

which evokes acquired characters. Clearly internal, just as much as external, stimuli evoke what are called "acquired characters."

(3) As a fact, biologists when classifying characters as "innate" and "acquired" have not in practice been influenced by the kind of stimuli which have evoked them. As again all literature testifies, they have, in accordance with popular usage, called all characters which develop in response to any very glaringly obvious stimulus acquired. For example, they do not call the musculature of the child, the youth, and the ordinary man "acquired"; but they do bestow that name on the musculature of the blacksmith, though the latter develops in response to precisely the same influence. Any number of similar examples might be named.

G. ARCHDALL REID.

9 Victoria Rd. South, Southsea, Hants,  
February 25, 1922.

### A Rainbow Peculiarity.

EVERY one has observed a brilliantly coloured rainbow and also the secondary bow situated some distance on the outside of the primary. Is it a fact of general observation that the whole area of the inside of the primary bow is brighter than the region outside?

It was not until the winter of 1913 that this bright inner region was brought to my notice on a photo-

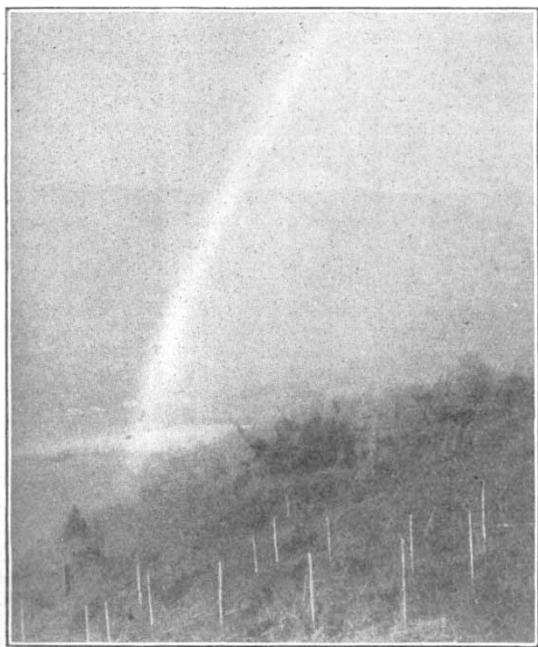


FIG. 1.—Rainbow photographed on December 1, 1913.

graph I secured on December 1 of that year. On the morning of that day one or two heavy showers passed from S.W. to N.E., traversing the ground to the north of the Norman Lockyer Observatory. The primary bow in question was distant about one mile to the north of the observatory, as could be judged from the spot where the rainbow ended on the ground. An attempt was made to photograph the bow with a 4×5 screen focus Kodak using the ordinary Eastman film, and on development it was found that the light from the interior area of the bow had acted on the film in a much more actinic manner than that on the outside—or, in other words, the area inside the bow

was brighter than that on the outside. The accompanying illustration (Fig. 1) gives a reproduction of the photograph.

I somewhat doubted the reality of this appearance



FIG. 2.—Rainbow photographed on December 22, 1921.

until I had taken another photograph of a similar nature, and an opportunity occurred in December of last year.

On December 22 numerous showers were passing to the northward of the observatory, and I photographed three different rainbows during the morning. They were not so brilliant as that photographed in 1913, but yet sufficiently bright to record the same phenomenon. One of these photographs is reproduced in Fig. 2, and a comparison of the intensity of the distant landscape inside and outside the primary bow corroborates the previous photograph.

These photographs thus establish a fact in Nature which appears to have been rarely noticed visually. Kämtz in his "Lehrbuch der Meteorologie" (vol. 3, p. 158), a book which was published so long ago as 1836, writes on the subject as follows:—"When a rainbow with very pronounced colours is projected against a dark cloud, the sky above the first bow is darker than that underneath. If we follow the path of light in our spherical drops and remember the limiting values which have been given above, we receive none of the inner surface reflected rays from any drops which lie higher than those in which we found the maximum and which form the bright bows; lower-lying drops also send out rays from the inner back surface, and, although these more or less diverge, they tend to produce an undoubted brightness under the bow. The drops lying above the bow also send out reflected rays from their near sides, while from the drops lying under the bow we receive rays from the far side."

Following this extract Kämtz states that he has to thank Brandes for directing his attention to this phenomenon, and gives a reference to Gehler's "Wörterbuch," *Nach. Astr.*, vol. 7, p. 1324.

WILLIAM J. S. LOCKYER.

Norman Lockyer Observatory,  
Salcombe Hill,  
Sidmouth, S. Devon.