

LETTERS TO THE EDITOR.

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Secular Changes of Climate.

FOR some time past it has been generally believed that the climate of Central Asia was once less arid than at present, but we now know, as Dr. Sven Hedin explained to the Royal Geographical Society on December 8 (p. 134), that important changes have taken place since the Christian era began. He found in the Lob Nor region forests with the trees long dead, traces of a road, ruined villages, coins, manuscripts and other relics which proved the northern shore of the old salt lake (now dry) to have been cultivated and occupied, down to about sixteen centuries ago, by a fairly civilised people. This, I think, implies a rainfall, less inappreciable than the present one, during the earlier centuries of that era, and the change, as he found dead forests, cannot be attributed (as in parts of southern Europe and Syria) to reckless destruction by the hand of man. But, besides this, Sir Norman and Dr. W. J. S. Lockyer have recently proved (in a communication to the Royal Society) a very remarkable correspondence to exist between the distribution of the periodic rains in India, Mauritius and elsewhere and the amount of solar activity, and they have, within the last few days, drawn the attention of the same Society to the fact that zones of abnormally high and low mean barometric pressure exist on opposite sides of the earth and oscillate from the one position to the other in accordance with the periodic small variations of solar activity. Dr. Sven Hedin's discovery apparently indicates a change secular rather than periodic, but may not both operate independently, as in the case of changes due to variations of eccentricity in the earth's orbit and to precession of the axis of rotation? The authors of those papers admit the existence of disturbing causes, some of which may be local, but not necessarily all. Is it, then, possible that these discoveries may afford a clue to the solution of two great geological puzzles—the abnormal temperatures of the Pleistocene and of early Tertiary times? In regard to the former, many now believe that the climate of North Central Europe when the loess was deposited more nearly resembled that of the Caspian steppes, and all maintain that in the Glacial epoch the mean temperature of the whole continent was much below what it is now. How much this was, at the time of greatest cold, is not easily estimated, but a few years ago I attempted a rough approximation. This will be found in a volume of the Contemporary Science Series called "Ice Work" (part iii. chap. i.), and the results (for Europe) are as follows:—Supposing the British Isles to be at their present level (in order to avoid the controversy as to the origin of Boulder-clays and Glacial gravels), the mean temperature of these islands at the present Ordnance Datum would have to be lowered by about 20° F. The same would probably hold good of Scandinavia—at any rate, that would suffice to make either country much more closely resemble a corresponding part of Greenland. In the more central parts of Europe, the problem is rather easier, for here we are undoubtedly dealing with "land-ice." A fall of 18° in the mean temperature would suffice for the Alps; perhaps rather less, 15° or 16°, for the Pyrenees, the Sierras Guadarrama and Nevada, possibly also for the breccia-producing age on the Rock of Gibraltar. A reduction of 18° at most, and more probably about 16° or 15°, would bring back small glaciers to Auvergne, the Schwarzwald, Vosges, Apennines, Corsican mountains, the Caucasus and even the Atlas. I may add that a reduction of 15° appears sufficient to form a great ice-sheet in North America, and that in the southern hemisphere and at Mount Kenya in Africa distinctly smaller change suffices. All these estimates assume the present levels maintained; they may be corrected at the rate of 1° for each 300 feet of elevation or depression. But geologists too often forget that the anomaly of early Tertiary heat is not less difficult to explain than that of Pleistocene cold, for in later Eocene ages the mean temperature of southern England can hardly have been less than 20° above that which it now enjoys. The explanations which have been offered for the Glacial epoch—a different arrangement of sea and land, variations in eccentricity, precessional movements (none of which, in my opinion, are more than partially successful)—cannot be applied to the

latter case, so that we seem compelled to seek for some other cause. Variations in solar heat have been already suggested, but hitherto this hypothesis has seemed too much a *Deus ex machina*. But as Dr. Sven Hedin's discoveries show that important alterations in climate have been in progress during the last fifteen or sixteen centuries, and Sir Norman Lockyer's researches indicate that comparatively small changes in solar activity produce rather important meteorological effects upon the earth, geologists qualified for the investigation may find it not unprofitable to follow up the clue. T. G. BONNEY.

The Government Grant for Scientific Research.

NOW that the annual advertisement of the Government grant is once more appearing, I should like to call attention to the long interval that elapses between the date appointed for the reception of applications for, and that of making known the distribution of, the grants. The former is fixed for January 31, the latter is some time in May, a period of more than three months. This seems to me to detract somewhat from the value of the grants, for, in certain instances at least, the conditions may have quite altered in so long a time and the possibility of making a particular research have passed away.

King's College, December 8. R. T. HEWLETT.

The Unconscious Mind.

IN a recent review (November 20) of my book on the "Force of Mind," "W. McD." remarks, "The book is vitiated throughout by the insistence upon the part supposed to be played by the unconscious mind."

But a closer attention to the argument would have revealed the fact that, while no stickler for a word and still less an advocate for two minds, the author is compelled to give some name for mental processes unaccompanied by consciousness.

The position of the man who denies any mental processes at all, as distinguished from mechanical, is logical; but the position of the man who distinguishes mental processes (that is, processes which a machine cannot conduct apart from mind) from mechanical, and at the same time will only recognise as mental those accompanied by consciousness, is illogical. The self-same mental process at one time may be conducted in consciousness and at another outside it, and he is therefore on the horns of this painful dilemma. He must either at one time call the process mental and at the other mechanical or "nervous," or he must extend the word "consciousness" so as to include the unconscious. To a psychologist, the consequences of such a theory are deplorable and are described in scathing terms by Prof. James¹ when he depicts the present state of this conservative science; while with a medical man it compels him logically to regard cases of neuromimesis as malingering or fraud because he sees the disease has mental characteristics, and yet cannot, according to the old psychological shibboleth, recognise as mind the unconscious psychic agent. I may say in conclusion that the need for this extension of mind has been felt by none more keenly than by the very psychologists who have refused it. The student of this subject has only to turn to Prof. C. T. Ladd's "Philosophy of Mind," p. 395, and compare it with p. 393; or to Prof. Sully's "Illusions," pp. 266 and 335, to see the existence of unconscious mental actions both asserted and denied in the same book.

These passages and others will all be found in my work² on the subject. A. T. SCHOFIELD.

6 Harley Street, W., December 15.

DR. SCHOFIELD objects to my strictures on his extensive application of "the unconscious" as an explanatory principle that solves (for him) all problems of the relations of body and spirit. And he persists in confusing the question of the validity of "the unconscious" with the question of the propriety of so extending the use of the terms "mind" and "mental" as to make them applicable to brain activities that do not involve affections of consciousness. This extended use of the words I myself, following Dr. Bastian, have urged and adopted, but to do this is not to commit oneself to the hypothesis of "the unconscious mind." Dr. Schofield's use of this phrase implies the assumption of a factor in mental life that is neither neural process nor conscious process, but an utterly unknown, unknowable and mysterious third agent, more or less intervening between the two

¹ Prof. W. James, "Psychology," p. 458.

² Dr. Schofield, "The Unconscious Mind," 2nd edition. (Hodder and Stoughton.)