normal white rats of the same breed was estimated. 25–50 cubic mm. of blood is necessary for the estimation. The process is similar to Went and Drinker's method, but in the colorimetry there is an essential difference. As a result of this investigation it was found that the total blood volume per 100 gm. body weight is  $4 \cdot 19 \pm 0.6$  cubic centimetre on the average. Other control experiments are in progress.

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Mock Suns observed at Nanda Devi in Garhwal

DURING the recent British American Himalayan Expedition, from an altitude of about 21,000 ft. on Nanda Devi in Garhwal, we saw at 3.30 p.m. on August 20 a particularly fine display of parhelia, or 'mock suns'. The two lateral images and the lower one were especially br ght, and were arranged as usual on a broad halo of light. The weather was cold at the time, unusually so even at that altitude for the monsoon period,  $20^{\circ}$  F. being recorded on the mountainside that same evening. We had on several previous occasions seen solar haloes, as we approached Nanda Devi via the Rishiganga gorge, but no certain appearance of 'mock suns', and the weather following the occurrence of these haloes had been fair and not particularly cold.

The afternoon of August 20, however, preceded by about thirty hours the worst blizzard we experienced during the course of the expedition. This blizzard, accompanied by a violent wind from the east—a southerly monsoon wind, we believe, deflected off the neighbouring great south face of Nanda Devi—held us in our tents at 21,300 ft. (Camp III) for about thirty hours, the minimum temperature on this occasion be ng recorded at  $12^{\circ}$  F.

I am well acquainted with the phenomenon of 'mock suns' in the Arctic, but I am unaware that it has been recorded previously from such low latitudes as those of the Himalaya, in this instance lat.  $30^{\circ} 22'$ . Its occurrence during the monsoon period, and at the altitude observed, would appear to indicate exceptionally low temperatures in the upper atmosphere. But 1936 will long be remembered in India for its unusually intense and prolonged monsoon.

It may also be of interest to record that on August 29, from the summit of Nanda Devi (25,645 ft.), Mr. H. W. Tilman and I looked through a still and clear atmosphere (the air temperature was  $19^{\circ}$  F. at 3 p.m.) towards the great 70-mile circuit of mountains of the rim of the Nanda Devi basin. The latter, as well as features beyond, were partially obscured by rising columns of cumulus cloud of very beautiful form. We learnt later that, while we were bathed in sunshine throughout the day, the districts to the south and west beyond the "rim" were experiencing disastrous floods, Mussoorie receiving as much as 19 inches of rain in the course of that day.

Clare College. Cambridge. Oct. 12.

## Points from Foregoing Letters

USING a hydrogen bond as the mechanism whereby laminar' protein molecules are formed from closed polypeptides, Dr. D. M. Wrinch and Dr. D. Jordan Lloyd elaborate possible structural formulæ and deduces that individual protein films must possess characteristic permeabilities and densities.

The optical rotation of lactic acid obtained from  $l \cdot \alpha$ -bromopropionic acid may be either left-handed like that of the parent compound, or may show inversion to right-handed rotation; this depends on whether the conditions are such as to favour a unior bimolecular reaction, as shown by the rate at which the change takes place. W. A. Cowdrey, Dr. E. D. Hughes and Prof. C. K. Ingold mention this as a particular instance of the general importance of paying attention to the rate of reaction in connexion with the Walden inversion.

From an investigation of the pedigree of four more families in which both colour blindness and hæmophilia occur, Dr. Julia Bell and Prof. J. B. S. Haldane conclude that these conditions, which are sex-linked, are also linked (and therefore transmitted) together. In the six pedigrees studied there was only one case of crossing-over, a colour-blind hæmophilic having a colour-blind non-hæmophilic brother.

The cause of the distortion associated with the remarkable yield in iron and soft steel is discussed by Dr. E. W. Fell. He considers it probably due to the mode of distortion of single iron crystals (multiplicity of slip-planes) and to small crystal size. This facilitates *transmission* of the distortion throughout the aggregate of crystals. Attempts to confirm this by producing similar effects in  $\beta$ -brass and molyb-denum are described.

By means of a device making use of simultaneous modulation of a valve transmitter and a valve receiver, H. Antoun and F. Minaw have succeeded in carrying out simultaneous transmission and reception of radio waves. They submit a photograph showing a special wave form of modulation and another showing patterns of transmitted groups of waves.

How a double star may act as an enormous 'cyclotron' and accelerate charged particles moving in the electric field derived from a difference of potential between the stars or from their rotation, is described by Prof. H. Alfven, who calculates that the particles can in this way obtain energies such as are found in cosmic rays.

Following upon Rogers's suggestion that the red blood corpuscles of echidna might prove to be nucleated, Prof. E. A. Briggs has examined a series of blood smears from the primitive Prototheria, platypus and echidna. The erythrocytes are typically mammalian in form, being non-nucleated biconcave disks.

In view of the importance of small amounts of certain metals for the health of animals, H. Ramage describes a method of extraction of the 'soluble' mineral constituents by means of dilute hydrochloric acid, and gives the percentage of calcium and iron found by this method in the liver and spleen of sheep.

An experimental arrangement for determining the concentration of weak coloured solutions in small amounts of the liquid (one drop or less) is described by Dr. J. Ch. Somogyi. The method has been used in estimating the total blood volume of white rats.

N. E. ODELL.