

steady state for several seconds. Again, the selenium cell is most sensitive to red light and the potassium vacuum cell to green light, although to a green which is well to the short wave-length side of the region of maximum visual acuity. With a vacuum cell in which the sensitive cathode is a very thin film of caesium on a base of caesium oxide the maximum is in the infra-red. No one of these cells agrees with the eye about colour in giving a maximum in the yellow which appears brightest to the eye.

The different sensitivity of different alkali cells to light of different colours is applied in modern lamp photometry to determine accurately whether the light from two incandescent lamps is of the same colour, and therefore whether the two filaments are at the same temperature, on the principle that if two cells of different colour sensitivity are adjusted to give the same current when exposed to light of some definite colour, they will give the same current when similarly exposed to light of the same colour even if its intensity is different, but will not give the same current if the colour is different.

Amongst the laboratory uses of photoelectric cells may be mentioned the demonstration by one of the modern forms, that photoelectric emission is independent of temperature whereas thermionic emission is not. This has already been accomplished in several ways, but can be shown rather prettily with a caesium cell, which has a readily measured thermionic current below 200° C. One of these cells is mounted in a small oven and the thermionic current from it (if any) found by the ordinary direct method, whilst light which produces a photoelectric current too small to deflect the thermionic galvanometer is allowed to fall on the cell simultaneously and is rendered intermittent by passing it through a rotating disc. The photoelectric current through the cell is then also intermittent and may be amplified independently of the thermionic current and fed to a loud speaker, the sound from which is a measure of its magnitude. When the cell is cold there is a photoelectric current but no thermionic emission, but, when the oven is heated, a thermionic current develops rapidly, whilst the sound from the loud speaker, and hence the photoelectric current, is not appreciably changed.

### Physiological Basis of Sensation.

IF we are to regard a sensation as a change in consciousness in response to a stimulus applied to a sense-organ, then the sensation evoked by a given stimulus will depend on the complexity of the consciousness of the particular individual. This will vary enormously from person to person, depending on heredity, education, experience, and so on and will differ enormously in man and in animal. This variation, however, is no justification for the abandonment of investigation, but is rather a guide to the choice of the most elementary species and the most fundamental processes for experiment.

Prof. E. D. Adrian, for the purposes of the discussion which he opened on Sept. 24 in Section I (Physiology) of the British Association, presented the view that the structural organs involved—namely, the sense-organs, sensory nerve-fibres, and the collection of nerve cells with their interlacing fibres in the brain—work in a fairly simple way. At any rate, the messages or nerve impulses which pass from the sense-organs are fairly simple; each consists of a very brief wave of activity—in the larger fibres each point remains in the active state for only a few thousandths of a second and the wave travels at a speed of 30 metres a second or more. The passage of an impulse involves a very small expenditure of energy, but fortunately some

of it can be easily detected, for it appears as an electric current flowing between the active and inactive parts.

By amplifying these electric changes, Adrian has been able to record the passage of impulses in each nerve-fibre, and has found that a succession of impulses passes up to the brain whenever a sense-organ comes into action. An active sensory ending usually discharges a rhythmical series of impulses with a frequency in the neighbourhood of 20-100 a second, and the sense-organ, like the nerve-fibre, behaves with machine-like regularity, giving always the same discharge of impulses for the same stimulus provided that other conditions are unaltered.

Adrian has recorded similar electrical changes in the optic nerve, which developmentally is a part of the brain, and there is no reason to suppose that changes do not occur in the brain itself similar to those in the sense-organs and their nerve-fibres.

Prof. Frank Allen, of the University of Manitoba, brought forward evidence of a quantitative character in support of the elementary and fundamental physiological basis of sensation. The same law is found to connect the magnitude of the response elicited by a definite adequate stimulus of a sensory organ irrespective of what the sensory organ may be.

Sir John Parsons also contributed to the discussion, pointing out, among other things, the valuable data derived from clinical examination of patients afflicted with such partial deficiencies as colour-blindness.

### University and Educational Intelligence.

CAMBRIDGE.—Candidates for the recently established Goldsmiths' professorship of metallurgy are requested to communicate with the vice-chancellor on or before Jan. 16. The salary attached to the chair is £1200 per annum.

The Raymond Horton-Smith prize for the present session has been awarded to Dr. W. D. Newcomb for his thesis on the relationship between peptic ulceration and gastric ulceration and gastric carcinoma.

LONDON.—Mr. O. L. V. de Wesselow has been appointed as from Dec. 1, 1931, to the University chair of medicine tenable at St. Thomas's Hospital Medical School. Since 1920 he has been chemical pathologist to St. Thomas's Hospital.

ST. ANDREWS.—The last examination for the diploma of L.L.A. has been held, and the scheme has now been wound up. Begun in 1877, when there was no opportunity for women to enter the universities and when the L.L.A. examination afforded them an opportunity of obtaining a diploma attesting their attainments in literature, science, and philosophy, the scheme grew gradually up to the year 1909, when there were as many as 1090 candidates in one year. By that time the effect of the admission to the universities of women had diminished to some extent the usefulness of the examination and the numbers gradually decreased. During its existence the L.L.A. has attracted 36,017 candidates and 5119 diplomas have been conferred.

THE sixth World Conference of the New Education Fellowship will be held at Nice on July 29-Aug. 12, under the presidency of Prof. P. Langevin, professor of experimental physics in the École Normale Supérieure, Paris. The theme for the Conference is "Education and Changing Society". Main lectures on the general theme have been arranged, also sectional lectures on special subjects and on progress within national systems of education, and study courses. Further information can be obtained from the Conference Secretary, New Education Fellowship, 11 Tavistock Square, London, W.C.1.