

### Letters to the Editor.

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#### The Meaning of Existence.

PROF. MUIRHEAD'S illuminating letter in NATURE of Feb. 7, p. 197, raises innumerable questions which I am not qualified to discuss with him, but I should like to add a comment on the narrower scientific aspect of the problem.

Here are two quotations, forty years apart, from eminent men of science :

(1) Lord Kelvin in 1889—" [The ether] is the only substance we are confident of in dynamics. One thing we are sure of, and that is the reality and substantiality of the luminiferous ether."

(2) Sir Arthur Eddington in 1929—" Among leading scientists of to-day, I think about half assert that the ether exists, and the other half deny its existence ; but as a matter of fact both parties mean exactly the same thing and are divided only by words."

We are in the paradoxical position that two scientific workers of to-day who say "Yes" and "No" both mean precisely the same thing, while two scientific workers forty years apart, who both say "Yes", mean diametrically opposite things. The key to the paradox is, I think, to be found in Prof. Muirhead's words : "before there can be any talk of existence you must define the world within which it is affirmed—what the logicians call 'the universe of discourse'".

The physicist of forty years ago did not suspect the need for any such definition. Surrounding and conditioning our world of consciousness, he saw a vast independent universe of concrete machinery, which he unthinkingly and unconsciously accepted as his 'universe of discourse'. On the other hand, the scientific worker of to-day finds his 'universe of discourse' in the phenomenal universe as apprehended by his brain. The crux of the matter seems to me to be that this does not—like the old ocean of machinery—provide a single, clearly defined 'universe of discourse'. It rather gives us a collection of universes of discourse, some greatly overlapping but some almost independent, some objective but some largely subjective.

First there is the universe of the astronomical observatory and the physical laboratory, which is "continuous with the world of the felt, waking body", experience showing that this is identical for all of us, at any rate outside lunatic asylums. I think science now compels us to give an unqualified denial to the existence of an ether in this universe of discourse.

Then there is the mathematical universe of discourse, which deals only with such phenomena as can be reduced to 'pointer-readings'. Those who want an ether in this universe may have it, just as they may have Cartesian or polar co-ordinates if they want them; but it will be a mathematical ether, not 'continuous with the world of the felt, waking body'.

Finally, there is the universe of discourse provided by that world which, in Prof. Muirhead's words, "resolution into mathematical symbols or 'pointer-readings' fails to make intelligible", including—if one must use the word—the world of 'values'. Although I am in almost complete agreement with Prof. Muirhead, I differ from him in thinking that an ether can have any existence in this world, or even any meaning,

mainly, I suppose, because 'values' do not enter into clearly defined relations with time and space. In brief, I would contend that in the physical world an ether is non-existent; in the mathematical world it comes into being at the beck and call of the mathematician; in the world of 'values' it is meaningless.

J. H. JEANS.

#### Validity of the Genus *Sinanthropus*.

PROF. MARCELLIN BOULE, Director of the Museum National d'Histoire Naturelle in Paris, has written to me with reference to my Henderson Lecture, "The Significance of the Peking Man", extracts from which appeared in NATURE of Feb. 7 (p. 202), to direct my attention to the fact that long before Dr. Weinert expressed doubt as to whether the Peking man should be excluded from the genus *Pithecanthropus* he had made the same protest. To quote his own words : "Je crois être le premier à avoir rapproché intimement le *Sinanthropus* du *Pithecanthrope*. Voyez *L'Anthropologie*, t. 39 (1929), pp. 455-460."

In my Edinburgh lecture I purposely refrained from mentioning Prof. Boule's name, because his opinion was expressed before the fuller information was available, which seems to me to be fatal to his view. Dr. Weinert's book was written, however, after this evidence was issued. Hence it was not unfair to quote him as the supporter of an opinion which I think is mistaken.

The question of priority is not a matter of any particular consequence. As a matter of fact, at a meeting of a students' society in this College (the University College and Hospital Anthropological Society), before either Prof. Boule or Dr. Weinert raised this question, Dr. H. S. Harrison, of the Horniman Museum, started a discussion by suggesting that the fossil from China was a representative of the genus *Pithecanthropus*.

I should like to point out that in his preliminary announcement of the discovery of the skull (on Dec. 2, 1929) Prof. Davidson Black directed attention to its resemblance to the calvaria of *Pithecanthropus* but gave cogent reasons for according it generic distinction. The profound contrast of a fossilised human tooth from China to those of *Pithecanthropus* was pointed out so long ago as 1903 by Prof. Max Schlosser (*Abhandl. d. k. Bayerisch. Akademie Wissensch., Math. Phys. Klasse*, Bd. 22, p. 20); and in his great monograph (*Palæontologia Sinica*, 1927) on the tooth which served as the type of the genus *Sinanthropus*, Prof. Davidson Black still further emphasised the contrast and justified his action in creating the genus, the validity of which is admitted by every palæontologist who has seen the actual specimens. As I have emphasised in my Henderson Lecture, the form of the brain case, the morphology of the individual bones, and even the architecture of the diploe, all corroborate the inferences drawn from the teeth that *Sinanthropus* is a distinct genus. Although the fossil from China definitely approaches more nearly to *Pithecanthropus* than to any other genus, the monograph which Prof. Davidson Black has written for immediate publication in *Palæontologia Sinica* (ser. D, vol. 7, fasc. 2) provides the full evidence, comparative data, and the statistical justification for its generic independence.

While the question of determining what criteria are necessary to justify the creation of a separate genus is one that does not admit of an exact answer, I do not think that anyone who has compared, as I have recently done, the actual Chinese fossils with those of other men and apes and the casts of fossil human skulls, would fail to realise that the inclusion