I will only say here that in the passage which Dr. Sterne quotes from my review, I called the results "inconsistent" because they were ostensibly different values for the same thing—"probability". I thought it would be understood that if those two things were called by different names, and made no pretensions to be the same thing, there would be no inconsistency. In other words, I did not attribute inherent inconsistency to the problem but to two possible ways of defining the solution.

HERBERT DINGLE.

Imperial College of Science,
S.W.7.
July 31.

Constitution of the Prosthetic Group of Catalase

KARL ZEILE[1] in 1930 was the first to provide evidence that the catalytic activity towards hydrogen peroxide of purified preparations obtained from liver and from marrow seedlings is intimately connected with a pigment exhibiting the spectral behaviour of a complex consisting of a hæmatin group—the iron being stabilised in the trivalent state—and of a colloidal component. The position of the absorption bands of the pyridine hæmochromogen and of the porphyrin, obtained in solution by treatment with hydrazine and acetic acid, led him to conclude that the hæmatin contained in the enzyme complex was either identical with, or was an isomer of, the prosthetic group of natural hæmoglobin.

Solutions rich in catalase were obtained by a method embodying fractional alcohol precipitation, removal of hæmoglobin by chloroform denaturation, adsorption of the enzyme on alumina gel, elutriation with secondary sodium phosphate, and concentration by acetone-CO_2-treatment in the cold. The active hæmatin-protein complex was split by acid acetone, the hæmin precipitated by evaporating the acetone, and recrystallised from propionic acid and HCl in order to remove admixed biliverdin crystals. About nine milligrams of a pure hæmin were obtained from the catalase prepared from fifty pounds of horse liver. The spectroscopic properties and the enzymatic activities of the various fractions were determined throughout.

The hæmin, when acted upon by hydriodic acid and glacial acetic acid, yielded a porphyrin the spectrum of which was identical with that of a sample of pure mesoporphyrin IX kindly given to me by Prof. Otto Warburg. The dimethyl ester obtained by treatment with HCl in methyl alcohol shows the same spectrum as does mesoporphyrin-IX-dimethyl ester. Final proof of the identity is afforded by the fact that the compound (m.p. 214°, uncorr.), when added to an equal amount of synthetic mesoporphyrin-IX-dimethyl ester (m.p. 212°, uncorr.) caused no depression of the melting point of the latter (mixed melting point 213°, uncorr.). I am indebted to Prof. Hans Fischer for a sample of the synthetic ester.

The conclusion seems, therefore, to be justified that the hæmatin group of catalase is a derivative of ætioporphyrin III and possesses a porphin skeleton with the same arrangement of the side chains as is found in the natural blood pigment, that is, in protohæmatin IX.

It is, perhaps, of interest to note that according to D. Keilin and R. Hill[2] and to K. Zeile and F. Reuter[3], the component *c* of cytochrome is also a derivative of ætioporphyrin III.

The details of this investigation will be published elsewhere.

The high activity of catalase is obviously due to the union of the hæmatin with a special protein[4]. Work on the nature of this protein is being continued.

KURT G. STERN.

Courtauld Institute of Biochemistry,
Middlesex Hospital Medical School,
London, W.1.
July 23.

[1] K. Zeile and H. Hellström, *Z. physiol. Chem.*, **192**, 171; 1930. **195**, 39; 1931.
[2] R. Hill and D. Keilin, *Proc. Roy. Soc.*, B, **107**, 286; 1930.
[3] K. Zeile and F. Reuter, *Z. physiol. Chem.*, **221**, 101; 1933.
[4] K. G. Stern, *ibid.*, **208**, 86, **212**, 207; 1932. **215**, 35, **217**, 237 **219**, 105; 1933.

Colour of the Positive After-Image of a Colour

IN certain conditions, the colour of the positive after-image of any colour or white is purple. It is best to use only one eye and to have both eyes covered with a black cushion before performing the experiment. The object should then be viewed for the shortest possible time and the black cushion be replaced over the eye. If tried with a spectrum, the whole of the after-image becomes purple.

If on a piece of white cardboard eighteen inches square a series of small squares of red and blue cardboard, each about three quarters of an inch square, be pasted to cover a surface of about nine inches square, and the whole is placed in sunlight and viewed as previously mentioned at a distance of about three feet, a brilliant positive after-image, red, blue and white, will be seen for a fraction of a second. Then all changes to purple, which becomes brighter and then disappears from without inwards in about eight to twelve seconds without becoming negative; the last thing to be seen is a whirlpool movement in the centre of the field of vision.

With spectral colours projected on a screen in a dark room the positive after-image of all becomes purple and disappears without changing to negative when viewed for the shortest possible time. When the eye is moved, the after-image spreads out, a portion of the retina not previously stimulated being affected.

These facts suggest very strongly that the photochemical stimulus in vision is liquid and movable in the retina.

F. W. EDRIDGE-GREEN.

Board of Trade,
S.W.1.
July 18.

Dental Caries in Prehistoric South Africans

THE Matjies River Shelter[1] has yielded a very large number of skulls with hundreds of teeth. The deposit commences with a form of the Mossel Bay culture (which may be called Early Mossel Bay) which, in natural superficial strata of the neighbourhood, and in a shelter about eight miles away at Plettenberg Bay, follows immediately on the last phase of the Stellenbosch culture. This phase of the Stellenbosch can be found from Plettenberg Bay to Mossel Bay in a hard red sand lying immediately below the surface layer of black sand, and may therefore be accepted as the end of the Pleistocene; the whole of the deposits of the Matjies River Shelter must therefore be taken to be Holocene.

My collection contains: teeth of one burial from