section. A new *ad hoc* Committee had been set up to give an impartial study to the future of the Universal Decimal Classification.

For the closing moments of the conference Dr. Burton Adkinson took over the chair and voiced the thanks of the delegates to the representatives of the host country, and in particular to Aslib, for the organization of the conference and for the accompanying programme of visits and entertainment.

E. M. R. Ditmas

X-RAY MICRO-ANALYSIS

List 177/2, recently issued by the Cambridge Instrument Co., Ltd., is an illustrated booklet* giving a comprehensive description of the Company's 'Microscan' X-ray analyser which is now in production. The technique of X-ray micro-analysis consists of focusing an electron beam, normally accelerated from 0 to 50 kV., on to a region of the surface of the specimen, approximately 1μ in diameter and rather less in depth, and analysing spectroscopically the resulting X-rays excited from the specimen. R. Castaing, in 1951, published details of the first practical instrument that could be described as an 'emission' micro-analyser, but Castaing's instrument, in common with similar instruments developed independently by others, used a static electron probe; it was thus limited to carrying out only point-by-point micro-analyses on parts of the sample surface previously selected under an optical microscope. The Cambridge instrument incorporates a deflexion system to control the electron probe, and in addition to static point-to-point micro-analyses it can also be used for scanning a maximum area of about $\frac{1}{2} \times \frac{1}{2}$ mm.^{2} on the sample surface. It is based on the instrument originally designed by Dr. D. A. Melford and colleagues at the Tube Investments Research Laboratories in collaboration with Dr. V. E. Cosslett and Dr. P. Duncumb, who were responsible for the prototype developed at the Cavendish Laboratory, University of Cambridge.

In the booklet the arrangement, constructional details and functioning of the analyser are clearly set out, together with photographs of parts of the instrument and of results obtained with the instrument. The analyser consists of four separately standing sections—the electrical supply unit, the main console, and three racks occupied mainly by scanning, counting and display electronic equipment, respectively. In the main console are housed the vacuum system consisting principally of a 2-in. oil diffusion pump backed by a rotary pump; the electron-optical system; the specimen chamber on which the electron-optical system is mounted and which is designed to allow from outside the maximum possible manipulation of the specimen which is itself under high vacuum. Sixteen positions are provided on the table and the table can be rotated to bring any one of the positions under either the electron beam or the optical microscope; the binocular optical microscope for conventional optical examination of the specimen for comparison with the electron image; and the semi-focusing X-ray spectrometer of a special and simplified design, containing three curved, rotatable, lithium fluoride crystals and two interchangeable detectors, one a sealed-off proportional counter for the detection of hard radiations and the other a flow proportional counter for soft radiations.

The technique of X-ray micro-analysis has so far been successfully applied to investigating the microstructure of both metals and minerals, and although the 'Microscan' was designed primarily for metallurgical work it can be used for substances other than metals. By providing both X-ray and electron pictures of small surface regions, the analyser is invaluable as a metallurgical tool, and the examples of its application to the examination of various alloys and inclusions in steel which are discussed and illustrated in the booklet show clearly its advantages. Its main limitation, in common with other similar instruments, is its inability at present to detect the soft X-rays from specimens consisting of elements of atomic number less than twelve.

* *The Microscan X-ray Analyser*, Pp. 32 (London: Cambridge Instrument Co., Ltd., 1961).

DISTRIBUTION OF INTENSITY AMONG VARIOUS ULTRASONIC DIFFRACTION ORDERS

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The generalized theory of Raman and Nath gives very complicated expressions which, with certain restrictions, have been modified by Nath[1] to get closed expressions for intensities of ultrasonic diffraction orders. The intensity of the supersonic field is assumed to be not strong enough to excite the second and higher orders and solving the difference-differential equation obtained in the generalized theory, the following expressions for the intensities of the first and central zero orders have been obtained for normal incidence:

$$I_1 = \frac{4}{\rho^2 + 8} \sin^2 \left\{ \frac{\sqrt{\rho^2 + 8}}{4} \xi \right\}$$

$$I_0 = 1 - \frac{8}{\rho^2 + 8} \sin^2 \left\{ \frac{\sqrt{\rho^2 + 8}}{4} \xi \right\} \qquad (1)$$

where $\rho = \dfrac{\lambda^2}{\omega\omega_0\lambda^{*2}}$ and $\xi = \dfrac{2\pi\omega L}{\lambda}$