

XX. *On the Hereditary Instinctive Propensities of Animals.* By THOMAS ANDREW KNIGHT, Esq. F.R.S. President of the Horticultural Society, &c. &c.

Received May 15,—Read May 25, 1837.

IN a communication which I had the honour many years ago to address to this Society upon the Economy of Bees, I gave an opinion that families of those insects, in common with those of every species of domesticated animal, are to a greater or less extent governed by a power which I have there called “an instinctive hereditary propensity;” that is, by an irresistible propensity to do that which their predecessors of the same family have been taught or constrained to do, through many successive generations. In that communication I stated that a young Terrier, whose parents had been much employed in destroying Polecats, and a young Springing Spaniel, whose ancestry through many generations had been employed in finding Woodcocks, were reared together as companions, the Terrier not having been permitted to see a Polecat, or any other animal of similar character, and the Spaniel having been prevented seeing a Woodcock, or other kind of game; and that the Terrier evinced, as soon as it perceived the *scent* of the Polecat, very violent anger; and as soon as it *saw* the Polecat attacked it with the same degree of fury as its parents would have done. The young Spaniel, on the contrary, looked on with indifference; but it pursued the first Woodcock which it ever saw with joy and exultation, of which its companion, the Terrier, did not in any degree partake.

I had at that period made a great many analogous experiments, and I have subsequently made a considerable number, chiefly upon one variety of dog, namely, that which is generally used in search of Woodcocks, and is usually called the Springing Spaniel. These experiments were commenced nearly sixty years ago, and occupied a good deal of my attention during more than twenty years, and to a less extent nearly to the present time; and as it does not appear to me probable that any person is now likely to investigate this subject as laboriously, or through so long a period, I have been induced to believe that the facts which I am prepared to communicate may be thought to deserve to be recorded in the Transactions of this Society.

At the period in which my experiments commenced, well-bred and well-taught Springing Spaniels were abundant, and I readily obtained possession of as many as I wanted. I had at first no other object in view than that of obtaining dogs of great excellence; but within a very short time some facts came under my observation which very strongly arrested my attention. In several instances young and wholly inexperienced dogs appeared very nearly as expert in finding Woodcocks as their ex-

perienced parents. The woods in which I was accustomed to shoot did not contain Pheasants, nor much game of any other kind, and I therefore resolved never to shoot at anything except Woodcocks, conceiving that by so doing the hereditary propensities above-mentioned would become more obvious and decided in the young and untaught animals; and I had the satisfaction, in more than one instance, to see some of those find as many Woodcocks, and give tongue as correctly, as the best of my older dogs.

Woodcocks are driven in frosty weather, as is well known, to seek their food in springs and rills of unfrozen water, and I found that my old dogs knew about as well as I did the degree of frost which would drive the Woodcocks to such places; and this knowledge proved very troublesome to me, for I could not sufficiently restrain them. I therefore left the old experienced dogs at home, and took only the wholly inexperienced young dogs; but to my astonishment, some of these, in several instances, confined themselves as closely to the unfrozen grounds as their parents would have done. When I first observed this I suspected that Woodcocks might have been upon the unfrozen ground during the preceding night, but I could not discover (as I think I should have done had this been the case) any traces of their having been there; and as I could not do so, I was led to conclude that the young dogs were guided by feelings and propensities similar to those of their parents.

The subjects of my observation in these cases were all the offspring of well-instructed parents, of five or six years old, or more; and I thought it not improbable that instinctive hereditary propensities might be stronger in these than in the offspring of very young and inexperienced parents. Experience proved this opinion to be well-founded, and led me to believe that these propensities might be made to cease to exist, and others be given; and that the same breed of dogs which displayed so strongly an hereditary disposition to hunt after Woodcocks, might be made ultimately to display a similar propensity to hunt after Truffles; and it may, I think, be reasonably doubted whether any dog having the habits and propensities of the Springing Spaniel would ever have been known, if the art of shooting birds on wing had not been acquired.

I possessed one young Spaniel, of which the male parent, apparently a well-bred Springing Spaniel, had been taught to do a great number of very extraordinary tricks (some of which I previously thought it impossible that a dog could be made to learn), and of which the female parent was a well-taught Springing Spaniel; and the puppy had been taught, before it came into my possession, a part of the accomplishments of its male parent. This animal possessed a very singular degree of acuteness and cunning, and in some cases appeared to be guided by something more nearly allied to reason than I have ever witnessed in any of the inferior animals. In one instance I had walked out with my gun and a servant, without any dog, and having seen a Woodcock, I sent for the dog above-mentioned, which the servant brought to me. A month afterwards I sent my servant for it again, under similar circumstances, when it acted

as if it had inferred that the track by which the servant had come from me would lead it to me. It left my servant within twenty yards of my house, and was with me in a very few minutes, though the distance which it had to run exceeded a mile. I repeated this experiment at different times, and after considerable intervals, and uniformly with the same results, the dog always coming to me without the servant. I could mention several other instances, nearly as singular, of the sagacity of this animal, which I imagined to have derived its extraordinary powers in some degree from the highly cultivated intellect of its male parent.

I have witnessed, within the period above mentioned, of nearly sixty years, a very great change in the habits of the Woodcock. In the first part of that time, when it had recently arrived in the autumn, it was very tame; it usually chuckled when disturbed, and took only a very short flight. It is now, and has been during many years, comparatively a very wild bird, which generally rises in silence, and takes a comparatively long flight, excited, I conceive, by increased hereditary fear of man.

I procured a puppy of a breed of Setters, which had, through many generations, been employed in setting Partridges for the flight net only, and of whose exploits I had heard many very extraordinary accounts. I employed it as a pointer in shooting Partridges; and for finding coveys of those birds in the open field, I never saw its equal, or in its manner of setting them; but it would never set its game amongst brakes or hedge-rows. Whenever it found a bird in such a situation, it invariably sat down, in the same attitude, and alternately looked into the bush and at me, seeming to think that setting Partridges in such situations was not a part of its duty.

It is well known that very young Pointers, of slow and indolent breeds, will point Partridges without any previous instruction or practice. I took one of those to a spot where I had just seen a covey of small Partridges alight in August, and amongst them I threw a piece of bread to induce the dog to move from my heels, which it had very little disposition to do at any time, except in search of something to eat. On getting amongst the partridges and perceiving the scent of them, its eyes became suddenly fixed, and its muscles rigid, and it stood trembling with anxiety during some minutes. I then caused the birds to take wing, at sight of which, it exhibited strong symptoms of fear, and none of pleasure. A young springing Spaniel, under the same circumstances, would have displayed much joy and exultation, and I do not doubt but that the young Pointer would have done so too, if none of its ancestry had ever been beaten for springing Partridges improperly.

The most extraordinary instance of the power of instinctive hereditary propensity, which I have ever witnessed, came under my observation in the case of a young dog of a variety usually called Retrievers. The proper office of these dogs is that of finding and recovering wounded game, but they are often employed for more extensive purposes, and are found to possess very great sagacity. I obtained a very young puppy* of this family, which was said to be exceedingly well bred, and had

* It was only one month old when it came into the author's possession.

been brought to me from a distant county. I had walked up the side of the river which passes by my house in search of Wild Ducks, when the dog above mentioned followed me unobserved, and contrary to my wishes, for it was too young for service, not being then quite ten months old. It had not received any other instruction than that of being taught to bring any floating body off a pond, and I do not think that it had ever done this more than three or four times. It walked very quietly behind my gamekeeper upon the opposite side of the river, and it looked on with apparent indifference whilst I killed a couple of Mallards and a Widgeon, but it leaped into the river instantly upon the gamekeeper pointing out the birds to it, and it brought them on shore, and to the feet of the gamekeeper, just as well as the best instructed old dog could have done. I subsequently shot a Snipe, which fell into the middle of a large nearly stagnant pool of water, which was partially frozen over. I called the dog from the other side of the river and caused it to see the Snipe, which could not be done without difficulty: but as soon as it saw it, it swam to it, brought it to me, laid it down at my feet, and again swam through the river to my gamekeeper. I never saw a dog of any age acquit itself so well, yet it was most certainly wholly untaught. I state the circumstances with reluctance, and not without hesitation, because I doubt whether I could myself believe them to be well founded upon any other evidence than that of my own senses: the statement is nevertheless most perfectly correct.

I could add an account of a great many more experiments and observations which were made with other varieties of dogs and upon other species of animals, but as all the facts which I have noticed are confirmations of the truth of the conclusions which I have drawn from those above stated, I shall state the result of one other experiment only, and that solely because it tends to establish a fact which appears to me to be of a good deal of importance.

I stated in a communication to this Society many years ago, "upon the Comparative Influence of the Male and of the Female Parent upon the Offspring of some Species of Animals," that in cases where nature intended the offspring to accompany its parent in flight at an early age, the influence of the parent of one sex upon the form of the offspring differed very widely from that of the other parent, and that when the female parents were of small size and of a small breed, and of permanent habits, and the male of a large size and large breed, and of permanent habits, the length of the legs of the fœtus were given by those of the family of the female parent. I imported some Norwegian Pony Mares with the intention of obtaining cross-bred animals between them and the London Dray Horse; having satisfied myself that the experiment might be made without danger or injury to the smaller animal. The bodies and shoulders of the cross-bred animals which I have obtained are excessively deep, comparatively with the length of their legs, which remains unchanged, except that the joints, being greatly larger, on account of the greatly increased strength of the legs, and being of the same form, necessarily occupy a little more space. The strength of

these animals appears to be very great; I believe that they will prove capable of drawing, particularly up-hill, as heavy weights as the London Dray Horses, provided that they be made to draw from a proper level; and I am quite confident that they will prove capable of bearing much more long-continued labour and living upon much less food.

The hereditary propensities of the offspring of the Norwegian Ponies, whether full or half bred, are very singular. Their ancestry have been in the habit of obeying the *voice of their riders* and not the bridle, and the horse-breakers complain, and certainly with very good reason, that it is impossible to give them what is called a mouth; they are nevertheless exceedingly docile, and more than ordinarily obedient where they understand the commands of their master. They appear also to be as incapable of understanding the use of hedges as they are of bridles, for they will walk deliberately, and much at their ease, through a strong hedge; and I therefore conclude that the Norwegian horses are not in the habit of being restrained by hedges similar to those of England.

The male and female parent appear to possess similar powers of transferring to their offspring their hereditary feelings and propensities, except in cases where mule offsprings are produced. In such cases, I think that I have witnessed a decided prevalence of the power of the male parent. The organization of the Mule, which is obtained by cross-breeding between the Horse and the Ass, is well known to be regulated to a much greater extent by the male than by the female parent; and its disposition is, I have some reason to believe, to a very great extent, given by its male parent. I have noticed this in the Mule which is the offspring of a female Ass. I have seen a few only of these animals, but those which I have seen presented the expression of countenance of the Horse, and were perfect horses in temper, and perfectly without the sullenness and obstinacy of the more common Mule. The results of such violations of the ordinary laws of nature appear to be very various in different species of animals, and I should not here have introduced the subject, but that the characters of mules have in many instances misled the judgement of physiologists in their estimates of the comparative influence in ordinary cases of the male and the female upon the offspring.

Whenever I have obtained cross-bred animals by propagating from families of dogs of different permanent habits, the hereditary propensities of the offspring have been very irregular, sometimes those of the male, and at other times those of the female parent being prevalent; and in one instance I saw a very young dog, a mixture of the Springing Spaniel and Setter, which dropped upon crossing the track of a Partridge, as its male parent would have done, and sprang the bird in silence; but the same dog having within a couple of hours afterwards found a Woodcock gave tongue very freely, and just as its female parent would have done. Such cross-bred animals are, however, usually worthless, and the experiments and observations which I have made upon them have not been very numerous or interesting.