depletion and feeding calcium supplements did not help. Dr L. R. Young (Massachusetts Institute of Technology), in a study of habituation, drew attention to an alternation of dominance between visual and vestibular cues in the perception of motion. Dr T. D. M. Roberts (University of Glasgow) showed with a mechanical model how his new scheme of labyrinth reflexes interact with the neck reflexes to stabilize the trunk, and suggested how the associated sensations might give rise to feelings of disorientation when astronauts move about freely in a large spacecraft.

The COSPAR meeting also provided an opportunity for further informal discussions on plans for the European Spacelab programme for 1980. The Council of Europe Working Party on Aerospace Physiology had recently been told that if it wished to propose a European experiment for any earlier NASA launch, it would have to be one which added no weight to the payload, occupied no space in the vehicle and consumed no power. Undeterred, Dr T. D. M. Roberts put forward a proposal which satisfies all these constraints, cannot be done on the ground, and promises a significant contribution to knowledge.

Information was to be collected on the interaction of neck reflexes with labyrinth reflexes in free fall conditions, using one freely floating astronaut as a subject, while another acts as a force generator, holding on to the spacecraft with one hand while with the other he applies linear accelerations in turn to the subject's head and to his trunk. Because the subject's arms are not engaged either in locomotion or in their own support against gravity, reflex movements should appear, and these should be visible from the ground over the existing television link. When this proposal was submitted in detail to NASA, yet a fourth insuperable constraint was revealed—the experiment must not occupy any additional astronaut time! A fully instrumented version of the experiment is to be included in the ESRO Spacelab programme.

NON-DESTRUCTIVE TESTING

Warsaw Meeting

from a Correspondent

At the Seventh International Conference on Non-Destructive Testing, held at Warsaw from June 4 to 8, Drs P. D. Hanstead and R. C. Wyatt (Central Electricity Generating Board, Bristol) described how ultrasonic images of discontinuities in manufactured components can be visualized directly, without scanning, using relatively simple techniques. Pulsed ultrasound of a few MHz frequency, passing through a sample immersed in a liquid, is brought to a focus in a transparent medium, which is illuminated stroboscopically. Visualization is, in one instance, by the Schlieren method and, in the other, by photoelasticity. In the second case, where the transparent medium must be a solid, images formed by shear waves as well as by longitudinal waves can be observed.

Drs S. A. Lund and P. Jensen (Danish Welding Institute) dealt with the scanning of welds by ultrasonic shear waves, which enter the test sample obliquely, using what they call the "P scan", a modification of C scanning, in which a flaw indication is recorded in a position corresponding to that of the defect, yet independent of that of the transducer. They claim that the method provides an indication of weld defects with a definition better than that given by radiography. Dr H. Jünke (Ingenieurhochschule, Berlin-Wartenberg, DDR) gave an account of a method of testing safety glass using ultrasonics. A glass sheet immersed in water is scanned by Lamb waves, which are induced by mode conversion, and their group velocity measured. There is a decrease of about 6% in this velocity in "toughened" glass as compared with untreated glass.

In radiology, Drs K. F. Sinclair, H. A. Zagorites and K. A. Zimmerman (Xextex Inc., Belmont, California) described a method of scanning using a technique which they term "scintillography", in which no film is used. The signal from the received radiation is observed as a trace on a chart, which moves in synchronism with the examined object. The method can be used with X ray, γ ray, and neutron beam sources. Applica-

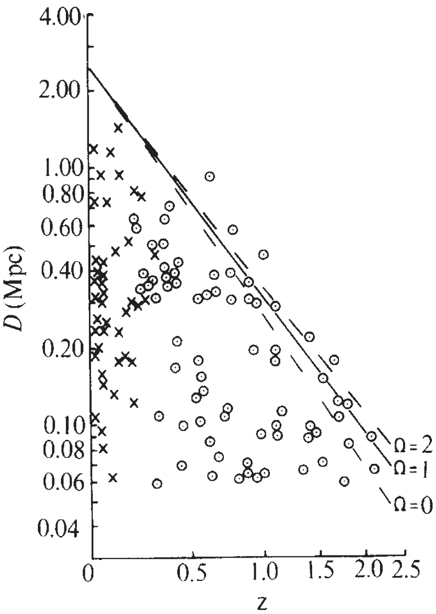
QSOs and Intergalactic Gas

In *Nature Physical Science* next Monday (July 2) Strom compares observations of the radio polarization of quasars with measurements of their angular size, and suggests from the trends in the data that quasars are expanding into a significant density of intergalactic gas.

It is generally agreed that to obtain regular behaviour, quasars must be separated into those with flat radio spectrum and those with steep spectra. Flat spectrum quasars, believed to be recently exploded objects, show a wide scatter in strength, size and radio polarization, presumably because of random circumstances in their formation. The mature steep spectrum quasars, on the other hand, have angular sizes which decrease with increasing redshift z, as is expected, and furthermore show depolarization due to internal Faraday effects which increases at high z.

Different astronomers have put forward different explanations for this trend in the polarization data. According to Strom it follows naturally from the supposition that the quasars are expanding into an intergalactic gas. The density of the gas increases at great distances, as $(1+z)^3$, and decelerates the explosion, forcing the radio source to be contained within a volume which decreases with z. On average, therefore, the gaseous products of the explosion will have higher density, and will cause greater Faraday effects, if the quasar is at high z.

This hypothesis also succeeds in accounting for a curious feature of the angular size data. In a Euclidean universe, the angular size of an object decreases with redshift as z^{-1}. The geometry of a universe with relativistic cosmology is less simple, and for the most probable models the angular size stops decreasing and may actually increase again, at redshifts of about 0.25, well within the range covered by quasars. Miley's compilation (*Mon. Not. R. astr. Soc.*, **152**, 477 ; 1971) shows no signs of this "elbow" in the universe, and suggests that the steep spectrum quasars seem to follow the Euclidean law with no further cosmological factors. Such arguments assume all quasars to have the same intrinsic linear size. Strom's hypothesis, that their linear size varies according to the surrounding medium, though it cannot yet be put on a quantitative basis, does succeed qualitatively in removing a curious paradox.



Component separation, D, calculated on the basis of an Einstein-de Sitter ($\Omega=1$) metric and plotted against the redshift, z (the axes are log D and log $(1+z)$), for $D>60$ kpc. X, Radio galaxy; ○, quasar. Expected upper envelope for radio components decelerated by an intergalactic medium, $D \propto (1+z)^{-3}$.