

Bridging the electronic gap

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Semiconductor Science and Technology. Editor R.A. Stradling. *Institute of Physics*. 12/yr. UK £160; elsewhere \$280.

Chemtronics. Editor J.O. Williams. *Butterworth*. 4/yr. UK £86; elsewhere \$98.

Journal of Molecular Electronics. Editors G.G. Roberts, R.W. Munn, G.B. Street, P.M. Chaikin, H. Bäessler and M. Aizawi. *Wiley*. 4/yr. UK £75; elsewhere \$145.

EUROPE is beginning to see itself as a unit, competing in the field of electronics against Japan and the United States. Because of the strategic importance of this activity and the wealth which it creates, it is as well that such cooperative activity is developing, albeit somewhat hesitantly. The three journals under review here all originate in Britain and have something to do with this new consciousness. The ESPRIT programme of the EEC is specifically picked out for mention by Professor Stradling in his editorial for *Semiconductor Science and Technology*. It is generally agreed that electronics, with its powerful scientific basis, is yielding a great deal of information. Some of this concerns the 'bits and pieces' which go to make up new electronic devices and is difficult to classify. Editors cannot always decide whether a paper falls under the rubric of electronic engineering, chemistry, metallurgy or physics — the reason, of course, being that modern electronics is a triumphant fusion of all of these fields.

These new journals attempt to bridge the old divide in which, for example, *Journal of Physics C* dealt with solid state physics and *D* dealt with applied. In the 1990s, even the interdisciplinary terminology of this decade will be outdated; some departments of materials science must be looking round for new names (has any considered Department of Chemtronics?); the present, select breed of 'device physicist' will be joined by 'device chemists' and 'device biologists'. The term 'molecular electronics' is indeed a pleasing and futuristic one: having found useful electronic activity in organic materials, we now have to understand how electrons move around within molecules as well as in the very large networks considered in classical solid-state physics. Suffice it to say that, in newly awakened Europe, new journals are needed to accommodate this ferment of ideas.

The editors of *Semiconductor Science and Technology* have to steer a line between the two existing Institute of Physics publications, *Journal of Physics C* and *Journal of Physics D*. Personally, I used to find those journals far less interesting than I now find this new one. This may confirm the new editor's view that, in accommodating papers on the *techniques* of solid-state electronics, the journal fills a gap. I would, however sound the warning

that — as for the Institute in general, so for this journal — the universities seem to predominate in its activities so far. For example, in the issues available for review, only 8 per cent of the papers were by authors in industry, although the editorial board is well balanced between the academic and industrial. There seems a good chance that the journal will ease the congestion in the area hitherto occupied by the *IEEE Transactions on Electron Devices*, *Journal of Applied Physics* and *Solid State Electronics*.

Chemtronics and *Journal of Molecular Electronics* can be compared fairly closely — both will be read more by chemists than by physicists, are more international than *Semiconductor Science and Technology*, and are perhaps trying to define a new interdisciplinary niche (*Chemtronics* describes itself as dealing with "topics at the interface of chemistry and electronics"). The scope of *Molecular Electronics* has already been mentioned. That of *Chemtronics* takes in a much wider range of chemical techniques. It seems to be a journal for those who really want to get their hands dirty at the chemical bench; by that I mean that preparative chemistry figures in the contents, especially chemical vapour deposition, an extremely important subject in the new electronics. There are practical articles on quality control and on the behaviour of the gases used in semiconductor processing. Scientists affiliated to chemical supply firms appear in the list of editorial advisors, although the fairly high price per page suggests that no subsidy is received from their employers.

By comparison, *Journal of Molecular Electronics* is a more limited affair, being half the price per page and having longer, more contemplative papers on organic compounds applied to devices or on the Langmuir-Blodgett film. The beauty of organic devices, if we can get them to work, is that we can tailor organic compounds with respect to electronic activity. The effect of adding a nitro- or amino-group to an organic molecule is as least as profound as the doping of an inorganic semiconductor, and in many other ways we have more freedom in the selection of device material. Of course, this also puts us directly on the road to macromolecular electronics, using proteins. Thus, this modest-seeming journal may hold more

keys to the future than does the more classically chemical one to which it is compared here.

Speed of publication is good in all three journals (short papers appear in about three months). Quality of production is also good; in particular, *Chemtronics* contains plentiful photographs, and the diagrams in *Journal of Molecular Electronics* are pleasingly bold. In the latter, I particularly welcome the editor's encouragement to contributors to "include enough introductory material to help readers . . . to appreciate the broad significance of the work reported". In other words, he is asking the authors to relax their accustomed space-saving style for a couple of paragraphs and let into the act a large number of readers who might otherwise be too puzzled to stay with the paper and understand it. In interdisciplinary journals such as this it is right that space limitations should be cautiously relaxed in the interest of better comprehension across fields.

All of these three journals will find a useful place in departmental libraries of physics, chemistry, metallurgy and biochemistry. Industrial researchers will also find in them the stimulation they need to produce the wealth-creating devices of the future. □

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Material progress

Lindsay Greer

Journal of Materials Research. Editor-in-chief W.L. Brown. *American Institute of Physics*. 6/yr. US \$260; elsewhere \$280.

IN THE United States, the meetings of the Materials Research Society cover a broad range of materials science and have encouraged a move away from traditional disciplines. *Journal of Materials Research*, an official publication of the society and following its aims, enters the field in competition with existing journals of materials science and with a number of metallurgical journals now increasing their scope.

In general, the quality of the articles is high. The aim of wide coverage has been met with contributions on the preparation, processing, properties, characterization and theory of materials. Ceramics and alloys have been well represented, but polymers and composite materials have not. A significant emphasis, setting this journal apart from its rivals, is on electronic materials, both semiconductors and contacts, and related processing. This emphasis is appropriate at a time when