#### Beptember 27, 1908.

## Ancestors Lived in Sea

#### (Continued from Page Three.)

distinct thread, a determined direction, which gave them all something in common. Australia was the land of the link-forms, the forms which linked great groups to each other.

In common practice we distinguish between five chief classes of the vertebratesthe fish, the amphibia (frogs, salamander and others), the reptiles (lizards and others), the birds and the mammals. If Darwin's teaching is correct, we must assume that all stand in a certain evolutionary relationship to each other and present more or less distinctly connecting links. The fish must be descended from very low animals, which are not even vertebrates, and in fact we know a fairly good evolutionary form, the so-called lancet fish or amphioxus. It lives at present near many coasts and also near the Australian strands as a specific, almost distinct, species, known as epigonichthys.

As we approach the top the fish must show, according to Darwin, evolution toward the amphibians, the amphibians to-ward the reptiles and the reptiles (here the ancestral tree split itself, so it is believed) on the one side toward the birds, on the other toward the mammals,

Without doubt that famous lizard Hatteria, which belongs absolutely and entirely to Australian domain, is the nearest of all living animals to the link between the amphibian and the reptile.

The link between the reptile and the mammal is represented, with at least partial distinctness, by the duck-bill, which also belongs exclusively to Australia and its islands. And Australia, almost alone of all lands, again gives up the next evolutionary group leading within the mammal family from the duck-bill to the higher mammals-hoofed animals, carnivora, monkeys and others.

The evolution from the reptile to the bird is not so simple-that is, not for Australia. The wingless moa and kiwi ostriches there certainly are remarkable and even very ancient forms of birds. But they are not genuine primeval birds, leading back directly to the lizards. We know how such a genuine lizard-bird should appear from the German Jurassic formations. We have two imprints of the so-called Archaeopterys, and that is unquestionably an animal exactly between lizard and bird-an animal, to be sure, that does not exist now, but disappeared from the world in that form probably millions of years ago

It was a pet thought of old Darwin that in some until then unvisited part of Australia-there were and are enough of themsomething like the Archaeopteryx might be found alive some day. When the traveler Haas found mysterious animal tracks in the snows of the Alps of New Zealand, Darwin adjured him to discover if a veritable lizard-bird did not dwell there. But nothing was seen of such a creature, and probably the tracks were those of a mammal which, to be sure, has not been caught or described yet.

Now there would remain the last great evolutionary turning point-between fish and amphibian, and lo! we find it in Australia. And in this missing link we find the ancestor of man that lived and still lives in the sea

It is the lizard-fish, Ceratodus, whose discovery has been described in a previous article of this series.

It was Richard Semon, one of Haeckel's pupils, who won the proof that Ceratodus really is the missing link between the reptile and the water-dwelling fish. He found its eggs after indescribable hardships in the Australian bush. He studied the life history of Ceratodus from those eggs to maturity. And he found that in their embryonic stage. and in the succeed-

## THE ILLUSTRATED BEE.

matter. There's only one thing to do then. Throw the cub to her at once. She will stop and examine it, and if you find she is still cross, you have plenty of time to escape. Very likely, seeing that nothing is wrong, she will spank the cub with her paw to teach it not to whine needlessly, and will then let you go on playing with it.

"It's curious how animal mothers differ from women," the keeper said, reflectively. "If you hurt a woman's child, she immediately starts to abuse or attack you, leaving the kid to howl. If you hurt a lioness' cub, her first thought is to look after the cub. Revenge comes second with her, and so the offender has a chance to escape."

## Carpenter's Letter

### (Continued on Page Fifteen.)

populated country than that to Christiania. As one goes south the farms are larger, the farm houses are of frame and there are blg barns and outbuildings. The country looks very much like the good farming regions of the United States. The houses are on the farms and not in villages, as in other parts of Europe. There are many cattle and dairy establishments which make the butter for export. I am told that the people ship their butter abroad and use oleomargarine themselves. This is so in Denmark and in other butter making countries.

I am surprised at the small extent of farm land in Sweden in comparison with There are altothe number of farms. gether 338,000 agricultural holdings, and of these fully one-fourth are under five acres, and 200,000 range from five to fifty acres in size. Of the whole area of Sweden less than nine acres in every hundred are cultivated and less than 4 per cent is good pasture land. The land laws are such that a farm is divided among the children upon the death of the owner, thus causing numerous small holdings. Of late years there has been some attempt at consolidation, and one now finds some large farms in parts of the country.

As far as I can see the soil is rich. It is black and it raises big crops of clover and oats. Wheat, rye and potatoes are grown, There is plenty of hay, but there is so much rain that the hay is often put up on racks to dry and then stored away in barns. Every haycock has a stick in it to give it air, and in some places the hay is dried on wire fences like clothes on a line

Everything looks thrifty. There are many red wooden houses with white shutters and trimmings, and along the railroad are fences of rocks, boards or rails.

I took a run over to Gothenberg last week. It is Sweden's chief seaport, having ships from all parts of Europe and the United States. It is also the terminus of the Gotha canal, which goes right through Sweden, crossing Lakes Wennern and Wettern, the two largest lakes in the country. Gothenberg has almost 150,000 inhabitants and it grows like one of our big towns of the west. It is a manufacturing center, making iron, steel and machinery, as well as sugar and beer. It has cotton factories, and also shipbuilding works. It has many fine stores, and in them much American goods. The town is perhaps the most enterprising in Sweden, and in many respects it surpasses Stockholm.

On this trip across Sweden I visited the Gotha canal, stopping at Trollhattan, where the wonderful falls are, and examining the locks by which the ships are raised and lowered to and from Lake Wennern. The canal has been cut about the falls, being blasted out of the rocks, making a trough just wide enough for a steamer or barge to pass through. There are six locks, one succeeding the other. The most of them are worked by hand and they are babies compared with the great locks of our Sault Ste. Marie canal. Nevertheless, many vessels pass through them. It is estimated that they raise 7,000 boats every season carrying lumber, wood, piles, iron and other heavy merchandise from Gothenberg to Stockholm and from western Sweden out to the sea.

to the falls of the Rhine at Schaffhausen. There are six different cataracts and numerous rapids, distributed over a distance of almost a mile. The fall is only 108 feet in all, but the water foams and boils as it dashes over the rocks into the cauldrons below. Here there are great pits of boiling waves speckled with foam. A little farther on the torrent dashes down mighty cliffs with a deafening roar and then flows on into the green river below. The force is such that it gives a water power equal to 200,000 horses all pulling at once. A number of factories have been built to take advantage of this power and Trollhattan is fast becoming an industrial center. FRANK G. CARPENTER.

# **Pointed Paragraphs**

One way to beat a retreat is by jumping a summer resort board bill.

When a couple are matched but not mated it is a sort of friction match.

When the unexpected happens it is usually inferior to what was expected.

A woman's sphere is the home. Any bride of a week is willing to admit this. Even a poor man who hasn't a dollar may be well off as long as he doesn't marry.

No self-respecting man cares to make love to a girl who makes love to a pet dog.

It is easier for love to find the way than it is for a good many young men to pay the way.

A pleasure party never gets credit for having a jolly good time unless there is at least one liar in the bunch.

It is almost as difficult for a man to get over a case of love sickness as it is for a woman to get over a barbed-wire fence.-Chicago News.

No.

# **Quite Different**

Marjory, getting well from typhoid fever, rebelled at regimen.

"Eat your broth like a good little giri," begged the nurse.

"I won't," said the good little girl. "I'm tired of nourishment. I want food."-Newark News.



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ing stages of development, they are not like fish, but like amphibians, going through stages similar to the tadpole stages,

So we must see in the lizard-fish Ceratodus, that dwells in the water, one of our very own ancestors, and an ancestor, too, who has bequeathed to us an invaluable inheritance-that of the lung. For Ceratodus, or one of his type, was the first water dweiling thing to begin breathing in a way other than through external gills.

Ceratodus has both lungs and gills, and as a lung-breather of the sea he is a most important forefather of the human race. WILHELM BOELSCH.

# Babies of the Zoo

(Continued From Page Five.)

door of the cage, and sometimes we entice her into an adjoining cage and then shut the door on her. Of course she raises a rough house when she realizes what has happened. You would wonder that any cage could hold her. For months afterward it is dangerous to go near her.

"But ordinarily a Honess is not fierce when she has cubs. She will allow you to go into the cage and play with them as much as you like, while she watches them proudly from a little distance, and seems quite pleased because you are interested in them

"Take care, however, that you don't accidentaily hurt one of the little beasts and make it yelp. If you do, the mother is up in arms in a moment to see what is the

It was at this point that I visited the falls of Trollhattan, considered by many the finest in Europe. They are far superior



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