

perhaps best provided by a study of the results obtained by Wright⁷ when he investigated this question in 1934. Fig. 3 has been constructed from his data and shows (a) the shift in position of the 'white' point in his colour diagram as the result of previously exposing the eye to red, yellow or blue, and (b) the paths followed by the locus of the point during its return to the normal position. If this colour diagram be related to Fig. 1 it is probable that the positions of the axes representing rod and cone activity lie roughly parallel to the directions of the lines drawn through the 'white' point. Any movement of the point to the left of the line *ab* indicates depression of cone activity, and any movement of the point to positions below the line *cd*, depression of rod activity. The red (620 m μ) used stimulates rods and cones in the proportion of 7 : 90 and the displacement of the 'white' point is in the proportion of 4 units along the rod axis and 42 units along the cone axis. The corresponding figures for the blue (470) and the yellow (560) are shown in the following table :

	Stimulation		Displacement	
	Rods	Cones	Rods	Cones
Red	7	90	4	42
Blue	30	5	22	5
Yellow	72	72	25	40

The figures speak for themselves, so far as the initial displacement is concerned ; the significance of the recovery paths is not so clear, but may be related to the different rates of recovery of the rods and cones and to general re-adaptation to the experimental conditions required for making the necessary matches.

The figures used throughout this article have, as already stated, been derived from the scotopic and foveal photopic visibility curves for the arc-light spectrum. The diagram will be considerably modified for spectra with different energy distribution, and the exact shape and position of the visibility curves is consequently of importance in any more detailed analysis. That the foveal visibility curve is so similar to the ordinary photopic curve and apparently can be regarded as the cone curve is of interest in that it suggests that at all levels of illumination at which cones are functional it is chiefly to their activity that we owe the sensation of brightness.

Finally, it is of interest to note that the line of minimal saturation divides the spectral curve into two portions, and the distance from this diagonal represents the positive or negative difference between the rod and cone responses for each wave-length. Distances along the diagonal represent the summation of the rod and cone responses. Since the differences vary with the wave-length, it is not surprising that the summation of rod and cone responses when plotted against wave-length should have some of the properties of the colour triangle, as was noted in the previous article¹.

¹ Willmer, E. N., *NATURE*, **151**, 213 (1943).

² Hartfidge, H., *NATURE*, **151**, 422 (1943).

³ Abney, W. de W., "Colour Vision" (London, 1895).

⁴ Hartline, H. K., and Graham, C. H., *J. Cell. Comp. Physiol.*, **1**, 277 (1932).

⁵ Hartline, H. K., *Amer. J. Physiol.*, **121**, 400 (1938).

⁶ Burch, G. J., *Phil. Trans. Roy. Soc.*, **B**, **191**, 1 (1898).

⁷ Wright, W. D., *Proc. Roy. Soc.*, **B**, **115**, 49 (1934).

OBITUARIES

Sir Arthur Newsholme, K.C.B.

SIR ARTHUR NEWSHOLME was born at Haworth, the village of the Brontës, on February 10, 1857. He received his medical education at St. Thomas's Hospital and took the degree of M.D.(Lond.) after a brilliant academic career. After holding resident appointments at St. Thomas's and other hospitals, he started in general practice at Clapham. But his interest was early directed towards public health, for in 1884 he was appointed part-time medical officer of health for Clapham, and took the public health diploma at the University of London. His early reports show the application of scientific principles to the study of disease outbreaks and reveal that he was already making a special study of problems of local and national vital statistics, density of population as a factor in excessive death-rates, and the need for local intensive comparison of death-rates. In 1884 he published a book on "Hygiene", and in 1887 a manual on "School Hygiene".

Newsholme rapidly became a leading authority on public health ; this was recognized by his appointment as whole-time medical officer of health of Brighton in 1888. Here he worked indefatigably and enhanced his reputation as an administrator and a scientific investigator. The writing of "The Elements of Vital Statistics", a standard text-book, led to the offer of the post of medical statistician in the General Register Office, which he declined in favour of Dr. T. H. C. Stevenson. He added to knowledge in his investigations of the epidemiology of tuberculosis, scarlet fever and diphtheria, and in 1895 gave the Milroy Lectures at the Royal College of Physicians on "The Natural History and Affinities of Rheumatic Fever". In these four lectures Newsholme showed that rheumatic fever is an infective disease, that 'explosive' and 'protracted' epidemics occur, that there is evidence of cyclical prevalence, that epidemics can occur in years of minimum rainfall and that the disease varies greatly in extent in different countries. The statistical approach to this and other problems of disease revealed facts of fundamental importance. A statistical study of "The Alleged Increase of Cancer" (with G. King), contributed to the *Proceedings of the Royal Society* in 1895, also broke fresh ground.

In 1908, Mr. John Burns appointed Newsholme as medical officer of the Local Government Board. The State was beginning to see that national health is not solely a matter of environmental hygiene. A beginning had been made with the setting-up of the School Medical Service under the Board of Education, and National Health Insurance was already foreshadowed. In his ten years tenure of office, Newsholme laid the medical foundation of the national health services—tuberculosis, maternity and child welfare, and venereal diseases—as well as making notable contributions to the public health side of the national war effort during 1914–18.

Newsholme was a kind and sympathetic chief ; he worked hard himself and expected his staff to work with equal energy and enthusiasm. He was made a C.B. in 1912 and was advanced to K.C.B. in 1917. With the advent of the Ministry of Health, he retired and accepted an invitation to lecture on public health at Johns Hopkins University in 1920 and 1921. He had a great regard for the peoples of the United States, and closely forged the links of co-operation in

health and social reform between the two nations. This influence is exerting its force to-day.

In the years of retirement, Newsholme's facile pen was seldom idle; and he visited many countries, including the U.S.S.R., to study their health conditions and to discuss their problems. His last two books, "Fifty Years in Public Health" and "The Last Thirty Years in Public Health", are not only autobiographical, but also possess scientific and historical value. Tall, handsome and bearded, with many social gifts, Sir Arthur was a popular figure in Great Britain and the United States. He married in 1881 Sara Mansford, and her death in 1933 was a great blow to him. Newsholme's work as administrator and epidemiologist takes high place in the story of British public health.

ARTHUR S. MACNALTLY.

WE regret to announce the following deaths:

Dr. W. S. Bayley, who retired in 1931 from the professorship of geology at the University of Illinois, where he was head of the department, on February 14, aged eighty-one.

Mr. Lionel R. Crawshaw, at one time a member of the scientific staff of the Marine Biological Association and for many years research officer, Sponge Fishery Investigations, West Indies and British Honduras, on April 24, aged seventy-four.

Prof. Kurt Huber, professor of experimental psychology in the University of Munich, recently executed for "traitorous conspiracy".

Prof. Martin H. Knutsen, professor of bacteriology at the Pennsylvania State College since 1928, on February 6, aged fifty-five.

NEWS and VIEWS

King's Birthday Honours

THE following names of men of science and others associated with scientific development appear in the King's Birthday Honours list:

Baronet: Sir John Fraser, regius professor of clinical surgery, University of Edinburgh.

K.C.B.: Dr. N. K. Johnson, director of the Meteorological Office.

K.B.E.: Sir T. Franklin Sibly, vice-chancellor of the University of Reading, and chairman of the Committee of Vice-Chancellors and Principals.

Knights: Capt. J. P. Black, managing director of the Standard Motor Co., Ltd., and chairman of the Joint Aero-engine Committee; D. A. E. Cabot, chief veterinary officer, Ministry of Agriculture; Dr. H. L. Eason, president of the General Medical Council; Dr. C. S. Fox, director of the Geological Survey, India; Dr. H. Spencer Jones, Astronomer Royal; J. M. Kennedy, deputy chairman of the Electricity Commission; P. M. Kharegat, vice-chairman, Imperial Council of Agricultural Research, India; E. Macfadyen, chairman of the governing body, Imperial College of Tropical Agriculture; Dr. A. D. McNair, vice-chancellor of the University of Liverpool; Prof. J. L. Myres, formerly Wykeham professor of ancient history, University of Oxford, for services to learning; Prof. G. P. Thomson, professor of physics, Imperial College of Science and Technology.

C.H.: E. W. Hives, for services in the design of aero-engines.

C.B.: J. M. Caie, deputy secretary, Department of Agriculture for Scotland; W. S. Farren, director, Royal Aircraft Establishment, Ministry of Aircraft Production.

C.I.E.: H. Trotter, utilization officer, Forest Research Institute, Dehra Dun.

C.B.E.: R. Chadwick, chief designer and director, A. V. Roe and Co., Ltd.; Dr. H. L. Guy, chairman of the Gun Design Committee, Scientific Advisory Council; Prof. J. Jewkes, deputy director-general of statistics and programmes, Ministry of Aircraft Production; Prof. J. N. Mukherjee, professor of chemistry, University of Calcutta; R. K. Pierson, chief designer, Vickers-Armstrong, Ltd. (Aircraft); Major R. W. Sharpe, chairman, Agricultural Executive Committee, Berwickshire; Lieut.-Col. W. W. Zambra, secretary, Imperial Communications Advisory Committee.

Prof. V. M. Goldschmidt, For.Mem.R.S.

PROF. V. M. GOLDSCHMIDT, whose election to foreign membership of the Royal Society has just been announced, has made outstanding contributions in each of the fields of petrology, crystal chemistry and geochemistry. His early studies in rock metamorphism marked a major advance in the correlation of the chemical and mineralogical composition of thermally reconstituted rocks and contained the first successful essay towards a systematic classification of rock-mineral assemblages in the light of the phase rule. The leader of great schools of geochemistry both at Göttingen and Oslo, Goldschmidt has for many years devoted his attention to the discovery of the principles governing the terrestrial distribution of the elements: in this programme his classical researches on the crystal structure of ionic compounds were early achievements and may be regarded as laying the foundation of the science of crystal chemistry. His exhaustive series of investigations on the chemical composition of rocks and minerals has revolutionized our knowledge of the distribution of the minor constituents of the earth's crust, while his similar studies on meteorites have brought a special contribution to the problem of the chemistry of the earth's deep interior. It is in these comprehensive researches, both geochemical and crystallochemical, that Goldschmidt has contributed in such large measure to the present-day picture of the geochemical evolution of matter within the lithosphere.

Prof. B. A. Houssay, For.Mem.R.S.

PROF. BERNARDO ALBERTO HOUSSAY, of Buenos Aires, elected a foreign member of the Royal Society on May 20, is one of the outstanding men of science of Latin America. He has held the chair of physiology in the University of Buenos Aires since 1919, and has made his laboratory a leading centre for endocrine research. His most remarkable discoveries concern the effect of the anterior pituitary body on carbohydrate metabolism; he showed that although the removal of the pancreas alone will cause diabetes, yet if the anterior lobe of the pituitary is removed at the same time the animal has no glycosuria and stays in reasonable health. Further analysis made it clear that the anterior lobe of the pituitary secretes