

during the development of the human embryo, taking as examples the development of the eye, of young nerve-cells, of muscular adaptations. In the adult human leg the peroneus tertius is separate in 90 per cent. of cases, having thus an advantageous position for the performance of its function in walking. In the anthropoid apes this muscle is quite unseparated from the long extensors of the toes. In the developing human foetus the rudiment of the peroneus tertius separates from the long extensors with which it was originally continuous. To most biologists this would be a typical case of recapitulation.

Sir Arthur Keith says he agrees with Huxley that there are no grounds for believing that the behaviour of embryonic muscle cells is in any way influenced by experiences gained by adult muscle fibres. He then makes the statement that "The evolutionary machinery lies in the behaviour of the embryonic muscle cells or myoblasts," which to me, as it stands, is quite unintelligible. The behaviour of the embryonic muscle cells can explain nothing but the mode in which the adult structure is developed. Such behaviour begins and ends with the individual organism, and cannot possibly contain any evolutionary machinery. It is merely one detail of the complicated embryological changes by which the adult structure is developed. In relation to evolution the question is how are we to explain the fact that the "behaviour of the embryonic cells" is different in the human foetus from what it is in the anthropoid apes, which presumably resemble the ancestral condition? On this question Sir Arthur Keith says nothing, except the assertion quoted of his agreement with Huxley.

In another part of his lecture Sir Arthur Keith discusses the action of hormones in the course of ontogeny in co-ordinating the development of different parts and tissues. He concludes that more complete knowledge "will reveal in full the true nature of the machinery which underlies the production of structural adaptations which occur in every part of the animal body in every stage of its evolution." Here, again, he is confounding the evolution or origin of the adaptations with their mere development in the individual.

Nevertheless, Sir Arthur, while denying the influence of external influences in human evolution, admits the heredity of "acquired characters" and even injuries in certain cases. He states that Lamarckism cannot explain the characters which differentiate one racial type of modern man from another. On this last point I am entirely in agreement with him, for Lamarckism is a theory of the evolution of adaptive characters, and racial characters of man are for the most part not adaptive.

I should like in conclusion to contrast two passages in Sir Arthur Keith's lecture. He writes, "Nothing is better known than that, if a bone of a rickety child bends under the weight of the body, the bone cells lying in its concavity will proliferate and build a buttress to strengthen the shaft." The bone cells "react to fulfil an end necessary for the occasion." This seems to me quite inconsistent with the statement, "there are no grounds for believing that the behaviour of embryonic cells is in any way influenced by experiences gained by adult muscle fibres." The first of these two passages admits the *reaction* of the tissues of the body to external stimuli, while the second passage and the whole tendency of the lecture apparently denies the occurrence of such reaction.

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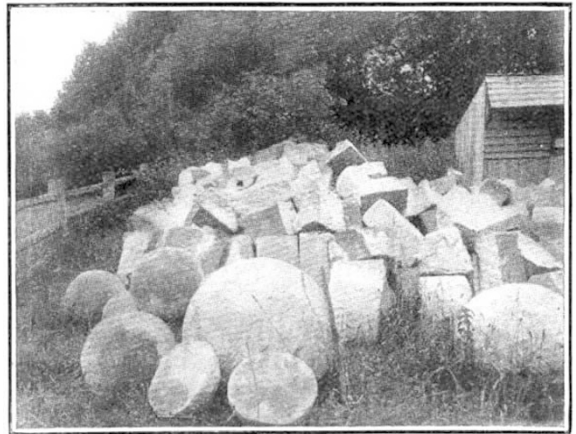
Chiswick, W.4,
September 11.

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Curious Spherical Masses in Ashdown Sands.

MR. HARRY E. BURNS, of Crowborough, this spring informed me of some remarkable spherical masses of sandstone in the Ashdown Sands at High Hurst Wood Quarry, and was good enough later to supply one about 10 inches in diameter to our Museum. He suggested that they might be sand casts of reptilian eggs like that of the *Iguanodon*. They consist of fine-grained nearly white stone—much of the iron having been leached out. I expected but failed entirely to find on section any pan or stains of limonite such as in the well-known balls of Folkestone Sands.

Recently I have visited the quarry with Mr. Burns, and was able to see a ball 30 inches in diameter in position. We were told they are confined to an upper bed about 14 feet thick, and vary in size from 10 to 30 inches in diameter. We could discover no evidence



of a foreign body or of concreterary growth, although such growths are not rare in the Wealden Sandstones—often, too, in a decalcified condition. Those at Crowborough are found loose in a narrow cavity, and the stone appears identical in colour, etc., with that of the surrounding bed. The adjacent stone for a few inches is shattered—due, I suppose, to the pressure of overlying beds against the unyielding sphere, while the narrow clefts are filled with clay, doubtless washed there from the once overlying Wadhurst Clay. Strangely enough, some of these balls have been used as ornaments at the tops of wooden gate-posts! During the forty-five years I have lived in the neighbourhood I have not met such masses before, and find them difficult to explain. The photograph (Fig. 1) shows a group of these stones taken by Mr. Burns, who kindly allows me to use it.

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2 Rusthall Park, Tunbridge Wells,
September 10.

Stereoisomerism among Derivatives of Diphenyl.

DR. TURNER'S remarks (*NATURE*, September 22, p. 439) appear to have been made without his having seen my letter of some eighteen months ago (*NATURE*, May 6, 1922, p. 581), which was concerned with the importance of stereochemistry among diphenyl derivatives in relation to Sir William Bragg's conclusions as to the molecular structure of benzene in the crystal. At that time, reasons for reviving the Dewar para-linkage formula for benzene had not been published (*Ingold, Trans. Chem. Soc.*, 1922, 1143), but since this bridged formula "is stereochemically