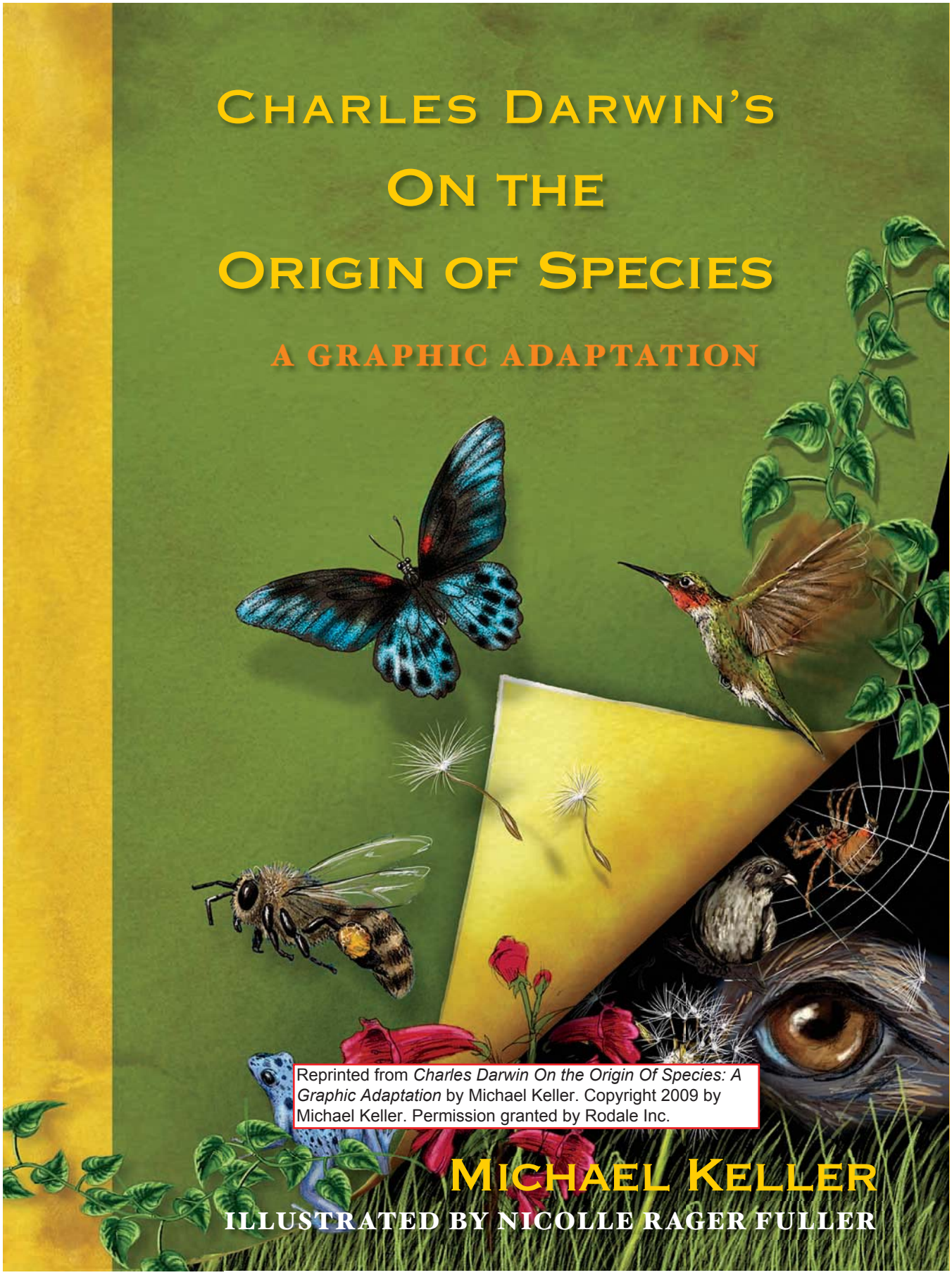
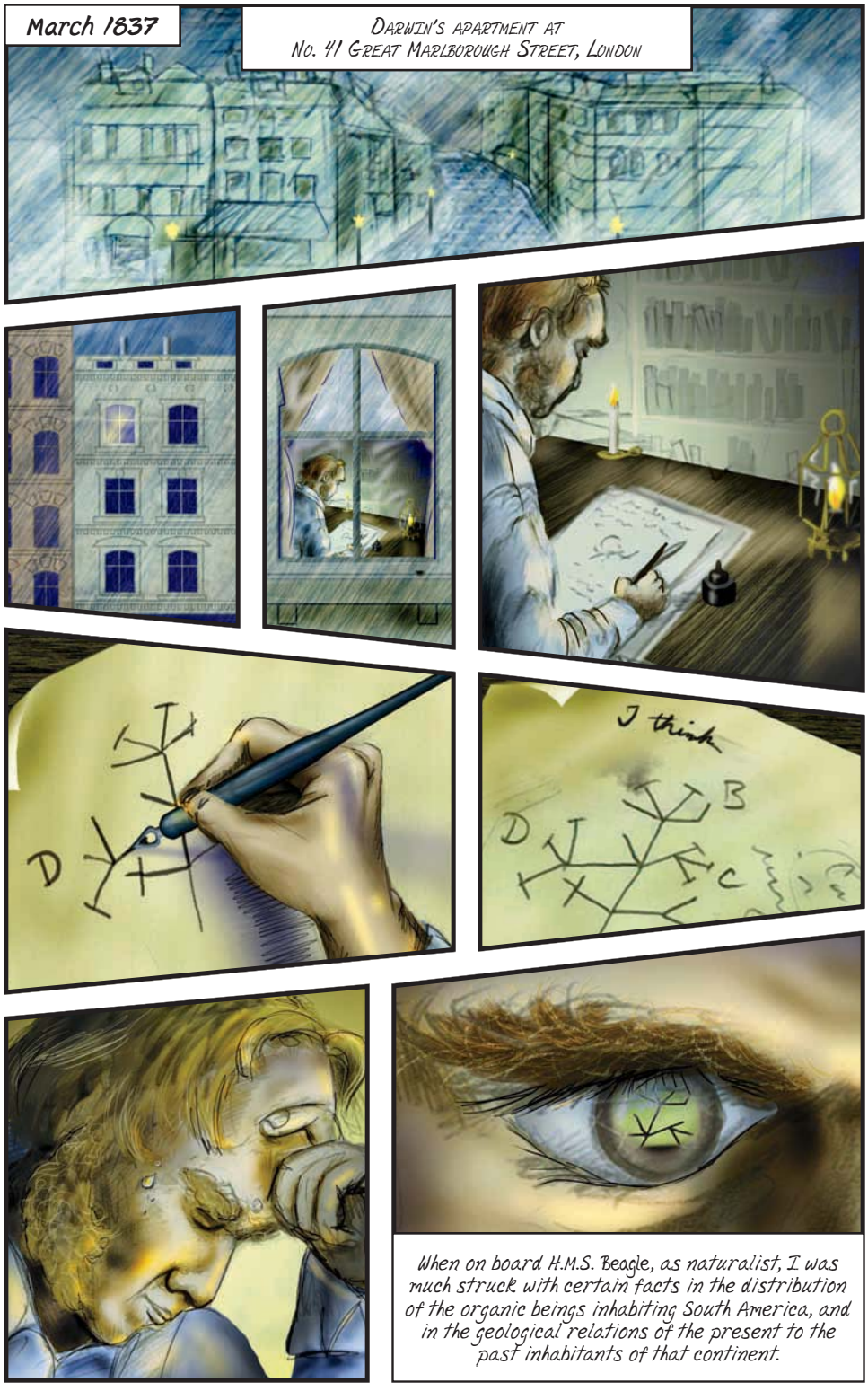
Charles Darwin's On the Origin of Species

A Graphic Adaptation



Michael Keller

Illustrated by Nicolle Rager Fuller


March 1837
Darwin's apartment at
No. 41 Great Marlborough Street, London
I think
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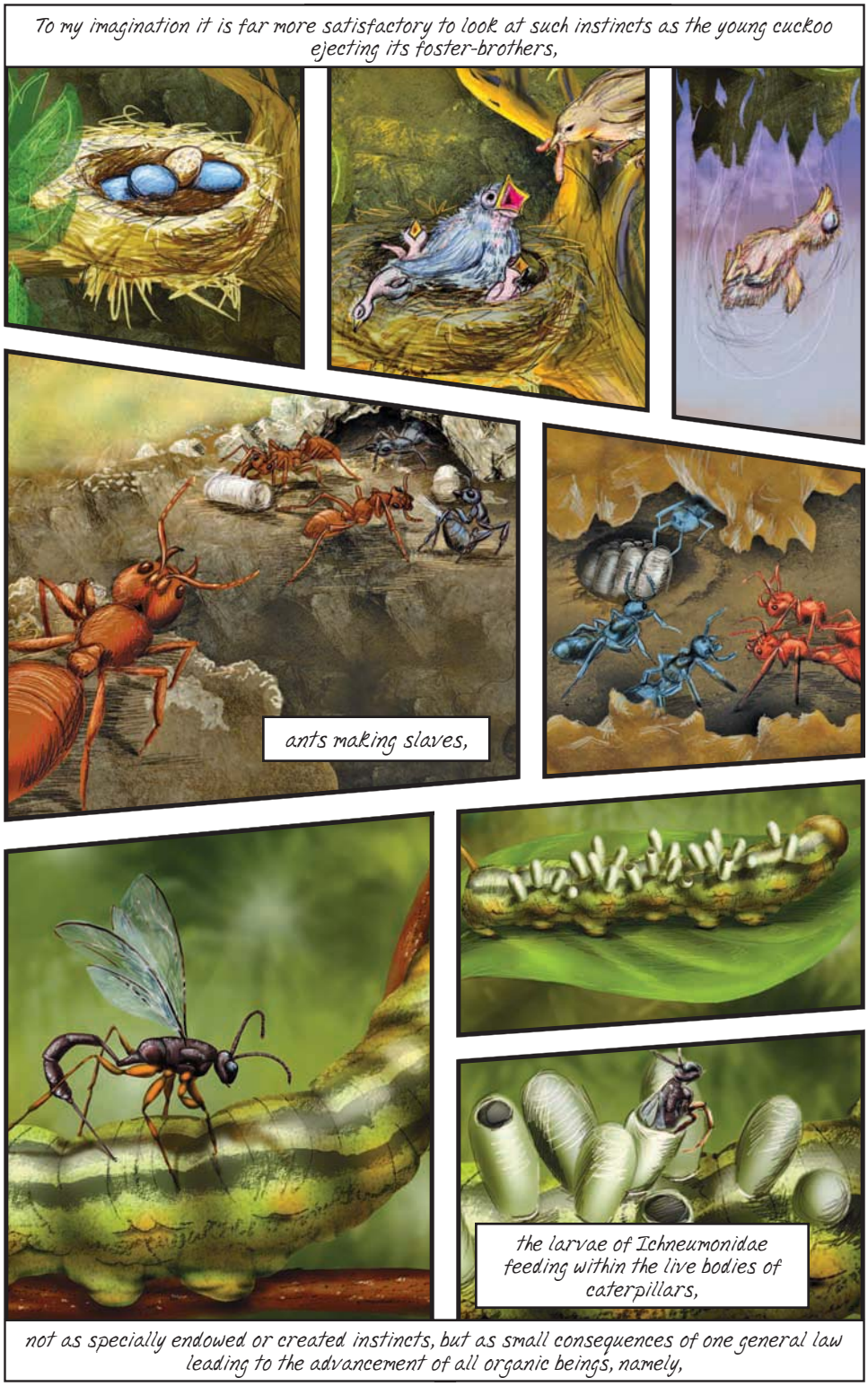
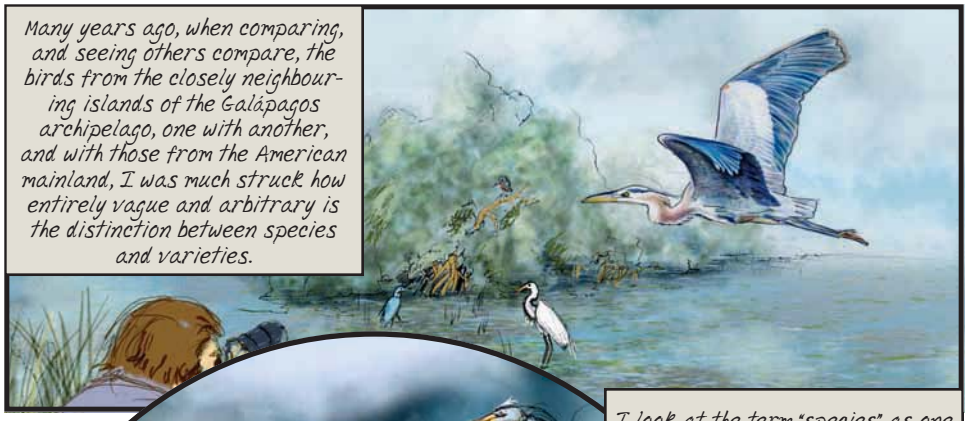
When on board H.M.S. Beagle, as naturalist, I was much struck with certain facts in the distribution of the organic beings inhabiting South America, and in the geological relations of the present to the past inhabitants of that continent.

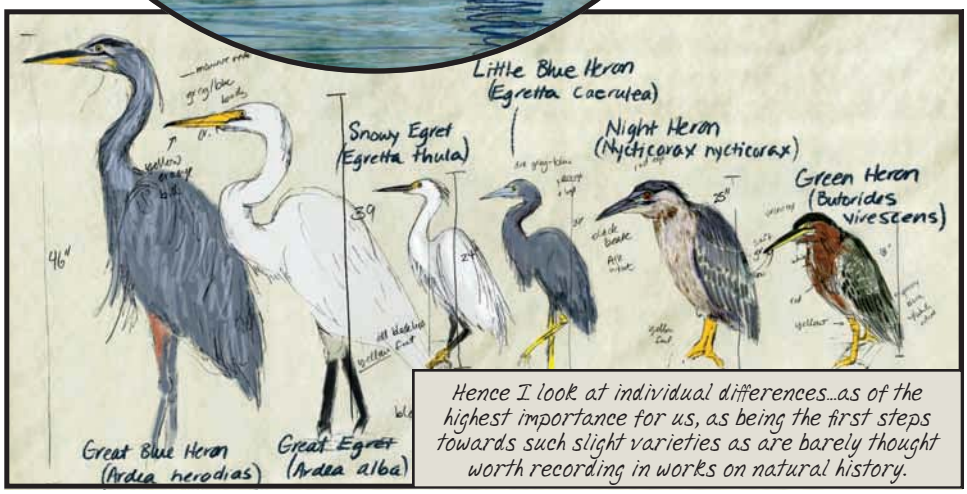

To my imagination it is far more satisfactory to look at such instincts as the young cuckoo ejecting its foster-brothers,
ants making slaves,
the larvae of Ichneumonidae feeding within the live bodies of caterpillars,
not as specially endowed or created instincts, but as small consequences of one general law leading to the advancement of all organic beings, namely,

Many years ago, when comparing, and seeing others compare, the birds from the closely neighbouring islands of the Galápagos archipelago, one with another, and with those from the American mainland, I was much struck how entirely vague and arbitrary is the distinction between species and varieties.

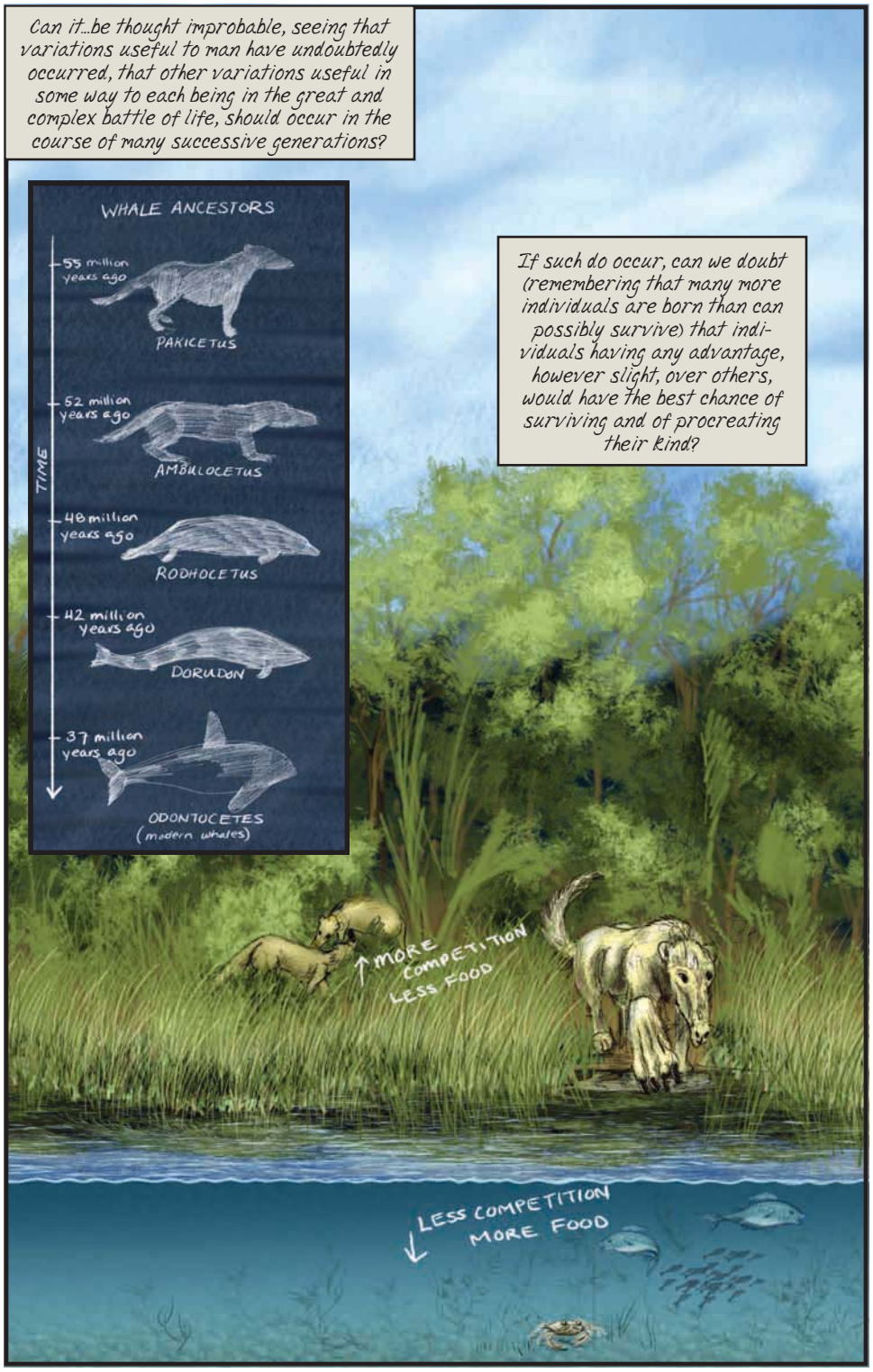


I look at the term "species" as one arbitrarily given, for the sake of convenience, to a set of individuals closely resembling each other, and that it does not essentially differ from the term "variety," which is given to less distinct and more fluctuating forms....

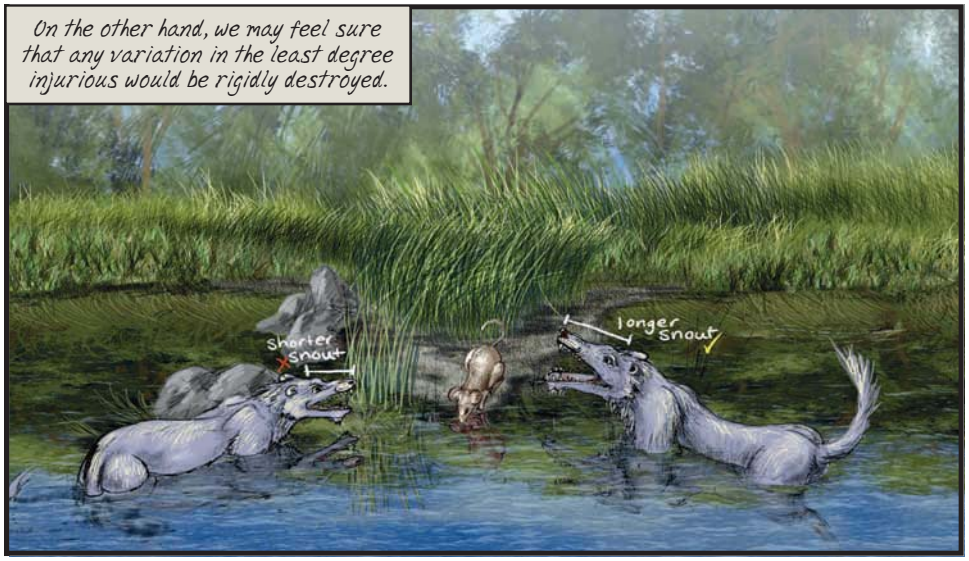
The passage from one stage of difference to another may, in many cases, be the simple result of the nature of the organism and of the different physical conditions to which it has long been exposed; but with respect to the more important and adaptive characters, the passage from one stage of difference to another, may be safely attributed to the cumulative action of natural selection....



Hence I look at individual differences...as of the highest importance for us, as being the first steps towards such slight varieties as are barely thought worth recording in works on natural history.

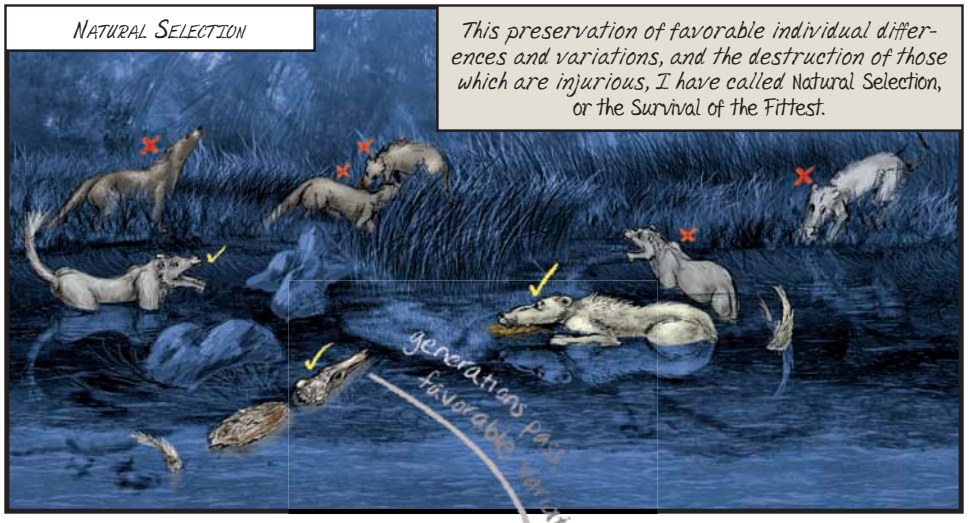

Can it…be thought improbable, seeing that variations useful to man have undoubtedly occurred, that other variations useful in some way to each being in the great and complex battle of life, should occur in the course of many successive generations?
WHALE ANCESTORS
TIME
55 million years ago
PAKICETUS
52 million years ago
AMBULOCETUS
48 million years ago
RODHOCETUS
42 million years ago
DORUDON
37 million years ago
ODONTOCETES (modern whales)
If such do occur, can we doubt (remembering that many more individuals are born than can possibly survive) that individuals having any advantage, however slight, over others, would have the best chance of surviving and of procreating their kind?
MORE COMPETITION LESS FOOD
LESS COMPETITION MORE FOOD

On the other hand, we may feel sure that any variation in the least degree injurious would be rigidly destroyed.



NATURAL SELECTION

This preservation of favorable individual differences and variations, and the destruction of those which are injurious, I have called Natural Selection, or the Survival of the Fittest.



...It is difficult to avoid personifying the word Nature; but I mean by nature, only the aggregate action and product of many natural laws, and by laws the sequence of events as ascertained by us.

How fleeting are the wishes and efforts of man! How short his time! And consequently how poor will be his results, compared with those accumulated by Nature during whole geological periods!

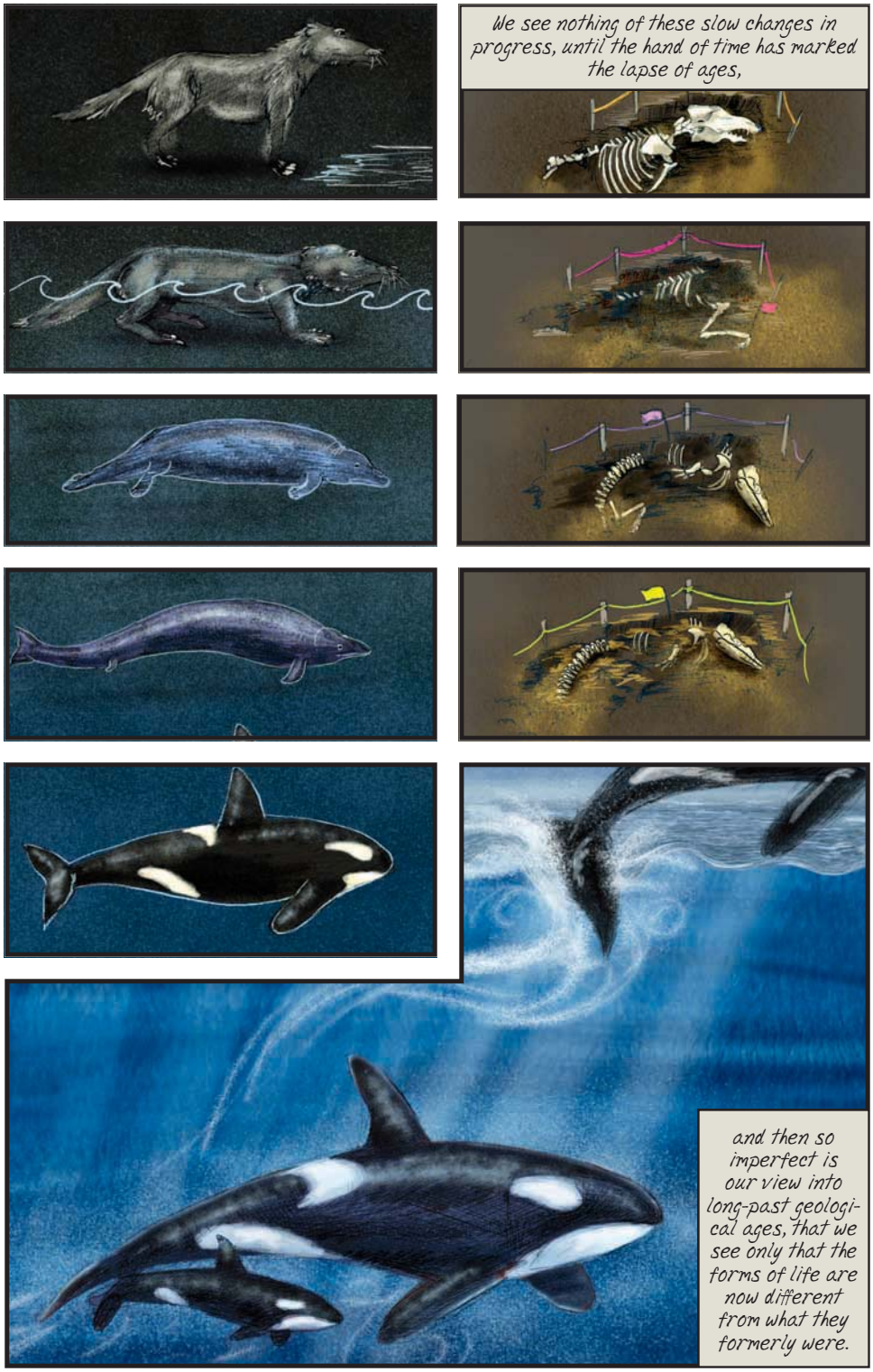
As man can produce, and certainly has produced, a great result by his methodical and unconscious means of selection, what may not natural selection effect?

Man can act only on external and visible characters;

Nature, if I may be allowed to personify the natural preservation or survival of the fittest, cares nothing for appearances, except in so far as they are useful to any being.

She can act on every internal organ, on every shade of constitutional difference, on the whole machinery of life. Man selects only for his own good; Nature only for that of the being which she tends.

Can we wonder, then, that Nature's productions should be far "truer" in character than man's productions; that they should be infinitely better adapted to the most complex conditions of life, and should plainly bear the stamp of far higher workmanship?

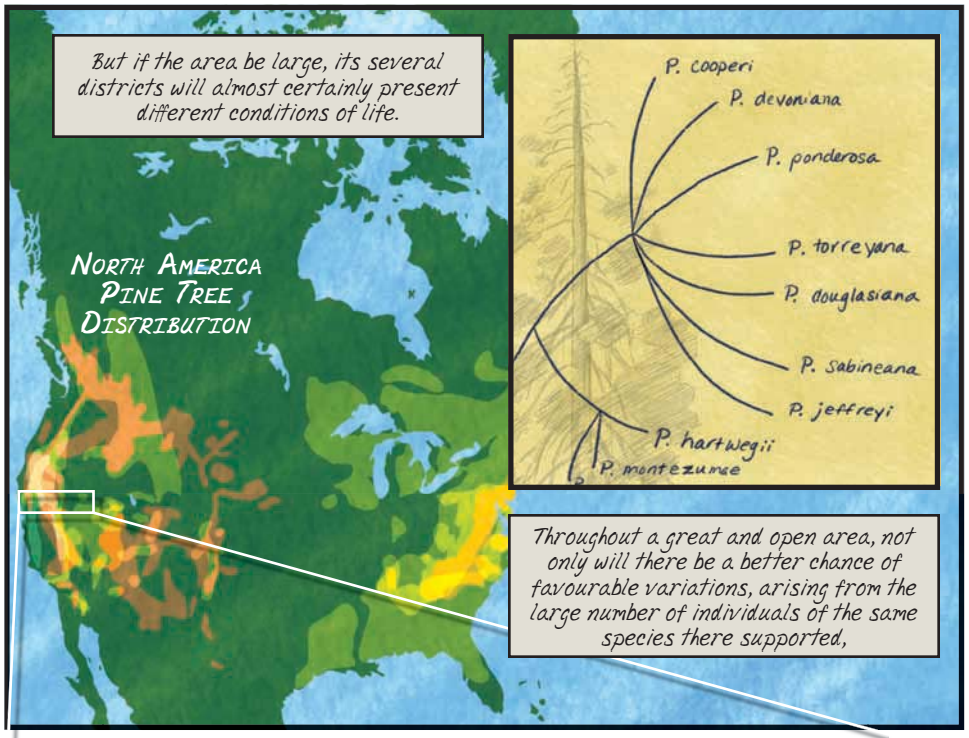

We see nothing of these slow changes in progress, until the hand of time has marked the lapse of ages,
and then so imperfect is our view into long-past geological ages, that we see only that the forms of life are now different from what they formerly were.

Isolation also is an important element in the modification of species through natural selection.

Isolation and Natural Selection

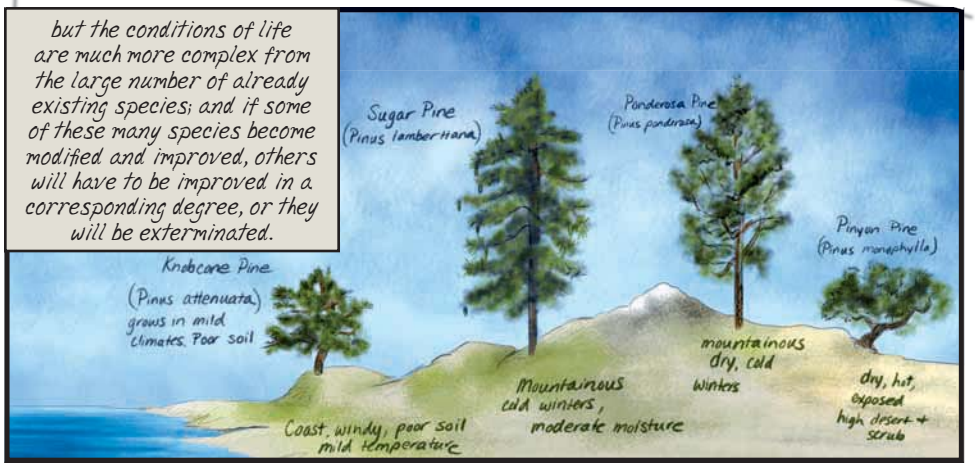
For within a confined area, with some place in the natural polity not perfectly occupied, all the individuals varying in the right direction, though in different degrees, will tend to be preserved.

But if the area be large, its several districts will almost certainly present different conditions of life.

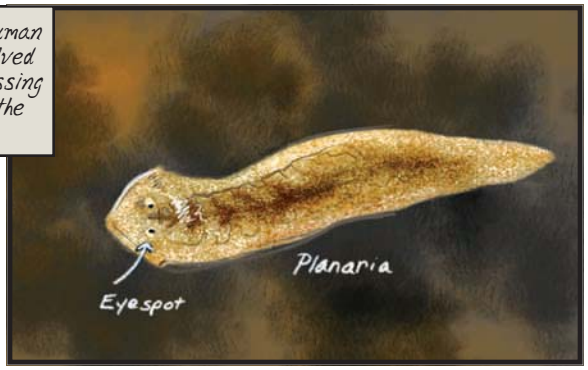


Throughout a great and open area, not only will there be a better chance of favourable variations, arising from the large number of individuals of the same species there supported,

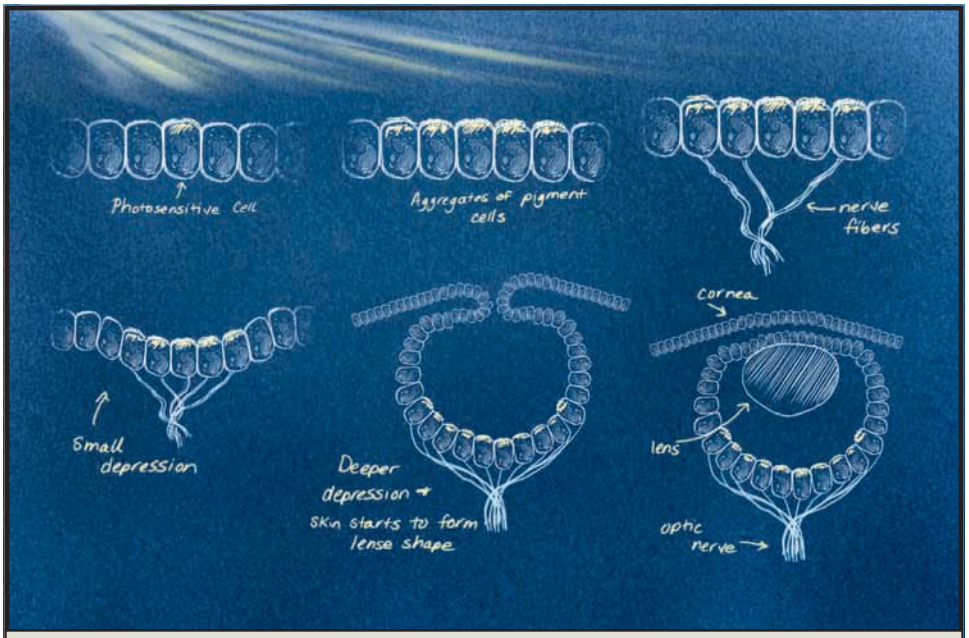
but the conditions of life are much more complex from the large number of already existing species; and if some of these many species become modified and improved, others will have to be improved in a corresponding degree, or they will be exterminated.



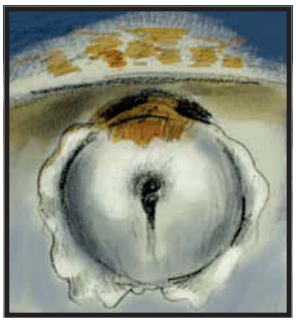
And what of the complexities of the human eye? How can that possibly have evolved through gradual changes when any missing component to the system prevents the entire thing from working?



We may...find aggregates of pigment-cells, apparently serving as organs of vision, without any nerves. (These) are not capable of distinct vision, and serve only to distinguish light from darkness.



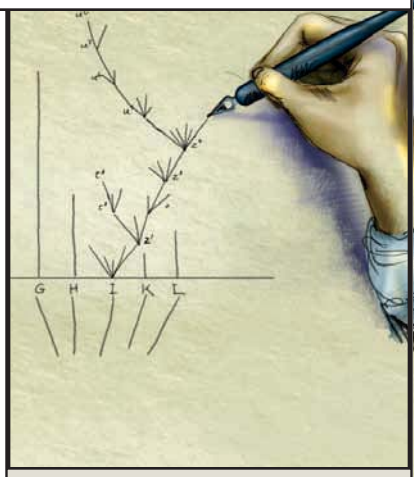
The simplest organ which can be called an eye consists of an optic nerve, surrounded by pigment-cells and covered by translucent skin, but without any lens or other refractive body. In this concentration of the rays we gain the first and by far the most important step towards the formation of a true, picture-forming eye; for we have only to place the naked extremity of the optic nerve...at the right distance from the concentrating apparatus, and an image will be formed on it.



We must suppose that there is a power, represented by natural selection or the survival of the fittest, always intently watching each slight alteration in the transparent layers; and carefully preserving each which, under varied circumstances, in any way or in any degree, tends to produce a distincter image.

Law of the Succession of Types

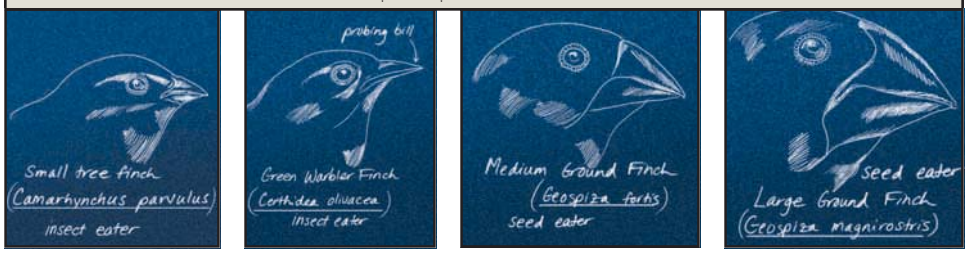
I was so much impressed with these facts that I strongly insisted...



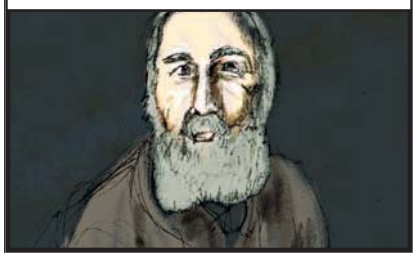
...on this "law of the succession of types"—on "this wonderful relationship in the same continent between the dead and the living."

The inhabitants of the world at each successive period in its history have beaten their predecessors in the race for life.

The succession of the same types of structure within the same areas during the later geological periods ceases to be mysterious, and is intelligible on the principle of inheritance.



Anatomical Similarities



Professor Häckel…has recently brought his great knowledge and abilities to bear on what he calls phylogeny, or the lines of descent of all organic beings. In drawing up the several series he trusts chiefly to embryological characters, but receives aid from homologous and rudimentary organs, as well as from the successive periods at which the various forms of life are believed to have first appeared in our geological formations….

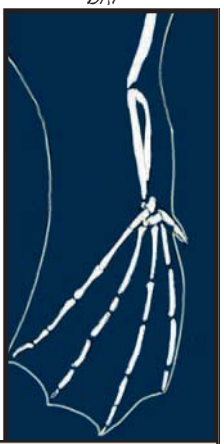
We have seen that the members of the same class, independently of their habits of life, resemble each other in the general plan of their organisation. This resemblance is often expressed by the term "unity of type"; or by saying that the several parts and organs in the different species of the class are homologous…. This is one of the most interesting departments of natural history, and may almost be said to be its very soul.

Mole

Human

Orca

Bat



What can be more curious than that the hand of a man, formed for grasping, that of a mole for digging, the leg of the horse, the paddle of the porpoise, and the wing of the bat, should all be constructed on the same pattern, and should include similar bones, in the same relative positions?…