cyclotron resonance in semiconductors were pointed out. So far only bismuth has been studied systematically, but the resonance has also been detected in tin.

This more or less concludes the most powerful tools, in which some quantity is measured as a function of orientation for all directions in space so that much detailed information is obtained. In contrast, the following determinations give a specific piece of information, which may not be obtainable in any other way, but which is an average over the whole band structure or the whole Fermi surface. J. A. Catterall discussed "X-ray Emission from Alkali Metals" with particular reference to lithium. He concluded that the maximum in the emission spectrum definitely came below the Fermi level. Miss R. Coldwell-Horsfall presented a paper on the "Electrical Conductivity Tensor and the Fermi Surface". There was considerable discussion about the density of states at the Fermi-level and related experimental quantities such as the electronic specific heat and the Knight shift. Papers on this were presented by Prof. H. Jones ("Experimental Data Related to Band Structure"); P. L. Smith ("Electronic Specific Heat of Simple Alloys"); L. E. Drain ("Nuclear Magnetic Resonance in Ag–Cd Alloys"). Prof. Jones pointed out that the electronic specific heat measurements require a density of states about 50 per cent higher than one would expect, and gave a theory of how this might be accounted for. The results presented by P. L. Smith and L. E. Drain showed how much more difficult it is to make sense of the results for alloys, and there was considerable discussion about this.

At the end of the first day of the conference, Prof. L. C. Jackson helped to take our minds off metals when he delivered the Duddell Lecture of the Physical Society on "Measurements of the Thickness of the Helium Film". The subject of this very interesting lecture was particularly appropriate to the conference since many of the experimental methods discussed involve low-temperature techniques. V. HEINE

OBITUARY

Prof. R. W. Whytlaw-Gray, O.B.E., F.R.S.

THE death of Robert Whytlaw-Gray on January 21 at the age of eighty removes one more link with the days when the Curies and Ramsay were rejuvenating inorganic chemistry. He was a student of Lord Kelvin and then a research worker in Ramsay's laboratories, where he developed a life-long interest in the physical properties of gases and great experimental skill in their manipulation. This led him to work on molecular and atomic weights, and in 1906 while in Bonn he re-determined the atomic weight of nitrogen by gravimetric analysis of liquefied and fractionated nitric oxide and by density determination. Whytlaw-Gray then returned to University College, London, and in collaboration with Ramsay, determined the atomic weight of niton. This was an outstanding achievement. The density was determined with a modified Steel–Grant micro-balance and about 0·1 mm.^{3} of niton.

In 1914 he became senior chemistry master at Eton, where his steadiness of purpose enabled him to carry out a considerable amount of research. In 1915 and for long afterwards he engaged in confidential work on toxic and other smokes, their physical properties and the methods by which their effects could be countered. In the fifth Liversidge Lecture, entitled "The Process of Coagulation in Smokes", delivered before the Chemical Society in 1935, he discussed his own and other work on this subject, and in 1936, with H. S. Patterson, published a book entitled "Smokes". His expert knowledge was again utilized by the Ministry of Supply in 1939 and he formed a group of about twelve workers at the University of Leeds to study problems connected with chemical warfare.

Whytlaw-Gray had been appointed to the chair of chemistry at Leeds in 1922 in succession to Arthur Smithells. His research activity there was intense and he developed a buoyancy micro-balance of high accuracy and employed it in the determination of the atomic weights of carbon, fluorine, nitrogen, sulphur and silicon by the use of gaseous compounds of these elements. He was elected to fellowship of the Royal Society in 1928. After ten years in laboratories designed by T. E. Thorpe, he entered the new building which he, Dawson and Ingold had so successfully planned.

His regime was marked by tact, by careful consideration of the views of others (especially when he differed from them), by an informed appreciation of the needs of other scientific and technological departments and by a firm adherence to those principles which guided his personal and scientific life. On his retirement the Senate was "happy to learn that he is to continue his investigations in the Chemistry Department of which the spirit no less than the fabric owes so much to his unselfish devotion". One of his colleagues said of him: "It may be that some aspects of his character are derived from, or at least, related to the quiet detachment of the exact experimentalist —his unruffled calm to the poise and exactness of his own micro-balances".

When Whytlaw-Gray left Leeds in 1950 the University conferred upon him the degree of D.Sc. *honoris causa*. In recent years he worked at the Imperial Chemical Industries' Akers Laboratory, Welwyn, on the isothermals of xenon at low pressures and also on the normal density of the gas. The communication, with Dr. G. A. Bottomley, published in *Nature* as recently as December 7, 1957, is characteristic of his life-long struggle towards perfection in measurements of the properties of gases and vapours. Some earlier work on the deviation from ideality of vapours at low pressures was shown to be subject to significant error due to adsorption. This they reduced to a constant minimum in a re-designed differential compressibility apparatus, mainly by avoiding passage of mercury through greased stopcocks. The PV/P graphs for benzene vapour, after correction for adsorption, then deviated from straight lines by less than two parts in 10^5.

His colleagues and friends will be happy to think that he was able to continue in active work to the end of his long life. He rarely spoke about himself, but it was clear to those who knew him well that he served God 'with a quiet mind'.

FREDERICK CHALLENGER

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