

former paper, the question was asked of me, which I certainly did not hear, if that Adam had an umbilicus. If he was evolved I would say he had, because in all placental mammalia there must be a placental circulation before a breathing one; if he was not evolved, but made after the manner that the image maker makes images, primary creation, which I believe is the theory held by many, creation of substantial form, then an umbilicus would not be necessary, although he might have one. As I conceive he was evolved from an ovum, I believe that like unto his offspring he had an umbilicus; no man, however, knows positively, or perhaps ever will know, how God created the first man, that is, the *modus operandi* by which he was made, therefore it is a lawful subject for discussion. Evolution appears to me the more reasonable theory, because it is in accordance with existing natural laws; the question to me, however, is only interesting as bearing on the science of development, and fortunately we have not to go back to the first man for that, seeing that we who are procreated attain all our animal and vegetative organs by the process of evolution, and that this evolution is taking place in us all as long as we have a living existence. Indeed, evolution continues in our material bodies even after death, for that which once is may undergo change, but cannot be annihilated; it always remains in one form or another, always perpetual evolution. As Dr. Bucknill, in his criticism of Mickle on the General Paralysis of the Insane, says: "We may reflect, as Hamlet did, how that a man may eat of the fish, that had fed of that worm, that had eat of a king, to show that a king may go a progress through the guts of a beggar." Not a very choice but a very expressive expression, proving the indestructibility of matter, and continual evolution.

I shall now quote for you what I consider the most interesting passages of Mr. Haeckel's work, interesting because the most practical; before doing so, however, I will give you the meaning of the many terms he uses, for certainly there are very many of them by no means familiar terms, or household words:

"*Phlyctic*," impregnation by the male.

"*Parthenogenesis*," virginal generation.

"*Ontogony*," germ history.

"*Biogony*," evolution of organisms, life.

"*Embryology*," germ science.

"*Phylogony*," tribal history.

"*Palengensis*," new birth inheritance.

"*Morphology*," science of forms.

"*Physiology*," science of the functions of forms.

"*Physiology*," } united, forms the science of
 "*Morphology*," } biology.

"*Biology*," the science of organisms, or science of life.

I confess to you on the first reading of Mr. Haeckel's book I was puzzled as to the meaning of terms, but when, I came to comprehend them, I was satisfied that each term represented a science, and, moreover, that the knowledge of each and all of these sciences was necessary to the perfect comprehension of the sciences of anatomy, physiology and pathology.

Mr. Haeckel, after giving a sketch of the life of Baer, says: "Baer especially perfected the fundamental theory of germ layers as a whole, as well as in detail, so clearly and completely that his idea of it yet forms the safest basis of our knowledge of ontogony.

"He showed that in man and the other animals, as in the chick—in short as in all vertebrates—first two, and then four, germ-layers are formed, always in the same manner, and that the modification of these into tubes gives rise to the first fundamental organs of the body. According to Baer the first rudiment of the body of the vertebrate, as it appears in the globular yolk of the fertilized egg, is an oblong disc, which first separates into two leaves or layers. From the upper or animal layer evolve all the organs which produce the phenomena of animal life; the functions of sensation, of motion and the covering of the body. From the lower or vegetative layer proceed all the organs which bring about the growth of the body: the vital functions of nutrition, digestion, blood-making, breathing, secretion, reproduction, and the like. Each of these two original germ layers separates again into two thinner layers, or lamellæ, one lying above the other. First the animal layer separates into two, which Baer calls the skin or dermal layer, and the flesh or muscular layer. From the uppermost of these two lamellæ, the skin layer, are formed the outer skin, the covering of the body, and the central nervous system, the spinal cords the brain, and the organs of sensation. From the lower, or flesh layer, the muscles, or fleshy parts, the internal or bony skeleton—in short, the organs of motion—arise. Secondly, the lower, or vegetative, germ-layer, parts in the same way into two lamellæ, which Baer distinguishes as the vascular and mucous layer. From the outer of the two, the