

CHAPTER II.

HORSES AND ASSES.

HORSE.—DIFFERENCES IN THE BREEDS—INDIVIDUAL VARIABILITY OF—DIRECT EFFECTS OF THE CONDITIONS OF LIFE—CAN WITHSTAND MUCH COLD—BREEDS MUCH MODIFIED BY SELECTION—COLOURS OF THE HORSE—DAPPLING—DARK STRIPES ON THE SPINE, LEGS, SHOULDERS, AND FOREHEAD—DUN-COLOURED HORSES MOST FREQUENTLY STRIPED—STRIPES PROBABLY DUE TO REVERSION TO THE PRIMITIVE STATE OF THE HORSE.
ASSES.—BREEDS OF—COLOUR OF—LEG- AND SHOULDER- STRIPES—SHOULDER-STRIPES SOMETIMES ABSENT, SOMETIMES FORKED.

THE history of the Horse is lost in antiquity. Remains of this animal in a domesticated condition have been found in the Swiss lake-dwellings, belonging to the Neolithic period.¹ At the present time the number of breeds is great, as may be seen by consulting any treatise on the Horse.² Looking only to the native ponies of Great Britain, those of the Shetland Isles, Wales, the New Forest, and Devonshire are distinguishable; and so it is, amongst other instances, with each separate island in the great Malay archipelago.³ Some of the breeds present great differences in size, shape of ears, length of mane, proportions of the body, form of the withers and hind quarters, and especially in the head. Compare the race-horse, dray-horse, and a Shetland pony in size, configuration, and disposition; and see how much greater the difference is than between the seven or eight other living species of the genus *Equus*.

¹ Rüttimeyer, 'Fauna der Pfahlbauten,' 1861, s. 122.

² See Youatt on the Horse: J. Lawrence on the Horse, 1829; W. C. L. Martin, 'History of the Horse,' 1845; Col. H. Smith, in 'Nat. Library, Horses,' 1841, vol. xii.: Prof. Veith, 'Die naturgesch. Haus-säugethiere,' 1856.

³ Crawford, 'Descript. Dict. of Indian Islands,' 1856, p. 153. "There are many different breeds, every

island having at least one peculiar to it." Thus in Sumatra there are at least two breeds; in Achin and Batubara one; in Java several breeds; one in Bali, Lombok, Sumbawa (one of the best breeds), Tambora, Bima, Gunung-api, Celebes, Sumba, and Philippines. Other breeds are specified by Zollinger in the 'Journal of the Indian Archipelago,' vol. v. p. 343, &c.

Of individual variations not known to characterise particular breeds, and not great or injurious enough to be called monstrosities, I have not collected many cases. Mr. G. Brown, of the Cirencester Agricultural College, who has particularly attended to the dentition of our domestic animals, writes to me that he has "several times noticed eight permanent incisors instead of six in the jaw." Male horses only should have canines, but they are occasionally found in the mare, though a small size.⁴ The number of ribs on each side is properly eighteen, but Youatt⁵ asserts that not unfrequently there are nineteen, the additional one being always the posterior rib. It is a remarkable fact that the ancient Indian horse is said in the Rig-Vêda to have only seventeen ribs; and M. Piétrement,⁶ who has called attention to this subject, gives various reasons for placing full trust in this statement, more especially as during former times the Hindoos carefully counted the bones of animals. I have seen several notices of variations in the bones of the leg; thus Mr. Price⁷ speaks of an additional bone in the hock, and of certain abnormal appearances between the tibia and astragalus, as quite common in Irish horses, and not due to disease. Horses have often been observed, according to M. Gaudry,⁸ to possess a trapezium and a rudiment of a fifth metacarpal bone, so that "one sees appearing by monstrosity, in the foot of the horse, structures which normally exist in the foot of the Hipparion,"—an allied and extinct animal. In various countries horn-like projections have been observed on the frontal bones of the horse: in one case described by Mr. Percival they arose about two inches above the orbital processes, and were "very like those in a calf from five to six months old," being from half to three-quarters of an inch in length.⁹ Azara has described two cases in South America in

⁴ 'The Horse,' &c. by John Lawrence, 1829, p. 14.

⁵ 'The Veterinary,' London, vol. v. p. 543.

⁶ 'Mémoire sur les chevaux à trente-quatre côtes,' 1871.

⁷ Proc. Veterinary Assoc., in 'The Veterinary,' vol. xiii. p. 42.

⁸ 'Bulletin de la Soc. Géolog.,' tom.

xxii., 1866, p. 22.

⁹ Mr. Percival, of the Enniskillen Dragoons, in 'The Veterinary,' vol. i. p. 224: see Azara, 'Des Quadrupèdes du Paraguay,' tom. ii. p. 313. The French translator of Azara refers to other cases mentioned by Huzard as having occurred in Spain.

which the projections were between three and four inches in length: other instances have occurred in Spain.

That there has been much inherited variation in the horse cannot be doubted, when we reflect on the number of the breeds existing throughout the world or even within the same country, and when we know that they have largely increased in number since the earliest known records.¹⁰ Even in so fleeting a character as colour, Hofacker¹¹ found that, out of 216 cases in which horses of the same colour were paired, only eleven pairs produced foals of a quite different colour. As Professor Low¹² has remarked, the English race-horse offers the best possible evidence of inheritance. The pedigree of a race-horse is of more value in judging of its probable success than its appearance: "King Herod" gained in prizes 201,505*l.* sterling, and begot 497 winners; "Eclipse" begot 334 winners.

Whether the whole amount of difference between the various breeds has arisen under domestication is doubtful. From the fertility of the most distinct breeds¹³ when crossed, naturalists have generally looked at all the breeds as having descended from a single species. Few will agree with Colonel H. Smith, who believes that they have descended from no less than five primitive and differently coloured stocks.¹⁴ But as several species and varieties of the horse existed¹⁵ during the later tertiary periods, and as Rüttimeyer found differences in the size and form of the skull in the earliest known domesticated horses,¹⁶ we ought not to feel sure that all our breeds are descended from a single species.

¹⁰ Godron, 'De l'Espèce,' tom. i. p. 378.

¹¹ 'Ueber die Eigenschaften,' &c., 1828, s. 10.

¹² 'Domesticated Animals of the British Islands,' pp. 527, 532. In all the veterinary treatises and papers which I have read, the writers insist in the strongest terms on the inheritance by the horse of all good and bad tendencies and qualities. Perhaps the principle of inheritance is not really stronger in the horse than in any other animal; but, from its value, the

tendency has been more carefully observed.

¹³ Andrew Knight crossed breeds so different in size as a dray-horse and Norwegian pony: see A. Walker on 'Intermarriage,' 1838, p. 205.

¹⁴ 'Nat. Library, Horses,' vol. xii. p. 208.

¹⁵ Gervais, 'Hist. Nat. Mamm.,' tom. ii. p. 143. Owen, 'British Fossil Mammals,' p. 383.

¹⁶ 'Kenntniß der fossilen Pferde,' 1863, s. 131.

The savages of North and South America easily reclaim the feral horses, so that there is no improbability in savages in various quarters of the world having domesticated more than one native species or natural race. M. Sanson¹⁷ thinks that he has proved that two distinct species have been domesticated, one in the East, and one in North Africa; and that these differed in the number of their lumbar vertebra and in various other parts; but M. Sanson seems to believe that osteological characters are subject to very little variation, which is certainly a mistake. At present no aboriginal or truly wild horse is positively known to exist; for it is commonly believed that the wild horses of the East are escaped domestic animals.¹⁸ If therefore our domestic breeds are descended from several species or natural races, all have become extinct in the wild state.

With respect to the causes of the modifications which horses have undergone, the conditions of life seem to produce a considerable direct effect. Mr. D. Forbes, who has had excellent opportunities of comparing the horses of Spain with those of South America, informs me that the horses of Chile, which have lived under nearly the same conditions as their progenitors in Andalusia, remain unaltered, whilst the Pampas horses and the Puno ponies are considerably modified. There can be no doubt that horses become greatly reduced in size and altered in appearance by living on mountains and islands; and this apparently is due to want of nutritious or varied food. Every one knows how small and rugged the ponies are on the Northern islands and on the mountains of Europe. Corsica and Sardinia have their native ponies; and there were,¹⁹ or still are, on some islands on the coast of Virginia, ponies like those of the Shetland Islands, which are believed to have originated through exposure to unfavourable conditions. The Puno ponies, which inhabit the

¹⁷ 'Comptes rendus,' 1866, p. 485, and 'Journal de l'Anat. et de la Phys.,' Mai 1868.

¹⁸ Mr. W. C. L. Martin ('The Horse,' 1845, p. 34), in arguing against the belief that the wild Eastern horses are merely feral, has

remarked on the improbability of man in ancient times having extirpated a species in a region where it can now exist in numbers.

¹⁹ 'Transact. Maryland Academy,' vol. i. part i. p. 28.

lofty regions of the Cordillera, are, as I hear from Mr. D. Forbes, strange little creatures, very unlike their Spanish progenitors. Further south, in the Falkland Islands, the offspring of the horses imported in 1764 have already so much deteriorated in size²⁰ and strength that they are unfitted for catching wild cattle with the lasso; so that fresh horses have to be brought for this purpose from La Plata at a great expense. The reduced size of the horses bred on both southern and northern islands, and on several mountain-chains, can hardly have been caused by the cold, as a similar reduction has occurred on the Virginian and Mediterranean islands. The horse can withstand intense cold, for wild troops live on the plains of Siberia under lat. 56°,²¹ and aboriginally the horses must have inhabited countries annually covered with snow, for he long retains the instinct of scraping it away to get at the herbage beneath. The wild tarpans in the East have this instinct; and so it is, as I am informed by Admiral Sullivan, with the horses recently and formerly introduced into the Falkland Islands from La Plata, some of which have run wild; this latter fact is remarkable, as the progenitors of these horses could not have followed this instinct during many generations in La Plata. On the other hand, the wild cattle of the Falklands never scrape away the snow, and perish when the ground is long covered. In the northern parts of America the horses descended from those introduced by the Spanish conquerors of Mexico, have the same habit, as have the native bisons, but not so the cattle introduced from Europe.²²

The horse can flourish under intense heat as well as under intense cold, for he is known to come to the highest perfection, though not attaining a large size, in Arabia and northern Africa. Much humidity is apparently more injurious to the horse than heat or cold. In the Falkland Islands, horses suffer much from the dampness; and this

²⁰ Mr. Mackinnon on 'The Falkland Islands,' p. 25. The average height of the Falkland horses is said to be 14 hands 2 inches. See also my 'Journal of Researches.'

²¹ Pallas, 'Act. Acad. St. Peters-

burgh,' 1777, part ii. p. 265. With respect to the tarpans scraping away the snow, see Col. Hamilton Smith in 'Nat. Lib.,' vol. xii. p. 165.

²² Franklin's 'Narrative,' vol. i. p. 87; note by Sir J. Richardson.

circumstance may perhaps partly account for the singular fact that to the eastward of the Bay of Bengal,²³ over an enormous and humid area, in Ava, Pegu, Siam, the Malayan archipelago, the Loo Choo Islands, and a large part of China, no full-sized horse is found. When we advance as far eastward as Japan, the horse reacquires his full size.²⁴

With most of our domesticated animals, some breeds are kept on account of their curiosity or beauty; but the horse is valued almost solely for its utility. Hence semi-monstrous breeds are not preserved; and probably all the existing breeds have been slowly formed either by the direct action of the conditions of life, or through the selection of individual differences. No doubt semi-monstrous breeds might have been formed: thus Mr. Waterton records²⁵ the case of a mare which produced successively three foals without tails; so that a tailless race might have been formed like the tailless races of dogs and cats. A Russian breed of horses is said to have curled hair, and Azara²⁶ relates that in Paraguay horses are occasionally born, but are generally destroyed, with hair like that on the head of a negro; and this peculiarity is transmitted even to half-breeds: it is a curious case of correlation that such horses have short manes and tails, and their hoofs are of a peculiar shape like those of a mule.

It is scarcely possible to doubt that the long-continued selection of qualities serviceable to man has been the chief agent in the formation of the several breeds of the horse. Look at a dray-horse, and see how well adapted he is to draw heavy weights, and how unlike in appearance to any allied wild animal. The English race-horse is known to be derived from the commingled blood of Arabs, Turks, and Barbs; but selection, which was carried on during very early

²³ Mr. J. H. Moor, 'Notices of the Indian Archipelago;' Singapore, 1837, p. 189. A pony from Java was sent ('Athenæum,' 1842, p. 718) to the Queen only 28 inches in height. For the Loo Choo Islands, see Beechey's 'Voyage,' 4th edit., vol. i. p. 499.

²⁴ J. Crawford, 'History of the Horse;' 'Journal of Royal United

Service Institution,' vol. iv.

²⁵ 'Essays on Natural History,' 2nd series, p. 161.

²⁶ 'Quadrupèdes du Paraguay,' tom. ii. p. 333. Dr. Canfield informs me that a breed with curly hair was formed by selection at Los Angeles in North America.

times in England,²⁷ together with training, have made him a very different animal from his parent-stocks. As a writer in India, who evidently knows the pure Arab well, asks, who now, "looking at our present breed of race-horses, could have conceived that they were the result of the union of the Arab horse and African mare?" The improvement is so marked that in running for the Goodwood Cup "the first descendants of Arabian, Turkish, and Persian horses, are allowed a discount of 18 lbs. weight; and when both parents are of these countries a discount of 36 lbs.²⁸ It is notorious that the Arabs have long been as careful about the pedigree of their horses as we are, and this implies great and continued care in breeding. Seeing what has been done in England by careful breeding, can we doubt that the Arabs must likewise have produced during the course of centuries a marked effect on the qualities of their horses? But we may go much farther back in time, for in the Bible we hear of studs carefully kept for breeding, and of horses imported at high prices from various countries.²⁹ We may therefore conclude that, whether or not the various existing breeds of the horse have proceeded from one or more aboriginal stocks, yet that a great amount of change has resulted from the direct action of the conditions of life, and probably a still greater amount from the long-continued selection by man of slight individual differences.

With several domesticated quadrupeds and birds, certain coloured marks are either strongly inherited or tend to re-appear after having been lost for a long time. As this subject will hereafter be seen to be of importance, I will give a full account of the colouring of horses. All English breeds,

²⁷ See the evidence on this head in 'Land and Water,' May 2nd, 1868.

²⁸ Prof. Low, 'Domesticated Animals,' p. 546. With respect to the writer in India, see 'India Sporting Review,' vol. ii. p. 181. As Lawrence has remarked ('The Horse,' p. 9), "perhaps no instance has ever occurred of a three-part bred horse (*i.e.* a horse, one of whose grandparents was of impure blood) saving his dis-

tance in running two miles with thoroughbred racers." Some few instances are on record of seven-eights racers having been successful.

²⁹ Prof. Gervais (in his 'Hist. Nat. Mamm.,' tom. ii. p. 144) has collected many facts on this head. For instance, Solomon (Kings, B. i. ch. x. v. 28) bought horses in Egypt at a high price.

however unlike in size and appearance, and several of those in India and the Malay archipelago, present a similar range and diversity of colour. The English race-horse, however, is said ³⁰ never to be dun-coloured; but as dun and cream-coloured horses are considered by the Arabs as worthless, "and fit only for Jews to ride," ³¹ these tints may have been removed by long-continued selection. Horses of every colour, and of such widely different kinds as dray-horses, cobs, and ponies, are all occasionally dappled, ³² in the same manner as is so conspicuous with grey horses. This fact does not throw any clear light on the colouring of the aboriginal horse, but is a case of analogous variation, for even asses are sometimes dappled, and I have seen, in the British Museum, a hybrid from the ass and zebra dappled on its hinder quarters. By the expression analogous variation (and it is one that I shall often have occasion to use) I mean a variation occurring in a species or variety which resembles a normal character in another and distinct species or variety. Analogous variations may arise, as will be explained in a future chapter, from two or more forms with a similar constitution having been exposed to similar conditions,—or from one of two forms having reacquired through reversion a character inherited by the other form from their common progenitor,—or from both forms having reverted to the same ancestral character. We shall immediately see that horses occasionally exhibit a tendency to become striped over a large part of their bodies; and as we know that in the varieties of the domestic cat and in several feline species stripes readily pass into spots and cloudy marks—even the cubs of the uniformly-coloured lion being spotted with dark marks on a lighter ground—we may suspect that the dappling of the horse, which has been

³⁰ 'The Field,' July 13th, 1861, p. 42.

³¹ E. Vernon Harcourt, 'Sporting in Algeria,' p. 26.

³² I state this from my own observations made during several years on the colours of horses. I have seen cream-coloured, light-dun and mouse-dun horses dappled, which I mention

because it has been stated (Martin, 'History of the Horse,' p. 134) that duns are never dappled. Martin (p. 205) refers to dappled asses. In the 'Farrier' (London, 1828, pp. 453, 455) there are some good remarks on the dappling of horses; and likewise in Col. Hamilton Smith on 'The Horse.'

noticed by some authors with surprise, is a modification or vestige of a tendency to become striped.

This tendency in the horse to become striped is in several respects an interesting fact. Horses of all colours, of the most diverse breeds, in various parts of the world, often have a dark stripe extending along the spine, from the mane to the tail; but this is so common that I need enter into no particulars.³³ Occasionally horses are transversely barred on the legs, chiefly on the under side; and more rarely they have a distinct stripe on the shoulder, like that on the shoulder of the ass, or a broad dark patch representing a stripe. Before entering on any details I must premise that the term dun-coloured is vague, and includes three groups of colours, viz., that

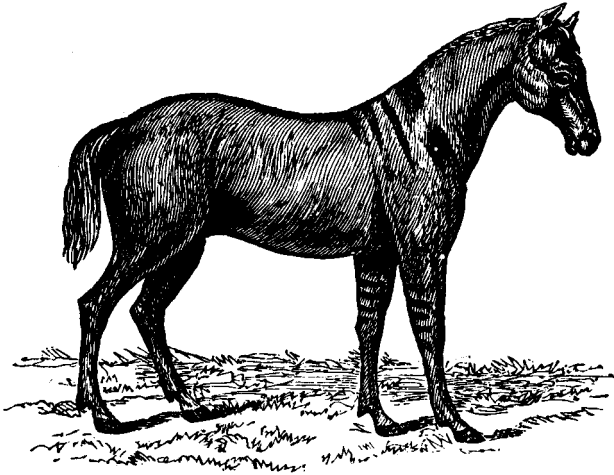


Fig. 1.—Dun Devonshire Pony, with shoulder, spinal, and leg stripes.

between cream-colour and reddish-brown, which graduates into light-bay or light-chestnut—this, I believe is often called fallow-dun; secondly, leaden or slate-colour or mouse-dun, which graduates into an ash-colour; and, lastly, dark-dun, between brown and black. In England I have examined a rather large, lightly-built, fallow-dun Devonshire pony (fig. 1), with a conspicuous stripe along the back, with light transverse stripes on the under sides of its front legs, and with four parallel stripes on each shoulder. Of these four stripes the posterior one was very minute and faint; the anterior one, on the other hand, was long and broad, but interrupted in the

³³ Some details are given in 'The Farrier,' 1828, pp. 452, 455. One of the smallest ponies I ever saw, of the colour of a mouse, had a conspicuous spinal stripe. A small Indian chest-

nut pony had the same stripe, as had a remarkably heavy chestnut cart-horse. Race-horses often have the spinal stripe.

middle, and truncated at its lower extremity, with the anterior angle produced into a long tapering point. I mention this latter fact because the shoulder-stripe of the ass occasionally presents exactly the same appearance. I have had an outline and description sent to me of a small, purely-bred, light fallow-dun Welch pony, with a spinal stripe, a single transverse stripe on each leg, and three shoulder-stripes; the posterior stripe corresponding with that on the shoulder of the ass was the longest, whilst the two anterior parallel stripes, arising from the mane, decreased in length, in a reversed manner as compared with the shoulder-stripes on the above-described Devonshire pony. I have seen a bright fallow-dun cob, with its front legs transversely barred on the under sides in the most conspicuous manner; also a dark-leaden mouse-coloured pony with similar leg stripes, but much less conspicuous; also a bright fallow-dun colt, fully three-parts thoroughbred, with very plain transverse stripes on the legs; also a chestnut-dun cart-horse with a conspicuous spinal stripe, with distinct traces of shoulder-stripes, but none on the legs; I could add other cases. My son made a sketch for me of a large, heavy, Belgian cart-horse, of a fallow-dun, with a conspicuous spinal stripe, traces of leg-stripes, and with two parallel (three inches apart) stripes about seven or eight inches in length on both shoulders. I have seen another rather light cart-horse, of a dirty dark cream-colour, with striped legs, and on one shoulder a large ill-defined dark cloudy patch, and on the opposite shoulder two parallel faint stripes. All the cases yet mentioned are duns of various tints; but Mr. W. W. Edwards has seen a nearly thoroughbred chestnut horse which had the spinal stripe, and distinct bars on the legs; and I have seen two bay carriage-horses with black spinal stripes; one of these horses had on each shoulder a light shoulder-stripe, and the other had a broad back ill-defined stripe, running obliquely half-way down each shoulder; neither had leg-stripes.

The most interesting case which I have met with occurred in a colt of my own breeding. A bay mare (descended from a dark-brown Flemish mare by a light grey Turcoman horse) was put to Hercules, a thoroughbred dark bay, whose sire (Kingston) and dam were both bays. The colt ultimately turned out brown; but when only a fortnight old it was a dirty bay, shaded with mouse-grey, and in parts with a yellowish tint: it had only a trace of the spinal stripe, with a few obscure transverse bars on the legs; but almost the whole body was marked with very narrow dark stripes, in most parts so obscure as to be visible only in certain lights, like the stripes which may be seen on black kittens. These stripes were distinct on the hind-quarters, where they diverged from the spine, and pointed a little forwards; many of them as they diverged became a little branched, exactly in the same manner as in some zebrine species. The stripes were plainest on the forehead between the ears, where they formed a set of pointed arches, one under the other, decreasing in size downwards towards the muzzle; exactly similar marks may be seen on the forehead of the quagga

and Burchell's zebra. When this foal was two or three months old all the stripes entirely disappeared. I have seen similar marks on the forehead of a fully grown, fallow-dun, cob-like horse, having a conspicuous spinal stripe, and with its front legs well barred.

In Norway the colour of the native horse or pony is dun, varying from almost cream-colour to dark-mouse dun; and an animal is not considered purely bred unless it has the spinal and leg-stripes.³⁴ My son estimated that about a third of the ponies which he saw there had striped legs; he counted seven stripes on the fore-legs and two on the hind-legs of one pony; only a few of them exhibited traces of shoulder stripes; but I have heard of a cob imported from Norway which had the shoulder as well as the other stripes well developed. Colonel H. Smith³⁵ alludes to dun-horses with the spinal stripe in the Sierras of Spain; and the horses originally derived from Spain, in some parts of South America, are now duns. Sir W. Elliot informs me that he inspected a herd of 300 South American horses imported into Madras, and many of these had transverse stripes on the legs and short shoulder-stripes; the most strongly marked individual, of which a coloured drawing was sent me, was a mouse-dun, with the shoulder-stripes slightly forked.

In the North-Western parts of India striped horses of more than one breed are apparently commoner than in any other part of the world; and I have received information respecting them from several officers, especially from Colonel Poole, Colonel Curtis, Major Campbell, Brigadier St. John, and others. The Kattywar horses are often fifteen or sixteen hands in height, and are well but lightly built. They are of all colours, but the several kinds of duns prevail; and these are so generally striped, that a horse without stripes is not considered pure. Colonel Poole believes that all the duns have the spinal stripe, the leg-stripes are generally present, and he thinks that about half the horses have the shoulder-stripe; this stripe is sometimes double or treble on both shoulders. Colonel Poole has often seen stripes on the cheeks and sides of the nose. He has seen stripes on the grey and bay Kattywars when first foaled, but they soon faded away. I have received other accounts of cream-coloured, bay, brown, and grey Kattywar horses being striped. Eastward of India, the Shan (north of Burmah) ponies, as I am informed by Mr. Blyth, have spinal, leg, and shoulder stripes. Sir W. Elliot informs me that he saw two bay Pegu ponies with leg-stripes. Burmese and Javanese ponies are frequently dun-coloured, and have the three kinds of stripes, "in the same degree as in England."³⁶ Mr. Swinhoe informs me that he examined two light-dun ponies of

³⁴ I have received information, through the kindness of the Consul-General, Mr. J. R. Crowe, from Prof. Boeck, Rasck, and Esmarck, on the colours of the Norwegian ponies. See also 'The Field,' 1861, p. 431.

³⁵ Col. Hamilton Smith, 'Nat. Lib.

vol. xii. p. 275.

³⁶ Mr. G. Clark, in 'Annals and Mag. of Nat. History,' 2nd series, vol. ii. 1848, p. 363. Mr. Wallace informs me that he saw in Java a dun and clay-coloured horse with spinal and leg stripes.

two Chinese breeds, viz. those of Shanghai and Amoy; both had the spinal stripe, and the latter an indistinct shoulder-stripe.

We thus see that in all parts of the world breeds of the horse as different as possible, when of a dun-colour (including under this term a wide range of tint from cream to dusty black), and rarely when almost white tinged with yellow, grey, bay, and chestnut, have the several above-specified stripes. Horses which are of a yellow colour with white mane and tail, and which are sometimes called duns, I have never seen with stripes.³⁷

From reasons which will be apparent in the chapter on Reversion, I have endeavoured, but with poor success, to discover whether duns, which are so much oftener striped than other coloured horses, are ever produced from the crossing of two horses, neither of which are duns. Most persons to whom I have applied believe that one parent must be dun; and it is generally asserted, that, when this is the case, the dun-colour and the stripes are strongly inherited.³⁸ One case, however, has fallen under my own observation of a foal from a black mare by a bay horse, which when fully grown was a dark fallow-dun and had a narrow but plain spinal stripe. Hofacker³⁹ gives two instances of mouse-duns (Mausrapp) being produced from two parents of different colours and neither duns.

The stripes of all kinds are generally plainer in the foal than in the adult horse, being commonly lost at the first shedding of the hair.⁴⁰ Colonel Poole believes that "the stripes in the Kattywar breed are plainest when the colt is first foaled; they then become less and less distinct till after the first coat is shed, when they come out as strongly as before; but certainly often fade away as the age of the horse increases." Two other accounts confirm this fading of the stripes in old horses in India. One writer, on the other hand, states that colts are often born without stripes, but that they appear as the colt grows older. Three authorities affirm that in Norway the stripes are less plain in the foal than in the adult. In the case described by me of the young foal which was narrowly striped over nearly all its body, there was no doubt about the early and complete disappearance of the stripes. Mr. W. W. Edwards examined for me twenty-two foals of race-horses, and twelve had the spinal stripe more or less plain; this fact, and some other accounts which I have received, lead me to believe that the spinal stripe often disappears in the English race-horse when old. With natural species, the young often exhibit characters which disappear at maturity.

The stripes are variable in colour, but are always darker than the rest of the body. They do not by any means always

³⁷ See, also, on this point, 'The Field,' July 27th, 1861, p. 91.

³⁸ 'The Field,' 1861, pp. 431, 493 545.

³⁹ 'Ueber die Eigenschaften,' &c., 1828, s. 13, 14.

⁴⁰ Von Nathusius, 'Vorträge über Viehzucht,' 1872, 135.

coexist on the different parts of the body: the legs may be striped without any shoulder-stripe, or the converse case, which is rarer, may occur; but I have never heard of either shoulder or leg-stripes without the spinal stripe. The latter is by far the commonest of all the stripes, as might have been expected, as it characterises the other seven or eight species of the genus. It is remarkable that so trifling a character as the shoulder-stripe being double or triple should occur in such different breeds as Welch and Devonshire ponies, the Shan pony, heavy cart-horses, light South American horses, and the lanky Kattywar breed. Colonel Hamilton Smith believes that one of his five supposed primitive stocks was dun-coloured and striped; and that the stripes in all the other breeds result from ancient crosses with this one primitive dun; but it is extremely improbable that different breeds living in such distant quarters of the world should all have been crossed with any one aboriginally distinct stock. Nor have we any reason to believe that the effects of a cross at a very remote period would be propagated for so many generations as is implied on this view.

With respect to the primitive colour of the horse having been dun, Colonel Hamilton Smith⁴¹ has collected a large body of evidence showing that this tint was common in the East as far back as the time of Alexander, and that the wild horses of Western Asia and Eastern Europe now are, or recently were, of various shades of dun. It seems that not very long ago a wild breed of dun-coloured horses with a spinal stripe was preserved in the royal parks in Prussia. I hear from Hungary that the inhabitants of that country look at the duns with a spinal stripe as the aboriginal stock, and so it is in Norway. Dun-coloured ponies are not rare in the mountainous parts of Devonshire, Wales, and Scotland, where the aboriginal breed would have the best chance of being

⁴¹ 'Nat. Library,' vol. xii. (1841), pp. 109, 156 to 163, 280, 281. Cream-colour, passing into Isabella (*i.e.* the colour of the dirty linen of Queen Isabella), seems to have been common in ancient times. See also Pallas's account of the wild horses of

the East, who speaks of dun and brown as the prevalent colours. In the Icelandic sagas, which were committed to writing in the twelfth century, dun-coloured horses with a black spinal stripe are mentioned; see Dasent's translation, vol. i. p. 169

preserved. In South America in the time of Azara, when the horse had been feral for about 250 years, 90 out of a 100 horses were "bai-châtains," and the remaining ten were "zains," that is brown; not more than one in 2000 being black. In North America the feral horses show a strong tendency to become roans of various shades; but in certain parts, as I hear from Dr. Canfield, they are mostly duns and striped.⁴²

In the following chapters on the Pigeon we shall see that a blue bird is occasionally produced by pure breeds of various colours and that when this occurs certain black marks invariably appear on the wings and tail; so again, when variously coloured breeds are crossed, blue birds with the same black marks are frequently produced. We shall further see that these facts are explained by, and afford strong evidence in favour of, the view that all the breeds are descended from the rock-pigeon, or *Columba livia*, which is thus coloured and marked. But the appearance of the stripes on the various breeds of the horse, when of a dun colour, does not afford nearly such good evidence of their descent from a single primitive stock as in the case of the pigeon: because no horse certainly wild is known as a standard of comparison; because the stripes when they appear are variable in character; because there is far from sufficient evidence that the crossing of distinct breeds produces stripes, and lastly, because all the species of the genus *Equus* have the spinal stripe, and several species have shoulder and leg stripes. Nevertheless the similarity in the most distinct breeds in their general range of colour, in their dappling, and in the occasional appearance, especially in duns, of leg-stripes and of double or triple shoulder-stripes, taken together, indicate

⁴² Azara, 'Quadrupèdes du Paraguay,' tom. ii. p. 307. In North America, Catlin (vol. ii. p. 57) describes the wild horses, believed to have descended from the Spanish horses of Mexico, as of all colours, black, grey, roan, and roan pied with sorrel. F. Michaux ('Travels in North America,' Eng. transl., p. 235)

describes two wild horses from Mexico as roan. In the Falkland Islands, where the horse has been feral only between 60 and 70 years, I was told that roans and iron-greys were the prevalent colours. These several facts show that horses do not soon revert to any uniform colour.

the probability of the descent of all the existing races from a single, dun-coloured, more or less striped, primitive stock, to which our horses occasionally revert.

THE ASS.

FOUR species of Asses, besides three zebras, have been described by naturalists. There is now little doubt that our domesticated animal is descended from the *Equus tæniopus* of Abyssinia.⁴³ The ass is sometimes advanced as an instance of an animal domesticated, as we know by the Old Testament, from an ancient period, which has varied only in a very slight degree. But this is by no means strictly true; for in Syria alone there are four breeds;⁴⁴ first, a light and graceful animal, with an agreeable gait, used by ladies; secondly, an Arab breed reserved exclusively for the saddle; thirdly, a stouter animal used for ploughing and various purposes; and lastly, the large Damascus breed, with a peculiarly long body and ears. In the South of France also there are several breeds, and one of extraordinary size, some individuals being as tall as full-sized horses. Although the ass in England is by no means uniform in appearance, distinct breeds have not been formed. This may probably be accounted for by the animal being kept chiefly by poor persons, who do not rear large numbers, nor carefully match and select the young. For, as we shall see in a future chapter, the ass can with ease be greatly improved in size and strength by careful selection, combined no doubt with good food; and we may infer that all its other characters would be equally amendable to selection. The small size of the ass in England and Northern Europe is apparently due far more to want of care in breeding than to cold; for in Western India, where the ass is used as a beast of burden by some of the lower castes, it is not much larger than a Newfoundland dog, "being generally not more than from twenty to thirty inches high."⁴⁵

⁴³ Dr. Sclater, in 'Proc. Zoolog. Soc.,' 1862, p. 164. Dr. Hartmann says ('Annalen der Landw.' B. xliv. p. 222) that this animal in its wild state is not always striped across the legs.

⁴⁴ W. C. Martin, 'History of the

Horse,' 1845, p. 207.

⁴⁵ Col. Sykes' Cat. of Mammalia, 'Proc. Zoolog. Soc.' July 12th, 1831. Williamson, 'Oriental Field Sports,' vol. ii., quoted by Martin, p. 206.

The ass varies greatly in colour; and its legs, especially the fore-legs, both in England and other countries—for instance, in China—are occasionally barred more plainly than those of dun-coloured horses. Thirteen or fourteen transverse stripes have been counted on both the fore and hind legs. With the horse the occasional appearance of leg-stripes was accounted for by reversion to a supposed parent-form, and in the case of the ass we may confidently believe in this explanation, as *E. teniopus* is known to be barred, though only in a slight degree, and not quite invariably. The stripes are believed to occur most frequently and to be plainest on the legs of the domestic ass during early youth,⁴⁶ as likewise occurs with the horse. The shoulder-stripe, which is so eminently characteristic of the species, is nevertheless variable in breadth, length, and manner of termination. I have measured one four times as broad as another, and some more than twice as long as others. In one light-grey ass the shoulder-stripe was only six inches in length, and as thin as a piece of string; and in another animal of the same colour there was only a dusky shade representing a stripe. I have heard of three white asses, not albinos, with no trace of shoulder or spinal stripes;⁴⁷ and I have seen nine other asses with no shoulder-stripe, and some of them had no spinal-stripe. Three of the nine were light-greys, one a dark-grey, another grey passing into reddish-roan, and the others were brown, two being tinted on parts of their bodies with a reddish or bay shade. If therefore grey and reddish-brown asses had been steadily selected and bred from, the shoulder stripe would probably have been lost almost as generally and completely as in the case of the horse.

The shoulder stripe on the ass is sometimes double, and Mr. Blyth has seen even three or four parallel stripes.⁴⁸ I have observed in ten cases shoulder-stripes abruptly truncated at the lower end, with the anterior angle produced into a tapering point, precisely as in the above dun Devonshire

⁴⁶ Blyth, in 'Charlesworth's Mag. of Nat. Hist.,' vol iv., 1840, p. 83. I have also been assured by a breeder that this is the case.

⁴⁷ One case is given by Martin,

'The Horse,' p. 205.

⁴⁸ 'Journal As. Soc. of Bengal.' vol. xxviii. 1860, p. 231. Martin on the Horse, p. 205

pony. I have seen three cases of the terminal portion abruptly and angularly bent; and have seen and heard of four cases of a distinct though slight forking of the stripe. In Syria, Dr. Hooker and his party observed for me no less than five similar instances of the shoulder-stripe plainly bifurcating over the fore leg. In the common mule it likewise sometimes bifurcates. When I first noticed the forking and angular bending of the shoulder-stripe, I had seen enough of the stripes in the various equine species to feel convinced that even a character so unimportant as this had a distinct meaning, and was thus led to attend to the subject. I now find that in the *E. burchellii* and *quagga*, the stripe which corresponds with the shoulder-stripe of the ass, as well as some of the stripes on the neck, bifurcate, and that some of those near the shoulder have their extremities bent angularly backwards. The bifurcation and angular bending of the stripes on the shoulders apparently are connected with the nearly upright stripes on the sides of the body and neck changing their direction and becoming transverse on the legs. Finally, we see that the presence of shoulder, leg, and spinal stripes in the horse,—their occasional absence in the ass,—the occurrence of double and triple shoulder-stripes in both animals, and the similar manner in which these stripes terminate downwards,—are all cases of analogous variation in the horse and ass. These cases are probably not due to similar conditions acting on similar constitutions, but to a partial reversion in colour to the common progenitor of the genus. We shall hereafter return to this subject, and discuss it more fully.