

All of these may, and have for that matter, become fossils; it is only necessary that the mud or the tar or the sand or the resin or the ice shall be preserved (obviously it can not be washed away or destroyed without destroying the fossil), and that the footprint or the shell or the bone or the leaf, or its impression, shall be preserved as well. This is made easy by the hardening of the mud or sand into rock, a process which is sure to follow if the material is given enough time. If the jelly-fish can hold its shape until the layer of mud has hardened, smaller particles will gradually filter into the cavity which it leaves, and these may be different enough from those around it so that when the rock is split apart on this particular layer the shape of the jelly-fish can be seen. The cavity may even become filled with calcite or a similar mineral. The two layers of mud that pressed the upper and under sides of the leaf may show its form and outline even though the leaf decay. On the other hand the shell or the bone, or even the entire body, as in the case of the mammoth, may be preserved as it is, without change. Sometimes, however, only the tube or burrow in which the animal lived is preserved.

Still another way in which fossils may be preserved is best described by supposing that you were to change a picture, a mosaic, which owed its feature to the skilful arrangement of differently colored berries by substituting for each berry a pebble of the same shape, size, and color. You would have changed nothing about the picture but its lasting qualities, you would have made it safe from decay. It is this process in nature but on a very much smaller scale which has given us such fossils as petrified wood. The exchange of particles is here so fine that the smallest details of structure are preserved and may be studied under the microscope.

Now many of the softer rock deposits are exposed at the surface of the earth and man has cultivated the layer of soil immediately above, but they were laid down, formed, ages ago and during the lifetime of the animals and plants whose remains can now be found in them. As we have said these are the real fossils. If a farmer living on such a soil should dig down three or four feet and bury a dog that dog would not become a fossil even though the bones did not decay and were to be dug up thousands of years later together with the remains of the real fossils. It did not get where it is in the ordinary course of events, man put it there. If the real fossils were dog bones it might be difficult to separate the fossil dog bones from the farmer-buried dog bones. But it would be almost impossible to mix a group of animals that had lived on the earth for any great length of time prior to another with

that other, so that the fossil expert, for whom the term paleontologist is in common use, could not detect the mixing. If one bone or shell did not give the fact away another would, and even the two sets of dog bones would probably differ from each other, for animals and plants have always changed from age to age. It is this progressive change in time which we call evolution.

If the person who dug up the fossil bones and the farmer-buried dog bones had looked closely he would have seen that the earth around the farmer's dog had been disturbed, that the lines of bedding (stratification) in the nearby rock stopped some distance from the dog and that the earth near it was jumbled together; also that this was not true with regard to the bedding near the fossils. It is this care in collecting and attention to detail which is natural to paleontologists, and which others must make use of when they collect fossils if these are to have any value. Many of the doubtful points in the earth's history, such as whether the human bones which have been found in certain places in our West, or in Argentina, are those of primitive man or those of recent natives were made doubtful by carelessness or lack of observation on the part of the person who first made the discovery.

Nature has been very careful about recording what she has done, however careless she may be in destroying that record, and fossils may be likened to the hieroglyphics which the Egyptians used to carve, in more ways than one. They, the fossils, are Nature's handwriting, her method of labelling the rocks of the earth's crust, and while fossil hieroglyphics are sometimes hard to read, and while they, like those of Egypt, mean little or nothing to the ordinary person, their story is easily read by the man who knows.

Perhaps we can better illustrate the use of fossils by comparing them to the documents placed in the foundation stones of buildings. It is customary to seal up in such stones objects like the daily papers of the date upon which the stone is laid, coins, etc., anything which will indicate to the one who opens the vault, whether this be done in a hundred or a million years, and when every other evidence as to the age of the building may have been lost, the exact period of the earth's history during which the building was erected. Nature has sealed up in rocks of all ages but the oldest, in all but a few varieties, and in nearly all places, articles (fossils) which convey an accurate idea of the relative time at which the different rocky tombs were built, and we are daily becoming more expert in reading the story they tell.

Since fossil experts in all countries are continually at work on these problems, and since an expert in Japan, for example, should know exactly what a