

2. The Evidence Adduced to Support the Evolutionist Interpretation

"Ordinary chemical analysis is unable to determine the differences in blood-composition between various animals, but that there were important differences had long been understood. This was shown by the fact that, in performing the operation for the transfusion of blood, it was not practicable to substitute animal for human blood, since the former might cause serious injury to the patient.

"The precipitation method of making blood tests is as follows: Freshly drawn human blood is allowed to coagulate or clot, which it will do in a few minutes, if left standing in a dish, and then the serum is drained away from the clot. Blood-serum is the watery, almost colorless part of the blood, which remains after coagulation. Small quantities of this serum are injected, at intervals of one or two days, into the veins of a rabbit and cause the formation in the rabbit's blood of an antibody analogous to the anti-toxin which is produced in the blood of a horse by the injection of diphtheria virus. After the last injection the rabbit is allowed to live for several days and is then killed and bled, the blood is left until it clots and the serum drained off and preserved. The serum obtained thus from a rabbit is called 'anti-human' serum and is an exceedingly delicate test for human blood, not only when the latter is fresh, but also when it is in the form of old and dried blood-stains, or even when the blood is putrid. Stains, for example, are soaked in a very weak solution of common salt and, if necessary, the blood solution is filtered until it is quite limpid and clear. Into the blood solution a few drops of the anti-human serum are conveyed and, if the stains are of human blood, a white precipitate is formed and thrown down, but if the stains are of the blood of some domestic animal, such as a pig, sheep, or fowl, no such reaction follows. In the same manner as above described, we may prepare anti-pig, anti-horse, anti-fowl, etc., etc., sera by injecting the fresh-drawn serum of a pig, horse, fowl, or any other animal into the rabbit, instead of human blood-serum, in some countries, notably in Germany and Austria, this test has already been adopted by the courts of justice and has been found extremely useful in the detection of crime.

"Further investigation showed that these blood tests might be employed to determine the degrees of relationship between different animals, for, although a prompt and strong reaction is usually obtained only from the blood of the same species as that from which the original injection into the rabbit was taken, the blood of nearly allied species, such as the horse and donkey, for example, gives a weaker and slower precipitation. By using stronger solutions and allowing more time, quite distant relationships may be brought out. Nuttall and his collaborator, Graham-Smith, made many thousands of such experiments bearing upon the problems of relationship and classification and it is of great significance to note that their highly interesting and important results contain few surprises, but, in almost all cases, merely serve to confirm the conclusions previously reached by other methods, such as comparative anatomy and palaeontology. It will be instructive to quote some of these results, the quotations being taken from 'Blood Immunity and Blood Relationship,' by G. H. F. Nuttall, including Original Researches by G. L. Graham-Smith and T. S. P. Strangeways, Cambridge, 1904.