overlaps the African shelf (and the South American shelf) but that there is a large gap between south-east Africa and Antarctica in the vicinity of the Weddell Sea. These discrepancies were put down to deformation since the break-up of Gondwanaland.

In a new computer fit of Africa–Antarctica by Robert S. Dietz and Walter P. Sproll, announced by the US Environmental Science Services Administration, the underlap in the Weddell Sea region is much reduced by matching the 1,000 fathom isobaths, but the Antarctic Peninsula now actually overlaps the exposed surface of South Africa (see map). Dietz and Sproll maintain, however, that the Peninsula did not exist when the original supercontinent broke up, but was formed later by mountain-building processes. Apart from that, the fit is remarkably good. The discrepancy between the two continents amounts to only 17,500 square miles along a 1,200 nautical mile long matching front.

TECHNOLOGY

Controlling the Vibrations

from a Correspondent

STRUCTURAL dynamics seems to be playing a leading part in breaking down the barriers which traditionally divide the branches of engineering. This was the impression to be gained from the proceedings of a symposium on structural dynamics held at Loughborough University of Technology on March 23 to 25.

About ten contributions were devoted to the dynamics of shells, cylinders, cone-cylinders and similar structures. Practical applications ranged from the vibration of steel chimneys in wind to the drumming of car body shells. Some people seem to favour the classical Rayleigh–Ritz approach to shell dynamics and others prefer finite element methods. There are also variations of approach within each group, particularly in the latter: a great deal of, mostly uncoordinated, numerical experimentation using the digital computer is apparently under way in many university engineering departments. As might be expected, no strong general conclusions emerged, although Professor G. B. Warburton (University of Nottingham) was brave enough to summarize the present position. For those not intimately involved in shell finite element methods the activity sometimes looks rather like a game which might be called finite-elementopoly, in which elements are priced in degrees of freedom and all chance cards read "go back to Rayleigh–Ritz". One recent development in shell theory, the variational finite difference method, which combines the classical energy formulation with finite difference schemes to evaluate the energy integrals, is a mixed method and reports of haphazard convergence are not altogether surprising.

One of several speakers who dealt with linear vibration theory in general was Dr D. J. Mead (University of Southampton), who discussed the existence of damped normal modes for systems with arbitrary distributions of hysteretic damping. These modes are uncoupled and can be superposed for (sinusoidal) response calculations in the manner of classical normal modes. When it is considered that the fundamentals of linear vibration theory were laid down by Lagrange and Rayleigh long ago, it is surprising that so many significant and useful results are still being unearthed, and this rich vein seems to be far from exhausted. The identification of linear systems through measurement of response is of great interest today from the point of view of both vibration and control. Dr W. G. Flannely (Kaman Aerospace Corporation, Connecticut) described the fairly well developed sinusoidal excitation techniques (although, judging by the discussion, his material was not as up to date as it might have been) while Dr R. G. White (University of Southampton) described the evolving technique based on rapid frequency sweep excitation: this method does not, however, yield the modes of the structure but only natural frequencies.

For the calculation of transient response of linear systems an alternative to the classical superposition technique is the finite time-step method. This is used by those who are forced to use Timoshenko rather than Euler–Bernoulli beam theory because they are interested in very short response times. This type of calculation was described by Drs C. M. Leech and B. Tabarrok (University of Toronto), who are concerned with the response of long gun barrels in which a projectile is moving, and by Dr E. C. Edge (British Aircraft Corporation, Preston), who is faced with calculating the motion of an aircraft arresting hook on impacting the ground.

Of the more unusual topics, Dr A. Simpson (University of Bristol) presented an elegant analytical treatment of the motion of a suspended cable when it is translating along its length, while Drs A. D. S. Barr and D. C. McWhannel (University of Edinburgh) illustrated the intriguing motions that arise through parametric excitation. But perhaps the strangest of all was the work of Dr J. R. Hutchinson *et al.* (University of California, Davis) on the vibration of trees. This work was prompted by the commercial need to know exactly how to shake fruit trees in order to harvest the fruit most effectively.

SEMICONDUCTORS

New TV Camera Target

by our Solid State Physics Correspondent

A NEW type of target for television camera tubes has been developed at the General Electric Research and Development Center in Schenectady, New York. It may lead to cheaper and more durable television cameras and could be the breakthrough needed for the commercial development of picture telephones. The key is a new sort of semiconductor array, consisting of rows of capacitors and p–n junctions which can withstand high temperatures, can be produced in a virtually perfect array and removes the need for a resistive layer of material to leak away charge between successive images.

The two chief problems in camera tubes are to find a light detector which does not require a so-called resistive sea to discharge it (which is technologically very cumbersome) and to find some way of growing a perfect array of these million or so detectors. W. E. Engeler, M. Blumenfeld and E. A. Taft (*Appl. Phys. Lett.*, **16**, 202; 1970) seem to have gone a long way towards overcoming these problems. They have formed pyramidal shaped detectors by the epitaxial growth of p type silicon on the surface of an n type wafer, and have produced the detectors in a remarkably regular array. They found that unwanted nucleation could be minim-