

effect on the selection of the type of mould, systems of feeding plastic from the nozzle to the various cavities which go to make up the impression, parting surfaces and cooling.

More advanced constructions are dealt with in the second part. This includes moulds which are split to permit extraction of products of complex shape, those with side covers and cavities and those which are adapted for moulding internal undercuts. Detailed descriptions are given of the complex arrangements necessary for releasing screwed components.

To a certain extent, injection moulding is an art rather than a science and its terminology has been evolved by the mould designers themselves with some variations in nomenclature. The inclusion in the book of a comprehensive glossary of terms is therefore timely and valuable.

The treatment is descriptive rather than numerate, although empirical formulae are given to enable the most important dimensions required in a mould design to be estimated. Thus such factors as the diameter of guide pillars for different sizes of mould, the area of moulding appropriate to the action of each injector pin, runner diameters and the dimensions of gates can be determined in the light of established practice.

The empirical approach is not a basis for criticism of a book intended to enable designers to appreciate and apply the results of years of intensive development, but consideration of the contents reveals some interesting basic problems which might well repay study from the scientific point of view. Such studies might include the flow of non-Newtonian fluids at changing temperatures through channels of various shapes and the transient heat flow associated with the introduction of hot material into moulds from which heat must be removed rapidly for the product to solidify sufficiently to withstand the forces applied when the work is removed at the completion of the moulding cycle.

The book is intended for, and admirably suited to, the student of plastics technology, but is unlikely to appeal to the non-specialist reader.

F. T. BARWELL

## Correspondence

### The Knights' Move

SIR,—Now that imagination has been banished from philosophy, and maintains a fleeting existence in laboratories, a somewhat furtive existence due to a widespread belief in the antipathy of fact and fancy, it is necessary to consider what forces are working towards its further suppression and extinction, and, in particular, to seek for any epidemic disorder of thought against which action can be taken. This is, as you point out so forcibly (*Nature*, 221, 109; 1969), no idle speculation. The scientific imagination, the most extreme manifestation of the human mind, is at stake. The scientific paper, Medavar tells us, is largely fraudulent. The heureka cry is muffled and we are denied the sight of the heureka-man, naked and dripping from immersion in some apparently irrelevant experience. The single author, the herald of insight, is being banished until age and administrative duties have deprived him of long and uninterrupted contact with raw data, an exile of youth most extreme in countries which are most vociferously democratic. The lights of the imagination are being dimmed, amidst widespread applause that the shadows of obscure inference are disappearing. The very seed-corn of reason is being sterilized because it is weed-infested and germinates unpredictably.

There are doubtless many reasons for the diminishing return in response to increased investment, but the matter is so important that a proportion of the space allocated to

what you call scientific journalism, in its best sense, should be devoted to it. I think I have identified one major virus which, originally incorporated as a useful symbiont, has now overwhelmed its host in many of the less robust sciences, and is disseminated by incorporation in their basic teaching. By infiltrating ready-to-wear computer programs it has now infected these devices which, in other ways, are so well fitted to the economical recall of fact and the orderly display of fancy.

I refer to the null hypothesis, the simplest concept which can permit surprise to be measured so that it can be expressed vicariously, appreciated communally and approved editorially.

The first alchemists sought gold without commerce, for they were ignorant of elements. Their successors sought to extract energy from closed systems, for they were ignorant of disorderliness. Our present alchemy is the disembodiment of intellect into simple rituals which will allow discoveries to be made without the tedium of thought or the indignity of the heureka, an event which tends to occur at inconvenient times to inconvenient people, usually lighting up the blind ending of some highway which has involved a major investment in resources and in the reputations of their trustees.

The null hypothesis is not to be confused with statistics although it provides the basis for the simplest decisional procedures which have so effectively colonized the more gullible sciences. An editorial policy which demanded the explicit formulation of any implicit null hypothesis would restrict this useful device to those few problems about which experts were adequately ignorant. It would also divert the talents of applied mathematicians from presuming to tell other people when they ought to be surprised to accelerating the colonization of those vast and fertile areas of the unknown which could benefit from simulation, model building, parameter fitting, the graphic portrayal of likelihoods, and to serious study of the genuine problems of machine intelligence. Most of these activities are assisted by computers and some are impossible without them.

Imagination, which has survived the attack of the theorists of knowledge acquisition, is now threatened by the sales-directed spread of transistorized sophistry, a threat of such gravity that discussion is necessary. Epidemiologists usually err in their first diagnoses, but this is no argument against epidemiology. Still less is it an argument against serious consideration of the alarmist views of those outsiders who pursue their subject without their thoughts being infiltrated by nullity or their manuscripts being decorated with significance tests.

Before complacency is induced by the widespread use, and occasional appropriateness, of these conventions, we should consider the sterilizing effect of the Aristotelian logic which was taught and practised for two thousand years. Bertrand Russell, after a prolonged search for some useful consequence of these rituals of inference, records the solitary example of a German metaphysician who was assisted in understanding a joke.

Yours sincerely,

J. H. EDWARDS

Department of Social Medicine,  
The Medical School,  
Birmingham 15.

### Mr Short's Shibboleth

SIR,—You are being less than fair to Mr Short (*Nature*, 221, 298; 1969). Your main reason for "profound despair" seems to be the apparent discrepancy between his figure of 90 per cent of parents who want religious instruction to continue and 20 per cent of the population confirmed in the Church of England. To the latter figure must surely be added: (a) the active members of other Christian denominations; (b) those who deny the divinity

of Christ, but see worth in His teachings; (c) those parents who do not themselves believe, but nevertheless wish their children to hear the Christian case and to decide for or against it later on; (d) those who are opposed to changes of any kind.

Your proposal for "neutral" ethical instruction in schools provokes the question "Where do we go for source-material?" To highly controversial figures like Comfort, Crick, Arnold Lunn or the Bishop of Woolwich? To the writings of professional philosophers? I agree with you that the Old Testament is now not very useful as source-material for ethics, its main claims to attention being cultural and historical. But why throw away the New Testament as a source? The principles laid down by Christ remain relevant—a fact of immense significance. It is quite possible to deny his divinity and yet to recognize that he was a man of immense genius who changed the world for ever.

As we all know, it is going to be difficult enough for children to make decisions on ethical matters as it is. Let us try to help, not to hinder. Parents who do not believe might have real difficulty in giving such instruction at home, as you suggest they should.

Yours sincerely,

H. N. V. TEMPERLEY

Department of Applied Mathematics,  
University College of Swansea,  
Singleton Park, Swansea.

### New Constitution for British Physicists

SIR,—While I do not wish to endorse all that Professor Blackman said in his letter of January 4 (*Nature*, 221, 105; 1969), I think it is true that had members of the Physical Society realized, at the time of amalgamation with the Institute of Physics, that within a few years their identity would have disappeared altogether, that what was proposed was really a take-over, the offer would have been rejected or at least bitterly opposed.

Some of us have, in fact, taken a long time to realize just what was happening: a sad commentary, in many cases, on the pressure of papers on our desks.

I do think, however, that the council of the IPPS would do well, if it wishes to retain its reputation for scientific integrity, to take heed of the advice given in your article (*Nature*, 220, 952; 1968) and to allow more time for discussion within the joint organization. A year would not be too long.

Yours sincerely,

KATHLEEN LONSDALE

125A Dorset Road,  
Bexhill-on-Sea,  
Sussex.

### Probability and Prejudice

SIR,—In the course of a book review (*Nature*, 221, 291; 1969) Professor M. S. Bartlett discusses the problem of three prisoners, two of whom are to be executed. His comments merit further discussion. He first remarks that if, as has been reported, the problem nearly wrecked a conference on theoretical biology and yet yields at once to Bayes's theorem, it does not say much for the conference participants. This seems a little hard on the theoretical biologists who will typically have learnt their probability from a member of the frequentist school who, if he mentioned Bayes's theorem at all, will have played it down as of minor interest. The fault surely lies with the statistician, not the biologist.

The second point is more material. Bartlett draws the conclusion that subjective prior probabilities are indefinite.

The basis for this assertion seems to be that the prisoner, Matthew, is entitled to feel happier if  $P$  (the probability of the jailer naming Mark if both Mark and Luke are to be executed) equals  $3r$ . If  $r > 1/3$ , the Bayesian analysis shows that this is impossible so that Matthew is inconsistent. If  $r = 1/3$ , this requires  $P = 1$ . Taking  $r = 1/3$  as a reasonable value, this shows that Matthew's elation is only justifiable (to him!) if he believes that when there is a choice, the jailer will always name Mark. So I would say to Matthew, "If you feel elated it is equivalent to your assuming this preference on the jailer's part". Matthew would typically reply that he has no reason for thinking the jailer has such a preference: therefore, I say, he has no reason for feeling happier. The subjective probabilities must cohere and their value lies in doing just this—in the example in establishing coherence between Matthew's happiness and his opinion of the jailer. This seems to me to lead to a definite conclusion of some value, contrary to what has been said.

Yours sincerely,

D. V. LINDLEY

Department of Statistics,  
University College London,  
Gower Street,  
London WC1.

### International Meetings

September 9–12, **Conformational Analysis**, Brussels (R. C. Smekens, Executive Secretary, 49 Sq Marie-Louise, Brussels 4, Belgium).

September 9–15, **Foundry Congress**, Belgrade (Professor M. B. Pajevic, Sevez Drustava Livaca SFRJ, Karnegijeva 4, Belgrade, Yugoslavia).

September 14–19, **International Society of Rehabilitation of the Disabled congress**, Dublin (Joseph N. Malone, National Organization for Rehabilitation, 25 Clyde Road, Dublin 4, Ireland).

September 15–16, **Bridge and Structural Engineering Symposium on Safety**, London (A. R. Collins, Civil Engineering Research Association, Old Queen Street House, 6 Storey's Gate, London SW1).

September 15–17, **Trunk Telecommunications by Guided Waves**, London (Conference Department, The Institution of Electrical Engineers, Savoy Place, London WC2).

September 15–17, **Programming Languages for Numerically Controlled Machine Tools**, Rome (Dr E. L. Harder, c/o Westinghouse Electric Corporation, 1204 Milton Avenue, Pittsburgh, Pennsylvania 15218, USA, and Professor A. Caracciolo di Forina, Centro Studi Calcolatrici Elettroniche, University of Pisa, Pisa, Italy).

September 15–17, **Aerospace and Electronic Systems**, Washington DC (Institution of Electrical and Electronics Engineers, Box A, Lenox Hill Station, New York NY 10021, USA).

September 15–17, **Congress of World Veterinary Poultry Association**, Belgrade (Professor L. Kozic, c/o Institute of Preventive Veterinary Medicine, Belgrade J. A., 8, Yugoslavia).

September 15–19, **Tropical and Sub-tropical Fruits**, London (The Scientific Secretariat, Tropical Products Institute, 56-62 Gray's Inn Road, London WC1).

September 15–19, **Electronics for Civil Aviation**, London (Electronic Engineering Association, Berkeley Square House, Berkeley Square, London W1).

September 15–20, **Chemical Engineering, Chemical Equipment and Automation Congress**, Marianske (III Chisa 1969, Czechoslovak Scientific and Technical Society, POB 857, Prague 1, Czechoslovakia).