the uninterrupted rate of decay of fatigue when the stimulus is removed, the other expressing the enhancement due to reflex (and perhaps also direct) action. I do not specially like the word defatigue, but have not succeeded in finding one which seems to be better. If a better one were suggested, I would at once concur in its use. But the great desirability is universality in the employment of terms.

W. PEDDIE.

University of St. Andrews,
February 27.

The Structure of the Great Rift Valley.

IN the issue of NATURE for October 6, 1923, which reached me at the end of the year, Prof. J. W. Gregory gives an admirable résumé of our knowledge of the Great Rift Valley. May I, in this connexion, be afforded space in order to contribute a few remarks upon the subject?

Prof. Gregory states, quite correctly, that my view (compression hypothesis) is based on general considerations, and that I do not appear to have seen any reversed faults along the Rift Valley Nor am I in a position to dispute the statement that "all the numerous faults that have been recognised in the Great Rift Valley series are normal." But one would like to know why the western fault of the Gulf of Suez has now been so drawn, the more so as in a generalised section across the region of the Egyptian oil-fields published by W. H. Emmons (after Hume) in his "Geology of Petroleum," 1921, p. 550, only two faults are shown; these are both—according to the section as drawn—primary Rift faults, and both are shown as reversed.

For my part, I have never seen any faults that can be interpreted as original (primary) Rift Valley fractures, but I know of many that are certainly secondary—that is to say, consequent upon the subsidence of a rift block—and they are, of necessity, normal.

Recent work in Bunyoro, Toro, and Ankole has brought out the following points:

1. The Rift Valleys (at any rate in the districts mentioned above) are beyond all doubt tectonic structures.

2. There has been differential movement between the valley sides and the valley bottoms (rift blocks).

3. The last great movement took place in human times, and affected the topography of the whole Protectorate.

4. There are three belts of volcanic activity in the Toro-Ankole area. They are coincident with lines of very ancient (pre-Rift) faulting, but the extrusions are part of the Rift Valley history, during which volcanicity manifested itself at least twice. The first phase is evidenced by a thick series of subaqueous volcanic tuffs, and the second by explosion craters blown through the tuffs. The volcanic belts run across the high land that separates Lake George from Lake Albert, and in directions more or less at right angles to the long axis of the Rift Valleys. They butt up against Ruwenzori. There is no evidence to show that they mark lines of subsidence or of upheaval.

5. The Lake Albert rift-block, the Toro highlands, Ruwenzori, part of Bunyoro and Ankole have suffered from pivotal movements which provide evidence of a general rise of the country to the south of Toro and a general subsidence to the north of it. The southern part of Ruwenzori has taken part in this rise.

6. Where the rift-block of Lake Albert sinks deepest the valley sides close in.

The position, at present, as I see it, is as follows:

(*a*) The great Kenyan and Uganda-Congo upfolds are in all probability compressional structures.

(*b*) The Rift Valleys (at any rate so far as we know them in Uganda) are quite certainly tectonic structures.

(*c*) The main "featuring" of the Great Rift Valley was brought about by the subsidence of the rift-blocks.

(*d*) The original Rift features have been generally obscured by secondary (normal) faulting on a very large scale, consequent upon the subsidence of the rift-blocks.

(*e*) Prof. J. W. Gregory's explanation of the origin of the Great Rift Valley (by tension) is an hypothesis; so is mine (compression hypothesis). Either may be subsequently proved to be right, partially true or wrong. Nothing but detailed work in a great many places along the Great Rift Valley system can establish the truth.

(*f*) Should it chance that compression is ultimately found to be the essential factor in the formation of the Uganda rifts, it does not follow rigorously that the same explanation holds for the rest of the Great Rift Valley; but upon those who maintain that the Uganda rift valleys are peculiar in origin lies the onus of proof. E. J. WAYLAND.

Entebbe, Uganda, January 3.

THE difference as to the faults between the figure in NATURE of October 6 and that in Prof. Emmons's book is that he copied the original section of 1916, whereas the figure in NATURE gives the modified section published by the Geological Survey of Egypt in its Petroleum Research Bulletin No. X. Dr. Hume's letter published in NATURE of January 12, 1924, confirms the later section. Mr. E. J. Wayland's summary of the recent progress in the investigation of the Rift Valley in the Uganda Protectorate is of great value, and he and his colleagues are to be congratulated on their interesting results. The fifth point he mentions agrees with the pivotal movements on east and west axes in the eastern branch of the Rift Valley in Kenya Colony. The results already announced indicate that Mr. Wayland's full report on the geology of the Rift Valley in the Uganda Protectorate will be a most important contribution to African geology. J. W. GREGORY.

The Temperature of Reversing Layers of Stars.

FOLLOWING the well-known treatment of the problem by Schwarzchild (1906), it has become conventional to estimate the temperature, T', of the outer atmosphere of a star as of the order $T_1/2^{\frac{1}{4}}$, or about $0{\cdot}85\ T_1$, where T_1 is the effective temperature of the surface (practically, the surface of the photosphere) as given by application of Stefan's law to the total energy radiation. This result presupposes that the stellar atmosphere can be treated as "grey," that is, as having an absorption coefficient which is the same for all wave-lengths. Milne has published (Mon. Not. R.A.S., 82, 368, 1922) an approximate mathematical discussion which indicates that when the atmospheric absorption-coefficient varies with the wave-length, the value of T' may fall as low as $\frac{1}{2}T_1$, or rise as high as T_1. The equation upon which he bases his treatment postulates that the outflowing radiation may be taken as approximately black. For stellar reversing layers this assumption seems unjustified, in consideration of the sharply selective opacity indicated by the existence of Fraunhofer lines. The radiation is indeed deficient in the very wave-lengths in which the gas may be expected to absorb and radiate most strongly. That the general,