

become potent sources of sound. The sound field around the jet will then be rather like that of light in front of an optical grating—that is to say, there will be directions in which the energy from different sources will constructively and destructively interfere—and there is some experimental evidence, from polar curves of supersonic jets, which supports this. What is perhaps more important is that in this range of speeds the noise-level increases at a power of the jet velocity much higher than the eighth—perhaps, the twentieth or more.

This behaviour of jets at subsonic and supersonic speeds was described by Prof. E. J. Richards and G. M. Lilley at a symposium on "Aeronautical Acoustics, in particular Jet Noise", held in London on May 21 under the joint auspices of the Royal Aeronautical Society and the Acoustics Group of the Physical Society. Other speakers dealt with the noise of jets in gas-turbine engines (F. B. Greatrex) and the noise of jet aircraft (N. Fleming and J. D. Hayhurst). The bangs heard as an aircraft crosses the sound barrier were described by C. H. E. Warren, and these have been the subject of a recent article in *Nature*<sup>12</sup>.

In the discussion which followed, speakers emphasized the nuisance which the starting and landing of aircraft constitute to those who live and work in the vicinity of aerodromes and the need for mitigation of the noise if aircraft travel at still higher speeds. Some of the speakers described tests of devices to reduce jet noise, but none of the reductions amounted to much in terms of decibels. A dilemma seems to have been reached in which the only cure for the noise is to reduce efflux velocity, but this means wider jets to maintain the thrust and so heavier engines, which could rob the gas turbine of one of its chief advantages.

<sup>1</sup> Richardson, E. G., *Proc. Phys. Soc.*, **32**, 394 (1931).

<sup>2</sup> Powell, A., *J. Acoust. Soc. Amer.*, **25**, 193 (1953); *Acustica* (in the press).

<sup>3</sup> Curle, N., *Proc. Roy. Soc. A*, **216**, 412 (1953).

<sup>4</sup> Richardson, E. G., *Proc. Phys. Soc.*, **43**, 400 (1931).

<sup>5</sup> Hubbard, H. H., and Lassiter, L. W., *J. Acoust. Soc. Amer.*, **25**, 184 (1953); N.A.C.A. Report TN 2757.

<sup>6</sup> Schuh, H., and Winter, K. J., *Proc. Intern. Cong. Appl. Mech.*, **2**, 61 (1948); R.A.E. Report Aero., 2412.

<sup>7</sup> Richardson, E. G., *Proc. Roy. Soc. A*, **203**, 149 (1950).

<sup>8</sup> Nyborg, W. L., Burkhard, M. D., and Schilling, H. K., *J. Acoust. Soc. Amer.*, **24**, 293 (1952).

<sup>9</sup> Lighthill, M. J., *Proc. Roy. Soc. A*, **211**, 564 (1952).

<sup>10</sup> Hartmann, J., *Phys. Rev.*, **20**, 719 (1922).

<sup>11</sup> Richards, E. J., *J. Roy. Aero. Soc.* (May 1953).

<sup>12</sup> Lilley, G. M., Westley, R., Yates, A. H., and Busing, J. R., *Nature*, **171**, 994 (1953).

department of Gordon Memorial College. Here he was destined to spend the next twenty-eight years, years of memorable service during which the Wellcome Laboratories in Khartoum became world-famous as an institute of tropical research under the direction of Sir Andrew Balfour, later of Dr. A. J. Chalmers, and finally of Sir Robert Archibald himself. He held the post of director from 1920 until his retirement in 1936, when the Wellcome Tropical Research Laboratories were divided among various departments of the Sudan Government.

These were years of intense productive activity. Archibald contributed numerous papers to the Reports of the Wellcome Tropical Research Laboratories, and with Balfour he compiled the "Reviews of Recent Advances in Tropical Medicine", published as supplements to the Reports and continued as the *Tropical Diseases Bulletin* by the Bureau of Hygiene and Tropical Medicine in London. He was a contributor to the "Oxford Index of Therapeutics" (1921) and editor (with Byam) of the monumental treatise, in three volumes, on "The Practice of Medicine in the Tropics" (Oxford Medical Publications). Archibald's own researches during this period are scattered through the scientific and medical journals in innumerable articles covering almost every aspect of tropical medicine and hygiene. He was local secretary of the Royal Society of Tropical Medicine and Hygiene, president of the Sudan Branch of the British Medical Association, member of the executive committee of the British Empire Leprosy Relief Association and *membre correspondant* of the Société de Pathologie Exotique. He was one of the original members of the Council of the Kitchener School of Medicine and later a member of its executive committee in London. He was also a member of the executive committee of the University College of Khartoum.

During the period of his Sudan service, Sir Robert Archibald saw active service in the Blue Nile operations (1908), Mediterranean Expeditionary Force (Dardanelles, 1915), and in the Darfur expedition (1916). He was several times mentioned in dispatches; he was awarded the D.S.O. in 1917, C.M.G. in 1928 and created knight bachelor in 1934. He was awarded also the Order of the Nile (second class) and Order of the Mejidieh (fourth class). After his retirement from the Sudan, Sir Robert Archibald was for a time medical superintendent of the Chacachacare Leper Settlement, Trinidad, West Indies. Later, during the Second World War, he was pathologist, County Laboratory, Poole, Dorset, and for some years before his death he was professor of bacteriology and parasitology in the Farouk University, Alexandria, Egypt.

Although it is nearly twenty years since Sir Robert Archibald left the Sudan, he is still remembered here with deep affection and respect—the good physician, able investigator, wise administrator, kind teacher and great gentleman whose death symbolizes the passing of an era.

ROBERT KIRK

## OBITUARIES

### Sir Robert Archibald, C.M.G.

ROBERT GEORGE ARCHIBALD died suddenly on May 2 in Salisbury, Southern Rhodesia, at the age of seventy-three years. He was the son of the Rev. W. F. Archibald, chaplain to the Forces, and was educated at Dollar Academy and the University of Edinburgh, where he graduated in medicine in 1902. After holding various house appointments, he entered the Royal Army Medical Corps in 1906, and was a pathology prizeman in the Royal Army Medical College, where he worked with Sir William Leishman. In 1907 he was seconded to the Sleeping Sickness Commission in Uganda. In 1908 he was attached to the Egyptian Army and appointed assistant pathologist and bacteriologist in the Wellcome Tropical Research Laboratories, Khartoum, which was then a

### Prof. D. Hanson

PROF. DANIEL HANSON was born in 1892 and was educated at Wallasey Grammar School and at the University of Liverpool, where he took the degree of M.Sc. After a short time at the Research Department, Woolwich, he went in 1913 to the National Physical Laboratory as junior assistant (now called junior scientific officer) in the Metallurgy Division.

In 1914 the superintendent of the Division, Dr. W. Rosenhain, went on a world lecture tour, and while he was away the First World War broke out. The two senior members of the staff were called to the colours, and Hanson and one other were left to carry on the metallurgical side of the work.

Hanson rose to be senior scientific officer in the Department, and published some twenty-five to thirty papers, mainly on aluminium alloys, impurities in copper, and fatigue in metals. His early interest was in constitutional diagram work, as exemplified by the excellent series of papers which he published with Marie L. V. Gayler on various binary and ternary aluminium alloys, work which set a new standard of accuracy at that time and which has rarely, if ever, been surpassed since. While it is obvious that his interests covered a much wider field as time went on, the accurate determination of an equilibrium diagram was always a subject that attracted his attention.

In 1926 Hanson left the Laboratory to take up the post of professor of metallurgy in the University of Birmingham—a position which he held until his death on June 12. The department, which was quite small when he took it over, grew until in the last few years he was director of a department that had three professors besides himself in addition to a number of lecturers and research students. The buildings also were considerably enlarged, a special

block being erected for the Industrial Metallurgy Section, and an extra floor being added to the main building.

The subjects which he had studied at the National Physical Laboratory still claimed Prof. Hanson's attention, but he added to them cast iron and tin alloys. In all he published about seventy papers in the *Journal of the Institute of Metals*, the *Journal of the Iron and Steel Institute*, and various other places.

Hanson established a reputation for himself, not only in Great Britain but also in many other parts of the world. He lectured in Australia, Canada, New Zealand, the United States and elsewhere. In particular, he gave the Institute of Metals Autumn Lecture in 1930, a British Exchange Paper at the International Foundry Convention meeting in Paris in 1932, and the eighteenth annual lecture to the American Institution of Mining and Metallurgy at its New York meeting in 1949. He also was a member of the delegation of British scientists that discussed, in 1950, the release of information on atomic research with American and Canadian scientists. He served for many years on the Council of the Institute of Metals, and was a vice-president from 1928 until 1939.

In spite of all his success in his professional life, Hanson had a complete absence of 'side'. He had very great charm and will be much missed by a large circle of friends.

J. L. HAUGHTON

## NEWS and VIEWS

### H. A. Lorentz (1853–1928)

A GREAT architect of the new era in physics and one of the most cosmopolitan men of science of all times, Hendrick Antoon Lorentz was born at Arnhem in Holland a century ago on July 18, 1853. He studied at the University of Leyden, where he graduated in philosophy in 1875, and became professor of theoretical physics at the early age of twenty-four. He was a voluminous writer, and his publications appeared in rapid succession over a period of more than fifty years in Dutch, French, English and German periodicals. His paper, "La théorie électromagnétique de Maxwell et son application aux corps mouvants" (1892), introduced and vindicated the conception of the electron in physics and supplemented Maxwell's theory on electromagnetic phenomena. His electronic theory of matter harmonized completely with the view which followed from J. J. Thomson's researches. Lorentz's expectation that a magnetic field would affect the appearance of spectra was realized in 1896 by his pupil, Pieter Zeeman, with whom he shared the Nobel Prize for Physics in 1902. The introduction of Lorentz's transformation revolutionized theoretical physics and became the foundation stone for the theory of relativity of another pupil of his, Albert Einstein. As early as 1880 he demonstrated the respective relations existing between the refraction of light and the density or aggregate condition, gaseous or fluid, of a translucent body. These relations were recognized independently and on different grounds by the Danish physicist, L. V. Lorentz, and are known to-day as the Lorentz-Lorentz relations. In Britain, Lord Rayleigh and Sir Oliver Lodge were chiefly responsible for making known Lorentz's work. Lorentz retired from the University

chair in 1912, when he was appointed director of the Teyler Laboratory at Haarlem, and he died suddenly on February 4, 1928, at the age of seventy-four. Innumerable honours were showered on this simple, modest and likeable man, and, among British honours, he was elected a Foreign Member of the Royal Society in 1905 and received its Rumford Medal in 1908 and the Copley Medal in 1918. Besides his purely scientific work, Lorentz excelled at international gatherings, where his idiomatic command of languages and great personal charm won the respect and affection of men from all countries.

### Royal Society of Edinburgh: Honorary Members

THE following have been elected Honorary Fellows of the Royal Society of Edinburgh: *British*: Prof. Sydney Chapman, Department of Natural Philosophy, University of Oxford; Prof. A. C. Chibnall, lately Sir William Dunn professor of biochemistry, University of Cambridge; Dr. A. T. Doodson, director of the Liverpool Observatory and Tidal Institute, Birkenhead; Sir Harold Jeffreys, Plumian professor of astronomy, University of Cambridge. *Foreign*: Prof. C. P. H. Dam, Department of Biochemistry, Polytechnic Institute, Copenhagen; Dr. G. Egloff, director of research, Universal Oil Products Co., Chicago; Prof. K. M. G. Siegbahn, of Stockholm; Prof. O. Struve, Department of Astronomy, University of California.

### Funds for Colonial Welfare and Development

IN reply to a question in the House of Commons on June 24, the Secretary of State for the Colonies said that he hoped it would be possible to introduce legislation to provide further funds for Colonial development early in the 1954–55 session. Mean-