

developed in the absence of these influences, and the term "inheritable" to characters which were present in the parent and tend to be "inborn" in the offspring. Thus they speak of heads as inborn and inheritable, and of use-callosties and scars as acquired and non-inheritable. I am not concerned here with the correctness of these terms. My statement of the manner in which they are used is correct.

Prof. Karl Pearson employs the term "inherit," but not, to my knowledge, the terms "inborn" and "acquired." Instead, he uses "bred" and "created," which apparently are intended to mean the same. He has not, I believe, defined any of his terms. Presumably, therefore, he uses them with their ordinary meanings. If he does not, then not only have I been mistaken, but also almost everyone else, including such a careful thinker as Sir Ray Lankester. In that case, what is the meaning of the expression "bred, not created"? Is potentiality meant here? The italics are mine.

Even in the absence of statistical inquiry, it is a common conviction that individuals tend to resemble their progenitors mentally as well as physically. Thus the offspring of a vertebrate is another vertebrate, of a man another man, of a Hottentot another Hottentot, and so on. But individual characters are less certainly inherited than varietal characters, varietal characters than specific characters, and so on. Prof. Pearson's work concerns only individual characters (*i.e.* variations); but he makes—not once but repeatedly, not only in scientific memoirs but also in popular lectures and letters to newspapers—the *unqualified* statement that the mental and physical characters of man are inherited at the same rate. It seems that this rate is "somewhere about 0.46 to 0.50." His estimate, if it led nowhere, would have no more importance than, for example, a calculation concerning the average length of noses. But it leads him somewhere—to the notion that the moral and intellectual qualities are "bred, not created," instead of to the notion that they are bred *and* created. It leads him to a false opposition between "nature" and "nurture," instead of to the really quite obvious truth that the nature of man, the educable animal, is such that he is supremely responsive to nurture. It leads him to the notion that the poorer classes in England are, on the average, by nature inferior to their more fortunate compatriots, and thence to dire predictions concerning our future as a nation and to demands that something shall be done. It would lead him, I suppose, to the notion that an English baby, reared by African cannibals, would, when grown, resemble his progenitors and differ from his educators as much mentally as physically. And so on and so forth. No one, I suppose, disputes that individuals vary in capacity. The dispute, in the case of the moral and intellectual traits, is entirely as to whether capacity can become more than mere potentiality unless nurture plays its part as the other blade of the scissors. In other words, the dispute is as to whether these traits are or are not acquisitions, that is, products of man's educability *plus* his individual experience.

The biometric plan of ascertaining correlations between variations, and thence surmising a causal connection, is not, as is commonly supposed, a new instrument in the hands of men of science. It is merely a variant of the very old method of concomitant variations which is described in almost every book on logic and in almost every work on the methods of science. There is, however, this difference: according to the method of correlated variations as exemplified by biometricians, if two things vary together *on the average*, there is *invariably* a causal connection between them; according to the method of concomitant variations as described by logicians, if two things *invariably* vary together, there is *probably* a causal connection.

In my letter I stated that Dr. Walker had reproduced some of my opinions in his book almost in my own words. I should have added that he made very full acknowledgment.

Southsea, December 10

G. ARCHDALL REID.

In Dr. C. Walker's quotations (NATURE, November 23 and December 7) from Dr. A. Reid's paper, Prof. Karl Pearson is represented as saying: "We inherit our

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parents' tempers, our parents' consciousness," &c.; this should read: "We inherit our parents' tempers, our parents' *conscientiousness*," &c. (see Journal Royal Anth. Inst., vol. xxxiii., p. 204).

E. LAWRENCE.

"Kama," Sunningdale Avenue, Westcliff-on-Sea,
December 11.

Temperature of the Upper Atmosphere.

MESSRS. GOLD AND HARWOOD in their paper on the present state of our knowledge of the upper atmosphere, printed in the British Association's reports for 1909, give a table showing the mean temperatures for the months of the year at heights varying from the surface to 15 kilometres. With regard to it they say the principal feature is the very marked minimum in March and the small, though less marked, effect in September. The table is based upon about 5800 readings taken at Strassburg during five years. With the aid of this table I have plotted on the accompanying diagram the temperatures at various

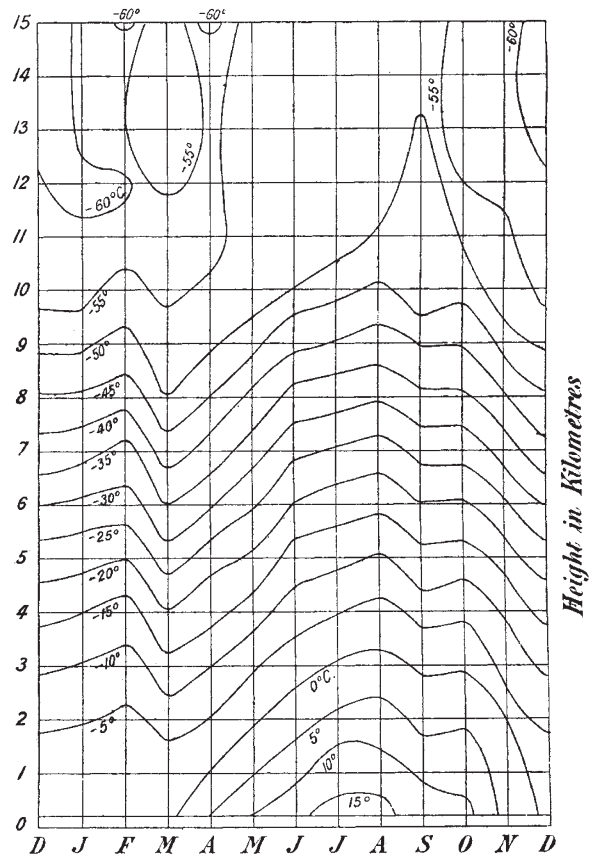


FIG. 1.—Temperature variations throughout the year at different heights.

heights (isotherms). Plotted in this manner, a result is obtained which shows clearly that a check in the fall of temperature takes place between September and October. The principal feature, however, is the rise of temperature between December and February, and the small gradient of temperature below 2000 metres during those months.

The tracing of the isotherms in the advective layer presents some difficulties, owing to the abnormal conditions prevailing in it. It would appear that during December a low temperature condition prevails, and appears to die away from the top downwards, disappearing at a height of about 12,000 metres in February. In March there is a marked inversion of temperature between 12,000 and 15,000 metres which does not seem to continue into April.