of the old herd instinct of submission to a dominant spirit and partly the result of want of brains to realise resistance is possible. The stubborn donkey, uncouth little grey beast, with the same ideals of existence as the horse,

NORWEGIAN DUN PONIES TAKING THEIR EASE ON THE FJELD-SIDE

"THE DESPISED DONKEY"

is really a much more brainy creature, as its self-will and resistance to slave-driving testify at once.

It is a horrid thought, I admit, that the despised donkey should be really a more intelligent animal than the horse, to which we owe so much, which serves us so well in pleasure, work and war, and has so long figured in poetry and romance as the noble companion of man.

Yet if the horse is not all he has been supposed to be, let it be remembered that it is no fault of his, and that we are doing him a worse service by reading imaginary virtues and reasons into his actions than if we recognised his true limitations. To expect personal love and devotion from a horse, whose mentality is not capable of it, is as wrong as it is *not* to expect it from a dog. While to talk of a horse having "the will to die for a cause outside itself", as did a writer in a weekly paper, is not only an example of gross anthropomorphism, but a good example of the muddled thinking which leads to a complete misunderstanding of animal mind and animal action.

In a chapter on the mind of the horse, some reference must be made to the celebrated learned horses of Elberfeld. These animals signalled answers to arithmetical questions by rapping with the hoof, one rap for one, two raps for two, and so on, supplying answers that involved "the four primary rules, a knowledge of fractions, use of brackets, the extraction of roots to the fourth and fifth root, complex sums involving multiplication of roots, and the solution of simple equations".[1] Discussion ran high as to the *bona fides*

[1] Professor L. T. Hobhouse, *Mind in Evolution*, p. 447.

of the horses' performance, which some persons accepted and others disputed, the latter alleging that the intelligence behind the calculations was that of the trainer and not the horses'. The balance of scientific opinion was that the horses were no more than highly trained, and that they gave the required number of raps in response to signals. Certainly the whole of our knowledge of animal intelligence, from chimpanzees downwards, is against the assumption that there was any arithmetical calculation on the part of the horses, for the evidence is that whereas most mammals and birds know the difference between one and many, they cannot count. The writer cannot find anything in the evidence concerning the Elberfeld horses to affect the contention put forward in this chapter that the horse is a creature of simple mind and limited understanding—in fact, no better than a fool! Certainly it is wiser and kinder to treat it as such, not getting impatient with our useful friend (or slave) when it fails to respond much to petting and cajolement, at the same time recognising its limitations and making due allowance for a mentality in which there is no place for swift insight and ready understanding.

CHAPTER IV

THE COW, HER CHARACTER AND BEHAVIOUR

It is necessary to use the word "cow" as part of the heading of the present chapter as if we were limiting ourselves to consideration of the female, because the English language, so much too rich in designations for most animals, has no species-name for what we collectively term "cattle". This latter, however, is a plural word and therefore not suitable for a title. The word "ox" is sometimes used as a collective noun to embrace bulls, cows, heifers, oxen, bullocks, steers, etc., but as popular usage assigns it to the adult castrated male it will hardly do for our purpose. We are driven, as a last resort, to the term "cow", definitely feminine, yet useful, having this in its favour, that as the feminine element will predominate in the following chapters, the title will be less misleading than if it had been "*The Ox*, its Character and Behaviour" —hence we go on to consider the mind of the *cow*.

To many persons the idea that a cow has any mind at all will come as a surprise, still more so the suggestion that she may possibly be more intelligent than the horse! Whereas the horse has been so long associated with human exploits and romance that its mental abilities are viewed in false perspective, the cow (employing the word "cow" as suggested to cover cows, bulls and oxen), never used in pleasure, at least not in northern countries, and regarded simply as a

source of meat and milk, has suffered from being viewed in an equally false perspective. It is as if the mental abilities of the horse had been viewed through a magnifying glass and those of the cow through a diminishing glass. But when it is remembered that many persons, even in these days of mechanical transport, have dealings with horses, but only those concerned with tending them have much to do with cattle, this ignorance concerning the cow is easily understood. The idea that cows differ individually and have character and personality will probably seem quite ridiculous, but it does not seem so to the herdsman in charge of a herd of cattle, who will tell you of the hundred and one traits of conduct and behaviour that distinguish his charges one from another.

Before going into the question of the mentality of the cow, it will be as well to do what we did in the case of the horse—consider its history and natural habits, as these help us to understand its character and aptitudes.

Like the horse, the cow was domesticated in prehistoric times. We know that the early inhabitants of Northern Europe had a small beast, which has been dubbed the Celtic shorthorn, *Bos longifrons*; we also know that a large wild ox, with big horns, *Bos primigenius*, survived in Europe up to comparatively recent times, for its remains have been found in conjunction with stone implements. It may have lingered later, for we have many semi-legendary accounts of "wild bulls", but it is impossible to be certain that these did not refer to feral cattle, for in the troubled times of the Middle Ages cattle often escaped into the forests, to there become, to all intents and purposes, "wild bulls".

This was probably the origin of certain of the old herds of "Wild White" or Park cattle, but of these more anon.

For the moment we are concerned with the history of our European domestic cattle, the various breeds that originated in Europe and have been exported to all parts of the globe. They are almost certainly descendants of the Celtic shorthorn, with a possible admixture of *Bos primigenius* blood. If I understand Dr. Marchlewski aright (who has done much work on the phylogeny of European cattle), he considers certain English breeds, notably the Hereford, Devon, Longhorn and the horned Park cattle, show considerable affinity to the gigantic extinct urus, or *B. primigenius*.

What, it may at this point be asked, has the extinct urus to do with the psychology of the modern cow? Well, I want the reader to appreciate the length of time that the cow has been domesticated; the great alterations that human selection has achieved with regard to its physique; and that there is no modern wild counterpart with which we can compare it. In the case of the horse, we have the tarpan to serve as a comparison; in the case of the cow, we have nothing whatever—the aboriginal wild cattle are gone from the face of the earth!

The only thing we have to give us any clue to the natural behaviour of the cow is the manner of life of the herds of feral cattle to be found in some parts of the world, of which the most celebrated are the so-called "wild" cattle of certain English and Scotch parks.

Though popularly supposed to be really wild cattle, it has been fully established that the original herds, such as those of Chillingham, Chartley and Cadzow,

consisted of cattle feral in the woods at the time the parks were enclosed, and which later received fresh recruits from the domestic blood of the district. The Chartley herd has died out in its old park (the few survivors were bought by the Duke of Bedford and transferred to Woburn), but the Chillingham herd, the property of Lord Tankerville, at Chillingham Castle, Belford, Northumberland, survives in considerable strength and purity. In the *Park Cattle Herd Book*, Vol. I, p. 14, it is stated: "The history of this herd is lost in the earliest antiquity, but perhaps Storer's view that they were enclosed with the park about the time of Henry III may be accepted. There is no record of any cross having been admitted. . . . The herd numbered about 90 head last year . . . but they have been reduced to 54."

The Chillingham cattle are, like all Park cattle, white in colour, but whereas most Park breeds have black points, i.e. dark nose, feet, ears, and some black specks on the legs, these are white with *red* points. However, the colour of the cattle, obviously *not* an ancestral trait (Park cattle, considered collectively, are apt to produce dark calves and there can be little doubt that the characteristic type of coloration has been maintained by the elimination of dark individuals), is of little consequence to us, who are only concerned with the behaviour of cattle living as nearly as possible under natural conditions, in a large park of some thousand acres in extent and in no way tamed.

One of the best accounts that have been written was that of Storer,[1] who speaks of the wildness and deep

[1] Storer's *Wild White Cattle of Great Britain.*

suspicion displayed by the Chillingham cattle, which were ready to flee at the sight of a stranger. "It is to me very extraordinary that they should be as wild as they are, considering that they are confined in a park of 1,100 acres, where they must often see man, and where they are fed by him in the winter; and I cannot conceive that any kind of wild animals would be, under the circumstances, wilder, while most would be much tamer. They do not, as a rule, willingly encounter man, but rather retreat, sometimes in a hurried manner, at his approach; but if followed up, they often show fight in the manner described by Culley, and are never thoroughly to be depended upon, even by their keepers, whom they so often see. Many stories are told of their ferocity. . . .

"The constitution of the Chillingham herd is an absolute monarchy. At its head is always a male, who is known as the king bull; he acquires his crown by virtue of his own prowess, and must always be prepared to defend it. The females are at his disposal, and the less potent males obey him. . . . The superior activity and vigilance of the younger bulls enable them sometimes, perhaps not infrequently, to seize some happy opportunity, and outwit their potent and vigorous, but less energetic, monarch, without the risk of a personal encounter with him. . . . When a younger bull thinks himself able to contest the supremacy with his chief, he challenges him . . . he puts himself in the attitude of defiance and paws the ground . . . the contest is no child's play. Sometimes both combatants perish, when very equally matched—both gored to death. . . . But generally the battle, though severe, is not fatal. The

old monarch, if beaten, retires, no more to reign; the challenger, if discomfited, bides his time, till his own increasing strength and his rival's advancing years allow him to renew the fight and gain the victory."

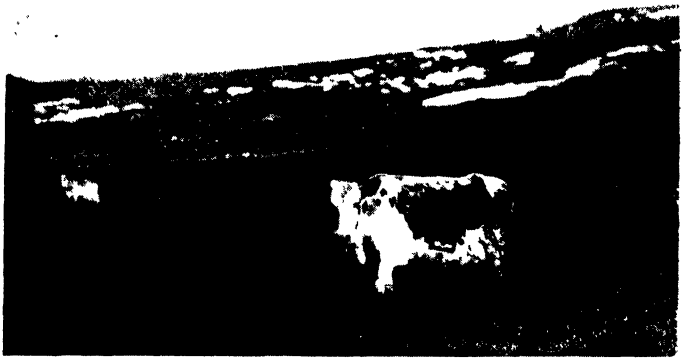
"There is little fighting among the females; still one is occasionally gored, and sufficient trials of strength occur to decide the question of mastership. Michie" (the keeper) "believes that the 'order of precedency' is quite recognised, and that *every cow knows her place quite as well as do more high-born dames.*" The italics are mine, and Mr. Storer's remarks on the question of precedence, or, as I shall term it later on, the "horning order", should be borne in mind, for I shall bring forward observations to show how strictly it is observed among domestic cows.

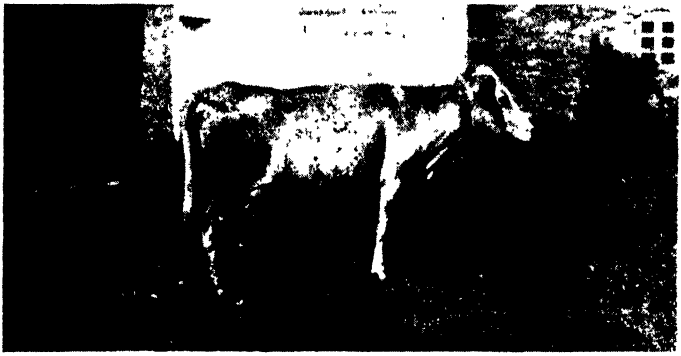
Our author continues: "The cows conceal their calves in the long grass or fern, and, as has been shown, defend them with the greatest ferocity; while the newly-born animal shows its instinctive wildness by crouching quietly in its hiding-place, like the hare when she nestles in her form." He then quotes Michie, the keeper, to the effect that " 'when a cow calves she chooses a secluded place to drop her calf, and rejoins the herd the next and every succeeding morning, returning to it at night and at other times to suckle it. The cow introduces the calf to the herd on the third or fourth day.' "

The foregoing quotations give us a very good idea of the herd system and behaviour of semi-wild cattle under tolerably natural conditions. The only particulars in which the conditions of life differ from those of the wild ancestral form being, first, the absence of other herds and rival aged males, the

(1) PRIMITIVE CATTLE. YEARLINGS OF THE OLD CHILLINGHAM STRAIN

(2) A NORWEGIAN HERD AT HOME





LEADERS OF THE HERDS—THREE STUDIES OF SCANDINAVIAN COWS

presence of steers, and the absence of persecution by predatory animals, the defensive instincts and aptitudes being hardly called into play at all. But in some parts of the world where domestic cattle run free over the plains, as on the South American pampas, they have more opportunity for exhibiting their tendencies in the latter direction, and do show an inclination to gather together to repel an aggressor.

When considering the behaviour of cattle that is a point which must not be forgotten—namely, they are armed to repel attack, the horns of both males and females being formidable weapons. Being armed and not very swift in flight, to face a foe is often better policy than to bolt. I do not suggest for a moment that the beast weighs up and considers this, but merely that the various factors of its physical make-up are correlated with psychological ones in such a manner as to induce it to face danger when it cannot avoid it. Its inherited tendency is to get away from trouble if it can do so, but to turn upon an aggressor rather than flee in blind panic.

Cattle will panic at times, but they rarely stampede in the blind fear that sends a herd of horses galloping wildly off, and even then they soon check their progress, gathering into a compact company, to await with tossing heads the onslaught of the foe.

But these considerations, to which we will return later on, are a digression from the constitution of the herd, which was the matter being discussed. I now propose to return to this, but to leave the subject of the "Wild White" cattle of the English parks and give some observations on the cattle of the Norwegian

mountains, where considerable herds are kept, and turned out to wander at will over wide tracks of unfenced country. These herds are exceedingly interesting because so many bulls of all ages run with the cows, and the different herds meet on the grazing grounds.

The cattle are of no definite type, being small cows varying in colour from black, through various shades of dun and mouse, to white. I have seen brindled individuals, and many of broken coloration, some even marked like Park cattle, but not one chestnut, red or yellowish red. Red, such as the red of the Shorthorn, or the rich colour of the Hereford, is not met with. They are mostly horned cattle, but now and again you meet with a few polled cows.[1] They are essentially a milk-breed, giving a fair quantity of most excellent milk, but carrying little flesh, even when the living is good-enough for them to put on meat. They are a very quiet, docile cattle, the males being extraordinarily good-tempered for the bulls of a milking-breed, in contradiction to the well-known rule that the better the milking qualities of the cow the worse the temper of the bull. It is a queer fact that irritability in the male is definitely correlated with milk production in the female, but of this more anon. At the moment it suffices to say that the cattle of the Norwegian Dovre Fjeld are an exception, partly perhaps due to the fact that they are always housed during the long winter, and so well looked after by the women and girls that they are without any nervousness—what

[1] This may be due to a cross with the Swedish breed of milking-cattle, known as Fjåll cattle, which animals are white with dark points, like the British Park cattle.

is commonly called "wickedness" in bulls being as often due to "nerves" as to true bad temper.

Well, during the summer months, when there is a little grass to be plucked on the mountain-sides, and green leaves to be browsed from the birch-bushes in the valleys, the cattle are taken to the saethers (little farmsteads on the fjeld-side) and turned out to wander at will, the herds varying from a dozen cows and heifers with an old bull and a yearling or two in attendance, up to fifty or sixty head with half a dozen or more bulls of various ages. I have never seen steers with the herds. Unwanted male calves come to an early end as veal, because the long severe winter and the shortage of keep make it essential to kill off every animal not destined to go into the herd.

Now the first thing that strikes the observer, and which made a forcible impression upon me, was that the leadership of the herd is *not* a male one; it is a female one, resting with one or two of the old cows. The so-called monarchs of the herd really occupy the position of "hangers-on". Again and again have I heard the tinkling of cowbells and waited to see a cow come through the birch-scrub, her bell tinkling as she snatched a bit of grass here and a few birch leaves there, while behind her strolled other ladies, young and old, mouse-coloured, dun and black, and in their wake an unprepossessing bull, with others of his kind bringing up the rear. Watching the progress of the herd, incessantly moving forward in eager search for food—no one who has not seen it can realise the scanty fare on which these cattle subsist!—I see that the old cow with the bell is a real leader. Other cows

may pass ahead, but the old cow determines the course of the herd. She appears to know where the best feed is, and when she leaves the path the others follow. When she makes down hill towards the bog, the rest do likewise. She is evidently leader by virtue of long experience, as is apparent again in the afternoon, when, milking-time being near, the herd moves homewards, with the bell-cow in the van, along the path that leads to the saether.

At Hjerkinn, on the Dovre Fjeld, is a wide marsh surrounded by fjelds, the whole forming a basin among the hills, and affording the cattle of the district comparatively good grazing—comparatively good, that is, compared with the rest of the neighbourhood, not as compared with more luxuriant parts of the world! Here, on the marsh, I have often seen a hundred head of cattle grazing at a time, and watched them, as the afternoon wore on, begin to work homewards. Each herd, which had "kept itself to itself" throughout the day, then moved towards the hills, the tinkling of bells coming from the van, where the old cow guided her followers homewards. By that expression "guided" I do not mean that there was any intention on her part to lead the others, but that the rest, accustomed to follow her, moved on when she did. She was leader by force of habit and custom rather than from any purpose on her part or on that of the cattle which followed her. The experience of years which was hers, coupled with the herd instinct to follow a comrade which is a characteristic of all herd animals as displayed by the rank and file, were the two factors that made the old cow a leader. One could see the same

forces at work and the same phenomenon in the other herds of the neighbourhood. In all of those I watched, the young cattle followed the old cows, who led the way over hill and marsh and back to the saether when milking-time came in the evening.

The so-called monarch of the herd, as already mentioned, seemed really to be a hanger-on! Many a time have I seen the elder bull lagging behind, especially in the afternoon, when the cows were wending their way homewards, and in one instance his majesty was quite lost. I was driving along the road between Fokstua and Hjerkinn, when I met a number of cows, at least a score of them, headed by a mouse-coloured one, whose bell tinkled pleasantly as she paused to crop a little wayside grass. She was followed by a dozen or so heifers and young bulls. They were making their way quietly homewards to Dovre Saether away on the right. There was no old bull with them, but this was explained when, a mile down the road, a solitary bull was espied. He was standing in the middle of the track, pawing up the dust and roaring, but his roar did not seem so much one of anger as a bellow to find his ladies. Yet never a sound came in reply. He listened, head up and ears pricked; roared again, listened once more, and then lowered his head to sniff the roadway. Here he evidently picked up the scent left by the cows as they wended their way homewards, for he started forwards, making a few rapid steps, then paused, sniffed the road, bellowed, jogged on, smelt the way once more, and so, alternately sniffing the track, bellowing and trotting on, he went after the departed herd. The last I saw of that brindled

bull he was still following the scent of his lost females, and no doubt soon overtook them.

Why had he got left behind? Was it the attraction of some extra good grazing which had kept him back, or the more potent attractions of some cow belonging to another herd? I cannot say, but so far as I could see, each bull confined himself to the herd to which he belonged, and there was no poaching on other preserves nor fighting between the different sires. The respective herds neither mingled nor sought each other's society, and their bulls took no note of one another, nor even, so far as I saw (and being engaged in bird-watching and bird photography, I often saw a great deal more of them than I wished!), of the cows of other herds. I expected to see fighting between the old bulls belonging to different herds, but did not do so, though they often passed each other. But I did see disputes between those belonging to the same herd, one episode standing out with especial clearness in my memory because I was seated in a small tent photographing a bluethroat at its nest, when a large herd of cattle came to investigate my little "hide". As I was making notes concerning the behaviour of the birds, I jotted down at the same time my impressions of the cattle. Here is an exact excerpt from my "log", and if the words and phrases are neither pedantic nor such as might be expected in a serious consideration of psychological matters, I can but say that they represent the impressions I received of the scenes around the tent.

"12.5. More botheration cattle, which wander around the tent. One old black brute of a cow comes to it, puts her nose down, and begins to crop grass off

the top of the bluethroat's nest, and appears about to place her foot on the nestlings, when I shout at her, 'Get off, you old devil!' and she jumps back as if shot. Should have shouted earlier, only two lively black bulls are at hand, and I don't like them. But what is that noise? Why, they are fighting! By squinting through another peephole I can see more clearly: they are head to head, shoving and pushing each other, grunting and roaring, and giving quite a pretty bull-fight exhibition. It would be rather fun if one were on a grandstand looking down into an arena, but as it is don't find it a pleasant sight; don't approve of bull-fights at all, especially when one has naught but a small stool with which to discourage them if this fight should bring them on to the top of the tent. Besides which, if they stop fighting, they may vent their temper on the hide! Altogether more thrill than fun about it. Don't like it at all." I kept jotting this down, for it was better than sitting awaiting events and doing nothing, while the monarchs of the marsh tussled on. Suddenly they paused and looked around; again I quaked. I had been getting happier in view of their obvious preoccupation with each other, but now they looked in my direction. They were really looking for the cows who, bored with the antics of their lords and masters, and too hungry to wait for them, had wandered on. The bulls looked this way and that, then one gave a low, menacing roar, tossed his head, swung about and made off after the ladies. The other followed him. I do not think I have ever had a more pleasing view than the rear one of those two bulls disappearing amid the willow-scrub.

Thinking it over, it was all very funny. For one thing, the cattle were far too intent on their own affairs to think of me, and I must have been a ludicrous sight crouching in my little tent in shivering apprehension; all the same, it did not seem a bit humorous at the time, and the sweetest sound I have ever heard was that of the cowbells dying away in the distance.

I saw another dispute between two bulls over a heifer. They shoved and pushed at each other with much groaning and grunting, but I cannot say the display was a fierce one. The head-on tussle had more the appearance of a trial of strength than of a duel *à l'outrance*. However, they were sufficiently intent on each other not to see the approach of a younger bull, who seized his opportunity! After which he and the heifer went off grazing together. They had been gone some minutes before the seniors realised the situation, when, after looking about them, they drifted off down the hillside in the wake of the herd. As usual, the bulls had got left behind.

That the fights may sometimes be more serious and that the combatants may be injured, with possible fatal results, I think exceedingly probable, for among well-fed English cattle a meeting between two herd bulls generally leads to a severe tussle; but then, unlike the Scandinavian cattle, they seldom get the chance of meeting, because, even if turned out with the cows, it is generally in a well-fenced field, whence it is not easy to wander and meet with rivals. Please note I have used the words "herd bulls", meaning thereby bulls running with the cows and having the presence of females to make them quarrelsome. When

(1) "WHY HAD HE GOT LEFT BEHIND?"

(2) OLD "DAMSON," MISTRESS OF THE HERD

PLACID-TEMPERED HEREFORD CATTLE

apart from the cows the males are not so intolerant of each other—witness the way on the South American estanchias they herd numbers of range bulls into one enclosure, where they remain together quite peaceably until returned to join the herds.

Thus we see that the bull is not really a quarrelsome creature, and that such fighting as he indulges in is for the possession of the females; moreover, he has the craving of the herd animal for society, and when deprived of that of the cows, will tolerate his own sex.

But generalisations such as the foregoing are dangerous because, though true as generalisations, they take no account of the variety of breeds and the differences in temperament between the highly-strung milking-strains and the placid beef-breeds, nor of the individual peculiarities of temperament within the breed.

CHAPTER V

THE COW, TEMPERAMENT AND INTELLIGENCE

The extent to which the various breeds of cattle differ in character and temperament is never better illustrated than in the parade of prize-winners at the annual exhibition of the Royal Agricultural Society of England. They are brought into the central ring before the grandstand, each breed being headed by its champion bull and cow. First come the beef Shorthorns and the Herefords, the finest specimens of their kind in the world, pacing slowly and sedately in, the mighty bulls, weighing over a ton apiece, being led by their halters; each has a thin cord to the ring in its nose, but it is there because regulations require it rather than to check the animal. Then come the milking Shorthorns, other beef-breeds such as the Devons and South Devons, the Welsh blacks, etc., to say nothing of Lincoln reds, Aberdeen Angus, Galloways and Highland cattle, these latter with their shaggy coats and immense horns looking the picture of ferocity, yet still we rarely see anything but a halter and cord used to lead the animals. But when the Channel Island breeds, with their lovely little cows (such incomparable milkers), file in, you will note the attendants use poles to lead the older bulls. A long staff attached to the ring in the bull's nose serves not only to lead him but to keep the bull off the man, so that he cannot horn him. Then come the Friesian cattle, with their great record as milk-producers, and

here we see an even more surprising sight—all but the youngest bulls are led with poles, and several of them are blindfolded! I am thinking, as I write, of the Royal Show at Nottingham in 1928, when one of the senior Friesian bulls was not only blindfolded, but needed three men to bring him into the ring and lead him round! When this bull came in the leaders of the parade had been for some time lined up before the Royal box; it was warm, the sun shone hotly, and the Herefords and Shorthorns got sleepier and sleepier. Still the King and Queen did not come, and one by one those placid cattle lay down to rest and chew the cud. But throughout the wait the bulls on the far side of the ring, the Ayrshires, Guernseys, Jerseys, and last, but not least, the Friesians, were restlessly tossing their heads, fidgeting about, and even pawing and roaring. A more eloquent illustration of temperamental differences could not have been seen, nor a better illustration of the correlation between flesh and good temper, and between milk and bad temper.

Apart from sheer fear, which is often mistaken for wickedness, and in its results is quite as dangerous, bad temper in cattle seems to be the result of a sort of nervous fretfulness, an exasperation with everything and everybody, leading the animal to vent its ill-temper on any person, just as it would have horned another beast. I remember a Hereford cow, normally a placid, easygoing creature, being taken to a show, where she arrived somewhat upset by her journey. As the herdsman expressed it, "She was in that state of mind when she would have liked to give another cow something!" At this moment an old lady looked

over the front of the stall and, remarking "What a pretty dear!" tried to stroke the cow's forehead. That, apparently, was the last straw that broke Damson's temper. The cow drew back and then drove her horns at the front of the stall so that they rattled against the woodwork, which was fortunately there, or they might have been rattling against the old lady instead.

It seems that the fretful nervous temperament that is unfortunately the lot of so many Friesian and Guernsey bulls leads them to be continually and invariably in the state of mind that was merely temporary in the cow mentioned above, and always ready to vent their chronic ill-humour on anybody or anything strange. The protective impulse to horn anything dangerous being in their case converted into an aggressive one, making them highly dangerous as domestic animals.

But cattle, both bulls and cows, may, as already remarked, be dangerous to human beings from nervousness, which is a totally different thing from aggressiveness. Cattle that are accustomed to seeing all sorts of people and dogs are rarely afflicted with nerves, but those that have been reared in out-of-the-way places, where they have seen few people and have not been handled, will betray the most primitive impulses—namely, to flee from that which is strange, and therefore terrifying, or, if they cannot get away, to charge it. This is what sometimes drives cattle to run amok, as when a young cow charges through a crowded auction yard.

We find the veneer of domestication wearing very thin in the case of cows allowed to calve out in the

open. They invariably leave the herd and seek seclusion, choosing if they can some hidden spot among the bushes. As soon as the calf is born the mother proceeds to lick it, and I have known instances where she has eaten the afterbirth, possibly a survival of an impulse dating back to times when it was desirable there should not be anything to attract wolves and dogs to the spot. If no one interferes with her she will stay with the calf for twelve hours or so, after which she leaves it hidden (I am speaking of several instances witnessed among pedigree Herefords), and goes off to feed and drink. But within a day or two the calf will be following her about. During this time she is to be regarded with respect, being ready to do battle for her little one, and personally I would rather have to deal with any bull than go near a cow and calf when the mother is at all upset. When the cow charges she means business and has no thought for herself. Nothing will intimidate or turn *her* aside; and however good-tempered she may be at other times, a cow with a new-born calf is better given a wide berth—unless she knows you and you know her!

I must pause for a moment to remark that what I am saying now, and am going on to say, is derived from many years' experience among pedigree Hereford cattle, also cross-bred cattle; and when I say experience, I mean not only the experience of observing them over a long period, but the personal handling of the animals. During the war, when my father was without a herdsman, I tended many of them, and took entire charge of two bulls.

Daily contact with cattle soon impresses one thing

upon you, that in their ranks there is strict observance of the order of precedence. It will be remembered that Storer, in speaking of wild white cattle, hinted at this factor in their behaviour; it is a very real one among domestic cows. Certain cows are dominant members of the herd, others come next in rank, and some are bullied by all. One cow drinks first at the water-tub, defies the other cows in a gateway, and horns all who try to shove past her at the cowhouse door. The factors that give dominance seem to me to be a certain confidence and "cocksureness" derived from age and having been born on the place, plus horns of the right type to give the other cows a sharp dig in the ribs. The leading cow in our herd at present is the one named "Damson". She was bred on the farm and is now an old cow. She is not very agile, being "bad on her feet" (to quote the cowman's expressive words), and is no leader in the sense of going ahead of the others—indeed, she is more often behind than before. But when she wishes to drink at a certain water-tub, any cow already there withdraws at her approach and waits to complete its drink until she has finished. She makes a habit of pausing in the cowhouse door, and when the other cows, urged by the cowman behind them, try to get by, she swings her head and they fall back again. No cow disputes her dominance or invites her to a contest. It is true her horns are long and sharp, but she is very far from active, and any one of the young cows would be more than a match for her. Next to her comes Elegance, about the same age, and one of the matrons of the herd, who drives all the cows but old Damson. She, too, was born and bred on the

farm, and is likewise in the "sere and yellow leaf". Her dominance, and Damson's, is certainly not due to physical power, but it is there all the same. I have watched her come to the drinking-place, where two fine young cows were waiting while a middle-aged matron drank, and with a toss of her horns send the young cows aside. She then advanced upon the third, who, looking up, stepped back just in time to avoid a dig in the ribs. Elegance drank her fill, then paused, with her head over the tub, as if lost in meditation. I do not mean to say that she did meditate, for how can we tell what really passes in the consciousness of an animal such as a cow? but she stood there, with the water trickling from her chin in a meditative attitude and with a meditative aspect, and the other cows with their calves stood respectfully in the background. At last she took another sup of water, after which she drew back a couple of steps. One of the youngest cows, a three-year-old heifer, stepped forward, eager for water, but Elegance merely turned her head and the presumptuous heifer stopped short. For over ten minutes the old cow stood there keeping those three cows and their calves waiting. If one made a move towards the tub she swung her head towards it, yet she had had as much as she wanted and obviously had no further desire to drink. It was sheer bullying, and if she did not behave with malice and the intention of keeping the younger cows away from the water, her actions had all the appearance of it.

The herdsman and other persons in daily contact with the cattle know perfectly well which cows are mistress over the younger ones, and that Damson and

Elegance are respected by all. It is analogous to the "pecking order" to be observed among fowls and the state of affairs between me and my two pet otters. In the days of Madame Moses' youth I administered one or two good shakings, with the result the otter learnt to respect me, and never afterwards showed resentment at anything I did to her. But towards the dog otter, much her superior in point of size, though her junior by two years, she was quite different. He was introduced to her as a half-grown cub, when she established her dominance over him, and this he never questioned. I have seen the old female wreak ill-temper on him that she dare not show to me. For instance, I sometimes took her out for a walk, which was a great treat, so much so that she did not want to be returned to the enclosure in which the otters lived. She always clung to me, and, when I put her down, tried to climb back into my arms. When Tom came near to see what was happening she flew at him in fury. Thereupon he jumped out of her way into the water, or rolled on his back and squeaked at her. He knew what to expect, as it happened every time the old female was brought home after an outing; yet however cross she might be he never showed temper in return, any more than she exhibited temper towards me. But Tom would not tolerate rough treatment from me! As a cub Tom was spoilt; it was a case of "spare the rod and spoil the child", and in consequence he had no respect whatever for me. I had to treat him carefully and not pull his tail unexpectedly or he would snap. He would, however, submit to anything from Moses. The latter would submit to anything

from me, but she would not stand nonsense from Tom; so our little society of three moved in a circle, each member in turn domineering over another, and likewise being domineered—all in consequence of early formed habits of giving in to him or her as the case might be.

I have digressed thus to the otters because it illustrates rather prettily how the "horning order" among cows may at times become quite complicated, and that it does not follow because a young cow allows an old one to drive her, that she will let another do so. It may be the reverse.

It is the mental factor that enables the leading cows to maintain their dominance, it being the domineering spirit, rather than horns, that keeps them where they are—namely, at the head of the herd.

Apropos of horns, it must not be forgotten that the fact they are armed has its influence on the behaviour of cattle. At this point the reader will probably be murmuring to himself, What about the polled breeds? Well, they do not affect the argument, for the absence of horns is a mutation that has arisen under domestication (I am not aware of any existing wild ox, nor of an ancestral form, that is without these implements of defence), and the polled animals appear to be psychologically identical with the horned. They have lost their horns, but not the accompanying instincts and impulses. A polled cow or a polled bull uses its head either in defence or aggression, just as a beast with horns would do, and in the case of alarm, when the cattle draw together preparatory to charging the object of fear, you can see no difference between the behaviour of the cows bearing horns and any polled

individuals that may be with them. The latter toss their heads and are quite as aggressive as the former. The whole herd (in strong contrast to the unarmed horse, which always flees in panic when alarmed) prepares for business with an air of consciousness of strength that is most impressive. That "consciousness", by the way, is almost certainly unconscious, for cattle have not the mental ability for self-analysis, but the "Irishism" is employed to emphasise that they have an instinctive feeling of strength and security in defence.

When domestic cattle, such as cows and calves, turned out in the fields, charge anybody it is invariably a question of defence by attack. They are frightened by the appearance of strangers in bright clothes, or, worse still, by the sight of strange dogs; and one cow having given the alarm with a peculiar low, short bellow, they all draw together, to shake their heads at the intruders, who, if wise, will take the hint and remove themselves from the field before anything happens.

I have seen the quietest and most sober of cows completely upset by an unknown dog. These were cows that would hardly turn their heads to look at familiar dogs, yet a strange one made them snort and shake their heads in a way that suggested it had roused a latent fierceness, dating from a period in the history of the species when wolves or other predatory animals were a danger.

From these remarks it must not be thought that I imply that the cow is a creature governed entirely by inherited impulses, simply responding in a machine-like manner to different stimuli. All living beings from ourselves downwards are largely at the mercy of their

physical and psychological make-up, but that does not mean that an animal is therefore an unintelligent automaton. The cow certainly is not. In my opinion she is far more intelligent than the horse. For one thing, she is not handicapped by the horse's tendency to blind panic; for another, she has a fair memory. It is a familiar fact to the persons in charge of cattle that the cows do not forget their stalls in the cowhouse, and will return to the old place even after a considerable lapse of time. Cows sent to an adjoining farm have walked straight to their respective stalls in the cowhouse when brought back after six months; while after being out for the summer (Hereford cows are not housed until late in the year) they rarely make a mistake, but each cow goes to her old quarters.

It may be objected that this is no criterion of intelligent memory, but only bespeaks the formation of habit, that "muscular memory" which, as we know in our own case, does not necessarily carry with it any preconsciousness of the action to be performed.

But can we attribute to mere habit the following action? There is a certain meadow in which our cows graze, where they are unable to obtain water unless it is pumped into a tub. The cattle always drink from the tub. They are in this field throughout the winter until March, when they are put elsewhere so that the grass may grow for mowing purposes. No cow enters it again until after the hay has been cut and carried, which, in the summer of 1928, was at the end of June. In July the cattle were allowed to return to the field. The moment they were driven in one cow stood and looked about her. Now the tub where the cattle had

drunk the previous winter was about three hundred yards away behind a belt of high trees, where she could not see it. She walked straight off around the trees to the tub and drank deeply. That seems to me definite evidence of memory extending over three months and several weeks.

But the most precise evidence I have of a long memory is in connection with apples. The episode to be related took place at the end of July, when a sudden gust of wind brought a few apples off the trees, especially those trees in the meadow where the cows were grazing. Being very fond of apples, the cattle, young and old, gathered under the apple-trees and picked all the fruit up. At three o'clock the same afternoon the herd was moved to another pasture, my brother, a most accurate observer, driving the cattle himself. He related how, as soon as they were through the gate, two of the elder cows, Graceful II and Ivybloom, walked off, away from the herd, right across the meadow, through an open gate, along a hedge-side, to where there was a single apple-tree in the fence. This tree was invisible at the point from which they took their departure, and it was at least eleven months since they had eaten apples beneath it. Some of the elder cows followed them when they saw the direction in which the leaders were going, but not one of the heifers went after them.

The behaviour of the two cows appeared to be governed by the memory of previous apples enjoyed beneath the tree, stirred by the fruit picked up earlier in the day.

In connection with the drinking-tub we can get a

little further evidence of intelligent purpose, because the cattle are frequently turned out in another field during the day, only being brought into the "Drive Meadow" at night. Now in the other field is a pond whence water can be obtained, but during the dry summer weather the pool shrinks, leaving a stretch of deep and sticky mud to be crossed before the cattle can drink. They sink into the mud and each step is an effort, so that the water is only reached with trouble. They do not like wading through the mud, and I have often seen them standing and hesitating ere plunging in literally up to their middles. During the summer of 1929 it got very bad and some of the cows would not face the mud, but after going and looking at it, turned away, walked off to the gate and waited for an hour or more until let through into the other meadow and the easy drinking to be had at the tub.

One afternoon I watched seven or eight cows and the stock bull come to the side of the muddy pool. They hesitated for some time, one walking around the pond as if looking for a sounder place, and at last she, and then another, plunged in, but the rest turned away, walked off to the gate, and the moment it was opened hurried off to the tub. No one watching them could doubt that they considered the situation, left the muddy pool and went to the gate with the *purpose* of waiting until it was opened and they could get water at the tub.

They did not go so far in their determination, however, as a cow I saw on the Norwegian Dovre Fjeld. It was spring, after a severe winter, during which all live-stock had been on short commons. Never have

I seen cattle so pitiably thin. The grass was just beginning to grow, especially in the small enclosures where it was hoped to have hay, and this young grass was what the cattle desired. Turned out on the fjeld-side, they would not stay there, but kept coming back to the cultivated land and breaking in to the "hay grass".

Once again the cattle were being driven off by a cowboy, when a small mouse-coloured cow broke away from him and trotted down the track. I saw her coming at a brisk, purposeful pace. She passed me, jogged on down the road, along which ran a fence of wire, topped with a strand of barbed-wire, and did not pause until she came to a gate that gave entrance to the "hay field", when she turned and jumped it neatly. I have never in my life been as surprised as I was when I saw that cow "hike" herself over. It was done so purposefully! And withal so neatly and efficiently. She immediately began to crop the grass, which was sadly scanty, and never stopped until the cowboy's stick had descended on her side with a resounding smack.

There was a bull my father owned, a pedigree Hereford (Lowland Paradigm 26986), whose behaviour was equally marked by purpose. When he wanted to get out of a field he went to the nearest gate, lowered his head, put his horns under it, and lifted it off its hinges, tossed it to one side and walked through, treating every gate that barred his progress in similar fashion. I have known other bulls do the same, and believe the explanation of their conduct is not that they thought out in the first place this means of

leaving the field, but that they were anxious to get out, and went to the gate to do so, being accustomed to entering and leaving the field by it. Then, finding the gate closed and their progress barred, they vented their annoyance in the usual bull manner—namely, by lowering their heads and horning the obstruction. The power of a bull is terrific, and a slight effort on his part is sufficient to lift a gate from its hinges; but at the next gate his movements would no longer be the fitful ones of impatience, but the more methodical ones of intention to get the gate out of the way. He now understood that if he put his head down and pushed the gate it would go. Our old bull simply tossed each gate to one side; and when he discovered he could also lift doors off their hinges, special arrangements had to be made to keep him at home, for he forced open the ordinary door as quickly as it was shut upon him.

With regard to the mentality of the bull, the old saying about "a red rag to a bull" is very well known, but I cannot affirm that it has any foundation in fact. Certainly a scarlet focusing-cloth waved just in front of a bull's nose has failed to rouse his attention on the many occasions when I have been trying to get a good photograph. A score or more of bulls have failed to respond to the "red rag". But the animals in question were all placid, equable-tempered beasts, and I have no doubt that any "rag", blue, red, green or yellow, would provoke a fretful-tempered animal (such as one of the bulls of the fighting strains of Spain!) to a quick charge.

But there is one thing that will upset the most

placid cattle, and that is the smell of blood. As when an old horse had to be slaughtered in the field and its blood soaked into the turf. The carcass had been removed and the spot covered with soil, everything possible being done to hide what had happened; yet when the cows were allowed to come into the meadow they quickly discovered the place, gathering round it, to paw, snort and roar in a most disturbed manner. For days both farm horses and the cattle came to visit the spot, each time displaying the same emotion and disturbance. I have also seen the cows start back and snort when passing near the place where a pig had been lately killed.

This response to the smell of blood must be a wholly instinctive one, as none of these cows nor their calves could have had any experience of the alarming and fearful things usually associated with the shedding of blood.

By the way, the reaction seems to take place only when the smell is encountered amid familiar home surroundings, and not when the senses are blunted by the thousand and one strange, bewildering scents and sounds associated with the slaughter-house. Here the beast rarely shows appreciation of the smell of blood, but, as mentioned, it is quick to sense it at home. In the wild ancestral beast this response to the shedding of blood may have been extremely useful, rousing the herd to furious emotion and thereby rendering it a most formidable force for carnivores to attack.

Occasionally, by which word I mean very rarely, and then for no reason the observer can perceive, a herd will fall upon one of its members and gore him

or her to death. I am not referring to a weak or sickly individual, which is always liable to a certain amount of persecution, and which, especially among semi-feral cattle, as described by Hudson in his *Naturalist in La Plata*, may be set upon by the herd, but to apparently sound, healthy individuals. I have seen such an episode among a mixed herd of some twenty-five milking-cows of cross-bred and Shorthorn types. These cows attacked and drove one of their number into a ditch, where they surrounded her, driving at and goring her with fury. The angry bellowing and roaring, quite different to the ordinary lowing of cattle, being terrifying in its intensity. The animals were frenzied. It was only with great difficulty that they were driven off and their victim rescued. She was never turned out with the herd again. The meaning of the attack was never known, but the insane rage that possessed the usually peaceful cows had to be seen to be realised—I shall never forget it!

Before closing this chapter, I must refer to one point—have cattle any notion of time? The punctuality of milking-cows is well known. On an English farm they come to the farmstead gate each morning and evening and wait to be let in and milked. On the Scandinavian mountains you could "set your watch" by the cattle, which turn homewards from their wanderings over the unfenced fjelds at about three-thirty each afternoon. It seems that the cows in milk lead the way back, doing so when they have eaten their fill and their udders begin to need relief. It is not the position of the sun which influences the herd, but the desire of the old cows to be milked, so we can

hardly ascribe their more or less punctual return to "knowing the time" in the sense of appreciating the hours that have fled, though we can ascribe it to the probability they feel it is time to be milked.

From what has been said it will be seen that the cow is an animal capable of considerable emotional reaction, yet of more stability of conduct than the horse, not being so liable to blind panic. She does not form habits with the mechanical certainty of the latter (you do not see a cow performing circus tricks), but she is a creature with a considerable memory and a meed of intelligence only realised by those who have had dealings with her.

CHAPTER VI

THE PIG, A MALIGNED BEAST

Pigs, apart from their bacon aspect, are not popular mammals; they have never been co-operators with men in sport or labour, save to take the part of quarry in boar-hunting and pig-sticking, hence are not invested with any romantic halo. No glamour attaches to the word "pig", it is merely a term of opprobrium, denoting all that is filthy and horrible; just as the expression "pig-headed" is commonly used to describe a contrary and obstinate person.

Yet, as pig-headedness indicates a will, even if it be a will to do the opposite to that which everyone wishes, it does not necessarily indicate want of wits; indeed, it would seem to denote the possession of a definite and set purpose. If this applies to pigs as well as persons, we are confronted with the notion that the pig, after all, cannot be a fool! Nor is it!

The average farmyard pig is not kept in a manner nor under conditions wherein it can exhibit intelligence. It is housed in a narrow sty with a small sleeping-place, and could not be clean if it would. It can barely avoid fouling the bed upon which it will have to sleep, yet it is a fact that most pigs will keep their sleeping-corner clean if they can.

Pigs allowed a certain amount of liberty have a better chance of displaying natural behaviour, and it is to such we must try to turn and get some idea of the mentality of the pig.

It is, of course, a semi-social mammal, the family,

i.e. a sow and her litter, keeping together for a long while, and young pigs tending to seek the company of others of their kind. The "herd of swine" is not altogether an artificial unit, but one pleasing to the component pigs. As with other social animals, a "pecking order" can be discerned among the members of the herd, certain individuals establishing the right to semi-bully their fellows, feed first and take more food than their friends, etc.

Old boars and old sows display a tendency to go off alone, to segregate themselves from the rest of the pigs, but the elderly individuals of another species often exhibit a desire for peace and quietness!

However, the pigs I want to deal with are the average pigs of a farmstead when these are allowed to run free, and thereupon display their natural predilections.

Such pigs wander far and wide (usually to the great annoyance of the neighbouring farmers!), ranging across the fields and through the woods in search of the dainties beloved of their kind. But, unless it is acorn-time and there is such an abundance of acorns that the pigs can get enough to eat without returning home, they can be trusted to return punctually at feeding-time, to stand grunting at the pig-sty door awaiting the pig-man and his bucket. However far they go they do not get lost, but display a good memory for country, jogging home, as I have said, punctually to be fed.

It is interesting, too, when the acorns are falling from the oak-trees, to watch them on being let out in a morning rushing off to visit the different trees.

"THE PIG MAY NOT BE A LOVABLE BEAST, BUT IT IS FAR FROM BEING A FOOLISH ONE"

Now the pig is an animal of lowly stature, and therefore of circumscribed outlook. Its horizon is limited by its view-point; hence, when pigs just released from the sty set off full gallop down a lane with a fence on either side, and career across a big field straight to an oak-tree on the farther side of the meadow, we can safely say that being unable to see the tree they had a mental concept of it and were guided in their actions by the memory of acorns previously found on the ground beneath the oak. They thought of the tree, or, rather, of its acorns, and went to it.

I believe the pig has a good memory. There was the case of an old sow which took a violent dislike to a man who she saw occasionally. He was not her regular attendant, but whenever he went near the pig she went at him open-mouthed in a most savage fashion. It transpired that he had hurt within her sight and hearing one of her piglets. He had to keep away from the sow. It was months before he dare go near the pig, and even then she seemed exceedingly suspicious of him.

Although the pig possesses the usual impulse of herd animals to gallop off with its fellows on any alarm, it is remarkably capable of "keeping its head" in the midst of its panic. For instance, take the case of some half-grown pigs that got into the garden about my home. Someone left a gate open. In a few minutes half a dozen young Middle White pigs were running over the lawn. This lawn is divided from a lower lawn by a ha-ha, or stone-faced ditch. From the upper lawn it involves a jump of about three feet wide with a two-and-a-half-foot drop—nothing of a leap, in fact.

The alarm "Pigs!" having been given, the maids and I raced helter-skelter from the house to drive off the intruders. With shouts, cries and waving of sticks we rushed upon them. The pigs gave startled grunts and set off full gallop across the lawn, to pull up short on the verge of the chasm. It was really nothing of a jump, and I smote the nearest pig a hearty whack on the back to urge it over the leap. With an emphatic grunt they one and all declined to pop over, turning about and charging by us in a truly pig-headed manner. I have always thought it said much for the efficiency of the devils in the Biblical narrative that they caused the swine to run down a steep place into the sea!

The young pigs we were chasing ran off with many grunts towards the gate by which they had entered, only to find some person had shut it—their retreat was cut off They paused by the gate in a puzzled and doubtful attitude, tried to push beneath it, failed and charged back, sticks used, none too gently, failing to stop them. We put the gate open and went in pursuit, but it was not easy to get the animals back. They had found the gate closed and were reluctant to return. It took us ten minutes to get those pigs out of the garden. Their behaviour was certainly aggravating, not to say maddening, but it was not foolish, and the purposeful way they avoided the, to them, unjumpable wall was amusing. What was more, they knew where they had come in, and would have gone back that way without hesitation had they not found it closed. It was different behaviour to the mad charge of panic-stricken horses. As I have said, the pig does not lose its head.

When allowed to sleep out a pig makes itself a good bed in some really warm, dry, sheltered place, carrying much bedding thereto, gathering mouthful after mouthful of grass, or, if it can find any, hay or straw. But the making of a couch does not necessarily imply the use of intelligence in doing so, for the nest-building of birds is an elaborate series of hereditary reactions; nevertheless, the pig that makes itself a soft bed between two hay-stacks, just where the sun shines in, and wind and rain cannot penetrate, appears to be making a deliberate and careful choice.

The pig may not be a lovable beast, but it is far from being a foolish one, and in my opinion it is one of the more sagacious of our animal neighbours, and, moreover, one with a psychology that would repay careful study.

CHAPTER VII

THE SHEEP—A SILLY FOOL?

Our very sayings illustrate what a poor opinion the majority of people hold as to the mental equipment of the sheep—"like a lot of silly sheep", "as foolish as a sheep", are remarks to make the stoutest quail, while the single word "sheep" suitably stressed can convey implications of stupidity and want of initiative better than any other word in our language.

According to popular estimation, a sheep is a creature without wits, personality or initiative, and with but one well-marked trait—namely, its tendency to follow its fellows. Of course, this is an outstanding characteristic of the sheep: sheep do follow one another, for, being herd animals, they have this primitive instinct of the herd creature strongly developed. Yet does this trait necessarily imply the absence of any understanding, does the undoubted fact that sheep have a strong tendency to follow one another, to run together into a compact flock on alarm and gallop off helter-skelter, rule out all intelligence and intelligent behaviour? It is true that if anything causes one or two sheep to bolt in panic, another fifty, or two hundred and fifty, will follow in unquestioning imitation without so much as a glance around to see the cause of the alarm. But an impulse to follow their fellows is so inherent a trait in the nervous make-up of all social beings that I cannot think it should be held as positive evidence of the foolishness of the sheep. Even we are not exempt from it.

(1) "ACCORDING TO POPULAR ESTIMATION A SHEEP IS A CREATURE WITHOUT WITS"

(2) "... HAVE LITTLE CHANCE OF OBSERVING EVIDENCE OF

(1) A BLACK-FACED HIGHLANDER

(2) THE HJERKINN SHEEP AT THEIR FEEDING-STONE

One wet and windy afternoon, when out fox-hunting, I suddenly decided I would go home, so swung my horse about and set off in the opposite direction to the pack and their attendant horsemen. The "field" were merely walking quietly onwards, whereas I started away at a sharp canter for home, but had not gone a quarter of a mile before I discovered I was being followed by half a dozen persons. I went on, thinking that they too were on their way home; until I noticed that among my followers were people who lived in the opposite direction. "Where are you folk going?" I asked the leader, as I pulled up my horse and faced them. "We—er—don't quite know", answered the first one. "We—er—thought you had seen something, or heard something, or were going somewhere, don't you know!" "I don't know", I replied with asperity. "I only know I'm going home!" and I went, leaving the half-dozen horsemen and horsewomen standing in a foolish group. Yet under ordinary circumstances those six people were far from unintelligent—in fact, there were at least two really able intellects in the group—but the circumstances had favoured a display of absolutely silly, sheepish action. The sight of someone galloping off had aroused the primitive unreasoning impulse to follow. They had undoubtedly followed without thinking the matter out, and I have often wondered how long, had I gone on, it would have taken them to realise what fools they were making of themselves. It was indeed a pity that I pulled up—I ought to have ridden steadily forwards!

I have recorded all this merely to show that the

tendency exhibited by the sheep to run together and gallop after its fellows does not constitute evidence of want of mental power, though we have little chance of observing evidence of intelligence when sheep are herded together into a jostling, bumping, pushing crowd. What chance has any sheep of showing its character during, say, a great round-up on the Westmorland Fells, when active shepherds and keen dogs have scoured the mountains for days before, and every picturesque long-woolled little Herdwick ewe has been brought in from the most remote crags, to join the baa-ing throng that converges on one of the farms down in the dale?

To this from far and near come sheep, men and dogs, for several neighbouring farmers have combined to shear their sheep at the same time, with all their friends and relatives to help in the clipping. What a busy scene it is: men clipping, women winding up and carrying off the fleeces, with sheep on all sides, incessant baa-ing in one's ears, the very air heavy with the smell of sheep packed closely in the sheep-folds, behind which stands the white-washed farmhouse, with the purple-grey fells brooding over all.

It is the same wherever sheep are driven together; whether on the plains of Australia or the pastures of Romney Marsh, they become a helpless, hapless, bleating throng. But then what chance, under these conditions of crowd, stress and push, has a sheep, even a curly-horned old black-faced Highland ram, of showing initiative, individuality or personality? None whatever, no more than one of us has in the hurly-burly of a Derby-going crowd on its way to

Epsom. Nor has the observer any better opportunity of seeing indications of intelligent behaviour either in sheep or men. All individual volition seems lost in crowd impulses. One may study herd movements during a gathering of the flocks, but for real observation of character less strenuous times are needed—times when sheep are individuals, not merely baa-ing atoms of the flock.

I had a good opportunity of watching sheep under good conditions for individual observation one summer in Norway, when I was staying at Hjerkinn, on the Dovre Fjeld, where a small flock of sheep was kept. It consisted of seven or eight ewes, with their picturesque white lambs frisking at their heels, headed by an old sheep of much cunning. This ewe was decorated with a cowbell hung by a leather collar about her neck, so that its tinkling might indicate the whereabouts of the sheep during their wanderings up and down the unfenced mountain-sides. But, though all the fjelds were free to this ewe and her followers, the bell was superfluous, for there was no fear of her going far from home, nor the comparatively good grazing to be had near the house. It was poor enough in reality, for the spring was a late one and the grass had hardly grown at all, but what little there was was around the farmstead.

The old ewe appeared to be the leader of the little flock, not only by virtue of her tinkling bell, but by reason of her superior wits. Nobody watching her could doubt that she acted purposefully, nor that anticipation of coming events guided her conduct. She was keenly alert for the coming of the boy who

fed the sheep, and whenever he appeared with a bowl in his hand, made straight for him, or else took a bee-line to a flat-topped rock on which the sheep were usually fed. It served better than any feeding-trough. The corn was spread on this, when the sheep speedily nibbled it up; after which the tinkling of the old ewe's bell told how she was taking her twin lambs down the roadside, where a little green grass was springing between the wayside boulders. You could depend on that ewe finding a warm and sheltered spot with the best grazing obtainable.

There was a plot of grass in front of the house, carefully fenced to keep the animals out, and where, in consequence, the herbage had reached the length of about an inch and a half! But to the half-starved cattle, ponies and sheep (which owing to the lateness and severity of the spring had latterly been living on lichens gathered on the fjeld-tops), it was indeed luxuriant, but not one of them displayed the determination exhibited by this old ewe in getting access to the plot. There was not a cow nor a pony that could compete with her. It did not matter how often she was turned away, how often she was chased out through the gate and that gate carefully shut behind her: she watched it like a cat watching a mouse-hole, and if it was left ajar for a moment she was through. The cowboy and the cowgirls, to say nothing of the household staff, spent much of their time driving her out. Her behaviour afforded an amusing contrast to that of the prosperous sheep of more lowland parts of the world, where food is always abundant and necessity does not sharpen their wits.

Certainly the Hjerkinn ewe displayed individuality, not to say cunning, and no one watching her and noting her purposeful air could have doubted she acted with intention. It was no mere chance or blind impulse that led her again and again into the enclosure by the house; nor could anyone seeing her trotting off to the feeding-stone, sometimes alone, sometimes followed by the little flock, doubt again that she was acting with anticipation. If she was not acting in consequence of a concept of corn spread upon the rock, it can only be said that it looked like it. We have grounds for believing that a party of persons entering a restaurant are each animated by mental references to food, and a good meal in particular; and the sheep's behaviour was quite as eloquent of expectation as any human conduct under these circumstances!

I have found the sheep of the Shetland Islands, a peculiar breed found only on these northern islands off the coast of Scotland, of more than average intelligence, but they, like the sheep of the Norwegian mountains, have a hard life on the rocky, wind-swept, barren places whence they have to derive their sustenance. The Shetland sheep are strange, goat-like animals, of every unsheeplike colour and variety of hue, from brown (moorit) and black to white. They have long fleeces of the silky soft wool famous in Shetland-knitted garments. They have a look of patient endurance mingled with cunning, their appearance suggesting that they are not lacking in wits. Nor are they, though they have the customary sheep impulses to run together when alarmed, and to follow

one another when driven; but food is scarce, and, under ordinary circumstances, it is every sheep for himself or herself, each going its own way to pick a hard living among the heather and rocks, or even off the seaweed on the shore. They know where the best feed is to be had, and are as quick to make for good grass as the Norwegian ewe, to say nothing of having certain sheltered spots to which they resort in bad weather.

Apropos of the latter sentence, I began this chapter with a description of Herdwick sheep on the Fells of Cumberland and Westmorland, and referred to them in a manner that might seem to indicate that these sheep are peculiarly stupid, yet in fact they afford us a good evidence of memory in the sheep, for they come home in severe weather.

The Fell sheep are not really short of wits, and indeed have more of them than many persons would believe. Despite the fact the flocks wander far over the hill-tops, the sheep know well enough where the farmstead is and the way back to it. Strange sheep might get lost on the Fells, but not those bred on the spot. The sheep of each farm return home, for which reason it is customary when a farmer quits his farm for him to leave a certain number of ewes for the newcomer to "take to". These, being natives, will give little or no trouble in winter storms, coming down from the Fells to seek food and shelter at the farmstead whenever the conditions become bad.

CHAPTER VIII

STUDIES IN SHEEP CHARACTER

The tendency to make for the place where they have been reared is not peculiar to the sheep of the north of England, because it was well exhibited by some cross-bred Oxford and Kerry Hill ewes that I had under observation in the Midlands.

These were four ewes that had been hand-reared, and were in consequence sheep of exceptional individuality. Though they began life as pet lambs they were later turned out with the flock, but to the end of their days, and one lived for many years, they always came home in bad weather. It did not matter where they had been put, nor how far from the house, they managed to creep through the intervening fences and get back to the stackyard, where they helped themselves to hay from the ricks and sheltered from the storm.

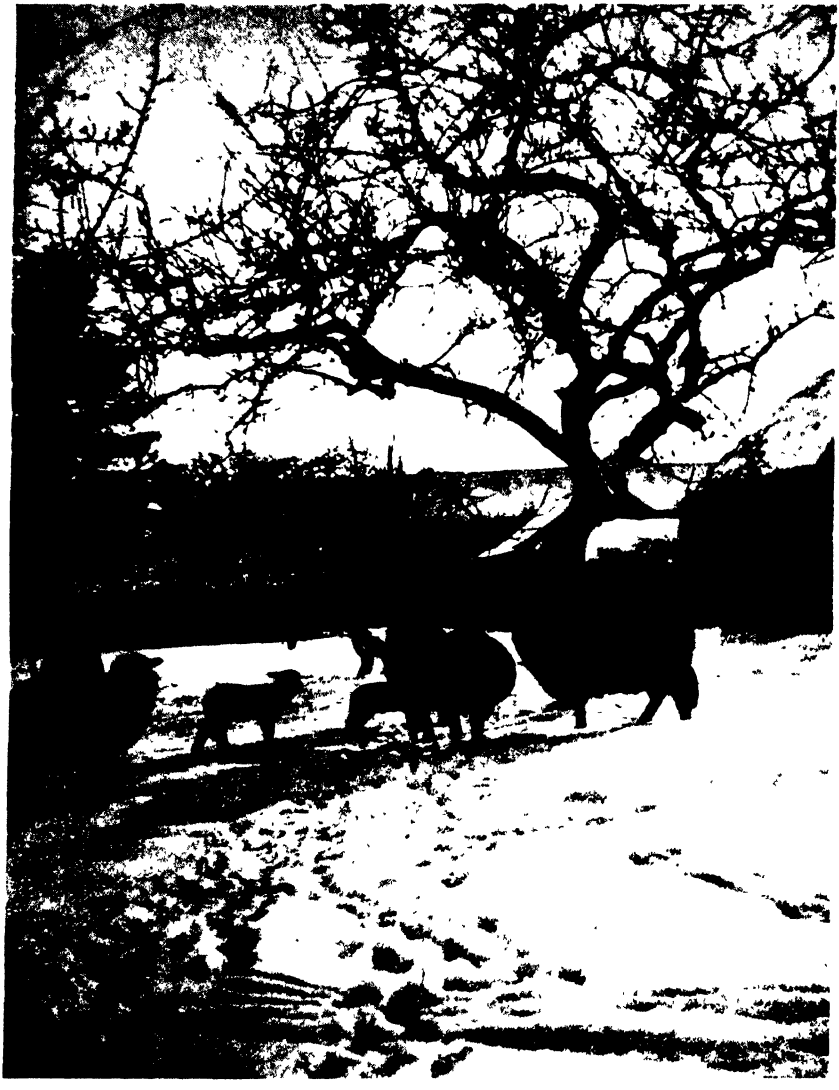
These sheep were, as I have said, hand-reared. They were orphan lambs, and my mother brought them up, feeding them with milk from a bottle until they were old enough to eat. Now to use the word "character" in description of sheep may seem to the reader utterly wrong. According to popular conception if there is one thing a sheep has not got it is character! Do not the majority of people believe that every sheep is exactly like its fellow? But this is not so, sheep differ as much individually as other animals. A shepherd knows each member of his flock at a glance, and sees them not as a crowd, but as so many

distinct entities. He has no more trouble in telling them apart than a huntsman has in recognising the members of a pack of foxhounds.

Well, these four "kaed" lambs (to use the term by which the country-folk describe hand-reared lambs) were as distinct in personality as any four living beings could be. They had their individual traits and differed much in character. The biggest and boldest was one called "Jill"; she had more "cheek" and determination even than the others, which was saying a good deal! Their upbringing had given all four peculiar boldness and they feared nought they knew, the shepherd's dog least of all! When the unfortunate collie was sent to bring up the flock, the "kaed" lambs—as they were called to the end of their days—drew apart from the other sheep, refusing to follow the throng, turned about and faced the dog. They shook their heads and stamped their feet aggressively, and knowing how very hard their heads were, for they had butted him more than once, the dog let discretion be the better part of valour, gave them a wide berth and left them behind. In vain did the shepherd beat the collie. The dog feared the "kaed" lambs more than his master's stick. The most he ventured to do was to bark at them, but it was waste of breath. The pet ewes were contemptuously indifferent to his voice and heeded it not a jot.

Yet they possessed the primitive impulses of their kind, and an unknown dog would cause them to rush off in panic with the rest of the sheep, ditto a fox crossing the meadow—when all the sheep, including the pet ones, ran together.

"JILL" AND HER OFFSPRING



IN BAD WEATHER THE FOUR PET EWES CAME HOME TO THE FARM BUILDINGS AND BROUGHT THEIR LAMBS WITH THEM

It was noteworthy that the tame ewes were not slaves to the crowd impulse to gallop off with the rest of the flock. I mean that they did not follow their fellows out of mere slavish imitative impulse. The majority of the sheep were often alarmed by one of the dogs that Jill and her comrades knew quite well, starting off in the sudden rush of frightened sheep. Again and again I have seen this happen, and seen the pet ewes spring up and start into a gallop with the rest, only to look round, pull up, regard the disturber, and resume grazing. The fundamental impulse to go off with the flock and follow the others was there, but modified and controlled by experience.

The four sheep knew us perfectly well. By "us" I mean my father, mother, brother and me, the different workmen and the various dogs—in fact, the personnel of the farm. Not one of them forgot my mother, though she might not visit them for weeks at a time. Jill was especially quick in recognising my mother's voice, baa-ing at once when she heard it and coming to her call. She did not answer anyone else or respond in any way to their shouts.

These four sheep were an interesting example of animal individuality, and their mental equipment was revealed as far greater than could have been expected. They had good memories and indulged in many purposive actions, of which their return to the farm buildings in bad weather was typical. It was also typical that they had favourite pastures, from which it was difficult to exclude them. They exhibited considerable determination in getting into these fields, and were just as obstinate about not staying in certain

others, where, presumably, the grass was not to their liking. Be that as it may, they had their likes and dislikes, and no fence would deter them from exercising these likes and dislikes.

To compare a sheep and a horse may seem exceedingly insulting to the latter, but such a comparison can be usefully made, to the enhancement of the reputation of the sheep. Both are herbivorous mammals, both are comparatively defenceless, the sheep being the more helpless of the two, and both are social creatures. They have many impulses in common, including that of drawing together when alarmed and bolting in a herd of panic-stricken animals. Yet, despite its lesser speed in flight and its helplessness, the sheep does not go as distraught with terror as a mob of horses, very soon recovering from its fright and beginning to graze again, while in many other ways it shows more initiative—witness sheep coming home to the farmstead for food and shelter.

PART IV

TWO FRIENDS

CHAPTER I

THE DOG, OUR BEST FRIEND

The dog and cat stand out from the rest of our domestic animals by reason of their friendship with the human race, the former pre-eminently so because of his whole-hearted adherence.

The dog is a co-operator in sport and work, no harnessed slave, but a joyful participator in what its master chooses to do, readily obedient to his slightest word or gesture. Its devotion is amazing. We are so accustomed to a dog at our heels, so used to the smallest puppy showing an ardent desire to follow the person he knows, that we hardly ever stay to ask ourselves why this should be. The cat swishes its tail and walks off serenely alone, but a solitary dog is an unhappy-looking object. It hangs its tail between its legs and glances furtively from side to side. It is lost and it looks it. It appears exceedingly unhappy, worried and anxious, and if another dog comes into view, especially an aggressive one, it tucks its tail still tighter between its legs and bolts as if for dear life.

But what an alteration when it finds its master! Its whole demeanour is changed. It seems filled with confidence. It holds its tail erect, trots cheerfully along,

bounds from side to side of the way, sniffing here and there, and when it sees a strange dog advances boldly to meet it.

There are exceptions to all rules, but such is the behaviour of the average dog when it has human support and when it has lost its master!

The dependence of the dog on mankind, and its devotion to man, is usually ascribed to its derivation from an ancestor of the wolf type that hunted in a pack and was furnished with aptitudes and instincts to follow and obey a leader and enjoy society.

Such a supposition fits admirably with the facts of dog conduct, especially as contrasted with cat behaviour. The cat is self-sufficient, its social cravings are few in contrast with the dog's ardent desire for company.

The dog is always ready to submit to a superior, a master, especially he who deals forth punishment. It is well known how wilful and disobedient are ladies' pet dogs, seeming to care little or nothing for their doting mistresses, who are usually mistress only in name, indulging their pets until they are utterly spoilt, unruly, cantankerous creatures. Contrast these pampered lap-dogs with a working collie, that hardly takes its eyes off its master, obeys his slightest gesture, and turns or stops at his whistle when half a mile or more away.

A highly trained sheep-dog is a marvel of obedience. I watched one sent after some sheep that were to be driven off. The shepherd was bringing a large flock of sheep along the hill-side, when he spied a number of sheep that had no business where they were. The

man had two dogs with him, a nondescript black and an equally nondescript spotted dog. He raised his hand and the black collie sank to the ground; he pointed and the spotted grey dog galloped off after the intruding sheep. His master whistled, and he stopped dead, looking back with pricked ears, at which the man gave a different whistle and the dog went on. The dog's usual work was to round up scattered sheep and bring them back to the shepherd, or help him drive a large flock somewhere; this driving off of a detachment was an unusual task, but at that second whistle he went on with the business, sending the sheep along, taking them right away over the skyline. Only then did his owner call him back, with a third whistle, again different to those previously employed.

The dog returned, tongue out, glanced at the shepherd, and fell into place at his heels. He had but done his work, and there was nothing to be said about it, though failure to obey would have brought down punishment—but he was none the less deeply attached to his master, perhaps the more so.

In considering the mentality of the dog we must not lose sight of its hereditary aptitudes, not only the generalised instincts we have referred to, such as the social impulse and willingness to submit to a master, evidently a legacy from its pack ancestor, but more specialised aptitudes that have been evolved under domestication.

Just as the dog varies so tremendously in appearance, in size, shape, build, coat and colour, from the great Irish deer-hound to the tiny Pekinese, from the greyhound to the bulldog, through a thousand and one

marvellous varieties and breeds, differing so much from one another that they make the brain reel, and make it almost incredible that such a variety of extraordinary beasts had a common ancestor, so the dog varies in its inherited predispositions to respond to certain stimuli in certain ways.

The retriever puppy has a desire to carry things about. An old shoe, a ball, or any other object, acts as stimulus to its retrieving aptitude. The object rouses the reaction to pick up and carry, that is, when the young retriever finds it, not when it lies in the path of a young sheep-dog, foxhound, or a bulldog!

It is only with difficulty, extreme difficulty, in fact, that the average dog of a non-retrieving breed can be taught to fetch and carry. True, there are occasional exceptions, but of these more anon. As for training a retriever, a foxhound or spaniel to round up sheep, in this case there is no aptitude whatever to work upon, and the task is impossible. The young collie, we find, has "a bent" for the work, it has a natural tendency to run after and around moving objects, just as the young foxhound has a marked aptitude for hunting with the help of its nose, and the young greyhound for hunting by sight.

From this it will be seen that some part of the dog's behaviour is based on ancient instincts, dating from a period prior to its domestication, and another part on aptitudes due to man's selection, artificial instincts, if we like to so term them, such as the fetching and carrying of the retriever, which possibly if not probably arose as a chance freak, variation or mutation.

I have known of fox-terriers that delighted in

fetching things, though such conduct is totally at variance with the behaviour of terriers as a whole, and I also knew a foxhound that made a regular practice of securing the fox's mask when one was killed, and carrying it home, often many miles, to the kennels. One of his sons had the same habit.

Traits like these are often exhibited generation after generation, and where useful and preserved through selective breeding can be established. No doubt a race of retrieving terriers could be founded, though it is doubtful if the keen sporting instinct of the terrier would ever permit it to handle game gently and bring it undamaged to its master.

Most of the "artificial" modes of behaviour that we see in the dog can be recognised at once because of their utility to us rather than the animal, but there are some actions which are equally clearly ancestral in character, and useless survivals from its predomesticated period. For instance, there is the "turning round before lying down" action, which nearly every dog, whether St. Bernard or Yorkshire terrier, indulges in before settling to rest. It often consists of several revolutions, and includes scratching and scraping with the feet, precisely as if the dog had to break down a place in undergrowth and scratch itself a comfortable hollow in the ground before it can have a nice bed. When indulged in on the hearthrug before the fire, it usually ends in the rug being scratched into wrinkles, and a reprimand from the mistress of the house.

The accepted explanation seems a reasonable one, and there is no reason why we should not credit the idea that in this behaviour of the dog we are seeing

reflex action, or a chain of inherited responses, which it acquired in that period of its history when it was a wild animal roaming the hills and valleys.

Then there is likewise the bone-burying impulse, when a dog bears off its unwanted food, scratches a hole in the ground, inters it, and carefully pushes the soil back with its nose so that the treasure is buried.

I discussed this matter at some length in *Animal Mind*, with special reference to how far it was instinctive, how far unthinking impulse carried out without much guidance from the "man at the wheel", otherwise consciousness, and how far it was truly purposive. I gave the case of Tiny, my terrier puppy, playing with Tom, the young otter (they were great chums), an apple being the plaything, and told how when the puppy got the apple, she rushed to a corner where lay a sack on the ground, scratched with hearty good will, dropped her apple on the spot, went through all the actions of pushing soil over it with her nose, and then ran off as if satisfied she had hidden it, but the apple was, of course, still exposed to view!

I further gave instances of dogs burying bones, etc., but leaving them where hidden and not returning to retrieve them, and expressed the opinion that the dog had an indifferent memory for hidden food, probably made worse by having no need of the food.

Since then many correspondents have written to me in defence of the dog's memory, giving instances of how their pets invariably return and dig up interred edibles, or even inedibles, as when a mischievous dog carried off his master's shoes and buried them in a flower-bed. On being reprimanded, he went off, dug

"TOM," THE MOST DEVOTED OF DOGS

them up and brought them back, thus proving that he, at any rate, remembered what he had buried and where he had hidden it. Nevertheless, we must class the hiding of superfluous food as one of the hereditary responses inherent in the dog's nervous equipment.

This equipment of instincts, reactions, reflexes, aptitudes, responses, call them what you will, is indeed large, varying as it does from the primitive ancestral ones of the ancient pack-beast to those of later date. But the latter aptitudes are, as we have seen, limited to their respective types of dog, while the primitive ones persist in almost every breed. Nearly all dogs want to hunt and enjoy chasing things such as rabbits and rats. Practically every dog gives tongue in the excitement of the chase (successful hunting by social animals depends on letting the rest of the pack know that game is afoot) and continues to throw its tongue while on the scent, this behaviour being similar in dogs so diverse as the Cairn terrier and the bloodhound.

It is indeed an amazing thing, seeing the extraordinary effects man's selection has wrought in the appearance of various dogs, that he should have altered their hereditary nervous equipment to such a *comparatively* slight extent! Man has had dogs, of a kind, since the earliest records of which we have any knowledge; remains of dogs are even found with those of Neolithic man, and yet a bitch with small puppies has still so many of the impulses of the primitive wild animal that, despite the fact her master is providing food for the whelps, she will go forth, gorge herself, return and vomit a mass of semi-digested food for her family.

CHAPTER II

THE MIND OF THE DOG

On the top of all its inherited aptitudes and tendencies, the dog acquires a great many habits and much experience, in the light of which it controls and modifies its actions.

No one, not even the most dogmatic of "behaviourists", would contend that our friend the dog was an unintelligent automaton! Exactly how intelligent it is, is another matter. As with ourselves, as with all species of birds, beasts and lower creatures, there is the personal equation. Mental ability varies in every animal, and you meet with all gradations from the fool to the exceptionally intelligent individual. In no creature, save man, is this variation so marked as in the dog, for the rigorous tests imposed by nature, including that of ability to get a living, having been eliminated by human protection, mental degenerates have been able to survive. I have known dogs that were more than fools, which indeed were quite idiotic, just as I have known dogs of exceptional intelligence.

In the former category was a highly-bred springer spaniel bitch. She came of a strain equally successful in the field and on the show-bench, but she was mentally "wanting". She was so frightened and nervous that nothing could be done with her. She had never had a harsh word spoken to her, let along been punished or ill-used, yet even as a half-grown puppy she would flee at the turn of your head. Endless time was spent trying to make her more sensible, endless

trouble was taken with her, but she seemed devoid of sense and unfit for anything.

As far apart as the poles was the old sheep-dog "Tom", who for many years was my father's favourite dog. He was a surly dog to other persons, tolerating interference from no one, but his existence hinged on my father. While my father was about he shadowed his footsteps, following him everywhere. If my father took his coat off, Tom lay beside it until he returned for it. When my father came indoors the dog lay on the doorstep, taking no notice of anyone or anything unless they spoke to him or touched him, when he growled surlily at them, for he was not to be cajoled into civility to anybody. When my father came forth dressed for riding or going out in the motor, Tom just glanced at him, and returned to his favourite place, unless invited to come, when he would spring to his feet and bound around his master with every expression of delight. In the car, which he entered eagerly, he sat up "like a Christian", and behaved himself perfectly. However, he never attempted to get in unless told to do so. As I have said, he did not expect to be taken out, and when my father appeared with his overcoat on Tom always lay down with a resigned air. Towards the time my father might be expected to return, Tom repaired to the lawn, whence he had a good view of the drive, and lay there and waited. Every time a car was heard he would sit up with pricked ears, stare and listen, but I never knew him go and meet the wrong car. When at last the right one appeared he was quickly at the drive gate to meet it, but should my father not be within, which happened sometimes,

he turned away with a disappointed air, returned to his post and resumed his watch. When his master did come back he bounded around him in wild delight which was in marked contrast to his usual staid, not to say sulky, demeanour.

On the rare occasions when my father was away from home for several days, Tom gave up his watching and would walk about with my mother, though he displayed no special geniality towards her. His behaviour was civil, but no more. He was, however, demonstrative enough when his master returned.

To compare Tom with the idiotic young spaniel would be like trying to compare a man of first-class scientific brain with a mentally-deficient child.

Taking, however, the average sensible dog, not exceptionally intelligent nor yet exceptionally foolish, what do we find? Why, that he is largely what he is made. In other words, that he is considerably the result of education. Now educability, the power to register experiences and govern subsequent actions in the light of those experiences, is the hall-mark of high intelligence; but there is also education which consists of implanting habits, sequences of action that become as mechanical as any inherited response, and in their performance differ little from instinct, being quite as unconscious. But the acquirement of habits does not necessarily imply an unintelligent mind. The formation of the letters in our handwriting once thoroughly learnt is carried out without resource to conscious control, as are the actions necessary to control and guide a motor-car. Nevertheless, the point at once arises, is a dog's educability of the latter kind? Does

what it learns become habitual, so that it acts without consciousness of what it is doing? Yes, and No! "Yes" because a dog, for instance, trained to jump over a stick at his owner's command does not stop to think before he acts (any more than we do when running or jumping), and "No" because he obviously brings wits to bear on his actions.

The retriever has acquired the habit of going at its master's signal to look for lost game, but there is no unthinking habit about the way it marks fallen birds. The precise manner in which it sits beside its owner while he is shooting will be habit pure and simple, not so the keen eye with which it notes where birds fall, and on being told to go, dashes direct to the spot where the nearest one fell, picks it up and brings it back. Here we have evidence of a mental concept formed, retained and acted upon—namely, that of a pheasant, partridge or grouse, as the case may be, lying dead on the ground, where it must be sought for, found and brought back. But the manner in which the retriever does it is testimony to the excellence of its training.

Education certainly plays a very large part in the behaviour of the domestic dog, coming into play upon the young puppy and being continued practically throughout life.

Although the tendency to follow a leader and run with comrades is the most deeply implanted of all the dog's predispositions, even this is emphasised by education, by the string which is put round the puppy's neck, and by the pull of which it is taught to follow closely at the heels of its particular man.

With regard to the expression "follow a leader", which I have used repeatedly in this and the previous chapter, I must explain that I did not mean that the primitive dog-pack was led by one particular individual, elected to the leadership by the others, but merely that the dog has a predilection to go with its fellows, to give way to the predominant members of the pack, and to follow whichever individuals may be temporarily at the head of affairs.

In a pack of foxhounds, which may be taken out hunting twenty or more couples strong and embracing individuals of all ages, those well ahead on the scent of the fox are followed irrespective of their age and sex by the rest of the pack. The young and eager ones drive ahead, which, if scent is poor, means they will certainly flash on too far, when the elder hounds, following them but hunting more carefully, keep on the line of the fox and are able to put them right, thus in their turn becoming leaders. There is, however, another leader, namely, the huntsman, who if not literally a leader when hounds are racing upon a good scent, is very much their leader at other times, especially when taking them to look for a fox. They follow him to and from their kennel, they keep in close touch with him and with one another when drawing a wood, and are always ready to heed the sound of his horn.

Yet let it not be thought that this obedience is all a matter of instinctive response, for like other dogs the foxhound has to be trained. Just as the little mongrel puppy learns its lesson of keeping to heel by means of a string round its neck, so the young foxhound who

lags behind, or fails to follow the others, earns the attention of the whipper-in and feels the weight of his whip on its back.

It is the readiness with which the average dog learns, his submission to punishment and his mental attitude, that can only be described as "a desire to please", which makes him so different from other mammals.

Does a dog know when it has done wrong? By "wrong" I mean something which it knows is against its master's wishes. That any mammal, even one of the higher apes such as the chimpanzee, has the necessary abstract mental concepts to think out ethical questions is almost certainly out of the question, even the young child cannot manage this. To the latter some things are taboo: it must not do this, it must not do that; and so it is with the dog. It has, however, definite notions of these taboos: that it is not to hunt the cat, nor go off poaching on its own account. And so clearly are these taboos associated with punishment that a culprit generally returns with guilt clearly expressed in every line of its depressed figure. And just as ducks and moorhens may have a feeling of "being in the right" or "being in the wrong" as regards territory, so undoubtedly has the dog with regard to its doings.

My fox-terrier bitch, "Tiny", is of an exceptionally independent spirit, also of a most sporting one, so that she sometimes goes off hunting by herself. She knows that retribution will follow, and to see her on her return is to see a picture of guilt. She comes sneaking back with her tail between her legs, and on catching

sight of me bolts into the house. Only the other day I administered a whipping because she showed she expected it, and afterwards made inquiries as to what she had been up to—she *had* been off hunting.

The actual mental powers of the dog are difficult to estimate. Very few have the necessary insight to understand the simplest latch to a gate. Where a dog does learn to open the garden gate, it appears he has found a certain sequence of actions will let him through, rather than that he has arrived at any understanding of the simple mechanism of the latch and the way to raise it. Many apparently clever tricks depend for their performance on the most careful training and the ready obedience of the pupil, the tricks being really matters of rote rather than appreciative understanding, against which a retriever marking falling pheasants, or a terrier guarding the exit from a rabbit-burrow when ferrets are driving forth the rabbits, are both studies in purposive attention.

Sheep-dogs are commonly cited as instances of marvellous intelligence—have I not lately used one myself as such an example?—yet the element of mechanical obedience enters largely into their actions, and it is their master's brain, rather than theirs, which controls the situation. They are, as pointed out, trained to stop instantly at a whistle. In collecting sheep the dog often acts like an automaton on a string, his initiative coming from that controlling whistle of his master, at the sound of which he drops as if shot. It *is* an amazing sight to see a dog, half a mile off up a mountain-side, respond to it on the instant.

In spite of this I consider that in some matters the

dog does not get as much credit as it should for intelligence. For instance, if a lost dog succeeds in returning home from a distance it does not get the credit of having any memory for country, nor for perseverance in trying to find its way, but is said to have been brought back by its "homing instinct". According to some persons, any dog or cat can find its way to any desired spot by the exercise of this super-normal power. In my opinion, the dog possesses no such extraordinary power. How many thousands, nay millions, of dogs change hands and therefore homes in the course of twelve months it is impossible to say, but taking the British Isles alone the number must be great. There are also the dogs that are accidentally lost, likewise a considerable number. Out of this very large number of dogs, many of which must ardently desire to return to their previous homes, how many succeed in doing so? Only an infinitesimal fraction. But we invariably hear of that fraction, especially if they manage to do a longish journey. Then we see a paragraph in the morning paper—"Homing Instinct of the Dog. Marvellous Journey of Fox-terrier", and so on; but we never see any paragraph concerning the thousands of dogs that are dealt with by the police and Lost Dogs' Homes; nor do we ever hear anything of what factors really helped that terrier on its way.

I have a good deal of experience of foxhounds, and of hounds being left out after a day's hunting, for it is not an uncommon thing for a hound or hounds to get separated from the pack and be out of ear-shot when the huntsman is blowing his horn to call them to him.

Such hounds, unless shut up by some kind-hearted but misguided person, always return to the kennels, but the time it takes them to get home is directly correlated with their age and experience. Old hounds, with a wide knowledge of the country, go straight back, however far away may be the spot where they got left, but young ones may wander about for days before they find their way home.

Did space but permit, one could write on at length on various aspects of the behaviour of the dog, for volumes might be filled with stories and anecdotes of man's best friend and with discussions arising therefrom, but here we must content ourselves with just a few remarks before closing this chapter, the first being that the mental images of the dog must embrace olfactory ones quite as much as visual ones. By the way, a few persons may demur that not only have we no definite evidence that a dog can form concepts, but how can we be sure it has images? Here surely the anxious waiting of a dog for the reappearance of his master, or the manner in which it will go off and fetch something it cannot see, is simple and direct evidence; but such images are probably very different from those that appear before our "mind's eye", embracing a world of scents and smells of which our blunted human noses have long lost all knowledge. For how long such images can re-occur—in fact, what is the memory of the dog—is difficult to ascertain with any certainty. As with us some individuals have better memories than others, but when we see an old fox-hound, as I have done, go to a fox-earth where a fox was killed seven months before and which it could

not have visited in the meantime, and sniff around the spot, it gives indication of recollection of events that happened in the previous hunting-season.

All animals live more or less in the present; time for them is short, the fleeting moment being their sole concern, but it would seem this is less so in the case of the dog than in that of most other mammals, and that it can form concepts of a sort, of coming events, and think of what has gone. The dozing dog by the fire-side groans, whimpers and yaps until it wakes itself, roused by the very vividness of its dreams; then as it wakes it sees its master getting out a gun, springs to its feet in tense excitement and bounds joyously round him, in very evident anticipation of coming sport—if it has not a concept of a coming rabbit-hunt and the fun of a chevy its actions are exceedingly deceptive!

Yes, we must give our good friend the credit of memory, some power to look ahead and further power to perform purposive actions—in short, he is indeed what we know as an intelligent animal.

CHAPTER III

THE CAT—A MYSTERY

"And he went back through the wet wild woods waving his wild tail and walking by his wild love."

RUDYARD KIPLING, *Just So Stories.*

Puss, purring on the hearthrug, presents us with one of the greatest mysteries in the study of animal behaviour, and, by inference therefrom, of animal mind.

Her fond mistress lauds her super-intelligence, asserting that the cat has an amazing understanding; but many serious students of animal behaviour go to the opposite extreme, and declare the cat to be a dullard, a creature of low mentality, and with no grasp of a complex situation, or even a comparatively simple one. They cite experiments on cats, such as those in which the animal (I nearly wrote "the victim"!) has been shut up in a cage from which it could escape by manipulation of a fastenment, but from which it has only got out after much haphazard scratching and clawing.

Such experiments appear to me to be unfair to the animal and valueless as regards their results, whether these results be positive or negative.

If there is one creature rather than another which is perturbed and upset by imprisonment, let alone imprisonment in an experimental cage, it is puss; her very perturbation gives her no chance of utilising whatever ability she really possesses, her excitement being such as to prohibit attention to the details of her strange environment.

"THE CAT RETAINS COMPLETE INDEPENDENCE OF ACTION'

"THAT UNTAMABLE SAVAGE, THE EUROPEAN WILD CAT"

Kipling summed up the cat's character and disposition with extraordinary fidelity years ago when he wrote the *Just So Stories* and made it say, "I am the Cat who walks by himself, and all places are alike to me"; for the cat does indeed walk by itself, giving but half-hearted allegiance to man.

Despite the long ages during which the cat has been domesticated and has been a household pet, despite its fireside intimacy, despite the saucer of milk (Kipling's cat bargained with the primitive woman to catch mice in return for a saucer of milk), despite, I repeat, the symbolic saucer of milk, puss remains self-contained, independent and an enigma. She—the female pronoun is certainly the more fitting for use when writing of the cat—will fawn round your legs, winding herself with purrs and blandishments into your good graces, yet she retains complete independence of action, being neither an obedient slave nor a willing co-operator. An hour, or even a few moments, after she was languishing at your feet, she will probably be slipping out of the door to spend the night roving the country-side, to return in the morning with a self-complacent air, and no trace of the shamed mien so characteristic of a dog that has been out hunting by itself.

Whoever saw a cat display any compunction for having gone out by herself? No, she returns from roving the night woods, walks into the house, settles herself by the fire, washes her face, and proceeds quite happily to sleep off the effects of her rambles.

In considering the character and psychology of the cat we must take into consideration its history and

ancestry. It was domesticated, or perhaps we should say semi-domesticated (for can we say an animal is truly domesticated when it displays the independence of puss?), in early times, as we may learn from the Egyptian mummified cats, but to what wild species it owes descent is another matter. No precisely similar cat now exists in a wild state. I mean as a bona-fide wild species. I am not referring to "gone-wild" or feral cats.

Of true wild cats it is certain that that untameable savage the European wild cat *Felis silvestris* was *not* its ancestor. A placid, confiding temperament is essential in any beast that is to be domesticated, and is peculiarly characteristic of *Felis Catus*, but many of the wild cats are extraordinarily fierce and savage, and not one is more untameable than *F. silvestris*. Apart from differences of structural detail, this difference in character is strongly marked. Small wild-cat kittens will spit like furies at the human hand; and long attempts to make friends with two wild kittens have convinced me that these fierce cats are really untameable. They are savage and resentful, and cannot be cajoled by bribery or blandishment. A fierce resentment seems to be the predominant emotion in their minds where human beings are concerned.

But we are not dealing here with the ferocity of *Felis silvestris*, nor other untameable wild cats, but with that eminently tameable, yet only half-domesticated, bundle of contradictions we dub "Puss"!

That domestication of *Felis Catus* seems to have been due to her love of home, her devotion to the spot where she was born and bred, and to which,

however far she may stray, she always tries to return, combined with the symbolic "saucer of milk". Food, however, does not seem to be the all-important tie which binds a cat to its home, for I have known of cats left behind when the inhabitants quitted a house that stayed around it, supporting themselves as best they could. No, the attachment seems to be to the locality, and in a lesser degree to those with whom the animal lives.

This is understandable when we remember that all the cats are solitary species, not given to hunting in company, without any hereditary disposition to seek their fellows or follow a pack-leader. The domestic cat in particular displays no social impulses or craving for company. She will seek a resting-place on our knees when enjoying the warmth of the fire, but she will not look back for us, or for another cat, when about to go forth into the night and prowl under the stars. Yes, Kipling was quite right when he said that the cat walked by itself!

Thus we see the cat as a creature of primitive impulses, little affected by man, nor with its natural conduct corrupted by his influence. It is a "born hunter" in all accuracy and literalness, for the tiny kitten, toddling on uncertain feet, crouches at the sight of a leaf blown by the wind; its short tail twitches, it springs and grabs the leaf, plays with it, tosses it in the air and again pounces upon it, displaying in that play every action and response the old cat would exhibit in capturing a mouse.

The kitten behaves thus "by instinct", though pleasure (if the air of joyous excitement which per-

vades it may be thus interpreted) animates its conduct, for the gratifying of an hereditary urge is always pleasurable, and with every repetition of the play experience is superimposed on the equipment of mechanical response, so that the kitten learns not only how to get the best fun out of a fluttering leaf, but later out of a captured mouse given it by its dam.

It is customary to refer to a kitten or cat amusing itself with a mouse as guilty of great cruelty, and to speak of the cat as a cruel beast. That suffering is inflicted on the mouse no one can question. Every animal that plays with its prey, whether it be an otter playing with a fish, a tiger with a man, or a man taking part in the pursuit of fox or deer, is being cruel to the quarry and inflicting suffering on it—in various degrees. But that a cat is intentionally cruel to a mouse and plays with it because she delights in inflicting suffering, I dispute. I doubt, I gravely doubt, that the cat comprehends that the mouse suffers either through fear or bodily hurt, or that the notion of hurting it, supposing her mentality was such she could comprehend pain inflicted on another, would please her in the least. What does please her is the play, the game of letting the mouse run away and then pouncing on it. Watch her excitement, how her eyes gleam and her tail twitches, and the thrill that runs through her when the unfortunate mouse nearly escapes and she has to dash after it.

We may get some idea of her mental state by comparison with that of our own when fishing. If the reader has ever played a stout fish, a salmon in particular, and remembers all the thrills and excite-

THE CAT "WHO CATCHES RATS AND EVEN RABBITS"

ments, the various rushes made by the fish, and how intensely the mind was concentrated on the business, until at long last the salmon was brought to the bank, gaffed and landed, he will be aware that he thought of nought but the happening of the moment, and had no time nor breath to spare to consider the situation from the fish's point of view!

That the cat is a sportsman, playing for the love of the game, is further borne out by the abandon with which it will romp with any small moving thing, not merely the leaf blown by the wind, but a bit of string swung by a human friend.

That the biological function of play is to get eye, nervous response and muscle in tune for the serious business of life, is not invalidated by the fact that adults will play. Their play, however, is much less hearty than the mad romping of the juveniles. Of all baby animals, which one plays more enthusiastically than a kitten? How it races and tumbles, with what concentration it stalks its mother's tail, or creeps around the coal-box ere springing on a thread detached from the hearthrug.

And this brings us to the question as to whether the kitten, which we admit to be a "born hunter", i.e. to have a very full equipment of responses and aptitudes which lead it to jump "by instinct" on any moving thing, knows also by instinct what a mouse is.

Now I am not going to be led into another discussion as to whether there can be such a thing as inherited *knowledge*—we have already discussed it, and I have expressed an opinion there cannot be, only inherited tendencies to react in particular ways to

particular stimuli. No, what I want to clear up is whether the kitten responds more vigorously to the sight of its first mouse than it does to other moving objects. I cannot affirm that it does. I have seen a young kitten sniffing doubtfully at a mouse which had just been brought to it by its mother, and the *sight* of the mouse did not appear to arouse any special interest, but when the mouse ran away the kitten grabbed it and growled ferociously in a manner it would not have done for any inanimate thing. There there *was* a special response. The moment the kitten seized the little beast its fur bristled and its tail began to twitch. It was obvious that its emotional tone was raised. It was highly excited. The gripping of prey had pulled the trigger and released responses that turned the kitten into a predatory animal; but I cannot believe that it understood beforehand what the mouse was, nor knew it as a mouse even when it held it. But it did henceforward!

The adult cat who spends much time watching mouse-holes, who catches rats, and even rabbits, is a highly *skilled* hunter. Long experience has developed her inherent talent into art, and her performance is tempered with judgment and discretion. Watch an "old hand" pounce on a rat, such as the tabby-cat I saw at work one day. She was a keen huntress, some three years of age, *not* of the overfed, pampered, fireside-pet description, but of the most sporting type. Something moved in a straw-rick. The cat, which was passing by, paused, listened, while her tail tip twitched and the pupils of her eyes dilated. The scuffling noise was repeated, coming from a spot in the side of the

rick about two feet from the ground. Puss crouched slightly and then waited in a rigid attitude. I saw something grey move in the straw. It was a nearly full-grown rat with its head towards the cat. She remained immovable, the only thing betraying her tense excitement being that uncontrollable tail-tip, nor did she stir until the rat turned, when she sprang like a flash, to seize the rodent by the back of the neck and drop down with it kicking in her grasp. She bit firmly into its neck, nor did she relax her grip until sure her dangerous prey was killed.

The way the cat waited until it was safe to spring, until she could do so with the certainty of getting the rat so it could not bite her, was eloquent testimony to her judgment. If her actions did not display forethought and intention it can only be said that they had all the appearance of it.

Now I contend that such an episode gives us a far truer insight into the mind of the cat than scores of experiments of the "find the outlet from the basket" type.

In experimental work it is extraordinarily difficult to be sure that the animal experimented upon will attend to the point at issue. An animal may be pronounced stupid when it is merely inattentive, perhaps through fear, or annoyance, or, again, through anticipation of a reward. The means of escape which seem to us so obvious are not obvious to it with other things filling its mental horizon. It is only when a bird or mammal is doing what pleases it that we can be sure it is attending. When a cat paces around a closed cage trying to find an exit, we cannot be certain of her

mental images—she may see the fastenment or she may overlook it altogether; she may be feeling angry, or merely thinking of her supper, a mouse-hole she knows of in the kitchen, or some other thing she is hindered from attending to—but when we see the same cat stalking a mouse or a rat, we may be confident she is intent on it and her attention is not wandering to anything else; hence I think that the recently described episode is a better clue to the mentality of a cat than much painstaking experimental work. It shows us she can weigh consequences—i.e. the risk of pouncing rashly on a rat—and wait her opportunity. If this does not betoken forethought, what does? In her sporting affairs it is evident Madame Cat is no fool!

To turn now to another aspect of the cat—what of her affections? We know that she is much attached to her home, but is less devoted to human friends. The dog is, of course, the standard by which she is judged, but that is a very high standard, for the cat, never a pack animal, has no inherent desire to attach itself to a protector, nor has it much pleasure in society. Company to the social mammal is a necessity of life, to the solitary species it is only an occasional luxury. Again we come back to Kipling's dictum that the cat walks by itself, but does that preclude real devotion to a chosen friend? I cannot truly say I have ever known a cat that I believed to be disinterestedly attached to anyone! Yet I *can* say that of an otter, and even a bird—namely, a macaw.

But devotion to the home is a different matter. Here we are on certain ground. Every cat, even the

most night-roving male, as said earlier in this chapter, is attached to the place where it lives, and if taken away tries its hardest to get back. The stories of amazing journeys performed by cats that have been taken from home and wish to return are so many that, even allowing for exaggeration and the well-known desire of the story-teller to improve his yarn, enough remains to point to the cat having exceptional homing powers. All the same, I do not credit it with any unknown sense or supernatural power of finding its way. Most of the cases of cats returning to their homes can be explained by a combination of chance and the excellent knowledge of the country-side possessed by most cats. As with the dog, we hear nothing of the large number of cats that are continually being taken by their owners to new places and either do not attempt to regain the old locality or fail to do so. It is only the exceptions of which we hear, and of these the most is made!

Nevertheless, puss remains a mystery, for however we may scrutinise her behaviour, however we analyse her conduct, whatever deductions we make from what we see of her, we cannot, after all, be sure we are any the wiser as to what really goes on behind her inscrutable green eyes!

PART V

A WILD ANIMAL—THE FOX

CHAPTER I

THE FOX AS A TRULY WILD ANIMAL

Owing to it having been for so long a beast of the chase, and the important part played by fox-hunting in the social life of the English country-side, the acuteness and cunning of the fox has become more than well known, it has become proverbial. Popular legend endows the fox with great sagacity, a wealth of stories and anecdotes supplying circumstantial evidence of its seemingly marvellous understanding. Whatever a fox does, according to the general idea, is done with forethought and design. Whereas most birds and mammals are popularly supposed to act "by instinct", the fox is credited with extraordinary intelligence, and its most ordinary actions ascribed to plan.

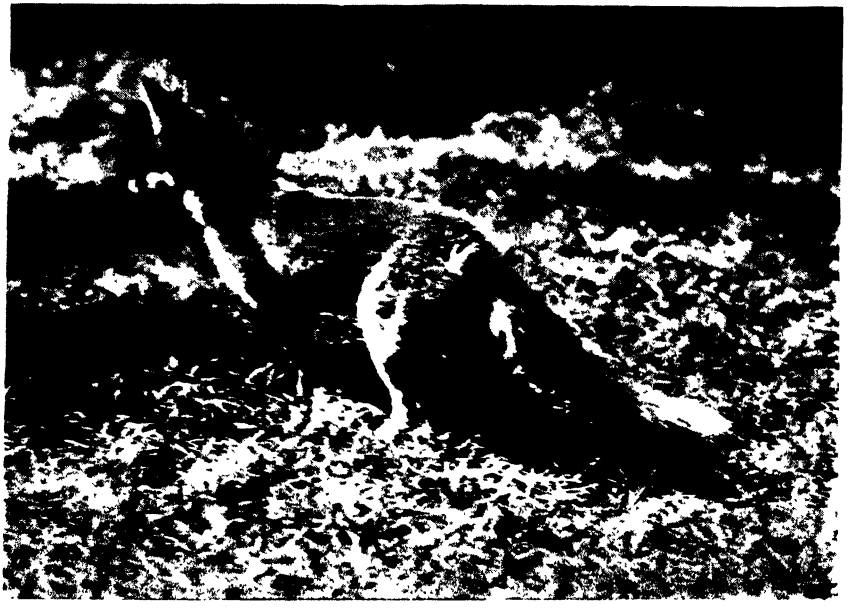
Before going into the behaviour and intelligence of the European red fox, *Vulpes vulpes*, it may be as well to consider the conditions under which it maintains existence in England, where my observations have been made, and the factors that bear on its behaviour. By reason of the sport of fox-hunting it is more or less protected in rideable parts of the country. "More" in the Midland Counties, "the Shires" of the fox-hunting world, and "less" in what is termed the "Provinces",

until in the outlying districts it becomes mere vermin, with every man's hand against it. Even in hunting districts there is a considerable destruction of foxes by rabbit-catchers, gamekeepers and others, the number annually put down by these persons being only realised by those intimately associated with the sport of fox-hunting. Over thirty years' experience of hunting affairs, as a partaker of the sport, as a Hunt Secretary, and latterly as an M.F.H., has convinced me that in the average hunting country for one fox killed by hounds four come to some other end, usually that of trap or gun, and that not two per cent. die a natural death of old age. Despite general belief to the contrary, it is only in that heart and hub of fox-hunting, the Shires, and one or two areas such as the Duke of Beaufort's Hunt, that foxes are really protected. Elsewhere they are partially protected, tolerated for the sake of sport, or not tolerated at all where the game-preserver's interests are dominant, and so we may go on, foxes in these areas having many worse foes than hounds to contend with. As remarked above, the degree of toleration wanes the further one gets away from the Midlands and chief hunting districts; though even in many outlying places fox-hunting is practised—for instance, there are the sporting foot-packs of the Lake District.

The point, however, that I want to emphasise is that the fox is everywhere a truly wild animal, even in the holy of holies of fox-hunting, having nothing in common with the semi-domesticated, hand-reared pheasant, and that in the greater part of the British Isles it has many foes to fear, its least one, paradoxical as the statement may sound, being the foxhound.

If fox-hunting came to an end it is certain that the fox would speedily join the wild-cat and pine-marten as a refugee on the wildest and most inaccessible hills; but the meed of protection it receives has not interfered with its natural life, nor with its behaviour—it is still a really wild animal. In fact, the fox is probably a temperamentally wilder animal than most of the mammals of remote parts of the globe.

In *Animal Mind* I gave at some length my observations, and opinions derived therefrom, on timidity in wild animals, and particularly on what is usually spoken of as "fear of man", showing that there is no such thing as instinctive fear of mankind, but that the mammals and birds of those parts of the world which have long been occupied by man are exceedingly nervous of anything in the slightest degree unusual or strange, for the simple reason that only shy and wary ones have been able to survive. On isolated and seldom visited islands we still find species that are unafraid, that view strange things, and particularly human beings, with inquiring curiosity, showing no apprehension of danger. There is the most delightful account in Mr. Beebe's *Galapagos: World's End* of sea-lions that swam up to investigate him while he sought for seashore specimens, and we find many similar accounts of the tameness of the creatures of out-of-the-way islands. Such bold animals have no chance of survival where there are human beings animated with the mania for destruction, and we find that all the larger mammals of the civilised parts of the world have a fund of inherent timidity. They are high-strung and nervous, always ready to be afraid, and liable to panic.



(1) "POPULAR LEGEND ENDOWS THE FOX WITH GREAT SAGACITY"

(2) "SHE WAS THE MOST FEARLESS AND IMPUDENT OF LITTLE CREATURES"

The fox is no exception. It is as shy and timid as any creature, perhaps even more so; but contrary to the generally accepted idea I cannot find any evidence that a young fox viewing a man for the first time knows him for what he is. Experience may teach it, but its instinctive response is simply an impulse to bolt from something strange and therefore alarming.

No, I have had several tame foxes and have noted their behaviour with care, in no case seeing anything to denote fear of man *as man*, but plenty denoting timidity of anything strange. I had a hand-reared vixen, which I got as a twenty-four-hour-old cub, and brought up with considerable difficulty; she was the most fearless and impudent little creature with her human friends, and not afraid of strangers, so long as she had time to have a good look at them and was not startled. Yet a strange sound, or meeting something suddenly which she had not seen or smelt before, was enough to make her flee in panic and race upstairs to the room in which she slept. Her behaviour was equivalent to that of a wild fox when it bolts for home and goes to ground in its earth.

Through education Toby was bold, but she had an inherent timidity which came to the fore when she was startled. It was the same with Tommy, another pet fox; he was not nervous of anyone whom he had time to inspect, but was subject to sudden alarms. When thus startled he would bolt in headlong panic, and to guard against losing him I had to put a light line round his neck, which checked his rush. These remarks likewise apply to Timothy, a third fox; he was perfectly confiding with me, but exceedingly nervous of anybody or anything strange, and liable to panic

teasing the cats, in complete heedlessness of my calls. Then I had to resort to stratagem, going to the farther side of the bushes and making a sudden noise, such as beating on a tin tray. This had instant effect, a flash of sandy-red bolting for the front door telling that the cub had rushed home. But one had to make a different sound each time, as if the same noise was used again it had no effect. The second time I banged a tin tray the fox ran out of the bushes and straight to me to see what the din was about. Curiosity was then the strongest factor and able to come to the fore owing to *boldness* acquired through her upbringing. I proved again and again that it was not the amount of noise or kind of noise that was alarming, only its strangeness, and that it was the same with objects and odours. Careful watching of Tommy, Toby and Timothy, also of wild foxes, and particularly of cubs playing at the mouth of their earth, makes me think that their frights and panics are often, though not always, reactions to unexpected sights or sounds, without any qualifiying recognition of the source of alarm. They do not bolt *because* they are alarmed, but spring away, as we blink an eye or a horse shies from an object,

and realise afterwards what it was that startled them, which recognition may either wipe out the alarm or intensify it. But every such experience qualifies future response. With regard to Toby, that which was unusual was treated as if it might be dangerous, but as the fox had been brought up with human beings and among human smells, they did not come under this heading.

To the wild fox human smell, to say nothing of a human presence, is so different from anything in its normal environment that it is exceedingly alarming. And the fright felt at the first sight of a person is so much experience, to be a further factor in making the fox even more shy and wary next time it meets a human being.

This somewhat lengthy dissertation on the timidity of the fox is not meant to imply that the animal passes its time in a state of trembling fear, for the exact contrary is obviously the fact. With all animals fright passes quickly, emotion following emotion, fear being succeeded by anger, joy, or some other feeling, as rapidly as in the case of the little child, whose April shower and sunshine existence bears witness to the rapid and transient flow of its emotions.

Thus we see the fox as a nervous, highly-strung animal, ready to react to the appearance of anything strange with alarm and swift retreat; moreover, as a truly wild one, which, though it owes its continued existence to our protection, shows no sign of abandoning its independence.

But to get a real comprehension of its mentality and the factors that govern its behaviour it will be necessary to consider its life-story.

To begin with, the fox is a solitary mammal, in the sense it is not a pack animal and has nosocial tendencies. Like the cat, "it walks by itself", and has no impulse to

follow a leader. This is at once apparent in tamed individuals, and is probably the reason it has never been domesticated. I do not doubt that in actual understanding the fox has as acute a brain as the dog, but it is utterly without that docility of disposition and tendency to submit to a master which is the striking characteristic of our good friend.

In using the expression a "solitary mammal", I must guard against being taken too literally, as I have reason to believe mated couples keep in touch with each other the twelve months round and often hunt together.

It has been proved in connection with fur-farming that the so-called silver fox, otherwise the melanistic form of the red fox of North America, which differs but slightly from the European red fox, is strictly monogamous. In the early days of breeding these black foxes for the sake of their pelts, one male was expected to consort with several females, but barren vixens and much disappointment ensued. It was then discovered that the foxes paired, mate being faithful to mate, whereupon followed a great boom in the prices of guaranteed mated pairs.

Many years' study of the ways of the British fox has convinced me that it, too, is monogamous. The very fact that the dog-fox helps to feed the cubs, carrying birds and rabbits from afar to bring them to his family, is convincing without other evidence, but there is such evidence—snow affords it.

When the country-side is covered with a fair white blanket, and no bird nor beast can move across that surface without leaving a tell-tale impression of its doings, the foxes write plainly, in the script of pad-mark and trail, the history of their comings, goings,

and the manner in which they came or went, i.e. whether singly or in company.

Many and many an hour have I spent following fox-trails in the snow, noting how frequently these impressions were double trails—that is, consisted of two sets of footprints, a larger and a smaller, presumably of a dog-fox and a vixen hunting together. Often, too, when I have come across a single trail I have not followed it very far before it has been joined by a second, and the two have proceeded together. Here is a description I jotted down of such a double trail:

"Among the trails on the snow are two where the rabbits had been going fast, where they evidently raced for home, flying over the snow in great bounds. Beyond these tracks are some more footsteps, small dog-like ones—namely, those of a fox. No doubt it was from the fox that the rabbits fled in such alarm. Looking closely at the fox-trail, some interesting details become apparent—it was made by two foxes stepping one behind the other, the last stepping almost in the footsteps of the first. Turning, I follow their tracks, which pass down the slope towards the covert ahead, noting as I do so that one of the foxes turned aside from the direct route to call at a large molehill (such spots serve as news agencies in the wild world), whence a whiff of rank fox smell greets my nose. No doubt they were a pair, hunting together, and it was the dog-fox that paused at the molehill. Studying the trail, it is apparent that one set of footprints, that of the fox which went first, is slightly bigger than the other; so one can picture the two, the dog-fox leading, gliding across the snowy waste, silhouetted by the moonlight

as dark shapes against it. By now, no doubt, they are tucked up asleep in some snug retreat; still, I follow on, to see what they have been doing. Through the bushes and into the wood goes the trail—a wood that is like fairyland, so exquisite are the trees and undergrowth in their clothing of white. Nothing stirs, and it seems sacrilege to push forward into this woodland peace, where all things are hushed and a truce, the truce of the snow, appears to brood over all.

"But the truce is more apparent than real, for on the snow lie scattered some feathers, grey ones, those of a chaffinch, and a few bloodstains on an ancient stump tell where the hawk has feasted—well, snow or no snow, the hawk has got to live!

"And as for the foxes' trail, that leads on and on; I follow it by brakes and through briers, across a deep dingle, past the pheasants' feeding-place, by fallen trees, onwards through the wood, and at last out into the fields again; and save for one or two deviations of a yard or so, the two trails are inseparable. It was evident these two foxes went everywhere together and never parted company.

"Once out of the wood the pair went straight across the middle of a big field, only turning from their course to investigate a newly-raised mole-hillock (molehills are most attractive), which shows raw and red against the snow, and then trotting on for a certain well-used 'smeuse' in the next hedge. Foxes do not go through fences at any or every spot, but have their recognised passages or 'smeuses', which are known to all the foxes of the district. These ways are used also by rabbits and hares, but not by badgers, which generally go through the gates, though gates, however

convenient, are despised by the foxes. The latter avoid the works of man as much as possible.

"The pair in question went next across a plough-ground, passing close to a roosting covey of partridges, whose 'squat' is plainly outlined in the snow, but had not scented them, though they had evidently smelt a field-mouse, for there is shown the impression where one of the foxes pounced, failed to catch the mouse, and then poked about in the snow.

"In another place the two indulged in a game and had a roly-poly in the snow, which even shows the impression of their fur where they rolled—what fun they must have had playing under the moon!

"I follow them for some way, it becoming evident they were making a circular tour that led them back to the wood. Here is where they investigated some hedgerow rabbit-holes—was my lady thinking of the day, as yet some time ahead, when she would be needing a nursery? And there, near the wood once more, is where they paused in the middle of the field, apparently to listen. The two trails are here a few feet apart, and one can see how the two foxes stopped simultaneously and listened. What was it they heard? Whatever it was it frightened them; for they sprang to one side and went off, full gallop, to the covert."

I have transcribed these notes in full because they give some idea of the way the pairs keep together and work together.

To get a yet better idea of the fox mind and of fox conduct, it will be as well to run through the annual cycle of behaviour and consider how far it is ruled by inherent responses and how far by practical judgment; this, however, will need a chapter to itself.

CHAPTER II

THE YEAR'S CYCLE OF BEHAVIOUR

It is difficult to find a natural starting-point in describing the life of a fox throughout the season, because in reality there is neither beginning nor end to the annual cycle of behaviour of any mammal or bird that breeds each spring. The sequence runs its course smoothly and without break, each happening and series of actions being the inevitable forerunners of the next, so that it forms a whole admirably timed to secure the production of offspring at the date most suitable for them being successfully reared.

In the case of the fox, our best starting-point is perhaps December or January, which is not only the end of one year and the beginning of the next according to the calendar, but also for the fox, as it is then that it pairs.

I do not use the word "mates", as many foxes will have found mates in previous seasons, and, as mentioned in the last chapter, not only is monogamy the rule, but there is evidence that the couples remain wedded so long as either partner survives and they are not forcibly divorced.

However, each winter finds a number of young unmated foxes in the country, also many older ones that have lost their spouses by one means or another. Thus it is that the winter nights find considerable excitement stirring in the woods, dog-foxes barking

here and there, the two or three short, gruff yaps of their kind, and vixens screaming.

What a piteous, hideous noise is the latter cry, a strangled yell, as of some being in dire torment. Whether this is the sole cry of the vixen is a moot point, most country persons asserting that she does not bark. But I would not like to be dogmatic on the subject, and see no reason why she should not yap on occasion; however, evidence is lacking. Her scream is chiefly heard at two times, in the excitement of the breeding-period, and when calling cubs to her. It serves the dual purpose of a sexual call and a maternal one, but is louder and more thrilling, not to say awe-inspiring, when used in the former respect.

Observations on the preliminary actions with which wild foxes lead up to actual pairing are necessarily oral rather than visual, for the courtship invariably takes place at night, when human eyes are of little use, and only our ears can gather tidings of what is going on. Yet by waiting and listening in the dark you can learn a great deal, as on the evening when I heard a commotion, and foxes barking on all sides. "It was barely dark", I wrote in my book *Woodland Creatures*, "when the first began. 'Wough! wough!' came faintly from the distant dark smudge, which in the failing light indicated a wood-clothed valley. The nearer coverts loomed black and forbidding through the twilight, and from their dim and mysterious recesses came the hoot of first one owl and then another. Hill and valley echoed with their thrilling cries, mingled with which came faintly the bark of another fox. It was a long way off and in the opposite

direction to the first; both foxes, it was evident, had just emerged for the night's prowl, and were greeting all and sundry. By the way, a fox as a rule barks early in the evening, before beginning his night's hunting, and it is exceptional to hear one later. A fox will sometimes bark on his way home in the morning, but even that is not usual. The general practice is to begin soon after dark, continue at intervals for an hour, or perhaps more, and then go off about the business of the night."

Here a digression for a moment, please, to say that the barking of the fox appears to be akin to the song of birds, and to serve the purpose of letting other males know that the one which barks is established in a certain territory, where trespassers will not be welcome, also of notifying the females of the position of the males, especially those without mates.

On the evening of which I am writing, "another and yet another fox joined in, until it seemed as if there were at least twenty barking. Most of the cries came from far away, from the distant woods across the valley, but one rang out quite clearly, the fox was not a field's length off. Allowing for the fact that most of the animals were on the move, that not one of them called twice from the same spot, which made the number barking seem much greater than it really was, there must have been eight or nine calling within a mile radius of the spot where I stood. 'Wough! wough!' came again the bark of the nearest fox, nearer still this time, and sounding weird and thrilling in the dark, through which one could see little save the indistinct black shapes of some cattle that were

lying out in the meadow. Vainly I peered into the darkness in the hope of seeing something of the fox, for it was invisible." But hardly had its bark died away, than fox after fox replied. "The explanation of the excitement, the answer to all these calls, came suddenly and unexpectedly—out of the darkness near at hand came a wail, a terrible, mournful cry, rising and shivering away through the still night air, like the last gasping cry of a lost soul in torment. A mixture of a whine, a gasp, a spit, and a howl, which startled even the hooting owls into silence. . . . It trembled to and fro on the echoes ere dying away into silence, after which, for some minutes, not a sound save the slight rustling of the leaves upon the trees was to be heard. Then again rose the gruesome cry, cutting through the peaceful night, and making one wonder if, after all, it could come from the throat of any mere animal, or was uttered by some lost soul wandering beneath the trees. . . ."

The dog-foxes replied from all sides to the vixen. "Three times at intervals she screamed her answer, after which silence fell, save for a fox that yapped once in the far distance, and though I listened long I heard no more." What happened afterwards remained a mystery of the night.

As to the interpretation of it all, undoubtedly the vixen was in condition to mate, but it should be noted that the dog-foxes were barking excitedly before she screamed. I have already mentioned that foxes bark regularly during the breeding-season, but this evening song is a different matter to the excited barking recorded. They would seem to have been aware of

the vixen and her condition, possibly if not probably by means of scent—how little conception have we, with our blunted noses, of what is carried upon the breeze!—and this roused them to the fever of emotion that set them all abarking and brought them to her as to a focus-point. Her scream hastened them, but they were coming without it. Whether she was a young vixen seeking a male, or whether she was an old one calling her mate to her, I cannot tell. The gloomy night swallowed them all and no more was heard.

That the dog-foxes sometimes fight either through territorial aggression or for possession of the females is known. My brother was an ear-witness of a furious combat one night, when two foxes tumbled about near him, snarling and growling as they crashed through the woodland undergrowth. They fought for some time ere making off into the darkness, when it was evident the battle had been a stern one.

With regard to the question of foxes having their own beats, the reader will probably be asking how this can be reconciled with the well-known fact that dog-foxes often travel far afield in the spring. If foxes are really stay-at-home animals, how do we account for a dog-fox being found some March afternoon six or seven miles from his district? It is a common happening in the spring for the hounds to find a fox in some wood and run him miles across country to a distant earth, to which he goes with the straightness and exactness of one that is making for home. Such a pilot is always a dog-fox. The accepted explanation is that he was away from home after a vixen, which is no doubt correct so far as it goes, but does not explain why he

should have been travelling at a time when most foxes have been mated some while and many even have family cares on their shoulders (many litters are born in March). My opinion is that these spring wanderers are foxes which have either failed to obtain mates or have lost their vixens.

A spring snow will betray, in addition to the footprints of "happy pairs", cases where a third fox has followed a vixen and her mate across the meadows.

As I shall deal presently, and at some length, with the devotion of the dog-fox to his mate, there will be no need to dwell on the behaviour of the pair from mating-time up to the birth of their litter, save to remark that as the latter event approaches, the vixen spends much time seeking a retreat, exploring holes, and at last enlarging one to make an earth.

The cubs are small, blind and helpless at birth, and the mother lies with them for some days, during which time the dog-fox supports her, bringing provisions to the earth. Apart from other evidence, this habit alone testifies that monogamy is the rule with the red fox, as it would clearly be impossible for one male to provide for a harem of vixens and their families.

In considering the devotion of the male to his mate and offspring, we may attribute it to an hereditary tendency based on the necessity of the vixen having help at this critical time, and later during the rearing of the cubs; also the difficulty a predatory animal experiences in securing sufficient food. This latter fact is no doubt a contributory factor in spacing the foxes. By that I mean making each pair keep apart from

other pairs. My experience is that under normal conditions, i.e. when foxes are not exceptionally numerous, you do *not* find several litters close together. The size of each occupied area varies according to the district, the fox population and the food supply. A dog-fox on the Fells of Westmorland and Cumberland, or in the Highlands of Scotland, will have a wider area to hunt in, and have to cover many more miles each night, before he finds supplies for the cubs, than his relative in the heart of Leicestershire.

The mistaken idea that two or more litters of cubs are often found near together is based on the way the vixen moves her family. She will remove them from one earth to another at the slightest provocation. For instance, a gamekeeper finds a hole obviously tenanted by foxes; he walks about in front of it, and finally goes down on his knees to see if he can "smell 'em up the hole", thereby sending a whiff of tobacco-laden breath into the burrow. This reaches the vixen's nose, arousing in her much uneasiness and discomfort. Whether she recognises it as human, and a keeper at that, we cannot say; we only know that her nervous disposition, more than ever to the fore now she has a family, is brought into full play—she takes the cubs away that night. When the keeper finds her new residence he invariably jumps to the conclusion that he has found another litter of cubs; ditto when she removes them again. The psychology of the gamekeeper under these circumstances affords nearly as interesting a study as does that of the vixen! He, nervous as to the welfare of his pheasants, is ready to believe there are three times as many foxes about as

is actually the case; while the female fox, a bundle of suspicions and maternal solicitudes, is prepared to move her family from place to place at the faintest hint of anything unusual about their home.

The vixen soon gives up lying with the cubs, and betakes herself to a lair in some nearby bush or adjoining earth, where they cannot worry her, for growing, as they do, amazingly quickly, they are soon lusty youngsters, and the most playful of young things.

The fox is always a beautiful mammal, but cubs are the acme of grace and fascination, and there is no more joyous sight than a litter at play, such as the family I watched one April day, when the daffodils by the stream-side were bobbing their yellow heads and the young green tassels of the larch waved in a chilly wind.

Three of us walked across a ploughed field, dried by the spring winds, towards a fence, over which we could look and scan the meadow beyond, where the turf sloped gently to the edge of a bank, really the side of a hill that formed the verge of a wide, extending vale. To the left was the fir-wood, away to the right a small coppice, and between, along the edge of the steep slope, an irregular fringe of old trees, a lime, an alder, and one or two others. The lime overshadowed an ancient quarry, an oval recess in the bank whence stone had some time or other been excavated, and to this our guide pointed, mutely indicating some holes on its farther side. For a moment I did not realise what was there, my eyes only taking in the scene as a whole—the old brown tree that overhung the spot, a tumble-down fence of wire, the tender greenery of the budding bushes and larch-trees beyond, the hazy

beauty of the valley pictured in greys and blues, and in the foreground the pinky-red of bare earth. Across that bare soil something moved, and in an instant my eyes and attention were focused on a fox-cub. It had paused at the mouth of one of the holes, its sandy-coloured form showing up against the dark entrance, as it stood, head turned in our direction, ears pricked, listening intently. Had it heard us? It did not seem so, for at that moment another cub appeared, raced after number one, caught it by the flank, and the first, forgetting all suspicions it may have had, cast care to the wind, turned about, seized its brother (or sister!), and the two rolled over in a hearty scrap.

Other cubs appeared as if by magic; the place seemed alive with young foxes, racing here, scampering there, and playing like a lot of puppies. We were about fifty yards from them, but everything they did was clearly visible, as when one picked up the white wing of a fowl and danced with it—what midnight raid did that wing betoken, and what bills would the Hunt Secretary presently receive? They played and played, we watchers standing transfixed by the sight of these graceful young things at play in the sunshine. It had been a cold, rather cheerless morning, but the sun had now come out, and it shone warmly on this sheltered bank, being probably the reason of the cubs being about at this hour. It was now 1.30 by our watches, i.e. by summer-time, but only 12.30 by the sun, an unusual time, in my experience, for cubs to show themselves. If you want to see fox-cubs, the early evening is best, and next best the very early morning, before the creatures of the night have retired for the

A FOX-CUB, "THE ACME OF GRACE AND FASCINATION"

day. At the break of day foxes, old and young, may be seen abroad, ere seeking their sleeping-places; yet here were these cubs running about in the midday sunshine. It was like watching a cinema, for hardly any sound reached our ears. One little fellow walked across the screen with his brush (that was to be) held stiffly out, displaying a white tip which promised a fine tag by and by. His slender, immature form, pricked ears and keen, inquisitive face made him a particularly charming youngster. He turned his little foxy head and gave us a yet better view, the while his quick eyes followed something on the bank below.

How many cubs were there? It was not easy to say for certain, because they kept racing and chasing each other, and popping in and out of the holes. There were at least five, and possibly six. They played on happily, until we people, trying to creep closer, made a slight noise, when they were gone in an instant. Playful youngsters though they were, the fox wariness and wildness was there, and ready to come into action at any slight unusual sound. They paid no attention to the creaking of a farm-cart up a nearby lane, nor to the buzzing and tooting of motors on the highway in the valley, but when I stepped on a twig they went to ground without tarrying to see what the slight cracking signified!

As a further illustration of the behaviour of young cubs, I transcribe the following description from my notebook:

"Something sandy-coloured slipping through the tangled greenery of a fence, a shape gliding across a dark, shadowy gap between the stems—a cub! The hedge is high and old, a tangle of unkempt hawthorn,

briers and rose-bushes. Its bank is riddled with holes, ancient rabbit-burrows tunnel it in all directions, and one of these has been converted into a fox-earth. Where the bank rises high and steep, and hawthorn-roots lie like twisted ropes upon the red soil, are certain dark holes, the entrances to the cubs' dwelling.

"Some blackbirds farther up the fence break into a volley of abuse, shrieking and chattering their alarm and annoyance—a cub, or cubs, is about. A white-throat breaks into fussy scolding from its hiding-place in a nettlebed, then a cub appears gliding forth from the shadows. For a moment it stands, perfectly still, not a hair or a whisker quivering, not even its nose twitching, and I hold my breath lest it should hear me breathe—the sun shines on its sandy jacket (it is but a half-grown cub and has not yet acquired the coat of red-gold that will come presently), on its keen, alert little face, delicate muzzle and pricked ears.

"Inquisitive youth is here, looking forth with amber eyes at the wide world of green field, dotted with buttercups and daisies, and the long lines of the old gone-wild hedges, whose tall hawthorns are so white with blossom that they look as if laden with snow. The air is heavy with the scent of May, flies hum drowsily and rabbits feeding by the fence flick their ears lazily. Still the cub stands and gazes, its slender, immature form showing up against the dark entrance to the burrow and the greenery of the hedge—next moment it is gone.

"I creep quietly away, climb through a gap in the fence, and find a position that commands an even better view of the earth, of the entrances and exits lying on the opposite side of the hedge to that where

I watched first. I am now on the sheltered side, where no breath of air stirs, and the sun blazes hotly, but however hot it may be I must wait, with the patience that those who would see wild things going about their business must ever possess. This time there is not a great call on my stock of patience, for in a short while a biggish cub appears.

"As before, a reddish shape is outlined against a dark space, but this time the cub comes forth and sits down in the sunlight. He (for its size indicates a dog-cub) is as big as a terrier, and it seems the cubs are about two months old. As I watch him he gives me a view of inherited aptitude coming into play. There are several rabbits feeding near. The cub turns his head and with pricked ears regards one with a steady gaze. Then he steps forward very gently and softly and begins to stalk it. The rabbit flicks a lazy ear and hops off. The cub makes a dash, the rabbit bolts, and there is a headlong scamper down the bank. The rabbit, with a bob of its little white tail, vanishes into the bushes, and a crestfallen cub trots back to the earth. His dash was perhaps half playful, but it was play founded on the hunter's instincts, and likely to prove perilous for the rabbit.

"The cub goes down a hole and I see no more, save the remnants of the various victims on which the cubs have feasted, for partridge wings, fowls' legs and rabbit-skins are numerous about the earth."

So closes this entry in my notebook, with a reference to the provisions on which the cubs had lived, all of which had, of course, been provided by the old foxes, for, however considerable their inherited aptitude

for hunting, young foxes cannot keep themselves. Now it is a remarkable fact that despite the heavy drain on their resources the parents seldom, if ever, kill near home. I have several times known of a litter of cubs near a farmstead, yet however heavy the toll levied by the vixen and dog-fox on the hens of neighbouring farms, those of the farm nearest the earth were immune from attack. Some persons attribute this to the cunning of the old foxes, which do not desire to draw attention to the presence of their offspring. To say their conduct is a matter of intention would seem to imply an amount of forethought and a degree of ability to look ahead and weigh up consequences that would involve mental capacity in excess of anything we have met with in other animals.

I am more inclined to attribute the fox habit of going a little distance from home before beginning to hunt, to an unconscious tendency, which has been preserved owing to the need of the young to have a goodly supply of quarry at hand when they begin to kill for themselves. This system ensures the area around the earth having a supply of game. Were it otherwise, the cubs would begin hunting in a neighbourhood denuded of everything easily catchable—but do not, please, read into this paragraph anything derogatory to the understanding of the fox. If many of its actions are governed by aptitudes and instincts, it has, nevertheless, a shrewd judgment and practical understanding of everyday affairs; but between practical judgment and consideration of the future consequence of actions, there is a wide gap. Hence I say that here popular opinion credits too much to the fox.

CHAPTER III

YOUNG FOXES

Young foxes, as hinted in the previous chapter in the account of the cub chasing the rabbit, early display an aptitude for hunting. This is as much part of their hereditary make-up as is a similar tendency in the case of a hawk. In the latter case I have seen stimulus pull the trigger of instinctive response. I was carrying a young sparrowhawk on my wrist, which having been taken early from the nest and hand-reared had been deprived of parental precept, guidance and example. It could not have learnt anything from its parents, because it had no opportunity. This hawk had been well fed on food of my providing and had grown into a beautiful young bird, but it had hardly seen other birds and had never flown at one. I was, as I said above, carrying it on my wrist, where it was sitting happily, making no attempt to fly off (though two light leather straps, one round each leg, known as jesses, attached in their turn to a leash, would have prevented it going far), when a blackbird dashed out of a bush close at hand. In the same instant the hawk flew violently from my hand, flapping frantically at the end of its jesses in a vain attempt to get after the bird. It had been in a semi-sleepy, indifferent state until the blackbird flew out so suddenly, but was galvanised into instant action. There was no time for consideration. It was as clear an instance of impulse as one could wish to see. The following morning I took the hawk out to some bushes whence birds would have to fly

across the open, and, removing its leash, prepared to let it fly after any quarry that might be forthcoming. Out came a thrush and away went the hawk, flying after it with the greatest determination, though only to be beaten, for the thrush dived into a hedge and the hawk could not see where it had gone. But after this, experience began to qualify the instinctive response of the hawk, and the next time I took Bessie out she watched the bushes for birds to get up, quivering with anticipation every time a leaf stirred—her primary inherited impulse was now overlaid and controlled by knowledge and deliberation.

All this may seem to have little connection with fox-cubs learning their business as hunters, but it has really a good deal, because the fox-cub, like the hawk, starts life with a considerable equipment of inherited tendencies, aptitudes and instinctive responses. It has a tendency to stalk and chase any moving thing, from a leaf blown by the wind to a rabbit nibbling the grass, and its conduct throughout life is a combination of these aptitudes with the results of its experiences—I mean the knowledge derived from experience.

Bergson has likened experience to a snowball on the snows of time, every rolling on, rolling on itself, gaining all the while, never the same and always increasing. The core of the fox's snowball, quite a big ball with which to start off, is its hereditary equipment of responses, what are commonly termed instincts, and around these adhere the gathering snows of experience. On a tendency to stalk and chase, to bury unwanted food (of this more anon), panic at the sight or smell of anything strange, etc., is built up the education derived from experience, which will qualify all future actions.

The young fox, from the time it first goes to the mouth of the earth and looks forth at the wide world of trees, bushes and greenery, is steadily accumulating education—but does the old vixen or dog-fox do anything to train the cubs?

In a way, yes; in a manner, no. As the cubs get older and bolder they follow their dam out into the woods at night, and there is no doubt they profit by her example and from her leadership. Through following her they learn their way about the country-side, and to know the fox-routes from place to place, the best drinking-places and natural bridges, or stepping-stones, across the streams.

That this is due to the leadership of the vixen is proved by the behaviour of motherless cubs. It is well known to those connected with fox-hunting that if cubs are captured, reared in an enclosure and turned down when able to feed themselves, they will keep themselves without difficulty, but they invariably prove unenterprising foxes that will not leave the home covert. Having had no parents to conduct them on hunting expeditions and lead them about the country-side, they do not know where to go when pursued by hounds, so they just run round and round. *Bona-fide* wild cubs act differently, and if not as bold as old foxes, behave more boldly than hand-reared ones.

I am speaking not only of what is generally known, but what I have personally observed, and if there were no other considerations involved, I would for this reason alone depreciate any turning down of cubs, or removal of cubs, in a fox-hunting country—in the absence of their mother, and the education she gives her cubs, the youngsters will grow up into stay-at-home

foxes, which will probably not survive to gradually acquire for themselves the knowledge they would have derived from her in the course of their first autumn.

But the reader must not imagine I mean to imply that the vixen takes her cubs out with "malice aforethought" and the intention of showing them round and teaching them their way about, i.e. that she gives them purposeful, deliberate lessons. No, I believe the lessons to be the result of the youngsters' desire to go out and explore, and likewise to follow their dam. In their inquisitive ambition to see the woodland world they trot after the vixen as she sets forth to hunt, and she suffers their company rather than the opposite. The lessons the cubs receive are those of example.

Thus they learn much, and are soon competent to find their way over a considerable area around their home. They have also gained experience in hunting and stalking, and the early autumn finds the cubs self-supporting. They are no longer in any way dependent on their parents, whom they rival in size and good looks. Yet the family tie persists for a little while longer, though the seeds of disruption were sown when the most forward cub made his first kill.

Previous to that the cubs had all lain in the main earth, but when they began to hunt successfully for themselves (field-mice, frogs and dung-beetles figured largely on their menu) there was no longer any special need to keep near home. Before, they had had to await their mother or their sire and the provisions that would be brought them. Now it does not matter, and they choose all sorts of sleeping-places, one in a big rabbit-hole, two or three out in the bracken, and perhaps one in the old home.

Not being truly social creatures there is no tie to

hold them together; brothers and sisters meet to play and part again—a spreading-out tendency is at work. The attraction of home will keep them about the neighbourhood, even the very wood in which they were bred, for a while, up to the middle of October or even November, but it will be as individuals that they stay, not as members of a pack, or even of the family. It is a case of each for himself or herself, and complete independence for every unmated fox. It is only when he or she arrives at sexual maturity that loneliness is felt, and desire is expressed (in muffled bark or wild wail) for a companion with which to roam the woods.

But before that day arrives, which completes our account of the year's conduct of the fox population, the young foxes will have still farther spread out; each being impelled by the exigencies of the food supply, pressure from the elders and by the desire for territory, to wander farther and farther afield, so that early winter may find them established some way from where they were born.

What of the old foxes? They, relieved of family cares, spend the autumn quietly about their old district, the dog and vixen keeping in touch with each other, usually spending the day in the same covert, but not travelling in company at night. Yet, bar troubles and disasters, they remain wedded (or so I interpret the evidence!) and only await the approach of another breeding-season to consort more intimately than ever.

Thus we return to the point from which we started to consider the annual cycle of behaviour of the fox, namely, the mating-time, and having seen that the fox's conduct does run in a cycle, must, in ensuing chapters, proceed to the consideration of details, especially such as throw light on the mind and intelligence of the fox.

CHAPTER IV

THE MIND OF THE FOX—THE HUNTER

The fox is essentially a predatory beast, gaining its living by preying on other animals, especially rabbits and birds. It may vary this fare with frogs, mice, and even beetles (the fox is exceedingly fond of the so-called "dor-beetles" that fly in the twilight, the hard, shiny elytra of which may often be found in quantities in its excrement), but such oddments are merely extras picked up as it journeys across the country-side, or tit-bits sought for in an idle moment as dessert after a more satisfying meal.

No; what it lives upon are creatures furred and feathered, the former category including rabbits and leverets—adult brown hares take too much catching to figure often on the menu—and the latter any bird it can pounce upon, such as a partridge, pheasant, or pigeon, and last, if not least (!), the domestic fowl.

According to some persons, it might be imagined that the fox never eats anything else, and in sober fact it does destroy a large number of poultry. I use the word "destroy" with intention, because it embraces birds killed and *not* eaten. It is certainly a fact that next to man the fox is one of the most wilfully destructive creatures that walk.

Most animals kill to satisfy their hunger. They hunt for food and nothing more. The peregrine is a good example of this, for the falcon, having stooped upon a bird, killed and eaten it, is satisfied and hunts no more,

retiring to some rock or other comfortable perch, where it rests and digests its meal in peace, both peace for itself and peace for other creatures. When thus sated, birds may pass close to it, and yet never rouse the impulse to pursue and strike. It rarely hunts for *sport*. The fox often does.

When the latter gets the opportunity to slay, it kills right and left, and its lust for killing lasts as long as there is quarry at hand. A minor illustration of this was when one of my tame foxes, Timothy to wit, got by mischance into a wire pen wherein there was a peacock, also a golden pheasant cock and four golden pheasant hens. In less time than it takes to tell, the fox had grabbed and killed first one hen pheasant, then another, tried to catch the peacock (which was too big and strong) and caught the pheasant cock. At that moment the commotion brought help for the pheasants. A rescuer came, and Timothy was chased from the scene of the slaughter.

It should be noted that he was not hungry at the time, having been previously fed, and that he made no attempt to eat the birds, merely killing them, dropping them, and racing after the next one.

Now compare this fox's conduct with some instances of fowl-slaying by wild foxes. One Sunday morning a farmer drove up to my home with over thirty dead young fowls in the back of his car. He had brought them to show to me in the hope of getting some compensation from the Damage Fund of the local Hunt. Many of them had had their heads bitten off, and others had been bitten across the back. He told how he had had fifty pullets living in pens in a meadow

some little way from his house, and that they were fed in the morning, after which they were left to ramble about for the day. The previous afternoon, when he had gone down the field to give the birds their evening meal, he had found the place, as he expressed it, "a sea of feathers", and fowls lying dead all over the meadow. Hurrying to the pens, he was just in time to see a fox making off, carrying a pullet in its mouth. He only saw the one fox, nor could I discover any evidence of more than one being involved in the massacre. The fox had evidently conducted its battue single-handed and had spent the afternoon in what, to it, was no doubt a most enjoyable fashion. I have elsewhere mentioned that foxes are not really nocturnal animals, and this one had been distinctly diurnal in its raid, which had indeed been a thorough one. Out of the original fifty fowls some forty were either missing or found dead, over thirty corpses being brought to me for inspection—the man received compensation from the Hunt!

Now for another instance of the fox's aptitude for slaughter—a neighbour of mine, a farmer, with a number of nondescript poultry, was in the habit of letting his hens roost where they chose, which was usually in the trees in the orchard. When comment was made as to the risk he ran, he replied that they had roosted there for years and he had never lost a hen—but one morning the fox paid a visit to the orchard, and such a commotion arose that presently it awoke the owner of the fowls, who ran out of doors into the chilly grey dawn to see his orchard white with feathers, hens lying here and there, and to catch a

glimpse of a fox gliding off. It had been at work for some time, since not only had it killed some eighteen cocks, hens and pullets, but had even buried one!

The fox is prone to bury unwanted food, but to hide a hen while engaged upon a raid seemed particularly impudent!

It would be possible to multiply instances of wholesale slaughter by foxes almost indefinitely, since it was my fortune, or ill-fortune, as Secretary to the Wheatland Hunt, to deal annually with large numbers of poultry claims. These gave me considerable insight into what a fox can and will do when it gets the opportunity. Needless to say, in many cases the opportunity was the result of carelessness, as in the case mentioned above, or in the case of the people who went to a Christmas party and left the fowl-pen open so that the fox helped itself to a Christmas dinner, but as we are considering the psychology of the fox, and not that of persons making poultry claims, we will turn to the state of mind of the animal when it is laying out hens right and left.

Perhaps we can get some clue to this by considering that of the fisherman when trout are really on the rise, when they are making many circles on the surface of the placid stream as it glides beneath the overhanging willows, and he hooks first one and then another spotted beauty. Does he go on fishing for the sake of getting something to eat? Does he stop fishing because he has enough for to-morrow morning's breakfast? Of course not! He never gives a moment's thought to one or the other. He is obsessed by the joy of the moment, the delight of casting his fly just where that

last dimple broke the surface of the water, of feeling the electric tug of a fish that has taken the fly, of seeing his rod curve, of seeing the beautiful game little trout fighting at the end of his line, of playing it, and at last bringing it to the net.

It is quite certain that he will fish on and on, regardless of everything but the sport, and there will be no desisting until the trout stop rising—*then* he will probably say that he has caught enough.

All the same, that fisherman would be horrified at being compared with a fox slaughtering hens; yet can we doubt the two are animated by the same spirit?

But we must not term the impulse that drives them on "the desire to *kill*"—the taking of life does not enter into the impulse of either of them; what they really want is to *catch* their quarry, yet it comes to very much the same thing from the point of view of the victims.

As the fox is an animal that hides a good deal of its extra food—I mean that which it cannot immediately eat; a considerable amount in the above cases!—it may be argued that it is not displaying a destructive but a provident spirit, for its extra kills are a provision for the future. I doubt, however, if there is any forethought or any other consideration in the matter. Why kill such an excessive number, the greater part of which must go "high" long before they can be eaten, and why bury some and not the rest?

The answer, or part of the answer, lies in the fact that the hiding of superfluous food is due to what we are so fond of calling instinct, i.e. it is based on an inherited impulse, for the smallest and most inexperienced of cubs display the typical reaction when

they find themselves in possession of more food than they can eat.

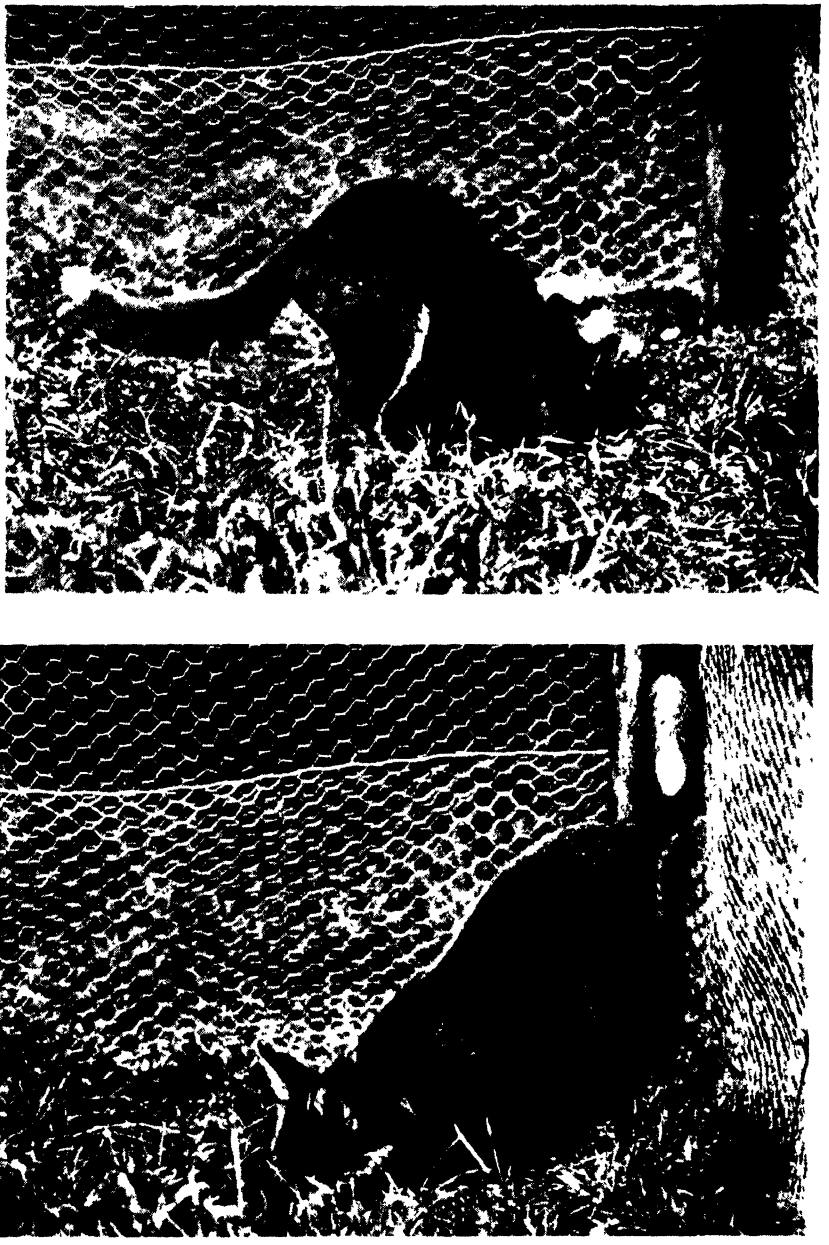
When Toby, my hand-reared vixen, was nearly eight weeks old and was eating well, I gave her a leg of rabbit, with fur attached. She gnawed at it, eating what she could, and then took the remainder to the corner of her sleeping-box, where she scratched in the blanket as if digging a hole. She then pushed the bone into the corner and next went through the movements of throwing earth over it with her nose, going through all the motions appropriate to flinging soil up, after which she poked at the bone as if pushing the earth tightly about it, though, of course, there was nothing with which to cover it, yet she turned away with a most satisfied air.

A few days later Toby interred a bone in the tray of sand which I had given her for sanitary purposes, and in this was able to bury it properly.

Timothy, the dog-fox, showed the same propensity while yet a toddling cub, endeavouring to bury all food he did not want to eat immediately. He likewise hid bones in the corner of his sleeping-box, going through the motions appropriate to proper burial; but it was when he was nearly full-grown and had the run of a shed with a tiled floor that I witnessed an episode which illustrated the instinctive character of the burying response.

Timothy had been brought up in company with Tiny, my terrier. The two were great friends, but this did not prevent them stealing each other's food now and again. One day I took them some chicken-bones, which were accepted with equal delight by the fox

and the dog, Tim seizing the biggest one and running off with it. He carried it around the shed, looking here and there as if in doubt what to do with his booty. There was a crevice between the tiles of the floor, about four inches long and one inch wide, and when he came to this he stopped, scratched at it, and then carefully pushed his bone into the narrow space. It was a tight fit, but he got his treasure in. Then he proceeded to bury it, though there was nothing with which to cover the bone; yet he went through an elaborate series of actions, a pantomime of drawing soil to the spot and pushing it over the cache. When all was finished, the bone was as exposed to view as when the fox began. The performance reminded me of the Hans Andersen story of the Emperor's new clothes. The burial was quite as non-existent as the Emperor's finery, yet Timothy turned from his work with all appearance of satisfaction. Tiny, however, was no party to the delusion that the precious bone had been hidden. She had finished her own one and now walked up to that which the fox had interred in the crack in the floor, lifted it out and began to eat it. The bewildered expression on the fox's face was comic. He watched her with pricked ears, though with no attempt to interfere, then walked up to his rifled treasury and sniffed the place long and earnestly. It was exactly as if he could not credit the evidence afforded him by his eyes. Finally, he turned about, and going to the dog, smelt her food. Did that sniff convince him that she had indeed taken his bone? Well, all I know is that he straightway came to me for another one, which he ate on the spot.



TIMOTHY, THE TAME FOX, BURYING FOOD

"DOES A FOX . . . HAVE A VISION . . . OF HIMSELF GALLOPING OFF WITH HOUNDS IN PURSUIT?"

Having so far stressed the unreasoning "reaction to stimulus" aspect of Timothy's conduct, I must add that his behaviour as a whole was highly intelligent, a hundred and one small details, difficult to describe and put on paper, showing how often judgment overrode the underlying outfit of inherited reactions. Experience and memory daily qualified his responses.

Apropos of memory, it is probable a fox has an excellent one, but positive tests are lacking. I proved that Madame Moses, my tame otter, remembered for over two years and three months. I had taught her how to get tit-bits by tugging at a dangling cord attached to a piece of cardboard placed on a fence five feet above her head. This card she pulled down and so obtained whatever was on it. Between August 6, 1928, and October 12, 1930, the cardboard was not used, but on the latter day I took it with me to the otters' enclosure and adjusted it on the fence while she was diving after a stick that I had thrown into the pond.

Moses came ashore, dropped the stick she had retrieved and, ignoring me, walked to the dangling string, took it in her mouth and gave it a smart tug, which brought the card and its bread and butter tumbling down. She lost no time in eating the latter. Her behaviour showed instant recognition of the card and recollection that it would carry a dainty.

The otter is probably of considerably superior mentality to the fox, but still the latter appears to have a fair memory. Wild foxes habitually return to food they have cached, sometimes as long as a week after they interred it. I have frequently found the place where

a fox has buried a rabbit or fowl, only to discover a few days later that the cache has been opened, the rabbit partly eaten and reburied somewhere near; and in considering this fact we must remember how rare it is to see our good friend the dog, of whose understanding we have so much to say, return and dig up the bone he has buried in the flower-bed!

Yes, the fox, despite its large equipment of inherited behaviour and unthinking responses, is undoubtedly an animal of intelligence, though whether its intelligence is quite so great as general opinion believes it to be is another matter to be dealt with later.

CHAPTER V

THE HUNTED FOX

When the fox is no longer the hunter, but changes places and becomes the quarry, we get a new light on its character and mentality, and one which helps us in the consideration of the question whether the fox is a really highly intelligent beast.

Now I have spoken of the fox as liable to panic. In contradiction to this undoubted fact it is equally certain that as long as it is not startled and flurried a fox will "keep its head" and act in a cool and collected manner. It has often been my fortune when out hunting to go on to the end of a wood to keep a look-out for a fox breaking covert, and thus I have seen many and many a fox go away. The uninitiated might expect to see the fox come helter-skelter out of the wood and race off as hard as it could gallop. Yet, unless the hounds are close to it, the fox does not do anything of the sort. No, it departs quietly. Many a fox have I viewed stepping through the covert fence, ere the pack were in the wood, gliding like a golden-red shadow over the turf, and cantering off at a sedate amble, with a pause to look back and with pricked ears listen to the sounds behind him, before again resuming his way and continuing in his chosen direction.

There stands out in my memory one particular scene. I was late for the meet, so took a short cut towards the wood which I knew was likely to be the first draw, and when about half a mile from it paused to listen, hoping to hear something of the hounds. I

had pulled my horse up in a gateway; there was a tall fence on either hand, and ahead stretched some rough fields dotted with thorn-bushes, the sunlight glinting on the withered wintry grass and the purple-brown bushes. Here I stood and listened, but everything was still, save for some sheep grazing to my right-hand and a pair of jays chuckling and scolding in the bushes ahead. Then I saw the cause of their displeasure: through the bushes, at a leisured trot, came a fine dog-fox. Even now I can see him, with the sunlight on his yellow coat (he was an exceptionally light fox), coming straight towards me. It was obvious his attention was behind him. He did not see me and my horse. Moreover, the wind, what there was of it, was from him to me, so my odour and that of the horse was not carried towards him. When no more than twenty yards from us he sat down, and with pricked ears looked back the way he had come. So he sat, as motionless as a golden statue, and very faintly there came the sound of hounds giving tongue, followed by a note on the horn. It came down the breeze, and I knew they were running, and the question was, were they on the line of this fox? Still he sat and listened, when my horse moved, and in an instant the fox had sprung to his feet, dashing up the bank at right-angles to his former course, and galloping off as fast as he could go. His panic was in great contrast to the cool consideration that seemed depicted as he sat and listened.

Ten minutes later huntsman and pack arrived, the hounds having hunted slowly on an indifferent scent, which was not improved by the fact the fox had run down wind all the way from the covert in which he

was found. This always makes scent lie badly. When an animal runs into the wind its pursuers have a much easier task, and on a poor scenting day the difference in the way hounds hunt when their fox has gone up wind is amazing. They will race under the latter conditions, but when it turns down wind they have much ado to puzzle out the line. It is an axiom of the hunting-field that a fox generally runs down wind. The fox in question had certainly done so, and was, therefore, in an excellent position to hear his followers, even while they were yet far away. The way he sat and listened suggested he was using this advantage and deliberating on his next movements. Such an assumption may, however, be a rash one, especially when we remember that a rabbit hunted by a stoat also pauses, looks around and listens, and a rabbit hunted by a stoat is notorious for want of wits.

But with regard to purposefulness in the case of the fox, his next movements seemed to indicate real deliberation and some amount of forethought. As I have said, in the sudden alarm of seeing me the fox galloped off at right-angles, and this, with suitable apologies for having been where I was, I explained to the huntsman when the pack came up. He laid hounds on the line, and picking up the scent, they ran fast for two fields, when they checked. The fox had turned again, *resuming his original direction*, for when the huntsman cast hounds they recovered the line and carried it left-handed. Scent was bad and the pack could not go fast, but hounds hunted on for a couple of miles to a big woodland, wherein fresh foxes jumped up and the original one was lost.

As a run it was a poor affair, but it has always stood out in my mind on account of seeing the fox and watching his deliberate ways. There was another big wood, or, rather, a hilly area, to the right of the fox's course, to which foxes usually go as if drawn by a magnet; but to reach that this fox would have had to run sideways of the wind; instead, and in spite of being headed, he went down wind to Oxenbold.

Now the question is, does a fox understand that in running down wind it is gaining an advantage, that its scent will not lie so well and that its pursuers will be at a disadvantage? Moreover, does a fox or any other animal understand that it leaves a trail of scent wherever it goes? Last, but not least, does a fox when roused from its resting-place by a pack of hounds realise its life is at stake?

All predatory beasts, such as the fox, have experience of hunting by scent, depending on the keenness of their noses to get their daily living; they also appreciate the influence of air-currents with regard to carrying scent. Have I not often, when trailing foxes in the snow, noted how the fox's footprints always led to the down-wind side of a bush; dogs, too, soon find this out, a terrier, when rabbiting, quickly learning the advantage of getting the right side of a hedge. That this is a matter of experience and has nothing to do with instinct or hereditary response is obvious when we watch the inexperienced puppy, which rushes madly round and into the bushes, with no regard for the direction of the wind or the thorns that will prick its nose. The wise old dog avoids the latter, and finds the rabbits by keeping on the down-wind side of the briers and letting

its keen nose pick out the different odours. Trailing foxes in snow has shown me that they do the same.

But does the fact that a fox understands that it must get "right way of the wind" to smell things, imply it also understands that when it is down wind its enemies will not smell it, or at any rate not smell it so well? The latter is a different assumption, and, as already remarked, implies that the fox knows all about its own scent—does it?

That animals are aware to some extent that they have odour, I do not doubt. Dogs, wolves, foxes, otters, and many other mammals, have calling-places, whereat they deposit excreta or urine; the latter in the case of the wolf, cat, dog and fox, the former in the case of the otter. This seems to be a means of gathering news and leaving information. I have seen tame foxes and pet otters visit these calling-places, the procedure being to sniff long and carefully, make their own deposit, and then smell that. My otters especially always smell their addition to the visiting-place. And this indicates they are sniffing their own odours.

However, this is a different matter to appreciation of the trail of scent left behind by every travelling mammal; but when the wonderful delicacy of nose possessed by dogs and foxes is remembered, and we recollect that they can follow each other's scent, how can we believe they are unaware of their own odours? I am of the opinion that when a fox or dog retraces its footsteps it is aware of the scent still hanging thereabouts.

Awareness of having a scent does not, however, necessarily imply that a hunted fox weighs up all the "pros and cons" of the situation or forms a

concept of how the hounds will seek for and smell that scent.

My theory of a fox's behaviour when pursued by hounds does not embrace such a factor. I do not think that when it is hustled and bustled, or is merely slipping quietly away, it stops to think about its own scent, but I do believe it wants to get in such a position that it can hear and possibly smell its pursuers, so that it can find out if they are really after it—this does not apply to a very fast hunt, for when hounds are close to their quarry the fox runs with less regard for the direction of the wind and may even turn into it—and whether there is any real need to be off.

This brings us to the last of our three queries: does a fox realise his peril? Does a fox roused from his snug bed in a brake of briers or beneath a gorse-bush, hearing disturbances in the covert about him, have a vision of hounds, huntsman, horses and horsemen, and all the pink-coated gaiety of the hunting-field; does he have a mental image, or series of images, of himself galloping off with hounds in pursuit, and of different possible refuges? Does he have a mental picture of the hounds overtaking him and being killed by them?

Apart from the question whether any animal, with the possible exception of the higher apes, realises that death must be its lot, or in any way understands death (fear and fright are emotions apart from knowledge of death), it is doubtful if a fox's mental equipment is such that it can forecast to this extent. Nevertheless, the evidence suggests that it does appreciate the situation to a certain degree, that degree varying according to the experience of the particular fox.

It is a well-known fact in the hunting-world that young foxes will not leave their home covert if they can help it, and that the early part of the hunting-season, from August or September up to the beginning of the season proper in early November, is devoted to cub-hunting, when young hounds and young foxes both learn the business.

Then one can observe the difference between experience and inexperience, and see what a considerable factor experience is in governing the actions of the fox.

Take, as an example, an early morning meet at the beginning of the cubbing, when hounds turn out in the grey dawn, so as to do their work ere the hot September sun blazes down upon them, and proceed to a wood where there is a litter of cubs. The cubs are now cubs only in name and want of experience, being well-grown and as big as their parents. But as yet the family party has not broken up, old foxes and young ones living in the one covert and keeping in touch with each other. The cubs, however, have long been self-supporting, not only killing for themselves, but being able to find their own game. Yet the difference between experience and inexperience is soon obvious to the person watching at the far side of the wood. The pack has hardly been put into covert at the southern end of the coppice, than the watcher at the northern end (myself) sees a fox gliding away through the bracken at the woodside. It is not a very big fox, nor a very handsome one, but it slips off with a peculiarly determined mien which tells at a glance what it is—namely, the old vixen. Let it be noted that hounds have not spoken yet, but she has

heard enough, and is off. At the same moment there is a holloa some distance to the right. That is a workman away in the fields. The dog-fox slipped out of covert with even greater promptitude and has met this man, but the holloa has not deflected him from his course. Let the old foxes go! They are not wanted this morning. The business is with the young foxes, who are now afoot. The hounds have roused them. First one hound speaks, then another, the whole pack joins in, until their voices rise in a great burst of music. At that moment a fox appears, a big, red, handsome fox, that looks out from a hole in the covert fence, gazes this way and that with a worried, bewildered expression, and turns back, showing his white tagged brush, before disappearing into the undergrowth.

It is one of the cubs, a big young dog-fox, and if ever expression and mien denoted bothered bewilderment it is written on that young fox, just as cool determination was to be seen on the face of the old vixen.

Now that description is of what I have actually seen, a particular episode, but one typical of many and many a morning's happenings, and of the contrast between the behaviour of young foxes and old ones.

The fox that has never been hunted does not know what it is all about nor what to do. Several times I have known cases where, owing to some circumstance or other, it was impossible to cub-hunt certain woods, and they were visited for the first time quite late in the season—result, the foxes just ran about, round and round the wood, close in front of the hounds, making no attempt to get away.

From all this we can conclude that the young fox, or what amounts to the same thing, the inexperienced one, does *not* understand hounds, nor being hunted; it may be frightened by the strange noises, but perhaps not more so than it would be by the shouting and disturbance of timber-haulers, and be thoroughly upset, but unless hounds get close to it, it is in no position to realise it is being pursued. Once they do that and really hustle it, the cub, provided he escapes, will have acquired experience which will make all the difference to his future conduct.

No one seeing that old vixen gliding off through the early morning shadows would have doubted that her behaviour was being regulated by memory! And a memory *not less* than six months old! Certainly the sounds and odours of the pack had brought an image of a previous experience before her consciousness. To her, hounds were hounds, not merely a strange disturbance in the dawn. *She* would not have left home in a hurry like that for any mere timber-haulers. Indeed, nothing is more striking than the way foxes will tolerate the latter, or similar intrusions on their woodland peace. A striking illustration of this, also of an old dog-fox's understanding of what hounds entail, came under my notice during the winter of 1928–29.

A wood of over thirty acres had been laid low, the timber-fellers and timber-haulers having been at work in it for the previous eight months. The trees had gone, save a few that the men were yet busy upon, but the branches, tops, etc., lying on the gronud afforded plenty of shelter for animals of all sorts. It was reported that a fox, or foxes, was lying under this "brush-wood",

so the hounds were taken to the covert. The huntsman drew the wood most carefully, and at one corner a few hounds spoke to what might have been the stale line of a fox, but it was so doubtful that the verdict was "blank". Just as the huntsman was blowing hounds out of covert a workman from the neighbouring fields came running to say that he had seen a big fox trot away from the wood two or three minutes before hounds were thrown into it! He—the man—had holloaed and shouted, but been unable to make any one hear. The pack were taken to the spot he indicated, and picked up the scent, but the fox had been gone too long for them to make much of it. They hunted perhaps half a mile, but could do no more.

When questioning the labourer as to which way the fox had gone, I asked if he had seemed in a hurry. "No, Miss; he sat down in the middle of the field over there and waited five minutes!"

Now that episode showed clearly how a fox will come to disregard disturbance harmless to him, yet fully appreciate the significance of sounds and scents that betoken hounds in the distance.

Hence we come back to the question: to what extent does a fox comprehend the business of hunting, and does he fully understand his danger?

The points we have considered and the facts we have had before us show that the answer depends to a considerable extent on the particular fox, his history and experience. The conduct of a cub bespeaks merely bewilderment and alarm at an unusual disturbance; that of an old fox, comprehension of what will follow upon the initial warning sounds.

But whether a fox *fully* understands his danger is another matter. To do so, as I have hinted, entails knowledge of life and death. Does the mentality of any animal, furred, feathered or scaled, permit it to indulge in abstruse speculation? Moreover, which I have again already hinted, action that would seem to imply fear of being killed may not in reality do so, fear and panic being often, if not usually, independent of such realisation. For instance, when I was driving a car round a bend in the road and met another car, to see in the same instant that a third motor (driven by a fool or a lunatic!) was striving to pass the oncoming one, so that a collision seemed inevitable, did I think of smashes and being killed? Not a bit of it! I only wondered if the brakes would hold my car and measured the roadside with my eye to see if there was room to squeeze by—there was, and we got through! Then I was frightened. I had a distinct recollection of being frightened as the predicament arose, but not as I was frightened when I thought it out afterwards and realised the "might-have-beens".

In the same way it is probable that when a fox finds hounds are after him he is frightened but not panic-struck, and I doubt that he has any mental image of them overtaking and killing him. Such would imply a power of forming abstract concepts of a very high order.

If coursed, either by hounds or a cur-dog, a fox is undoubtedly badly scared, and may then have a fuller realisation of his peril, though in this case I think sheer panic, rather than realisation of anything, would better describe his mental state.

I was once run by a bull, or, rather, which amounted to much the same thing, *thought* the bull was charging down upon me. My brother and I were standing at a lake-side, at a place where cattle were accustomed to come down to drink, when a noise of galloping startled us and we looked up to see a large Hereford bull coming over a bank, tail up, head down, charging straight at us. There was a barbed-wire fence some twenty yards ahead. We sprinted for that in a way I have never run before or since, and tumbled headlong through it into a bed of nettles. I was conscious of nothing but sheer fright! Neither the barbed-wire ripping my clothes nor the stinging of the nettles was known to me, nor was I clearly conscious of anything in my panic.

It is perhaps not material to the story to say that fright was unnecessary, since the bull had not seen us, and was only galloping down to the water to get away from pursuing flies!

It is, of course, impossible to penetrate to the mind of any other being, even a brother or sister, but I would expect that the mental state of a fox with a cur-dog or a pack of hounds hard at his brush would be similar to mine as I flung myself into the nettle-bed—I certainly did not have any concepts of anything at all!

Though hardly germane to our subject, it may be of interest to remark that being chased by a sheep-dog or other cur has a peculiar effect on a fox, for the quarry leaves practically no scent afterwards. I mean to say that if hounds are hunting a fox, and their fox passes a farmstead, whence a cur rushes out and pursues him, they will take the line to that spot and

there check, having thenceforward great difficulty in puzzling out the scent. I have seen this happen again and again, and it has this much connection with our study of the mentality of the fox, that it shows that the sudden chase of the cur-dog produces a mental change which affects the body and the scent given off from it.

Now to get back to the problem of the extent to which an adult experienced fox forecasts and uses judgment, I think we are safe in assuming that on being disturbed he always (to use an expression we are so fond of applying to our own conduct) "makes up his mind" to go somewhere, that on getting the first indication of disturbance he has mental reference, probably in the shape of an image of it, to a distant earth, a big woodland, or some other spot that has served him as a sanctuary in times past, and thereupon sets off to reach it.

In January, February and March dog-foxes will often make very long points, going comparatively straight across country to some distant stronghold, for then it is that unmated foxes, which have been abroad in search of a mate, find themselves in difficulties and go home as directly as they can.

Foxes rarely run without aim, and they not only, if they can, stick to the country that they know, but they adhere to their accustomed routes, for foxes have their highroads through woods and over streams (where stepping-stones make a convenient crossing-place, or a fallen tree affords a ready-made bridge), across the fields and through the fences. These paths vary little year in and year out. If you know them you can often forecast which way a fox will go.

All this, of course, applies to a fox that is travelling more or less at its leisure, and to those days when scent is not too good, so that hounds cannot go at any great pace. On those other days, by no means common ones, when scent lies really well, and hounds race on what is termed a "breast-high" scent, the situation is altered; then a fox really has to gallop, and then he pays far less regard to route, though he may try to make his point; however, if the pressure is too great he will probably turn down wind and simply run on.

Now, is that turning down wind intentional, or simply a matter of taking a line of least resistance? I am inclined to think the latter, because it is always an effort to face a breeze of any stiffness.

Another query that arises at this point is whether a tired fox deliberately goes through a flock of sheep with a view to foiling his scent. The frequence with which this happens would seem to indicate intention, but to assume that it really is deliberate also entails the assumption not only that the fox knows he leaves a scent, which we have accepted, and that he knows hounds are following him by means of that scent, but also that he knows the smell of sheep will mask his scent. Does he clearly appreciate all this? At any rate we should not lose sight of other facts, such as flocks passed, though the fox might easily have run through them, and the instances where the foiling of the line has been clearly accidental, the sheep having chanced to stray across the scent after the fox had gone by. Personally, I consider it rash to affirm that a fox intentionally seeks to spoil his scent

by running through sheep, as I deem it rash to deny he may do so.

Moreover, what may hold good for one fox does not necessarily hold good for the next. As I have repeatedly said, here and in other places, personality looms large in Nature; every individual differs from the next, and in no respect more so than in wits. Just as some of us are fools and some few are geniuses, so animals differ in intelligence. Few foxes are fools, but the amount of practical judgment any one can display is another matter.

My opinion of the average fox is that it ranks high in the scale of intelligent mammals, but that much of its conduct is regulated by inherited response, though such instinctive aptitude is ever qualified by experience, by which the fox profits to a marked degree, its very educability proving its intelligence.

Much, however, as I respect the mental ability of *Vulpes vulpes*, I cannot subscribe to the popular verdict, which credits the fox with almost superhuman cunning, and everything it does to forethought and calculation.

No, the fox is much as other beasts, living largely in the present, without worrying about past or future, and content with the fleeting moment. If not so super-intelligent as some sporting writers and the sentimental story-writers would have us believe, it is equally far removed from the thing of merely automatic responses that the behaviourist school make of our mammals.

PART VI

THREE STUDIES IN TEMPERAMENT

CHAPTER I

THE LEMMING

The lemming, a small rodent of circumpolar distribution, is found wherever Arctic conditions prevail throughout the Northern Hemisphere. It has some striking peculiarities of temperament and behaviour, but this is not surprising, considering it spends more than half its existence beneath the snow.

Its representative in Western Europe is the Norwegian lemming, *Lemmus lemmus*, which is common on the high fjelds of Scandinavia, or, rather, I should say that in normal seasons it is found upon the fjelds, but that in exceptional years it increases and multiplies, until it descends from the mountains to the valleys, and overruns the country. Many stories are told of its doings under the latter circumstances, one being that the migrating hordes, travelling on in search of food, will throw themselves into the sea, and commit suicide in hundreds of thousands.

That any animal, even of the highest intelligence, will *intentionally* kill itself is, to say the least, doubtful, the act of intentional self-slaughter implying an understanding of life and death and a power to look forward, forming concepts of coming events, which

it is indeed questionable if an animal such as the lemming can possibly possess.

But this is going on too far, for the migrations of the lemming, and its behaviour when on trek, must be dealt with later. Before considering the unquestioned fact that lemmings do sometimes drown themselves, we must give a little space to the consideration of the lemming. First of all, it is a lovely little beast about twice the size of one of our field-voles, handsomely and peculiarly marked, being pied with black and yellow. Its under parts, chest, and throat are cream; its head and shoulders are glossy black, save for a speck of cream on its nose and a pair of cream stripes on its head; but its hinder parts are a rich yellow (varying in some specimens to golden-chestnut), with three longitudinal black bars. *Why* a mouse-like creature should indulge in such a peculiar and bizarre colour-scheme is a question hard to answer, but the problem will be considered presently in conjunction with other problems arising from the lemming's behaviour. But to continue the description of the little beast: it has a thick, rather silky coat, which becomes much thicker in the autumn, and gives it an attractively fluffy appearance, short ears, almost buried in its fur, little black eyes, that give it a keen, alert look, and such an attenuated tail that the casual observer might be forgiven for thinking it had not got one. However, it is not like the guinea-pig of our childish days, that extraordinary natural-history specimen of which it was said that if you "held it up by its tail its eyes would drop out" (!), but really has a caudal appendage. However, in general appearance it

undoubtedly has a likeness to the cavy, but this is only superficial, its affinities lying with the voles, with which it is placed in the sub-family *Microtinae*. In fact, we can regard the lemming, in its various forms, as a large vole especially fitted for Arctic life, to withstand cold and to support existence on the scantiest and most innutritious diet.

Now to turn from general considerations concerning the lemming, to such particular observations as I have been able to make on it. In June 1927 I visited the mountains of Central Norway, the Dovre Fjeld, with the particular intention of studying lemmings. On reaching Hjerkinn, one of the highest inhabited spots on this range, I found the indications of them were many and obvious; indeed, there was every appearance of there having been a lemming plague the previous autumn. The retreating snow revealed ground gnawed bare of every living leaf or blade of grass, and the stems of the low-growing shrubs, such as juniper and dwarf-birch, were barked to a height of six or seven inches. Lemming-nests, also exposed by the thawing snow, but, of course, now deserted, were everywhere—upon the drier tussocks in the marshy valleys between the hills, and under the scanty vegetation in the highest hollows of the fjeld-tops.

At first I feared the lemmings had gone, for a good lemming season is often followed by a lean year, when these rodents almost disappear. Then you see their remnants—old nests, mummified lemmings, etc.—but never a sign of a live one. My fears were accentuated when I noticed many such remains, though I was cheered when I found a freshly-killed lemming, a

wisp of black and yellow fur, lying in the sunshine upon a rock, left there, no doubt, by hawk or buzzard, for that meant there were some live ones somewhere. A little later I met a real live lemming, very much alive, judging by its voice. There was a small stream which, swollen by thawing snow, raced down from the high fjelds as a raging torrent, cutting a deep channel through the peaty soil of the mountain-valley. I had just found a place where it was possible to jump across the torrent, when vigorous squeaks made me pause. They seemed to come from a low-growing bush of dwarf-birch. Turning to investigate, I soon spied a lemming in a recess where two stones met, squeaking for dear life and gnashing its yellow teeth.

It had, no doubt, been startled when I jumped across the water, and had scuttled off, to find itself in a cul-de-sac between the rocks; whereupon it had turned to bay, to vent its fear, or anger, or a mixture of both, in the chattering, shrill squeaks that are the lemming equivalent of shrieking "Murder! murder!"

Had that lemming kept quiet I should never have seen it; its behaviour advertised its presence to all the world, as many another lemming has done before and since, for Cob, as this one was subsequently named, was exhibiting typical lemming behaviour. As I wanted to take several live lemmings back to England with me, I advanced upon him (the masculine pronoun was, in fact, correct, for it proved to be a male), but he backed farther into his corner, baring his fine yellow teeth, and chattering more vigorously than ever. His incisors made a most intimidating display, while the vigour, audacity and pugnacity of the little

beast were impressive. Now I have said that the lemming was in a cul-de-sac—so it was in a sense, but I do not mean to imply that it could not get away, for, being an active little animal, it could easily have sprung to the top of the stone against which it had taken up its position, and so escaped. But it seemed to have no idea or intention of trying to get away, no more than any other lemming has when surprised in the open.

Take, as an example, the behaviour of lemming number two, which was met with and captured that afternoon (number one had been safely "bagged" and carried home squeaking indignantly), being also surprised in the open. I was walking over a fjeld-top, high, barren ground, where there seemed but little to support life, when I spied a lemming sitting in the sunshine nibbling at something or other. "Tally-ho!" I cried, at which the lemming gave a squeak—any other rodent, mouse, vole, rat, or rabbit, would have dashed headlong for its burrow, but the lemming, though it almost certainly had a hole somewhere near, merely sprinted across the open to the shelter of a scrap of low-growing dwarf-birch, where it turned to bay, rolling almost on to its back, squeaking open-mouthed, and giving a fine display of its large yellow incisors.

The dental display was decidedly intimidating—at least it daunted me, for the lemming's teeth looked more formidable than those of a rat. Yet the exhibition, and the whole attitude of the lemming, seem to be largely bluff. I bagged this one, and many another, without much trouble and without a nip. We can accurately say the lemming's squeak is worse than its bite, yet if a lemming did give one a nip it would probably be a sharp one.

Apropos of the question of whether the lemming's defiance is entirely bluff, here are further notes on the behaviour of a third, also surprised on a high fjeld. The entry in my notebook runs: "I was startled by a squeak, and there was a lemming crouching in the grass. When touched it ran as far as the edge of a puddle of water, where it turned to bay and refused to budge another inch. It menaced me with an exhibition of teeth, squeaked furiously, and when I stroked it with a feather, hit out with its forefeet—rather like a vole—and chattered with anger. It boxed again and again at the feather, but made no attempt to bolt, though it could easily have done so. Then M. B. held her walking-stick towards it, when it sprang at it, but despite the exhibition of teeth I could not see it bit the stick. It would not budge, and it was still holding its position when we desisted from annoying it and walked on."

Certainly lemming psychology is something to wonder at! What can be the feelings and emotions, and the ideas (if it has any?) of a lemming, when it sits up and defies a great, hulking, towering monster, such as a human being must seem to so small a beast? And how completely its behaviour contrasts with that of its near relatives, the voles and mice. Take the highly successful meadow-voles (the *Microti*), widely spread and exceedingly numerous throughout the Northern Hemisphere: would one of them stay to squeak at an intruder, let alone a human being? Not it; let anything move suspiciously within its ken and it would be gone like a flash of lightning, diving helter-skelter into the safety of its burrow. In them we have extreme timidity and caution, that utmost development of fearfulness that seems to be the prerogative of all the most successful species, for the

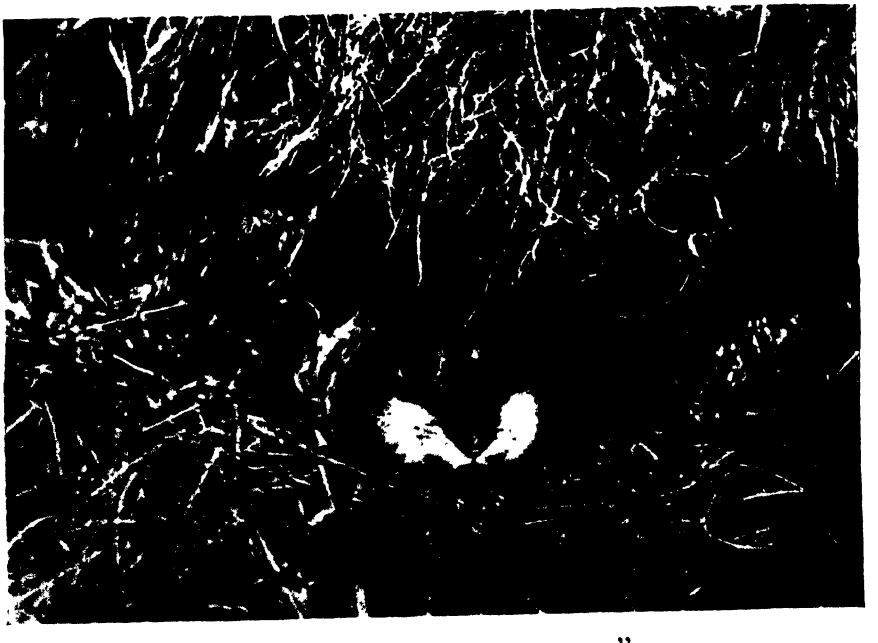
widespread species are all (with the exception of the house-sparrow, which is a strange mixture of "cuteness" and boldness) intensely nervous and ever ready to take alarm.

But the lemming is *not* nervous, not at any rate as a meadow-vole, a bank-vole or a rat is. By this I mean it is not quick to take alarm. Many and many another instance could I describe showing how indifferent to danger, nay, how pugnacious, these pretty little rodents may be. Yet I am not sure the lemming is really fearless, for I have come to the conclusion some of its actions may be the outcome of fright. When startled, a lemming invariably sits up, throws back its head, opens its mouth and squeaks; but if you approach one quietly its behaviour is different. It then sits sedately and watches you, only to slip away to its burrow when you get too close. My domesticated lemmings, of which more later on, that were quite tame, never sat up and squeaked at anybody, but were quick to bolt to their retreat at the sight of something unusual—far quicker, in fact, than wild lemmings on the fjeld-side.

All this leads me to believe that the intimidating display of the lemming—and really it is most intimidating!—is the outcome of a mixed emotion of fear and anger. How closely the two are akin we can judge by remembering and trying to analyse our own feelings when in a "tight corner". And that the whole is a species of bluff, akin to the fur-raising, back-arching and spitting of a frightened and enraged cat. Puss, of course, can give a good account of herself, her claws being formidable weapons; the lemming's teeth are likewise useful weapons, but neither the cat's claws nor the incisors of the rodent are sufficient to save their lives from a really substantial enemy.

(1) "SQUEAKING OPEN-MOUTHED"

(2) THE LEMMING



(1) "A TYPICAL LEMMING HABITAT"

(2) "HOWEVER INCLEMENT THE WEATHER, VORACIOUS LEMMINGS HAVE TO FEED"

The question with regard to the lemming is, whether this bluff is of survival value to it. Does it ever save a lemming from kestrel or merlin? Does a vision of ferociously bared yellow teeth ever cause a hawk to "throw up" as it stoops upon its prey? Does that angry squeak ever check a fox as it is about to pounce?

It does not appear to be so, for the predatory birds and beasts of Scandinavia live largely on lemmings—in fact, the number of hawks, harriers, owls, stoats, weasels, foxes, etc., is correlated with the abundance or scarcity of lemmings.

However serious a lemming year may be for the human inhabitants of the country-side, to say nothing of the cattle, goats and sheep, there are other creatures that rejoice—namely, the birds and beasts of prey. It is not overstating the case to say that the carnivorous birds and mammals are dependent on lemmings. It is true that there are also voles, mice and shrews, and during the summer plenty of small birds, but it is the lemming which is the great standby of the hunters, whether winged or furred, and when it increases so do they. A lemming year means that all the creatures dependent on it wax fat and flourish, and likewise increase and multiply.

The summer and autumn of 1926 had been favourable for lemmings, but they died off considerably during the winter (I have said that their remains were to be seen on all sides, to say nothing of old nests and their "runs", which were like a network over the hill-sides). However, the effect of their abundance was still visible during the spring, when merlins were common, ermines, otherwise stoats, were to be seen hunting the fjelds, and harriers were a daily sight. And all were busy keeping watch over the survivors.

This being the case, we are driven to the conclusion that the pugnacity and bluff of the lemming are of little avail as a means of defence, and it is possible that it is its peculiar temperament, rather than physiological characteristics, which is the chief factor in deciding if its distribution shall be limited to areas where more or less Arctic conditions prevail and where the lemming has the protection of the snow from September to May.

All these considerations have driven me to the conclusion that the teeth-displaying performance of an angry and frightened lemming is not only no use to it, but must often lead to its early decease, that it is the outcome of its peculiar temperament, and a characteristic it has been able to retain because it lives a sheltered life beneath the snow-drifts of the mountain-tops for so many months of the year, and is, moreover, a creature that multiplies at a great pace, being one of the most prolific of the smaller rodents.

The peculiar temperamental quality we dub tameness, and which, apart from its manifestation in the lemming's boldness when attacked, is a feature of its conduct in other respects, is a character no bird or beast can possess, and continue to hold a place in the world, unless it has some compensating advantage, such as great size and strength, or distributional, such as the habitation of secluded islands. In the lemming's case the compensatory advantage, or rather advantages, are those already mentioned: that it haunts an Arctic terrain, where it hides beneath the enveloping mantle of snow, and that it breeds so freely and quickly as not only to keep its numbers up, but, when conditions are in the least favourable, become exceedingly numerous.

CHAPTER II

THE LEMMING AS A TRAVELLER

The migrations of the lemming are famous. Most of us have heard how hordes of these little mammals will travel on and on, surmounting obstacles of all kinds, until their ranks are decimated by disease and predatory creatures, and the armies fade away.

The story about the migrants committing suicide in the sea has already been alluded to, and it is certainly true that they do not fear water. When they begin to travel they go ahead with little regard for consequences, and probably with no idea of the whys and whithers of their journey.

By the way, when using the word migration to describe movements of the lemming, and when speaking of lemmings as migrants, it will be as well to keep in mind that the movements of these rodents have nothing in common with the ebb and flow of bird-migration, which is seasonal in character, and only indirectly connected with the question of food. Moreover, bird-migration is normal, a part of the bird, and a necessary condition of its existence. The journeyings of the lemming are directly concerned with the food supply, and are abnormal, inasmuch as they are only undertaken when increasing numbers, combined with shortage of food, compel the lemmings to travel. Under ordinary conditions, when supplies are sufficient, the little animals remain contentedly upon the barren fjeld-tops.

A lemming plague starts with a favourable summer,

when the lemmings breed exceptionally freely. If this is followed by a good winter, the ensuing spring will find a large number of the rodents reduced to very "short commons", having tunnelled far and wide beneath the snow in search of dried grasses, and to bark the tough branches of the low-growing junipers and dwarf-birches. With the thawing of the snow, they have no choice but to descend to the valleys in search of better fare. And they do come down, to eat the scanty spring grasses, on which the hard-working, hard-living Norwegian farmers depend to keep their half-starved cattle. No wonder that the Norwegian hates and fears the lemming, for dead or alive it may be a serious menace. Alive, it eats up the grass; and dead, it may pollute his water-supply. A Norwegian lady I met said that the previous year she and a number of other visitors staying at an hotel had all been taken ill, some seriously so, and this illness was traced to the water-supply, which had been contaminated by the number of dead lemmings that had fallen into it!

This gives some idea what a plague of lemmings means, and that the word "plague" is not used lightly or inadvisedly to describe them and their effect on the country-side. Unfortunately for me, my visits to Norway have never coincided with a plague season, but I have twice been over the year *after* a lemming visitation, when the effects of the rodents were still only too visible. In Surnadal, in the summer of 1923, there were mummified lemmings all over the place, even down in the valley at the river's edge, though not a sign of a live one, even on the highest fjelds. On the

Dovre Fjeld, in 1927, the previous season's plague was hardly over, and lemmings were still fairly numerous. Though no general migratory movements were witnessed, I saw many single lemmings on trek, running purposefully along and making for the lower ground. There was one fine lemming I saw on trek about nine o'clock on a June morning. Despite the date, there was nothing summer-like about the weather, for snow was falling steadily and the heights were blotted out as by a grey veil. I was watching the wintry scene from my bedroom window, when something moving upon the hill-side caught my eye. A lemming came racing down the bank, running boldly across the open, straight towards the house. It seemed to be making for the back door and came on unhesitatingly, showing no sign of fear or nervousness. Thus it reached the doorstep, on to which it climbed, and whence it looked around. Then it popped under one of the flags, came out again, looked in at the back door, turned around and surveyed the scene for a moment—the farmstead, the rapidly falling snow, and the ponies, with their tails to the storm and the snow powdering their backs. Another second and the lemming was off again, racing from the house towards an outbuilding some thirty yards away; but it paused half-way to nibble a blade of grass, while the snow fell in white specks upon its handsome fur, that glowed richly chestnut and cream through the storm. Then it went on once more, past the shed and away beyond it, travelling across a bit of newly-dug ground and straight away, as if for the valley. The last I saw of it, it was trekking into the distance. This lemming had a most

determined air of being off somewhere. The house stopped it, but did not change its purpose. It was still travelling when I lost sight of it, but whether it knew whither it was going is another matter.

Very much another matter, for if we consider the possibilities it is almost certain it did not know whither it was going. Want of food had undoubtedly acted as the stimulus that made it leave home, and once it had left its burrow and snug nest it just went on and on, impelled to go downwards, an instinctive urge which may have arisen originally from the simple fact that any lemming which travelled up hill in times of shortage would inevitably move to worse feeding-grounds, starvation and speedy death, and as inevitably leave no offspring; whereas, those in which there was an impulse to descend would almost as certainly survive to breed, because there is usually some food to be found in the valleys.

Away my lemming went, and we may imagine it with no idea of what was ahead, but just a satisfaction in going on, going down, and obtaining fresh grass as it went.

Did bird-migration originate in a similar, comparatively simple, manner? I cannot but believe that it did, and that long ages of evolution have added many complications and built up manifold instincts about the original impulse to move in search of food. The primitive urge of the lemming just sends it onwards and downwards, on over surmountable objects, such as streams and rivulets. Now, to such a lowly creature, a yard-wide puddle of water must appear much the same as a river or fjord. I mean that as the travelling

lemming approaches water, its viewpoint only an inch from ground-level, it cannot see more than a few inches ahead, and to it several feet of water must look the same as an arm of the sea.

Its feeling of wanting to go on drives it equally recklessly into the puddle or into the fjord, to swim easily across the former, or die in the latter; but one thing is quite certain, the lemming does not *mean* to drown itself, and to speak of lemmings committing "suicide" is to use the word in a totally wrong sense. No lemming means to commit suicide, and the verdict should be "death by misadventure".

By the way, in comparing lemming movements with the migration of birds, there is a point which must be noted—namely, that whereas feathered migrants travel (as a rule) in companies, each lemming seems to go off "on its own". My observations on this point are supported by Alverdes, who says "only when a large number are migrating, or when external objects act as dams, do we get the impression of a gathering possessing the characteristics of a herd. The direction of the migration is determined by the given environment, so that, as a general rule, all the individuals travel in the same direction, even in different years."[1]

The author does not indicate what determines the direction, but after watching many single lemmings journeying down from the fjelds, I have no hesitation in repeating, what I have already hinted, that they obey an impulse to go down hill, just as young loggerhead tortoises hatched in the sand make for the sea, the stimulus in their case being the more open horizon.

[1] *Social Life in the Animal World*, p. 15.

In the case of the lemming it may be that the more open horizon is also a factor, but I am convinced the chief determinant of direction is a downward gradient.

Thus we find that the migrations of the lemming are initiated by hunger and their direction determined by the terrain, an impulse to go off and search for food, combined with an urge to go downwards, being the factors that drive the little rodents upon their way.

Alverdes, quoting Brehm (*ibid.*), asserts that the travelling lemmings are chiefly immature males, and that the female seldom migrates; but having examined specimens of both sexes killed on trek, and seen fine adult lemmings scuttling valley-wards, to say nothing of the fact that want of food must bear equally hardly on both sexes, I am of the opinion this is mistaken; though I do not doubt that unattached young lemmings, like the young of all species, including the human, will be readier to go out into the world than settled-down adults.

CHAPTER III

THE LEMMING FAMILY

Even a casual glance at the traces of lemming activity suggests that the little beasts are of a tolerant social disposition and take pleasure in each other's company; their interlacing runs, nests in proximity to one another, and the fact that where you see one lemming you generally meet with others, all point to this. Against this it is well-known that when two or more lemmings are imprisoned together they are liable to fight desperately.

My observations supply a clue to this and reconcile the apparent contradictions, for according to these the social system of the lemming depends on the family clan principle, relations living together in harmony, but bitterly resenting and repelling the trespassing of strangers about their home territory, and being moved to anger when placed in company with an unknown lemming, especially if of the same sex. This is the case with most small rodents, also with certain small insectivores, such as shrews and the mole.

Now to give my notes on particular lemmings. When visiting the Dovre Fjeld I took with me a cage made of tin and suitable to withstand the onslaught of those most efficient gnawing instruments, a lemming's teeth, intending to bring home two or three pairs of lemmings for study at leisure. I have already related how two lemmings were captured within a day or two of arrival, a male and female, who were dubbed Cob and Mob, and who settled down quite contentedly to a captive existence. Lemmings, as

hinted, were fairly numerous, and I had no difficulty in finding further companions for Cob and Mob. I introduced a third very handsome lemming, but they did not seem pleased to see him. Cob gave him a warm reception, squeaking loudly and standing up to him. They patted at each other with their forepaws like boxers, but, so far as I could see, teeth were not used, and I did not think their scrapping would lead to any harm. Here I must digress for a moment to say that neither Cob nor Mob showed any fear of me. Within twenty-four hours of being caught they would let me pick them up, and even climb on to my hands of their own accord. They were quite fearless. And this was not a personal peculiarity, for a lemming I had had some twelve months before—Johon Hjerkinn of lamented memory—had been as confiding, and the lemmings subsequently caught behaved in the same way. But though Cob was prepared to be friendly with me, his good manners did not extend to another male. My impression that the scrapping was not serious was a mistaken one, for it was too much for poor Chitabob, as he had been named. I found him dead; but he made a beautiful skin and a nice addition to my series of Norwegian mammals. A female met with no better fate; but whether it was Mob that should be blamed in this instance, I cannot say, but I must confess that Cob attacked the strange lady in a most ungentlemanly fashion. After these unfortunate happenings I resolved to leave Cob and Mob in peace until the end of my visit to Norway, when I would try to get two more lemmings to bring home to England with the first pair.

Two days before departing, I sallied forth on a lemming-hunt, making for the fjeld-tops above and behind the house. This hunt I will describe in detail, because it will also describe a typical lemming habitat, and the behaviour of lemmings when pursued. If some of the details seem irrelevant, I must add that any and every thing that gives one any clue to animal behaviour *is* relevant, for it may help to a better understanding of the whys and wherefores of their actions.

Well, as I have said, I made for the fjelds. It was a wild and stormy day, with three inches of fresh snow on the higher ground, so that it was a cold and unpleasant walk over the wild moors. Dark clouds hurried overhead, seeming anxious to reach the farther hills and join the mists that rested thereon, enveloping the white tops in grey, while the valleys and lower fjelds showed dark purple, almost purple-black, and deep blue under the stormy sky. Behind and to the north rose the great points of the Snehetta range, to lose themselves in dark, swirling clouds; and an icy wind tore the vapour from these crags, to send fresh clouds racing southwards after those hurrying before. As for the wind, oh! it *was* cold! Never shall I forget its icy blasts as I breasted the first summit. It was not the kind of wind that tempted you to stay and look at the view. I hurried down the farther slope, over ground where there had been lemmings on previous visits, thinking it would be luck if there was one abroad on such a day as this. There was never a sign of a lemming, not even a trail in the snow. I hurried on over the fjeld, up another hill, then down again, crossing deep drifts of old snow that was hard enough to bear you comfortably.

Beyond this was another rise, free of old snow and clothed sparsely with low-growing dwarf-birch, which, despite the fact that the calendar declared the date was midsummer, was as yet guiltless of bud or leaf, while the powdering of fresh snow might have led one to believe that it was really midwinter.

Yet, however inclement the weather, voracious lemmings have to feed, and here it was that an angry squeak made me look round, to see a fine lemming sitting up in the snow. It turned and ran, to dive beneath a birch-shrub and bury itself in the reindeer moss that cushioned the ground, where I grabbed it and dragged it forth by the tail. But my lemming was by no means bagged. Its wretched little tail was horribly difficult to hold. It was almost impossible to keep the bag open with one hand, but despite this, despite its wriggles, squeaks, and the menace of its yellow teeth, I tumbled it in at last, when it subsided, protesting vigorously, to the bottom of the bag.

Only a few yards beyond, lemming No. 2 lifted up its voice and abused me. A lucky grab and I had it by the back of the neck—such a beauty, with exquisitely striped fur and teeth even better than those of the first. In it went to join No. 1, and their protests rose in chorus from the bottom of the bag. I hurried them back, protesting all the way, to join Cob and Mob. The moment I opened the cage and tumbled the new-comers in, the resident lemmings came out to meet and inspect them, but the strangers had been without food for nearly an hour, and the insatiable appetite of the lemming made them too hungry to take any notice of Cob and Mob. They showed no

interest in them, or fear of me, but went straight to the pile of grass that lay in the box and began to eat, nibbling and nibbling as if they would never stop. Cob and Mob advanced and smelt the new-comers, and then chattered at them, behaving as if much annoyed at this invasion of their privacy. But the strangers, now dubbed Chitabob and Flipmenob, still went on eating, indifferent to everything but the supplies before them.

When I captured Cob and Mob, green food was scarce, for the spring grass had not begun to grow, and what trouble it was to get them enough to eat! My friend and I spent quite a long time each day plucking bits of grass for them, searching about the rocks and in sheltered corners for the scanty green blades. The Norwegians watched us with amused interest, evidently convinced we were very mad—harmless lunatics, it might be, but quite, quite daft. The grass was now more plentiful, yet to get enough for four voracious lemmings was no light matter. But Cob and Mob did not let the new-comers eat too long, advancing aggressively upon them until the strangers turned to defend themselves. Cob and Chitabob faced each other, nose to nose, as if kissing, and then struck out with their forefeet, squeaking at the same time, but without any material damage being done so far as I could see. The two females had a similar tiff, accompanied by much unladylike language. The "kissing" part of the performance was very funny, for their cream-tipped noses actually touched, and it *looked* so affectionate.

While the females were scrapping, Cob and Chitabob had taken things quietly, the latter going on eating,

but when I tried to stroke him he gave a loud squeak, turned almost on his back, hit me hard with his paws, righted himself, and instantly resumed eating. His one idea in life was food, and yet more food. This made me hopeful that I should get all four safely home to England, but this was reckoning without Cob and Mob. The next morning Chitabob did not look very well. His appetite was not affected, but he had lost his glossy appearance. We were to leave the following day, and I began to feel nervous about him. The next morning there was no question about it, neither he nor Flipmenob were at all "the thing". Cob and Mob, filled, no doubt, with anger at this wanton intrusion on their "happy home", had given them no rest nor peace, but had bothered, harried and fought them, until the strangers became ill. I took poor Chitabob and Flipmenob up on to the fjeld and set them free.

As for Cob and Mob, they were all right, and they stood the long, tiresome journey to England without any detriment to their well-being, arriving in the Midlands looking sleek and glossy, and with keener appetites than ever, to say nothing of a fine appreciation of English grass.

Now lemmings are supposed to be most difficult creatures to keep alive and well for any length of time. I do not know of any records of lemmings having been kept long in captivity. The previous year I had had one for a couple of months, but it died from some disease due, I believed, to living too well on rich English grasses. The fare on the fjelds is of the worst, but the lemming's digestion is attuned to this miserable diet. When the migrating hordes descend to better

things they soon die off, and though an infectious complaint (query coccidiosis?) may be the direct cause, the indirect cause is almost certainly rich damp grass, which does not suit them and renders them liable to infection.

However, despite the fact my lemmings had to have much better grass than any they were accustomed to, they did well on it, and were immediately at home in the larger and more comfortable cage that now became their quarters. A small wooden box was used as a sleeping-place, and in it they built up a bulky nest of dry grass, *both* lemmings being active in making it, an interesting fact in light of subsequent events. They carried in mouthful after mouthful of grass, piling it up into a considerable heap. This nest was a far more bulky affair than any ordinary sleeping-bed subsequently constructed, being, in fact, a nursery. But lemmings are reputed so difficult to keep alive in captivity, that despite the fact I had seen the male very attentive to the female prior to leaving Norway, I never gave a thought to the possibility of them breeding; yet I might have guessed it was a nursery they were building up so busily. It was the eighth day after the pair arrived in England that I discovered the family, then a few hours old. Touching the nest-box produced strange small squeaks, at which I drew back more than a little startled. Mob had distinguished herself by producing a litter of young, the first lemmings, so far as I can discover, bred in captivity in England.

The litter was born on June 7th, and I had seen the male pursuing the female on May 17th, which indicates a gestation period of twenty days.

Anxious as I was for the welfare of the little ones, I carefully refrained from interference, let alone peeping into the nest. On the 10th I noted: "Both parents sleep in the nest, which has been elaborately built up. Every scrap of dry grass in the cage has been carried to it." When I touched the nest, poking it gently, small but vigorous squeaks were heard, the same angry squeak given by an enraged old lemming. Later, when they emerged and I touched one for the first time, it turned over, squeaking furiously. It was strange to see this comparatively helpless baby adopting the same intimidating attitude and going through the same performance as its elders and betters. Evidently the "squeak-fight" behaviour is typical of lemmings of all ages and is part of their hereditary make-up.

What funny little things the babies were when they toddled forth from the nest for their first glimpse of the world! In pattern and markings they were perfect replicas of the old ones—there was the black saddle, the black dorsal stripe and side lines, but their buff markings were not so bright as in the adults; yet they were quaintly pretty little creatures. It was exactly eleven days from the time I discovered them that the first two ventured out from the nest, when they not only had good coats, but their eyes were open, and they were fairly active in a babyish, uncertain, toddling fashion. They were about the size of a half-grown meadow-vole and somewhat top-heavy in appearance. This did not prevent the one scuttling after his mother, who was sitting in a corner of the cage, getting beneath her, turning on his back, and

with all four legs flourishing in the air proceeding to help himself to the good fare she had for him.

On July 20th I jotted down: "Four little lemmings out this morning, all more alike than peas out of the same pod, and all trying to eat. They sit up and nibble grass in a most old-fashioned way, save when running after Mob, scratching themselves, or being taken home by Cob. Yes, by *Cob*!"

I was not prepared for this discovery—namely, that the male lemming is a loving and careful father and helps with the nursery duties. In the case of all the mice and voles that I have observed, the male is either quite indifferent to his offspring or antagonistic to them, even attacking and destroying them, but Cob was a model of a paternal relative.

As I have said, the four little lemmings all came forth, toddling feebly about and trying to nibble a little grass, sitting up in the most elderly, old-fashioned way, until one saw its mother and ran after her, to seek nourishment better suited to its days and the state of its teeth. It rolled on its back to suck, just as the other had done, which enabled the old lady to clean it and dress its fur. Subsequent observation showed that the young ones always sucked in this position. Meantime, the others were still toddling around, when the male came out of the nest and looked about him, to see his youngsters playing about. He went up to one, caught it by the skin of its back, the slack of its breeches so to say, and pulled it towards him, when he got a better grip of it, taking it by the scruff of the neck, and with head held high, so that it should not drag on the ground, bore it right across the cage

and took it into the nest. In a moment he was out again, found a second, and took it home. No. 3 had joined the fourth, and they were both helping themselves at their mother's side, lying on their backs and sucking away as hard as they could. I mention this to show that there was no possibility of confusion as to which lemming carried the young into the nest —*it was the male.* As a matter of fact, I knew the two perfectly, Cob being brighter and handsomer in colouring, though not quite so big as his mate. Well, Cob went up to Mob, seized another of the little things and carried it off to the nest, whence he hurried back to pull the last from her and bear it off to be put to bed.

Having once found their way into the open, the young lemmings wanted more liberty, and their sire was kept busy rounding them up, but their mother did not trouble herself much. She made up the nest with considerable care, but as for the little ones, well, if they wanted to go out they might go—she did not bother to fetch them back. Even Cob had to give it up, for the family grew so fast that after a few more days they were past his management. As fast as he carried one home another ran out of the other side of the nest, to scuttle around the cage, look for grass, and nibble it like an adult lemming.

Another week and they were quite self-supporting, when the old lemmings no longer worried to make up the nest, though they did not attempt to turn the young ones out of it, papa, mamma and family sleeping together in an amiable heap of yellow and black fur.

When a month old two of the young lemmings showed symptoms of ailing, running from the nostrils and mouth as if afflicted by a bad cold. One succumbed, but the other recovered, though the ailment checked its growth and it did not grow as big as the two that escaped illness. By late autumn the latter were as big as their parents, with whom all three continued to reside, living in the one nest and sleeping happily together. Early spring found the old lemmings losing their handsome winter coats and becoming worn and shabby, with Cob showing symptoms of age—but I saw no signs of the young ones taking advantage of this, or any evidence of "scrappings", let alone serious disputes. No family party could have been happier or more peaceful, and their conduct was always contrasted in my mind with that of strange lemmings which find themselves placed together.

Both parents died in June 1928, having become extremely decrepit and feeble. One youngster disappeared mysteriously during the summer and the other two lived on until autumn, doing well until a wet spell set in, when *dry* grass was unobtainable. The herbage was saturated with moisture, and even when artificially dried was quite different from the natural fare of lemmings on the high fjelds. The two died. But they left me with many notes on lemming behaviour and considerably more knowledge of this quaint little rodent.

CHAPTER IV

THE CRANE AT HOME

BEING NOTES ON THE BEHAVIOUR OF A VERY WILD BIRD

The European crane, *Megalornis grus*, once a bird of fairly wide distribution, has suffered, like so many other species, from the increase and spread of human population, with the accompanying reclamation for agricultural purposes of large tracts of boggy land, where the crane formerly found a safe home and good living on the marsh plants that it loves. In consequence it has vanished from its former breeding-grounds in Britain and the thickly populated parts of the continent of Europe, being only seen in its old haunts as a rare migrant. To find it nesting you must resort to wild places, such as the marshes among the fjelds of Scandinavia, remote, inaccessible wastes that form a fit home for what in my experience is one of the wildest, shyest and most nervous of birds.

This part of my book is really a study in timidity, but to describe the ways and wiles of this shy bird, it is necessary to give some idea of the environment in which it breeds, and I do not think I can do better than tell how I first saw a crane. It was upon the Dovre Fjeld, on a hot July day—a sandy road wound ahead, with birch-scrub on either side, while above rose the grey-brown fjelds, with beyond ridge after ridge, point after point, of blue hills, stretching in exquisite shades to the horizon. To the one side, and at a lower level, stretched a desolate waste of marsh, a wide,

wild bog, brown and sere, silvered here and there with nodding cotton-grass, and gleaming now and again with blue water—water that twinkled like a heliograph as it reflected sunshine and shadow, passing white clouds and the dazzling blue of the intense Norwegian sky.

From this valley of desolation came a voice. "Wonk! honk! honk! wonk!" it cried, repeating the call again and again. Weird and eerie it rang across the marsh, seeming to carry far up the surrounding hills. "Wonk! honk! honk!" it was repeated yet again and again. It seemed as if the very spirit of the bog was crying to the skies, the spirit that broods over these vast mountain wastes, the embodiment of the spirit of the Dovre Fjeld. To describe this call in more prosaic terms, one may say that it is between the honk of a goose and the "come-back!" of a guinea-fowl, but with a peculiar echoing quality that makes its precise location difficult. Once heard and you cannot mistake it for that of any other bird. Even I, who had never heard a crane before, had no doubt as to what the call was uttered by.

The following morning found me hurrying down to the bog, anxious for a nearer view of the owner of the elusive voice. The marsh lay ahead, a wide area of some two hundred acres or more, shimmering in the blazing July sun. From its brown depths came again the weird cries, luring me on over the tussocky ground, with its squelchy, peaty hollows, from which rose clouds of mosquitoes, that "pinged" around me in a humming throng, likewise a couple of redshanks, that flew about whistling plaintively, their red legs exposed to the view. But I had neither eyes nor ears for redshanks, not even for mosquitoes, though the

latter pressed home their attentions with a wicked perseverance that would have distracted attention from most things, for the cranes were calling not far ahead. Louder and louder came their voices, but it was now impossible to make a bee-line towards them, for the black, peaty water welled up beneath one's feet, and, spring as one would from tussock to tussock, the ground quaked ominously at every step.

To and fro I tacked in the endeavour to find better going, but the further I progressed the worse the bog became. It shook beneath my feet, and horrid chills ran up and down my spine. In fact, it was as nasty and awe-inspiring a bog as one could wish to explore. I was getting the full benefit of every thrilling step over the quaking morass of water, peat and cotton-grass, when "Wonk! honk!" and there, sailing around on the farther side of the bog, was a great bird, a creature like a glorified heron—in other words, a crane!

It swung about on its magnificent six-foot span of wing, and I caught a glimpse of another large dark shape in the distance.

Such was my first view of the European crane in its breeding-haunts, but to emphasise the wild, lonely nature of its retreat, I will append a description of the bog as it appeared late that evening when I was leaving the neighbourhood.

The sun was sinking, and its last rays coming over the fjeld-tops into the valley of the cranes created a strange and most beautiful transformation. The grey-brown desolate bog had become a glowing yellow: it was as golden as a buttercup. The magic light was but the rays of the setting sun, which, sinking behind

the snowy summits of the fjelds, was with its last rays gilding the sombre marsh. All else was dark and drear; the bog alone glowed as if lit by inner fires, and my last glimpse of the breeding-place of the crane showed it still bathed in the sunset radiance.

So much for the spot as I first saw it. It will be appreciated that it was as "far from the madding crowd" as the shyest of wild creatures could desire, and that the depths of the marsh were seldom disturbed by human beings. Cattle, it is true, invaded it frequently, and sometimes in large numbers, but the birds of the bog were indifferent to these visitors, going about their affairs unperturbed by cows picking their way across the wet, peaty waste.

The bird fauna, though marsh species predominated, was nevertheless a varied one. Redshanks, as already hinted, were much in evidence, their sweet whistle greeting you as soon as you reached the damper parts. The melancholy whistle of the golden plover was also to be heard, snipe buzzed and drummed overhead, a jack-snipe got up at my very feet—probably a bird on passage to the far north—while duck were numerous. Mallard and teal were the most plentiful, and there were a good many pintails. Hoodie-crows were quite a feature of the marsh, and there was a pair of merlins that harried the numerous pipets, while two hen-harriers, nesting on the moor at the head of the bog, policed it for lemmings and water-voles. Yet with all these attractions, or distractions, my attention was riveted on cranes. It was soon apparent that there was one pair in residence upon the bog, and that their headquarters was at its upper or north-western end,

so the friend assisting me and I directed our steps towards that part.

It was a lovely morning, mild and spring-like, as we made a detour via the head of the valley to reach the farther side of the bog. The birds were singing, everything seemed alive, though the trees were bare, the country yet dead and brown, and deep snow-drifts barred our way again and again. A streamlet that had to be crossed was a raging torrent, for the thaw was bringing snow-water down from the hills, and every runlet had become a stream; however, we reached a hillock that afforded a good outlook over the bog, where I lay down behind a stone, and M. B. behind a bush, to watch the cranes, both of which were honking and calling as they marched about the swamp.

They had seen us coming while we were yet half a mile away; we had caught a glimpse of them making off, half striding, half running, in a peculiarly furtive manner.

What fine birds they looked as we lay and watched them, so big and tall on their long legs! And they are, in fact, big birds, for with their heads up they must stand four feet high. Their long dark necks, light, slate-grey, almost blue backs and black-tasselled "tails" are conspicuous. The posterior adornment, which looks like a handsome elongated tail, consists of wing feathers—namely, the secondaries, which are long and tapering, and form, when the bird is strolling about, a great tassel over the true tail.

They came stalking back across the bog, pausing every now and again to draw themselves up very tall and straight, stare suspiciously in our direction and honk loudly. Thus they approached within a hundred yards, where they paused and would not come any

HJERKINN BOG, A BREEDING-HAUNT OF THE CRANE

NEST AND EGGS OF THE COMMON CRANE

nearer. The one was a bigger bird than the other, more handsome and brighter in hue. The smaller bird had a brownish look, and we assumed that it was the female. Later on, when we knew the lady better, we dubbed her Contrary Caroline—she earned the title!

She was now standing on one leg, scratching her head, while her mate poked about and picked up things. Neither of them would come any nearer, yet they seemed anxious and bothered, honking continuously and behaving like birds with a nest on their minds. It was obvious, if they could not see us, that they knew we were somewhere about. In the light of after observations on the crane I would not guarantee they did not see us; in fact, I would not guarantee a crane not to see through six feet of solid rock, let alone through a mere birch-bush and around a small boulder! At any rate they were not going to give away the position of their eggs.

I whispered to M. B. not to move, but to lie very quiet and watch, while I got up and waded out into the bog to look for the nest. If I did not find it I would walk right away, when the bird might come back to her eggs and reveal the position of the nest. Few birds, if any, can count, and the fact they had seen one person retreat would probably deceive the cranes into thinking all was well and we had both gone. They would not notice that, whereas two people had come, only one had left. The exploring part of the programme was not carried far, for though "the going" was quite good to begin with, owing to the bog being as yet partly frozen, I soon came to a channel which was not only deep but wide—far too wide to step or jump across. Moreover, its farther bank looked horridly

rotten. Finding no way across it, I signalled to my friend that I was going away, and went, making myself as conspicuous as possible, hoping I had drawn the attention of the cranes to myself and that they would forget M. B. lying hidden behind the hillock.

An hour and a half later she rejoined me, bringing the best of news. She had located the cranes' nest. It was there, but a few yards on the other side of the water-course that I had been unable to cross. For three-quarters of an hour the two birds had hung about in an uncertain and hesitating way, until at last the female, or rather the smaller bird of the two, which we assumed to be the female, came towards the portion of the marsh ahead of M. B. This was a particularly watery part, and, as I have said, a difficult piece for any creature save a water-loving bird to get across. As a strategic situation for the nest of a shy wild bird it was admirable, that deep water-course preventing access from the land side—*and the nest was there!* The bird came nearer, hesitated, looked about her, and sat down among the brown dead cotton-grass. M. B. watched her making herself comfortable and tucking her eggs beneath her.

Yet even when she had settled down the crane was as keenly alert as ever, and no sooner did the watcher make a slight movement than the bird's head went up, she rose, turned and made off.

Early the next morning the two of us hurried off to the bog, bent on getting to the cranes' nest, as I was very anxious to photograph the birds upon it, and as a first step to attain this end intended to put up the frame of a small hiding-tent. After spying out the land, or rather the water, from afar, it seemed there

was a possible line of approach from the northern side of the marsh, so I waded into the bog from that end.

The cranes had caught sight of the two of us long before we had got anywhere near their territory, while still half a mile off on "dry land", and we had watched them stride away, making for the farther end of the bog. It should be noted that they were immediately alarmed by our appearance in the distance, though they had taken no notice of some Norwegians at work on a bank somewhat nearer the marsh; nor did the cattle alarm them. That we did so was an undoubted fact! They finally took wing and flapped around, honking loudly.

Meanwhile, I was making my way towards the spot where the nest had been located, a by no means enjoyable business over the treacherous bog, which in its half-frozen, half-thawed state held unpleasant surprises and possibilities. There was a stretch of ice which afforded quite good "going"—except when it let one through! However, from this ice I got to a heathery ridge, and thence to another low ridge, when the worst of the journey was over, for there, not five yards off, was the nest!

There it was, a scraped-together heap of bits; that is, pieces of cotton-grass, sphagnum and rushes, collected from the surface of the bog, and piled up into a flattish heap about a yard and a half in diameter, with a slight hollow in the centre, wherein lay two large oval eggs. I have heard of much better and larger nests, containing a cartload of material, but it is probable that the bird adds to her nest during incubation, and that these large nests have been those of birds whose eggs were near the hatching-point. In this case the crane had not been sitting long. One could see

where she had plucked the vegetation in a two-yard circle around, in consequence of which the spot *looked* particularly watery. Though really the situation was comparatively firm, but it must be added that this "firmness" was probably due to the frozen state of the sub-soil.

The eggs were by no means conspicuous, despite their size (they were rather bigger than those of a turkey), being of a yellowish-buff as regards ground colour, just the "sere" shade of the withered grass, with sandy or reddish spots, which became small blotches towards the bigger end.

Returning to the mainland (an unpleasant crossing), I fetched the frame of my "hide", consisting of a few light canes of the type gardeners use, and carried it to one of the islands, where I put it up, as a preliminary step in educating the cranes. I did so without anticipation of trouble, having never in a lengthy experience of bird photography known any bird object to a few sticks being stuck up near her nest, and these were some fifteen yards away—little did I then know what cranes were!

Having with difficulty pushed the sticks into the frozen ground of the island, having put an armful of juniper beneath them (as a hint of the coming shelter), I made my way back to my waiting friend, who had been watching the cranes, keeping her field-glasses upon them, and reported they had been agitated by my presence near the nest. I had heard them honking all the time I was there.

We went off, until well away from the marsh and out upon the moor, when we turned to see if the cranes were coming back to their nest and eggs. They were striding homewards and were half-way up the bog. We watched them for a while as they made their way

towards the upper end of the marsh, when M. B. made some remark to me, in an ordinary conversational voice, when instantly the two cranes turned about, honking loudly, and beat a retreat. They behaved as if they heard us. If so, their hearing was marvellous!

The next day I went back to the island near the nest (experiencing many thrills on the way) and added a little juniper and heather to the small heap beneath the sticks. It was then that the first suspicion assailed me, yet it seemed impossible that the birds could have abandoned their eggs because of two or three canes stuck into the ground on an island over fifteen yards away—there was nothing to alarm the shyest of birds. But, in the light of after-events, there can be no doubt the cranes *had* deserted the nest the moment the sticks were stuck up. It is true they flew around as we went away. "They fly round," I wrote in my notebook, "looking very fine, like immense herons, pictured in blue-grey and black, with a steady flap, flap of their great wings, honking all the time as if annoyed. The one has a higher note than the other. The bird with the deeper honk seems to have a gurgle in its voice. After leaving the bog the honking stops; evidently the birds are at peace now M. B. and I have gone."

Yet even as I wrote that note I remembered that the crane is a relative of the common coot (*Fulica atra*), and if there is one bird which the photographer finds a perfect fiend in feathers it is the coot.

To cut the story short, the cranes had left their nest. On the following morning the eggs were cold and wet from rain. Hoping the birds might yet return to them, I cleared not only the sticks, but every scrap of juniper, from the island—result, hoodie-crows ate the cranes' eggs!

CHAPTER V

MORE ABOUT THE CRANES OF HJERKINN

My observations on this pair of cranes do not, however, close with the desertion of their first nest and eggs.

We will skip thirteen days and reopen the narrative on June 15th, when a solitary crane was the only one to be seen on the marsh. Throughout the intervening thirteen days the two birds had been inseparable. Though too wary and suspicious to let us get within half a mile of them, we had watched them closely through our glasses from convenient outlook places on the fjeld-side. Now one was missing—the inference was obvious! "Contrary Caroline", as we called the bird believed to be the hen, had laid another clutch of eggs!

The next morning we repaired to a place that overlooked the marsh, and, lying down behind a birch-tree, began to study its watery surface with the greatest care. The bigger crane was soon spotted, near a heathery ridge that rose perhaps two feet above the level of the bog, and to which he frequently repaired; he seemed to use it as a look-out place, and a spot from which to scan the bog. He was upon it when there was a loud honk, and Contrary Caroline came sailing over the marsh, to plane gently down beside him. Where had she come from? We knew not, but might yet find out. We lay as still as mice, while away on the bog the two cranes strolled about, sometimes picking up morsels from the bog, sometimes preening and scratching, yet all the time having a furtive and preoccupied air that

caused our suspicion to deepen into certainty. We waited and watched, with eyes glued to the distant specks, for Caroline and her mate were a good half-mile away. At last she turned and strode off across the marsh, taking long strides, yet picking her way with the fastidiousness of one who did not like deep water and had no wish to damp her skirts. Then she faltered, turned back, hesitated, went forward again, paused, busied herself with something among the rushes, sank slowly into a sitting position, and was down upon her nest.

"I will go out and see what she has got", I whispered to M. B., moving my head as I did so. That extraordinary bird must have seen me, for in an instant she was up and off. However, I had marked the spot and could make a bee-line towards it. The bee-line involved some "soft going", but excitement over the nest steadied my nerves. Yes, it was a nest, and in it was a single fine egg, of similar type to the first two. The situation was rather more watery, and the journey involved in reaching it held quite enough thrills for me. I beat a hasty retreat, followed by the hearty abuse of Caroline and mate, returning to the watch-tower and hiding once more. The two cranes seemed to think all was well and stalked sedately homewards, the female approaching very cautiously and stealthily.

We were, as has been said, about half a mile away, lying behind a group of birch-trees, upon rough ground clothed with heather and juniper, where it would seem impossible for any eyes, however good, to discern us; yet hardly was the crane settled upon her nest than I was betrayed into a slight and involuntary movement—I did but sweep a fly off my nose!—when the bird was up and away in an instant.

She certainly saw me and took alarm in consequence, but no one who had not seen the episode would have believed it was possible for a bird to see so far. In fact, the keen senses, both of sight and hearing, possessed by this pair of cranes were wellnigh incredible.

On the following day I again visited the nest, to find the crane had laid her second egg, the two exactly resembling the first clutch. The cranes did not go so far away while I was inspecting the eggs, and honked anxiously most of the time. The question now was whether photography should be attempted. Having come all the way to Norway on purpose to photograph cranes at the nest, I was anxious to achieve my object, but not at the cost of making the bird desert her second clutch of eggs. After the first disaster there must not be another mistake! However, a scheme occurred to me that seemed promising and not risky. Gathering a supply of moss at the margin of the bog, I carried it to a spot twenty-five feet from the nest, where I shaped the sphagnum into a neat pile some twenty-four inches high and the same in breadth, while on each side of the nest I placed a small and inconspicuous twig. My idea was to hide the camera under the moss and take a string from its release across the nest, when the crane would be able to take her own photograph as she sat down upon the eggs. Like many things which are admirable in theory, it did not work but of that more anon. The start was promising.

From our look-out place the two of us watched the female crane making towards the nest. She took no notice of my heap of moss, but kept staring in the direction of the hillock upon which we lay hidden

We were lying flat behind a birch-stump, moreover, were clad in grey-green tweeds, and, of course, were quite half a mile away, yet not only was she obviously suspicious of our presence, but, as before, I felt sure she could see us. However, the moss-heap and the twigs did not worry her, and she went to the nest, arranged her eggs, lowered herself on to them, and sat there, head up, looking about. As she seemed more or less settled down I whispered in M. B.'s ear that we had better beat a retreat and that I would get away first. M. B. remained with her glasses focused on the bird, while I wriggled around and crawled off on my hands and knees. I had not got far before M. B. overtook me and said that the moment I moved, the instant I began to crawl off, the crane had jumped up from her nest. The bird strode away in seeming alarm across the marsh, having evidently caught sight of me.

Apropos of this I wrote in my notebook: "These cranes have marvellous eyesight, more acute even than that of the birds of prey. When leaving the nest in alarm Caroline goes along with her back up and head down—she sneaks away; but after going a little way she assumes an upright carriage of the body, at the same time stepping daintily through the water or along a heathery ridge. When the sun shines on them the two cranes are quite conspicuous objects, their light grey backs showing up, as do their dark fronts, but they are not so easily seen when among uneven ground."

I quote this entry here to explain that we had little difficulty in observing the birds, even from a considerable distance, as they were fairly conspicuous and easy to watch.

The next morning I annoyed the cranes by returning to the nest and adding to the heap of moss, which, as the bog was thawing rapidly, involved a by no means enjoyable trip. To add to the difficulties the rapid thawing of snow on the fjelds was bringing much water down from the hills to flood the marsh. However, I got to the nest and the heap of moss, duly enlarging it, before making my way back to dry land and our watch-tower on a knoll overlooking the bog. Here the two of us hid extra carefully and settled down to watch the cranes. They could be seen stalking about, pecking, feeding and preening, sometimes coming to look at the nest and then going away again. But Caroline did not go far, returning to make a circuit of the nest, during which she seemed to cock one eye towards our distant post, so that it looked as if she was considering whether we were there or not. At last she sat down on the eggs, having never cast so much as a glance at my improved moss-heap. So natural was it that a few moments later a hoodie-crow alighted on it, whence it regarded the crane. She took no notice until it flew over and dropped down beside her, dancing around and cawing excitedly. Its voice carried clearly across the marsh. The glasses showed Contrary Caroline was much upset at this attack, sitting on the nest with her feathers ruffled and wings erect behind her head in the attitude of an angry swan, save that they were held a little higher. With her black elongated secondaries her wings made a fine display.

The performance went on for some minutes, seven or eight at least. It looked as if the hoodie was trying to get the crane's eggs from beneath her. What else it

can have been after I cannot imagine. At last the scoundrel gave it up and flew away, when the crane lowered her wings and settled down again—not to rest, for she was untiring, but to relax a little. She never seemed to lower her head, and her glance was ever roving round. Could we get away unseen? Indeed no! I began to crawl off on my hands and knees, and in the same instant she was up and away. Her eyesight was marvellous. Even when we were a long way away, walking up the road, two specks were just visible upon the little ridge behind the nest, and we had no doubt that it was the pair watching us retreat.

The next morning was fine and bright, so I resolved to put the heap of moss to the test. Once more there was the journey across the bog, which was now worse than ever, while the cranes protested against the invasion of their domain in tones alternately abusive and derisive—at least, so they sounded to me, as I picked a nervous path across the watery waste, where every footstep provided its thrill, and the only certainty was that the least mistake would plunge one into unknown depths of black mud.

Everything was in order at the nest, from the heap of moss to the twigs that the string was to be affixed to, and I lost no time in interning the camera. The result was fine, though I say it myself, but then pride always goes before a fall. But really the heap was most realistic, absolutely natural, the only hint of the camera being the lens peeping from beneath a bit of sphagnum, and that was hardly seen. Then there was the string intended to pull the trigger of the shutter, but it was brown and invisible at two or three yards'

distance. Altogether I was pleased with the arrangements and took myself off, confident the crane would photograph herself within the next hour. But this was reckoning without Contrary Caroline.

Hidden in our watch-tower we saw the two cranes return from the farther end of the bog and Caroline walk towards the nest. By the way, this was the moment when she received her name, the title being a brilliant inspiration of M. B.'s. It was, indeed, completely suitable. The contrary creature skirmished around for a while, then circled a little nearer, finally pausing when about forty yards from the nest, and staring hard at it. She stared and stared, then spread her great wings and flew off, her mate following her. They were away some time, then returned, flying down the marsh, honking as they came. But they passed the nest area, to alight on the bank of a stream at the end of the bog. However, Caroline soon came back. She ran forward, taking half a dozen quick strides, taxied a little farther, and then, with steady flaps of her great wings, rose in the air. What a stately and magnificent bird a crane is! They do not always taxi before taking off, as I have seen them jump straight into the air. Caroline alighted some way from the nest and repeated her former tactics, not going within forty yards of it. We hardly dared breathe as she circled widely around it, and when she again went off my spirits dropped to zero. "What can she see?" I groaned, and rising, went forth to fetch the camera away. I removed it and the string, leaving everything as before, and returned to our hiding-place on the hill-side.

The two of us waited, and we saw Contrary Caroline

behave as before—that is, come back to the neighbourhood of the nest, but not venture within forty yards of it. What could she be objecting to now? Yet again I sallied forth, across that horrible black and yielding bog, and completely did away with the little hillock of moss. The two cranes honked at me in the distance, but that was all. That there might not be any doubt in their minds as to the coast being really clear, we walked away, making ourselves as conspicuous as possible, but from the house, with the help of field-glasses, we kept a watch on the pair, to see them amusing themselves in the middle of the bog and feeding as contentedly and peacefully as if there was no such thing as a nest and the duties pertaining to it.

Could the crane have abandoned her second nest?

Indeed she could and had! On provocation that would not have been provocation to any other bird of which I have had experience, she had left this last clutch of eggs, and never went near them again. Twenty-four hours later they were wet, cold and deserted. Such was the timidity of this pair of birds that they would not tolerate anything suspicious anywhere in the neighbourhood of the nest. As a study in nervousness and what we usually term "wildness" they certainly could not be surpassed!

But before closing this description of the Hjerkinn cranes I must recount the last glimpse I had of the pair. My friend and I were about to leave the neighbourhood when we heard the cranes calling loudly and clearly, so we left our preparations for departure and walked towards the marsh to see if we could get a last glimpse of the pair. We had not gone far from the house when something grey, moving upon the black, peaty soil

of a cultivated patch of ground, caught my eye—the cranes had come from the bog to feed upon the newly-sown oats which had been planted here. We crouched behind a wall and watched them, being some five hundred yards from the birds.

The two cranes, looking very big and fine, were standing facing each other, quite close together, and as we stared they sprang into the air, their wings outstretched, in an elegant, fantastic dance! It was a "courtship" dance, undoubtedly the prelude to another clutch of eggs!

They dropped back into position, facing each other with beaks almost touching, and so posed for a moment ere swinging round on their heels and demurely preening their feathers, after which they began to feed, picking up what I concluded was the recently-sown grain. As half a dozen mallard (all drakes, whose ducks were no doubt sitting) fed beside them, the Norwegian farmer was sustaining a raid on his crop!

The cranes went on feeding for ten minutes one working one way and the other the opposite direction, the browner of the two birds, which was the one we had all along believed to be the female and had named Caroline, finally reaching the ditch that bordered the little field. Here her mate followed her, and the two became difficult to see, so I whispered to M. B. that I would slip away, make a wide detour, and try to approach them from another direction. But, as on former occasions, the cranes saw me the instant I moved. I had thought they were hidden in the ditch, but they were not so hidden as to be unable to keep a keen look-out. Despite the fact I moved quietly and was going *away*, not towards them, their heads were

up in a second, and in another instant they were on the wing, flapping majestically off to the marsh, honking as they went, their loud cries floating clearly down the breeze —such was my last glimpse of the cranes of Hjerkinn, the wildest and most timid birds I have met with.

The impression I derived from watching these cranes is that they were for ever on the alert. I do not mean to imply that they lived in a continuous state of nervous tension and strain, because, like most timid creatures, they seemed to recover quickly from a fright. They doubtless remembered it, because otherwise they would have gone back to their eggs, but the actual emotion seemed to pass quickly. This is so with most wild animals; watch them closely and you see displayed a rapid stream of feelings, fright, contentment, fear and happiness succeeding each other with bewildering rapidity.

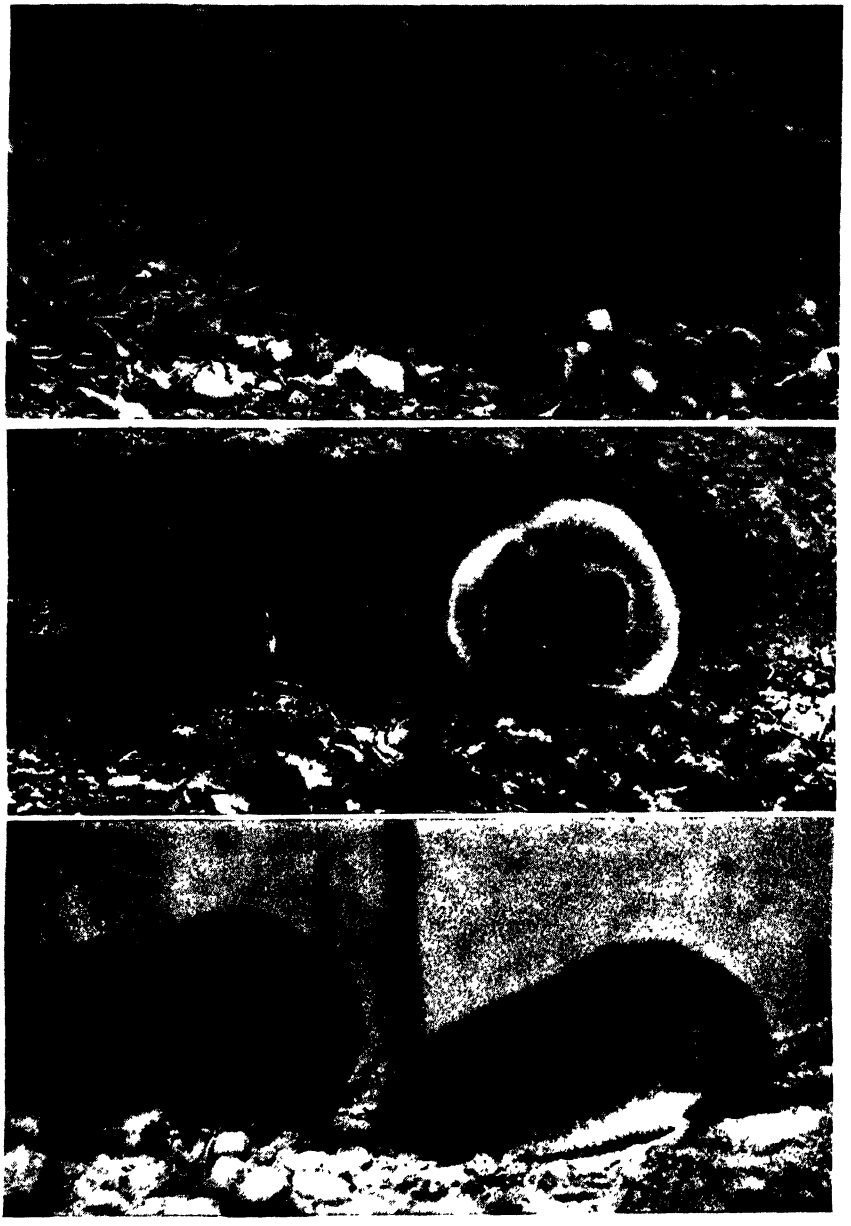
But the cranes were always ready to be afraid. With their wonderful eyesight and hearing, every unusual sound and unusual moving object was promptly noted, and it was the *unusual* to which they instantly responded. The cattle, an everyday feature of the bog, were disregarded; the cowgirls calling them home in an evening hardly perturbed the birds at all; but anything strange, whether human or inanimate (to wit, my camera-lens peeping from beneath its mossy covering, or a few inoffensive canes stuck up on an island), was terrifying.

Now I do not think this was because the cranes studied any of these things at which they exhibited alarm, and deliberately and with thought found them dangerous; rather I believe they were first frightened by them, and in consequence treated them as dangerous.

With all wild animals it is the same, the sight of something strange in their environment arousing a reaction similar to the sudden fright we experience at an unusual noise in the night. We have no actual appreciation of the sound in the dark signifying danger. We are just startled and frightened. So is the bird or mammal. It is the presence of this reaction in varying degrees which constitutes wildness. That it is almost universally present in the animals of those parts of the world populated by the human race is a melancholy testimonial to the predatory nature of the human species, which has killed off the birds and beasts that did not possess it.

In the case of the two cranes there could be no doubt they had this instinctive reaction in full force. When Contrary Caroline spied something strange, either in the distance or near the nest, she was frightened, as frightened as we should be at a cry in the dark, so made off, the impulse of fear being stronger than the desire to brood her eggs. She came back, it is true, to have a second look at the peeping camera-lens, but the second glance was worse than the first, fear mastering all wish to incubate, and leaving so strong an impression that she left the nest for good.

Though timidity may under circumstances such as these be disastrous to the eggs, it is obvious that extreme readiness to take fright may be beneficial to the bird, for, unless exceptionally wary and timid, a bird so large and conspicuous as the crane would afford an easy target to foes, human and otherwise. In it, as in so many other creatures, that mental trait we term "wildness" is undoubtedly of survival value.



(1) THE SKOMER VOLE
(2) A SKOMER VOLE AND A BRITISH BANK-VOLE
(3) THREE SKOMER VOLES

CHAPTER VI

THE SKOMER VOLE

For our third study in temperament let us revert to mammals, and again take a rodent—namely, the bank-vole peculiar to Skomer Island off the Welsh coast.

When on Skomer in June 1925, I captured six specimens of *Evotomys skomerensis* alive and unhurt, brought them home with me and kept them under observation, when I was able to note many peculiarities of conduct and temperament; but before going into details it may be as well to give a few facts concerning the status of the species.

This mouse was first recognised as distinct from the common bank-vole of the mainland by Mr. Robert Drane, who caught a number, including five live ones, when on the island in June 1897, but at that date the authorities would not accept it as a new species, failing to recognise the importance of the material he submitted to them. It was reserved for Major Barrett-Hamilton, in 1906, to name this vole, and show that it not only differs from *E. glareolus britannicus*, but is derived from a different stock, of which the modern representatives in Great Britain are *E. alstoni*, from the Island of Mull, *E. erica* of Ramsay (both islands being situated in the Inner Hebrides, off the west coast of Scotland), and *E. caesarius* of Jersey. These are all large mice compared with *glareolus*, and are apparently of a more primitive type, for they only persist as isolated colonies on small islands where they are safe from competition. Barrett-Hamilton says (*History of British Mammals*, p. 421): "that the palaeontological evidence

and the character of *skomerensis* indicate that the latter is a somewhat modified survivor from an older fauna, which has been driven out by the newer and more recent arrival, *glareolus*."

In appearance *E. skomerensis* is a big and handsome vole, being larger and brighter in colour than our familiar bank-mouse, but its large massive skull, and the complicated character of the folds of the enamel of its third molar, are the more stable differences which distinguish it from *E. glareolus*—but are such characters of survival value, or the reverse? And if not, what were the characters which determined the fate of this vole, which caused it to give ground before a smaller competitor, lose status as a widely distributed species, and dwindle away until only a remnant of the species is left, and that confined to one small island of but nine hundred acres in extent?

This was the problem which interested me when I visited Skomer in the autumn of 1924, and again in the summer of 1926, exploring the vole's limited territory with care.

Skomer lies off the Pembrokeshire coast of Wales, being divided from the mainland by a narrow sound, the fierce tidal currents of which make crossing difficult in bad weather. The island, which is more or less flat-topped, has precipitous cliffs, the home of countless sea-birds, and presents a formidable appearance from the sea. The top, however, is not only fairly flat, but is fertile, and was formerly cultivated. Now it has run wild again, being covered with bracken, nettles and sheets of bluebells, heather in places, and good grass in other parts. Blackberry bushes, and in one spot a blackthorn-bush, are the nearest approach to timber the

island possesses. There are several little streamlets and a pond, about which the vegetation is rank and luxuriant.

The wild mammalian fauna of the island consists of rabbits in large numbers, the long-tailed mouse, *Apodemus sylvaticus*, the common shrew, *Sorex araneus*, and, of course, the Skomer bank-vole. The bird population in the nesting-season is terrific. There are huge numbers of puffins and a great many Manx shearwaters, but the latter, being nocturnal in their habits during the breeding-season and spending the day in their nesting-burrows, are not noticeable. The cliff-birds consist of kittiwakes, razorbills and guillemots, all in considerable strength, the first named being most numerous. There are a large number of lesser black-backed and herring-gulls, which nest on the south-east corner of the island, to say nothing of the great black-backed gulls, of which there are a good many pairs, and which, as far as predatory habits are concerned, may be classed with the birds of prey. These latter are represented by two or three pairs of buzzards, ditto of kestrels, and visiting sparrow-hawks from the mainland. There are a great many carrion-crows, jackdaws, a raven family and owls. I picked up a feather which appeared to belong to a short-eared owl and had a glimpse of a little owl. Oyster-catchers abound, and there is a fair population of small birds, warblers, finches, blackbirds, and so on; hence, despite the fact that the small mammals of Skomer have plenty of foes to keep their numbers in check, there are also many small birds to share the attack.

So far as the voles are concerned, the kestrels and buzzards are probably the most effective of their enemies. During my visits to Skomer one or other of

these birds was always to be seen, sweeping in wide circles above the cliffs, or hovering as a dark speck against the sky. In fact, my impression was that natural foes were more in evidence on the island than they are on a similar nine hundred acres of mainland. Yet, as already stated, the small mammal population is considerable in point of numbers if not of species.

On my first visit to Skomer, a mere flying one of three days, I trapped chiefly round the house (there is but the one dwelling), and beneath the blackberry bushes in the little valley near it, and caught five voles. Previous visitors had reported the voles as being found in the outbuildings, and Mrs. Sturt (wife of the owner of the island) assured me the mice often came into the kitchen—I have never known *glareolus* taken indoors. In 1925 I captured eleven specimens of *skomerensis*, six being alive. The best trapping-places were then by the little streams, to which the mice appeared to resort for the sake of the luxuriant grass and bluebell shoots which grew in the hollows. There was plenty of evidence they were very fond of the flower-buds of the bluebells.

My captive voles ate a lot of green food, more after the manner of the meadow-voles (*Microti*) than bank-voles, nor did they display the same liking for dry food as the British bank-vole; but it was not until I had got them home and settled down in their new quarters that I was able to realise their most striking difference from the common bank-vole.

At first I let all the half-dozen mice stay together in a large cage, where they were most interesting to watch, especially when they started "scrapping". They slept together in a common nest, lying in an amicable heap, but the moment fresh food was given

them trouble began, when there was much squeaking, boxing and chasing. It was very funny to see them standing up on their hind legs, chattering furiously, so that their squeaks could be heard all over the room, and hitting out like lightning with their forepaws. Their little handlike feet moved so rapidly that the eye could hardly follow them. As a rule, these combats did no harm, and seemed merely to add a zest to life, but there came a morning when I found one of the males with a bite in the flank, so I broke up the party, putting two pairs of Skomer voles in separate cages and giving the two remaining Skomer mice each a common bank-vole as a companion.

I did this with the hope of getting *skomerensis* and *britannicus* to breed together, but my hopes were not realised. The Skomer pairs, or, rather, one pair, bred, producing after twelve months in captivity a litter of four young ones, but not the others. Yet the mixed couples proved extraordinarily interesting, making comparison between the two species so easy. The difference in appearance is marked, much more so in life than when skins are compared. The common British bank-vole appears small, lean, keen and dark, beside that from Skomer Island. The latter is bigger, brighter in colour, and of a more yellow-red-brown tint, besides which it has a portly figure and less alert look. And as for disposition, here we come to the most radical divergence. *E. glareolus britannicus* is shy and nervous, quick in its reactions, and therefore difficult to handle. These Skomer voles were all placid and docile and far from wild. Any one of them would let me pick it up and put it on my arm, where it would sit quite comfortably, not seeming frightened or even

disturbed. A common bank-vole would have "jumped to Jericho" under such circumstances! It was the same with the offspring of these original mice, which were seldom handled and in no way petted or tamed, yet were noticeably tame and confiding. One observer summed up the impression the Skomer mice made on him by saying they "were perfect fools"! Certainly they showed none of that alertness so characteristic of the most successful cosmopolitan species, such as the house-sparrow and the brown rat, nor anything approaching the extraordinary wildness of the cranes on the Dovre Fjeld. The behaviour of my individuals led me to believe that their species would inevitably be beaten in any competition with a more alert mouse, quicker in "the uptake" and of readier wits. *Skomerensis* has the characteristics of a species that finds life fairly easy, which is certainly the case on its island home; that is, as far as the presence of allied forms of mice is concerned, for it will be remembered that the long-tailed mouse is the only other small rodent that occurs on the island—there is not even a meadow-vole. Nevertheless, as already pointed out, this large bank-vole has foes on its island refuge, and plenty of them, too, so it *is* competition between the species, not persecution by predatory birds and beasts, that has determined its present status as a refugee, a lingering survival of an old fauna, only enabled to survive by its isolation. This assumption, it should be remembered, is in agreement with palaeontological evidence, which shows it belongs to a type once widespread, but that has been supplanted by *glareolus*. So here we have a case where those characteristics which we sum up under the heading of "temperament" have been the deciding ones in the fate of a species.

PART VII

HAS THE FISH A MIND?

CHAPTER I

THE TROUT AT HOME

Can a fish have any mentality, any form of consciousness, which it is possible to dignify by the term mind?

To many persons the obvious answer will be "No", and to others the equally obvious answer will be "Yes". Trout fishermen will be in the latter category. They, at any rate, do not doubt that a fish can see what is before it, and make intelligent deductions from its percepts. Of all fish not one has been so intensively studied by fishermen as the trout, and for that reason I take it as the subject of this portion of my book.

The trout, in its different forms and races, has an exceedingly wide natural distribution throughout the Northern Hemisphere, from the beautiful rainbow trout of America to the spotted brown trout of Europe in general and Great Britain in particular. Man has also carried it into the Southern Hemisphere, where in the rivers of New Zealand it has established itself and now flourishes amazingly. In some forms, i.e. the sea-trout, it is a fish that alternates between fresh water and salt water, but the particular race I am going to consider is the stay-at-home brown trout of English

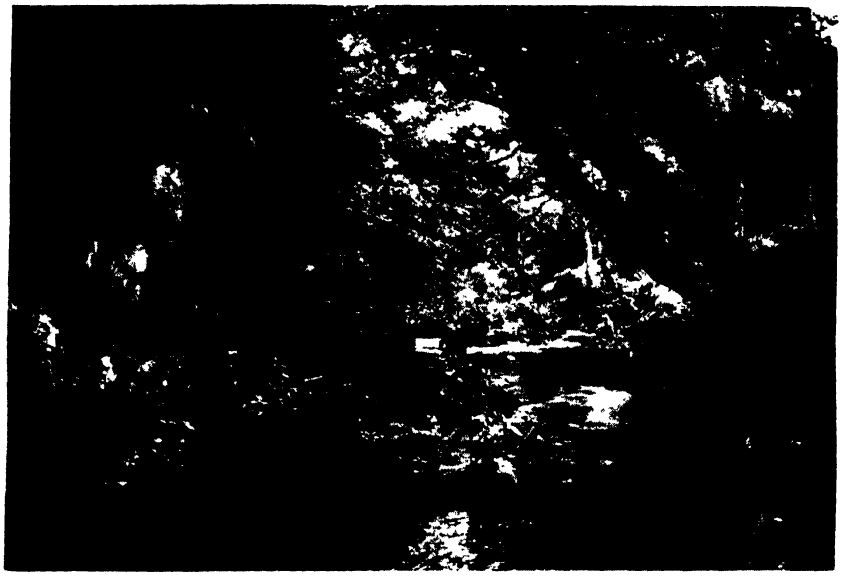
streams and rivers, that sporting fish beloved of the fly-fisherman. Even within this race there is a vast amount of variation, from the tiny troutlets of a Cumberland beck to the beautiful golden-sided, pink-fleshed three- or four-pounder caught in some chalk-stream.

Size in the trout seems chiefly a question of food, while colour and markings seem equally a matter of environment; these facts, however, have only a slight bearing on what we want to consider—namely, the natural habits of a trout and to what extent, if any, its behaviour indicates intelligence.

Let us take any typical English stream, with a fair complement of trout, and see what are the outstanding features of the conduct of these fish.

I have a particular brook in my mind as I write, a stream that follows a varied course through meadows and shady woodlands, now running quietly between steep, high clay-banks, and anon tumbling headlong in foaming rapids between mossy rocks. Here it broadens out into wide shallows, there it becomes deep, dark and green. Its variety is endless: it winds and it turns, it creeps quietly under ancient trees, it is imprisoned in a mill-pool and finds escape over the creaking, groaning old mill-wheel; it races ahead once more, dashes over falls, its spray flying afar, and yet again flows away beneath the shade of overhanging trees.

Take this stream on a June day, when the sun shines warmly, the birds are singing from every bush and tree-top, butterflies flit by and handsome dragon-flies follow them, while last, but not least, the mayflies



(1) "A STREAM THAT FOLLOWS A VARIED COURSE"
(2) A GOOD TROUT STREAM

hover overhead in a dizzy throng. These gauzy flies, the long-tailed final stage, the imago, of the *Ephemeridae*, beloved of the trout and of those who fish for trout, float up and down, up and down, in that aerie dance which is the culmination of their existence—they dance and die. But they, and their mates, are a factor in the trout's existence, they have their influence on its conduct this glorious June day, hence our mention of them.

Watching the stream, here a fairly wide and deep one, with its water flowing gently forward in unceasing journey to the sea, we see spent mayflies, gnats, and even caterpillars, floating down the current, we also see ripples appear upon the water, circles that break its surface, widen and disappear—the fish are "on the rise", i.e. they are feeding on the insect-fare that so plentifully besprinkles the stream, and each circle that appears, spreads in ever-widening ripples and disappears, betokens "a rise", i.e. that a trout has come up to the surface and taken a fly.

The rises vary from gentle ones that barely disturb the placid brook, to resounding "plops" where a fish has jumped from the water. The latter are chiefly the smaller trout, for the big ones come to the surface very quietly.

A trout-stream when the fish are on the rise is indeed an interesting sight, becoming the more interesting the longer one waits and watches, for the very activity of the fish betrays several facts about them. The first is that the trout are not mere wanderers in the water, drifting anyhow and anywhere up and down the currents, but that every fish is attached by

invisible ties to a circumscribed area. Each trout moves within a limited, often a very limited, territory. All the long river is open to every fish within it. So far as we can see there is nothing to prevent any trout wandering off whither it chooses, but on an afternoon such as I have described we find the fish population, for practical purposes, a stationary one. There, beneath the shade of that overhanging alder, is a darker shadow in the green water. A spent mayfly comes floating down the current, and the mayfly has gone. The trout sinks back to its old position, maintaining itself in the water with slight movements of tail and pectoral fins. During all the long summer afternoon that trout remains there, not varying its position by two feet in either direction, nor taking flies outside a narrow circle.

Upstream of this trout is a quiet sheltered pool, where the current moves but sluggishly, and several big trout have their homes. One hugs the left-hand bank, on account, no doubt, of the insect-fare which drifts that way. This fish is patrolling some three yards of the stream-side. One can see it move very slowly upstream, take a mayfly here and another fly there, turn and come as quietly back again. It hangs near its starting-point for a little while, rises two or three times, and then swims off for another short circuit, only to come back once more to its headquarters. There is a second trout on the opposite side of the pool, also patrolling a short stretch of the stream-side, and behaving in a similar manner; to say nothing of three or four distributed about the pool, which latter do not vary their positions very much. The fish have their

stations and adhere to them—at least, until an incautious movement on the part of the observer sends them dashing off in panic. But even a frightened fish behaves as if animated by purpose, i.e. it makes for shelter, a recess under the bank, the lee of a big stone or deep water. It does not seem to dash off madly, but seeks concealment. And it is possible, nay probable, it does so because it has a memory of that shelter. I say it is "probable" because when the same fish is alarmed on successive occasions it generally seeks the same "holt". Mark any particular trout and approach it day after day, each time manœuvring the approach so as to be able to see its actions under water, and, provided its retreat is not intercepted, you will see how it swims hurriedly off to its accustomed hiding-place.

Of course, it is possible to explain its behaviour in terms of stimulus and response, and its repeated return to the same retreat as habitual action independent of memory and recognition.

But what of the fact that a trout drives other fish from its own particular feeding-place and from the vicinity of its "den"? One day I was leaning over the wall of a bridge, gazing into the stream that ran beneath. The water was crystal-clear and my viewpoint was so directly overhead that I could see every detail in the river and on its bed. The stream was broad and shallow above the bridge, it became narrower and deeper where it passed beneath the arches, debauching on the lower side into a big pool. Leaning over the parapet, I stared into the water, detecting the form of a trout here, there, and again there, just dark, grey-brown backs almost invisible

against the gravel bed of the stream, but betraying themselves by a slight movement of fin or tail now and again. There were three fair-sized trout lying where the water ran rather deeply around a buttress. The second was about a yard below number one, and the third as far below the second. The stream ran fairly swiftly, yet they maintained their position with slight movements of tail and pectoral fins, and did not move more than an inch or two in any direction. They were not on the feed, alder-flies drifted over their heads but not a fish stirred, nor was there a trout rising within my view. No, the three trout had their stations, that was all! Still I waited and watched, to see a small trout coming up beneath the bridge. It swam past trout number three, which turned towards the stranger, but the little fish was gone so quickly that number three dropped back into its position; trout number one was equally aggressive and quicker in "the uptake". The small stranger was barely level with the latter fish, when it dashed at the intruder and chased it off upstream. Away darted the hunted one, making no attempt to withstand the attack, and vanished beyond the shallows. Number one swam quietly back and resumed its standpoint. All three fish were still maintaining their positions when I last saw them. They were also there on succeeding days. One of them subsequently succumbed to an artificial fly fished over it from the bridge, but its place was taken by an even bigger trout.

It is a well-known fact among fishermen that certain favourite spots always hold a good fish. As soon as one is caught another takes its place. Evidently these spots

are especially desirable, probably owing to a combination of factors, shelter, a not too strong current, and a plentiful supply of food. But the interesting point for us lies in the evidence they afford as to *choice* by the trout.

The fact that a fish shows a predilection for a particular place and returns to it after every excursion does not necessarily signify intelligence or anything but the most limited memory. The lowly limpet also has a home from which it makes excursions and to which it duly returns, to wit, its particular site on the wave-washed rock, yet the most optimistic of naturalists, with the most anthropomorphic tendencies, would hardly credit the limpet with an intellect worth mentioning. It has the power of registering such experience as entails recognition of its home surroundings, that is the most one would dare to ascribe to the limpet, and were it not for the evidence that a trout *does* discriminate and exercise choice, we might think its return to a certain place indicated no more than does the homing of the limpet. But when we remember that a trout will chase its neighbours away from its chosen stance, and yet abandon that spot the moment a better one is available, we have reason to think that the trout must have a mind of a sort. Not a very great one doubtless, but still a perceptive power capable of registering recognition of its surroundings, and of experience in connection therewith—it can pick and choose, therefore it can learn, and therefore it has a memory.

In further connection with this, let us consider the trout as known to the angler, in particular the fly-

fisherman, for here, if anywhere, we are likely to find evidence of the fish profiting by experience and exhibiting purpose in its actions.

First, however, it will be as well to consider what the fish sees of the fisherman and his lure, as without such consideration some of the trout's reactions will seem inexplicable. Dr. Francis Ward, in his book *Animal Life Under Water*, showed some remarkable under-water photographs, taken from a submerged chamber, which illustrated the aquatic viewpoint, and how various fish, birds and mammals appear when viewed from beneath the surface, also how things on the surface appear to them.

The outlook into the upper world from, say, the bed of the river, or almost on the bed, where a trout would hang in the water, is limited owing to reflection of the bed by the surface. "Seen from below, the surface of the water would appear as an extensive mirror, with the river-bed reflected upon it. Immediately above the observer the reflecting surface is broken by a circular hole or window. Through the surface of the water, in the area of this 'window', the sky and objects immediately overhead have their usual appearance, but in addition surrounding objects above the water-level are also seen through the 'window' as dwarfed and distorted images, suspended, as it were, in the air above the circumference of the circular hole. A ring of iridescent colours separates the 'window' from the surrounding reflecting surface."[1]

This description explains much with regard to trout

[1] Francis Ward, *Animal Life Under Water.*

behaviour that without it would be mysterious; why, for instance, fish are so quickly alarmed at any person on the high river-bank above them (whom they can see through the "window"), yet take no notice of a fisherman wading quietly up the stream until he is very near them. Of course, in the latter case the reflecting surface cuts off any view of the intruder until he gets quite close and his head appears over the edge of the "window". Then, at last, the trout take alarm and are off like a flash.

Much otherwise inexplicable in the conduct of the trout is explained when we remember "the window" and realise how circumscribed is its view of the upper world. This accounts for its readiness to take alarm at objects above it, and its indifference to those upon a lower level. The fish is equally susceptible, equally afraid (if we may assume it feels fear!), of *moving* things in either position, but it can readily see the former, whereas the latter are not visible until close upon it. As I have said, it is only when a wading fisherman's head appears over the margin of the "window" that the trout can see him; likewise the head of the wading heron. This is the reason that waders, whether feathered or human, are usually successful in capturing fish—they approach unseen.

But the question is, when the trout *does* see them, whether its succeeding actions are the outcome of fright.

CHAPTER II

DOES THE TROUT LEARN?

It is possible to explain the trout's behaviour when any object comes into its field of view in terms of stimulus and response, and no doubt such explanation is partially correct, i.e. the image of the intruder, whether the person be on the river-bank or wading upstream, falling suddenly on the retina of the trout, does set in motion such a sequence of reactions that the fish is gone "before it has time to think", but that does not preclude it "being alarmed" in the ordinary sense of the words, nor experiencing the sensation of fear.

It is not only possible, it is probable, that the trout's behaviour is akin to that of a hen with chickens, when a piece of paper blown before the wind sails over the wall, and she gives a frantic danger cry that sends the family scuttling to shelter, where they will lie motionless until the hen, her nerves quieted, gives a peaceful, satisfied cluck.

The hen has a predisposition to respond thus to any object appearing overhead, a response undoubtedly brought about by danger from birds of prey, and one exercised automatically, as can be demonstrated with the said piece of paper.

Granted that the trout's response is equally instinctive, it does not follow it is not frightened. The hen obviously experiences the emotion of fear; the way she looks up and looks about her seems to show that she remembers her fright, at any rate for a while. Is this

so with the fish? Does it too remember its alarms? It is very hard to get evidence on the point owing to the difficulty of watching under-water life; but in another connection there appears to be some evidence of memory and the storing of experience. I allude to the behaviour of trout that are constantly fished over.

It is a well-known maxim of fly-fishermen that fish become "cute" and "get to know too much". Certainly the trout of a brook that is rarely or never fished are much bolder than those of a stream where someone or other's line is constantly on the water. Of course it may be merely a matter of the survival of the shy fish, irrespective of whether they are shy from intelligence or the reverse, and that in a river which is much fished all the bold, free-rising fish are soon caught. Certainly the difference in behaviour between the trout of a little-fished brook and a much-fished brook is striking, the former rising freely at almost any sort of fly, and the latter "coming short", as if acting with caution, at the most carefully selected lure. To cast a fly over one of the latter fish is an education (for the fisherman!), because it appears to know so much. You can see it move slightly, turn and show a spotted side, only to drop back into place. Cast the fly over it once more, let it drift down the current, and watch again. The trout moves, comes almost to the surface, turns over and sinks, giving a movement of its tail as it does so that carries it back upstream to its station. It will not have the artificial fly, yet it is hungry—witness the greedy way it rises at a natural fly coming downstream. The fisherman never doubts that such conduct is due to the trout "knowing too much", and it is

certain we should not hesitate to attribute such behaviour in any other animal to experience and knowledge derived therefrom.

Yet there is evidence to negative the idea that a trout, or any other fish, does learn from what happens to it—witness the many stories, not *all* fishermen's yarns, of fish that having taken a lure and broken away with it have shortly been captured with the first hook still in their mouths!

When, however, I think of my own fishing experiences, and of the number of trout I have pricked, often but slightly, and how these fish, one and all, have promptly dashed off to disappear for the rest of the day, I cannot but conclude the average fish remembers, at any rate for a while, an unpleasant happening. Perhaps some remember for days. There was a fish, a goodly sized one, that lived in the shade of an alder-bush, which I hooked and lost. The next day a fish of the same size and appearance was in the old place and rising freely, but no artificial fly would move it. Nor, to my knowledge, was it ever caught. To all appearances that trout learnt a lesson—namely, to discriminate the real fly from the unreal.

In my opinion, an instance like the latter throws more light on the fishy mind than exceptional cases of trout coming again after being pricked. The latter are exceptional, the former is typical.

In further support of my contention that the trout has a memory, even if but a meagre one, let us not forget that in fish hatcheries, where the fish are regularly fed, they learn to come for food, wherein we again have profiting by experience.

Now is there any other way which we can get an inkling whether a fish can display purpose and indulge in purposive actions? What about its choice of food? When a feeding trout persists in rising at a particular kind of fly, selecting that one species among the many varieties to be had, does not that show it is choosing? It may be argued that when it started to feed it began by taking this insect, and has established a temporary habit, therefore it is behaving mechanically and unintelligently; but how much simpler to suppose it is choosing the fly it likes.

That the trout *does* select its food is proved by the fact it does not rise at non-edible matter, such as bits of grass or leaves floating down the current, and that lures must resemble the real thing to be effective.

Probably, like the newly-hatched chick, the trout has an innate proclivity to pick up small attractive objects, the pecking impulse in the chicken, the feeding impulse in the fish, in the latter more often than not causing it to take flies floating on the surface of the water. We know that the chick learns to choose, i.e. to discriminate between the edible and inedible, and that its first uncontrolled pecking responses are soon governed by knowledge of what is worth pecking at. The newly-hatched chick will pick up bits of red wool and white paper, the several days old one confines its activities to what is worth having and displays purpose in seeking for food. It can discriminate and look slightly ahead. The trout displays similar behaviour, and must, therefore, have sufficient consciousness or mind to comprehend the simple matters of its daily life.

A last consideration, before closing this chapter, is whether fish play. Nearly all the more highly organised beings indulge now and again in sportive behaviour, and though such does not necessarily indicate percepts of a purposeful description, it does appear to show enjoyment of pleasurable emotion. A creature feeling miserable does not play. But the question is, *do* fish play? Fishermen believe they do, averring that there are times where trout rise short at the fly, jump over it and dash about in a manner totally different to their behaviour when feeding. It is also a fact that when salmon rise freely they are most difficult to catch. I once saw a Norwegian river, the Namsen, boiling with jumping salmon. Big fish, some of them very big, probably fifty pounds and over, were jumping out of the water to fall back with resounding smacks, and smaller ones were doing the same. Wherever one looked across the wide, dark flood of the hurrying river one saw fish; *but* despite two of us fishing steadily for three hours we did not touch a salmon. We had caught several fish the day before and did so again the next day. The Norwegian boatmen declared that the fish were playing, and when they did so there was no hope of catching any.

Who can say how far their idea was correct? But the sight was a remarkable one, and however lowly the mind of a fish it would be more strange than otherwise if it could not experience feelings of pleasurable excitement.

Certainly I credit the trout with a mind, of sorts, not of our kind, but a lowly, very lowly, one, into the dim workings and hazy purposes of which it is hard

to penetrate, but which, nevertheless, has its intentions and moments when that vague intellect overrides the full equipment of hereditary responses and instinctive actions and compels its owner to purposive behaviour, such as choosing a good feeding-place or discriminating between an imitation and a real fly.

POSTSCRIPT

The foregoing account of several species of mammals, birds and fishes, with their varying types of mentality and behaviour, will, I hope, have emphasised what I set forth to point out—namely, the importance of the mental factor, and how weighty it is in determining the status of an animal, its survival and distribution.

In the wild, quickness and alertness may make all the difference in the failure or success of a species. Under domestication, a tendency to follow and co-operate with a leader has carried one mammal to every corner of the globe, and a love of home has enabled another to become an almost equally world-wide pet.

Every bird, beast and lower creature supplies us with a problem of the highest interest—namely, the elucidation of the factors that control its position in the web of life, of which factors those governing behaviour are the most vital, especially the mind that governs purposive action.

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