

SOME RARE CASES OF ALBINISM IN ANIMALS.

By PROFESSOR EDWARD E. PRINCE, LL.D., D.Sc., F.R.S.C.
Dominion Commissioner of Fisheries, Ottawa.

In a paper which I contributed to THE OTTAWA NATURALIST, Nov., 1906, I summarized my views upon the large subject of Animal Coloration, and I dealt with the evolution of the colors of living creatures, attempting to classify exhaustively a large variety of examples known to me. In referring to "Physiological Coloration" I made mention of a closely allied phenomenon, which I regarded as "Pathological," and due to abnormal or diseased conditions, grouping thereunder albinos, such as white crows, hawks, peacocks, moles, etc. I mentioned, as a likely cause, a diseased or defective peripheral nerve supply; a white hedgehog (*Erinaceus*) being found to have an abnormal condition of the peripheral nerve twigs ending in the skin, and resulting in a lack of the usual color or pigment in the integument, or rather in the spines and hairs developed from the skin. I stated that, according to Darwin, white cats have blue eyes, are, as a rule, deaf, and, if Dr. Lawson's statement be correct, are always tom-cats. The eyes of most animals are dark or colored, owing to pigment massed in the retina, and in the iris; but in albinos, color being absent, the retina is without it and the rich blood-supply renders the eyes red or pink, as well as the nose and tips of the ears, as in albino rabbits and white rats and mice.

All white animals are not albinos, because the absence of color in the fur or plumage may be due to seasonal and other normal causes. Thus the grey harbour seal is snow white when very young, but its nose and eyes are jet black. The Polar bear, Arctic fox, the stoat or ermine, the varying hare, the ptarmigan, and other animals, are permanently or seasonally white, and thus resemble their wintry surroundings. Dr. Starr Jordan observes that the white color of Arctic animals may be useful not alone in rendering them inconspicuous, but may also serve a direct physiological function in preventing loss of heat from the body by radiation. He adds, "the dark colors of animals may be of value in absorbing heat rays and thus helping to keep them warm. But by far the most widespread use of color is to assist an animal in escaping from its enemies or in capturing its prey." Now, while cold and dryness tend to produce whiteness, damp and warm conditions result in darkening the fur or plumage and the external color of animals generally.

"Melanic varieties, as they are termed," says Beddard, "often occur on islands and other situations where the climate is moist as well as warm." On the other hand, in such a country as New Zealand, white, or what are called albino, varieties of birds, and many living forms, are said to be frequent owing to very dry seasons or periods of drought, and to the presence of snow on the lofty ranges of mountains, which for height and grand scenic features resemble our own Pacific coast mountains. The whitening process in our Northern Hare (*Lepus americanus*, Erxl.) has been carefully studied, and it has been proved that the summer coat actually bleaches, but the change is accompanied by a growth of new hair, so that the coat is thicker than in summer and the hairs are longer. The outer border of the ears remains black, but the rest of the fur becomes pure white, the blanching successively passing from the black tip of each hair down the reddish middle part to the basal leaden-colored part. The hairs of the forehead and shoulders are the last to change and a few long black hairs are always present above and below the eyes and extend backwards. One observer, Mr. Welch, tells us that the entire change occupies about three months, from early in October till late in December, but further north, in the latitude of Quebec, it is said to be, usually, early in November, and the whitening is also more rapidly accomplished. Sir John Ross observed a lemming on board his vessel change color in a week, in February. Whether the assumption of a white winter coat is due to Arctic environment, or to natural selection and heredity (the white examples surviving when other examples were more readily seen by enemies and exterminated), it is not necessary here to discuss. The brown musk-ox, the black raven, the sable and other northern animals do not change, and thus the matter is a complicated one. But the term albino should not be applied to forms which are white normally, or turn white seasonally as an established feature in their life; but should apply rather to the somewhat erratic and abnormal cases of whiteness and lack of normal coloration due to some congenital cause, apparently allied to a diseased or pathological condition.

An extremely rare and interesting case of this true albinism was discovered this season (1913) at the St. Andrew's Biological Station, New Brunswick. A specimen of the common sea-urchin (*Strongylocentrotus drobrachiensis*) of our Atlantic shores, over three inches in diameter, instead of exhibiting the reddish purple and variegated colors of typical specimens, was of the purest chalk-white, the plates of the somewhat depressed globular test or shell, as well as the crowded sharp-pointed moveable spines, being entirely destitute of color. Even the eye spots,

which are rudimentary colored visual organs on the five ocular plates, alternating with the five genital plates round the periproctal space at the aboral pole, did not show any pigment. It was a perfect albino, and, so far as I have been able to ascertain, the first albino sea-urchin ever seen. It was a beautiful object, appearing as though its characteristic apple-shaped form were delicately carved in white marble. It is now conspicuous in the faunal collection of fishes and invertebrates at the Dominion Biological Station, St. Andrews, N.B.

An interesting albino specimen of the lobster (*Homarus americanus*), from the Pictou shore, Nova Scotia, came into my possession some time ago. Pale tinted specimens of lobsters have long been known, some of which, in place of the dark blackish blue of the usual type, show reddish or yellowish coloration; but the specimen which I secured was dappled all over with irregular patches of yellowish white and the blue-black color was confined to small, irregular spots, chiefly on the upper parts of the tergum, or dorsal portion of the body and tail-segments. This very unusual specimen was only 8 inches in length and cannot have been more than three or four years old. It might be suggested that, instead of being an albino, the specimen merely retained some of the varied coloration of the infantile stages, for when half-an-inch long, at the stage when salts of lime and pigment first appear in the delicate shell, the general color is maroon, or sometimes pale brown with green intermingled, and especially prominent are some chalk-white spots, four or five in number, apparently marking the attachments of the tendons of the cephalo-thoracic muscles inside. These spots are even more distinct at the sixth stage, about the fifth week after hatching, when its length is three-fifths of an inch. At the seventh stage (seventh week), when three-quarters of an inch in length, a definite pigment layer appears below the external cuticle. In the adult lobster this pigment layer, called by Dr. W. B. Carpenter the areolar layer, is a canaliculated stratum crowded with lime salts, and is hypodermic in origin, and mainly constitutes the thick, dense shell. A tubular layer occurs beneath, likened by some authorities to dentine, being thick and dense, and forming the gleaming white part which is seen when the shell is broken. Lowest of all is a thin lamellar non-calcified layer. The color in the areolar layer is due to chromogens, which are converted by boiling, dehydration by alcohol, etc., and even by exposure to excessive light, into a red lipochrome. Every one is familiar with the change, by boiling, of a dark blue or blackish-green lobster into a bright scarlet one. The normal prevailing color of lobsters on the Atlantic coast is blackish-blue, sometimes of

a greenish cast, those on rocky bottoms being darkest, as off the western Nova Scotia shores, but on sandy, shallower areas, as off Prince Edward Island, the color is paler, and often greenish or even brownish.

Professor Herrick records a very black specimen, only 6 or 7 inches long, found among eel-grass in three-fathom shallows off the Maine coast, and the captor, a fisherman, thought at first that it was coated with coal-tar. It was regarded as a melanic specimen, and it may be mentioned that melanism has been noticed also in crabs. Abnormally colored lobsters have been reported of a red or reddish-yellow color, when alive; others are cream colored, i.e., color is practically absent, but mottled specimens, blue-green and yellow, are not rare, while pied examples, showing bold green and light yellow spots, are less common. The specimen secured by me was, in the main, of a yellowish-white, as already stated, but small blue-black spots occurred here and there, on the highest parts of the back. No doubt the example was a pathological or "abnormally physiological" specimen and a near approach to the typical albino.

The third case of albinism recently brought to my notice is that of an albino porpoise (*Phocæna phocæna*, L.), which was captured in Scotland, and a photograph of which was sent to me by my friend Professor McIntosh, F.R.S., of St. Andrews. The *London Globe*, some years ago, gave an account of an English specimen obtained near Ventnor, Isle of Wight, which was described as white, but of a reddish color on the under side. It was shipped alive to the famous Brighton aquarium and exhibited there, according to a correspondent, Mr. R. Blake, of Ventnor.

The normal color of the porpoise, as is well known, is a deep, shining black, but the breast and under surface is dirty white; but this albino specimen, studied at the Gatty Marine Biological Station, St. Andrews, Scotland, was a female of a dull yellowish color, with a faint longitudinal band, somewhat dusky, along the upper lateral region on each side, while a band of the same dusky appearance curved in a crescentic course round the front of each eye, reaching to the corner of the mouth. It measured 2 feet 10 inches in length and was rather more than half grown. Professor McIntosh notes that it seemed to retain the coloration of the very young porpoise, for a specimen 6 inches long, secured at St. Andrews, on Nov. 18th, 1911, was dusky over the dorso-lateral region, the head very dark above as far as the neck and the breast flippers, dorsal fin and horizontal tail-flukes were blackish, the under surface of the last being very

dark. An older specimen, also before birth, and obtained on Feb. 6th, 1912, was 17 inches long and the color of the young specimen was now replaced by deep black, but becoming paler down the sides. Adult specimens of various whales show at times increase in white coloration. Thus the Humpback (*Megaptera*) is black above, but white beneath, varied with black spots, but sometimes the black underneath decreases to an indefinite marbled arrangement, or, in some cases, the black disappears and the under surface is white. The huge rorquals or fin-back whales show similar variations, and Mr. Lyddeker surmises that age or special food causes this tendency to albinism. The Right whale of the Arctic is very black above, but white beneath and where the two tints meet there occur irregular patches of white extending into the black color. The Killer whale or Grampus is black above, but in one specimen I observed a white patch above each eye, or there may be a white patch below the eye and a transverse crescentic patch of white behind the huge erect dorsal fin.

It is hardly necessary to point out that the albino porpoise above described recalls the small beluga or white-whale (*Delphinapterus leucas*, Pallas), which is creamy white all over and abounds in the mouth of the River St. Lawrence and round Hudson's Straits into Hudson's Bay, and along Baffin's Land and as far north as Barrow Straits.*

Mr. A. P. Low expressed the view that the white-whale industry might become an important one in many places in Hudson Bay and Straits owing to its abundance, and the Hudson Bay Company, as well as the Eskimo, have long taken considerable numbers for oil and leather, while the boiled skin is a native dainty and the dark colored meat is also used as food.

It is impossible in this place to enter into the somewhat profound and complicated subject of the origin of albinos, and to define the essential differences which divide them from merely pale examples, or seasonal varieties. Melanism can be explained partly at any rate, as due to environment, but albinism is no doubt due to causes which are congenital, possibly pathological. Merely white varieties are not albinos, and the so-called albino skunk, reported as seen last year in Delaware Park, near Buffalo, was not an albino.

Curator Crandall, who saw it, described it as blue, with apparently no black or white hairs intermingled and it may be compared to the blue variety of Arctic fox, which is blue, or rather slate grey, all the year round, and less numerous in the more northerly regions than in the more southerly. In the

*Lilljeborg states that the young beluga is greyish-brown in color.

litters of this blue variety of the Arctic fox there frequently occur pure white specimens, but a whole litter of white cubs has not been recorded. Some interesting figures in a recent report of the Conservation Commission may be here referred to. Thus on St. George Island (Pribyloff Islands), in a total of 772 so-called blue foxes killed in 1897, no less than 40 were white. In 1898, 18 were white in a total of 885 foxes, but in 1903 only 15 were white, out of 1,061 foxes taken, and in 1907-8, out of a total of 1,005 only 8 were white, indeed, only 3 were pure white, the others were bluish white. These pale or white specimens are not valued, and every effort is made to exterminate them and prevent the increase of a white variety. The ordinary variety of dirty brownish colored Arctic fox, which turns pure snow-white in winter, though recently fashionable, was not many years ago regarded with contempt by fur dealers, and Indian trappers were usually "called down" severely for taking the trouble to bring such little-valued pelts to Edmonton and other fur-receiving centres in the North-west.

White deer, like white house-sparrows, have not unfrequently been reported, but whether such are true albinos with pink eyes is not recorded. A red deer of almost snowy whiteness was reported up the Gatineau region some years ago. A white form of the Scottish red deer has been established as a distinct variety, and in Welbeck Park, Langley Park, near Slough, Windsor, and Woburn Castle, in England, there are herds of cream-colored or white deer, believed to be originally of German origin, though the Duke of Portland has regarded them as a Danish variety. It is interesting to note that a creamy or white colored variety of the black bear was discovered not many years since in British Columbia, north of Rivers Inlet, and at the head-waters of the Skeena River and at other points. This small bear has been called "*Ursus Kermodei*" by Hornaday, who first described it.

The whole subject of albinism is deserving of investigation, but it may be clearly stated that white animals, whose eyes are dark, or the tips of the ears, the tail, tip of the nose, etc., are black, are really not albinos, for albinism in mammals involves pink eyes, pink nose, and a general absence of pigment.

MEETING OF THE BOTANICAL BRANCH.

November 8th, 1913, at the residence of Mr. R. B. Whyte. Owing to the rainy weather only a small number of members were present.



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