

THE PLAN OF CREATION.

A LECTURE BY PROFESSOR AGASSIZ.

[Reported for the Scientific American.]

The interest in the lectures of Prof. Agassiz continues unabated. On the evening of the 16th ult., not only was the Academy of Music completely filled, with many persons standing in the aisles, but large numbers left, unable to obtain admission. It so happened that the news of the capture of Fort Donelson came just in time to enable the lecturer to announce the event to the audience. After the applause had subsided, he said:—

Allow me to add my voice to that of the national joy at this great success. And this collection of people also enables me to rejoice at the evidence of interest in intellectual culture, and to entertain the hope that this nation will soon take the lead in science and literature, and have its thoughts turned to other channels than war.

It is my purpose in these lectures to show that at least the animal and vegetable part of creation is formed in accordance with a plan. There are two ways in which Providence may have formed these creatures—either by establishing certain laws or forces which should produce the organized beings, or by a special act of creation for the production of each individual or race. In either case the evidence of design is just as conclusive proof of the existence of a designer. We perceive that articles made by a machine are the result of intelligence, though the intelligence was employed only in devising the machine, which then goes on doing its work without the possession of intelligence itself.

Within a few years a theory has been widely disseminated by some learned, but, I may say, fanciful men, which supposes that very few animals were created, and that from these all others have descended—the various genera and species resulting from the different circumstances under which the progeny was born and reared. As this theory has been somewhat extensively accepted, before proceeding with my demonstration, I will show its fallacy.

As the newer rocks rest upon the older they cover much more of the earth's surface, and have consequently been much more thoroughly examined. It is not strange, therefore, that a larger number of species have been found in the newer rocks. And if we compare living species with those in the old fossiliferous rocks, the contrast in the numbers will be still greater. We come constantly in contact with the living animals, while we know of extinct species only by that portion of their remains which have been buried in the earth and which we have exhumed. Furthermore, we have a knowledge of living animals in all parts of the earth, but only a portion of Europe and a portion of North America have been explored for extinct species. From these facts it is very natural that we should be acquainted with a greater number of living species, and of those in the newer rocks, than of those which existed in the remote ages when the older formations were being deposited.

But if we compare the living species in any given area, with those in an equal area in the older rocks, we shall find that the number of species has been as great ever since the commencement of animal life upon our globe as it is at the present time.

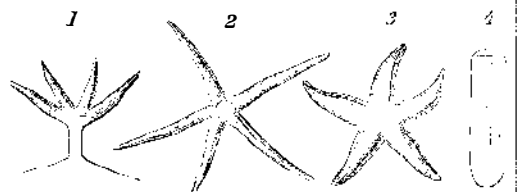
[The lecturer then cited numerous cases in Italy, Germany, the State of New York and other places to show that the number of fossil species in a given area is as great as that of the species now in existence; arguing from this against the truth of Darwin's theory, which supposes that all existing species come from a few individuals.]

He then said, I will now return to the order in which animal life has been brought forth on the globe, and the relation of this order to the structure of existing species. I will place here at the head of columns the names of the four orders into which the animal kingdom is divided by naturalists, and at the left of the lines the names of the principal classes of rocks in the order of their ages. As I stated last week all of the classes of the three lower orders are represented in all the formations, but the order of vertebrates is represented only in its lowest class—the fishes. Now I will proceed to the main purpose of my lecture, which is to show the relation between the

times at which the several species made their appearance on the earth, and the complexity of their organizations. It would require months to state all the facts which prove this relation in regard to all the classes, and I must, therefore, select one or two. I will select those with which we are most familiar. First, let us take the class of the echinoderms in the

	Radiates.	Moluscs.	Articulates.	Vertebrates.
Recent.....				
Pleocene.....				
Miocene.....				
Eocene.....				
CRETACEOUS.....				
Jurassic.....				
Permian.....				
Carboniferous.....				
Devonian.....				
Silurian.....				
Unstratified.....				

order of the radiates. There are at present living upon the globe four families of this class which I will represent upon the black board. Lowest in the scale are the crinoids (1 in the cut). These have radiating arms only from the upper surface, and are attached by a stem immovably to the rocks or bottom of the sea in which they live, without any power of locomotion. Next comes this family with long radiating arms (2 in the cut), next the starfish (No. 3) and lastly the holothurids (No. 4).



This may be a little tedious, but if you will read Shakespeare, you must learn the English language, and if you would read the thought of God you must be willing to learn half a dozen of the characters in which that thought is written. For, there is no way in which the thought the Creator as Creator can be read but in his works.

These animals rise in complexity of structure, and in the scale of being in the order in which they are numbered.

Of the crinoids, which are lowest in the scale, there is but one species now known. It is found near Porto Rico in the Caribbean Sea. But in the oldest fossiliferous rocks the remains of crinoids are found in immense numbers. As we approach our own days in the geological history the species of echinoderms which prevail are those of more complex structure, till we come to our own day, when the starfishes are the most numerous; the numbers of the highest class, the holothurids, beginning to diminish again.

Now comes this singular coincidence, one of the proofs of a unity of predetermined plan in creation. When the starfish of our day is first born he is a crinoid. The little starfish is a perfect miniature of the large crinoid which was the first creation of the family of the echinoderms. Nature builds up the individual now in accordance with the same plan by which she has brought forth the class through the long geological ages.

I will give another illustration of this law. I will take the class of the crustacea in the order of the articulates. You are familiar with two families of these, the lobster and the crab. On a close examination there is no difficulty in deciding that the crab is of a higher order than the lobster. The nerves in the lobster are scattered along the sides, while in the crab they are centered about the head, and in other respects the crab has a higher organization. In the oldest fossiliferous rocks of this State we find, in immense numbers, the remains of a crustacean of this form, the body consisting of three lobes, from which it is called a trilobite. At each end there is a shield of this form, and the middle lobe of the body is divided both across and longitudinally, in this manner.



In certain parts of Germany rocks come to the surface

much newer than the rocks of this State which contain the trilobites, and these German rocks are filled with the remains of animals like the lobster. At the present time there are but very few species of lobsters, while the species of crabs are very numerous.

As with the radiates, so with the articulates, the species first created were of comparatively simple structure, and those that were created afterward were of a higher and more complex organization. The same law holds too in regard to the development of the individual. If we examine the egg of the crab when the germ first begins to show signs of life, we find the germ bearing no resemblance to a crab. It is a miniature trilobite. We have the same shields at the ends, the same transverse and longitudinal divisions. A diagram of the one would be a good representation of the other.

When the young crab is first hatched, it is in form neither a trilobite nor a crab, but a perfect lobster. It has the same long tail, the same feelers, and is in appearance a complete lobster. But as it grows, its form changes to that of the crab.

The same law prevails in the order of vertebrates. The lowest class of vertebrates is unquestionably the fishes, and this is the class that was created first. In all the rocks below the carboniferous, we find the remains of no vertebrated animals except fishes. The class next above the fishes in the order of vertebrates is the class of reptiles, and this is the class that made its appearance next in the order of creation. Next above the reptiles in the scale of being is the class of birds, and these were created next after the fishes. Above the birds in complexity of structure are the mammals, and these were framed last in the work of creation. Highest of all mammals is man, and it is only in the recent rocks that human remains are discovered.

The individuals of the vertebrates are now developed in the same order in which the whole creation of vertebrates have come forth upon earth. If we examine the egg of a bird when life begins to be manifested in it, we shall find the embryo reminding us of a fish. It has the same elongated cylindrical body, and bears a close resemblance to a fish. Later it is developed into the form of a reptile, and finally comes forth a featherless bird.

The higher classes of radiates and articulates are superior to those below them only in certain respects. But the upper classes of vertebrates are superior to those below them in all respects—in their nervous system, in their circulation, in their breathing, in their limbs and in their posture and aspect. The fish moves through the water by undulations of its body. A portion of the reptiles do the same, but others are raised upon legs, while the mammals are more perfect walkers. The fish and the reptiles have a slow circulation and are cold blooded; the birds and the mammals are warm blooded with a vigorous circulation. The fish breathe the water through gills; the birds and mammals breathe air by means of lungs. The fish has the spinal column in a horizontal position, the reptile somewhat inclined, the bird more and the mammal most.

Man is the last comer upon earth, and in all respects he is superior to all others of the animal creation. His circulating respiratory and nervous systems are more complex and intricate in their organization. His hand is not a mere instrument of locomotion, but is the means of expressing his deepest and warmest emotions. With it he grasps the hand of his friend, and embraces the objects of his tenderest affections. His attitude is superior to any of theirs. His aspect is forward and upward. Forward and Upward! The words that should form the motto of our lives. Forward in intellectual culture; upward in moral excellence. Forward in a knowledge of the works, and upward in approach to the character of the great Creator in whose likeness we are made.

"THE Telegraph to India Company" have given notice that the Alexandria and Suez land line will be restored to working order early in March. It is further stated that the cost of a message between any part of England and any of the following places at which the company have agents will not exceed £3 for a single message—viz., Aden, Bombay, Galle, Madras, Calcutta, Penang, Singapore, Hong Kong, Shanghai, King George's Sound, Melbourne, Sydney, Mauritius, and Reunion.