

to relate extremely specific operational policies and assessments of functional content to appropriate and economical building forms. While the capital cost penalties of misguided choice of form may not be as great as in other building types, the operational strains may be very damaging, even to the extent of influencing the hospital's success in care and therapy. Running costs of hospitals are very sensitive to badly distributed medical and logistic functions. Design difficulties are also caused by the speed with which hospital techniques change, linked to extended periods of time between the making of a design decision and its final physical commissioning.

Again, in higher density housing for local authorities, mathematical structures of the kind outlined could offer the designer and researcher great opportunities to explore the physical and cost consequences of a projected new design standard, or to describe and evaluate theoretically attractive forms of site layout against a particular brief and site. The relative absence in housing design of design information about the operational, that is to say the social, systems to be accommodated makes it at once important and difficult to search out quickly the implications of new standards and the way they interact with the old. An inappropriate choice of dwelling or layout form carries with it relatively greater cost and social penalties than in a university or teaching hospital, yet design methods of a comprehensive kind are less developed.

This is a unique and remarkable document, not only because of the wide range of sources of information and method that have been tapped or the theoretical fluency with which these have been applied, but also because of the rigour of the research process and of the care and frankness which have gone into the authors' description of it. It differs sharply from most academic building research, which is often narrow in scope, increasingly scientific in method and carried out by non-designer specialists for largely academic motives. This research, on the other hand, is broad in scope, technological rather than scientific in nature, and is specifically useful to the practising designer. In these respects, it approaches closely the type of research that could be expected within a large designer-client organization, such as a government department or a large local authority. Here its expenditure on non-project-oriented design research can be set directly against savings in the capital and running costs of its own buildings.

Although widely used in planning and transportation system design, computable models of buildings and their relations with the institutions they accommodate have not been available at all to the designer. Many individual, unrelated techniques using computers have been devised to tackle small parts of the designer's problem, however, and this report refers to many of them, as well as describing the authors' own efforts in this field. Existing computer applications to buildings have been as much in the cost control, managerial and administrative functions of building professionals as in their role as designers. It is good that this first attempt should be one that is so theoretically articulate on the design process, and one that indicates such clear procedures for the designer and client.

In the attempt to show how information about "needs" can systematically be interpreted into information about "forms", the authors may well be seen by some artist-architects as invaders of their special territory. The more explicit, external and reproducible a cycle of design becomes, the less call there must be for the exercise of internal, personal and subjective judgment, which is what an artistic role implies. It will be interesting to trace the impact of this book on the course of design of universities and other complex buildings, and on research methods and objectives in design.

JOHN BUNNEY

## Correspondence

### Battery and Free Range Eggs

SIR,—Dr Dennis Jones claims, after full investigation, to have shown that there is no basis for the preference shown for free range eggs. In fact, all he did was to compare the cholesterol content of the yolks of six pairs of eggs, and the fatty acid ratios of 11 pairs, from one breed of hens. His investigations of embryos, chicks and earthworms, though interesting, are not really relevant, and he made no observations on the whites or on flavour.

He found appreciable differences in the cholesterol and fatty acid content of free range and battery eggs, but he concludes that these differences are only of academic interest on the grounds that battery eggs sometimes hatch better and that "essential fatty acid deficiency has never been demonstrated in man, or in adults of any other species".

Thus his conclusions are based, not on his findings, but on the *a priori* grounds that such differences are of no importance. With this approach to the problem, it is difficult to see why he carried out the investigation.

The most serious criticism, however, concerns his dogmatic statement that "there is *certainly* (my italics) no reason why they (free range eggs) should have more flavour". This is the point of most general interest, and yet it is one on which he has absolutely no evidence.

I personally have no views on the matter, but there are many people who have, and if they are to be told they are wrong on such evidence as this, they may well say "You can prove anything with statistics".

Yours faithfully,

B. M. WRIGHT

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Rickmansworth,  
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SIR,—A healthy scepticism is a valuable product of a scientific training, but I find disturbing the tendency to read confirmation of one's doubts in limited and in some cases almost irrelevant investigations.

In his article in *Nature*, on battery versus free range eggs, Dr Jones finds positive differences even in his experiment and dismisses these as "academic" which sounds more dogmatic than scientific. Furthermore, for most free range birds the diet is probably different from both that of battery birds and that of his experiment. Thus the distinction may be only coincidentally associated with the housing arrangements or alternatively it may be that it is largely one of freshness because free range eggs are often obtained from small suppliers after very brief storage periods. In addition, the experiments reported concerned only one type of bird and controlled conditions, very different from those of typical free range birds. Whatever the reason, I can assure Dr Jones that there is a distinct difference of taste between the free range eggs which I and my family and associates consume and the battery products normally available commercially. If it is of any help to him, I suspect that there are other differences also, such as a tendency for free range eggs to have a deeper and more "orange" coloured yolk and a rather less fragile shell. Whether these effects are real and if so whether they correlate in any way with flavour I am not certain, but I would suggest that the experiments



reported hardly form a scientific justification for the statement, "There is therefore no basis for the preference shown for free range eggs".

Yours faithfully,  
L. C. WALTERS

134 Park Road,  
Chandlersford,  
Hampshire.

These two letters refer to an article "Point of Distinction between Battery and Free Range Eggs" by Dennis Jones (*Nature*, 220, 921; 1968).

### New Materials make their Mark

SIR,—The following comments are relevant to the letter "New Materials make their Mark"<sup>1</sup>.

It seems that we have now established that several groups contributed to the refining of the art of pyrolysis of textile fibre to carbon fibre that enabled the achievement of current high specific mechanical property figures.

As a participant on one of the groups involved, I can affirm that we had no knowledge of the methods used by Mr Watt and Mr Johnson until July 12, 1966. At this time, after we had submitted our paper for publication<sup>2</sup>, we received a note from one of our colleagues outlining his interpretation of the methods used by the Royal Aircraft Establishment. This note was based on a meeting between our colleague and Mr Watt and Mr Johnson on July 8, 1966.

The methods of Mr Prescott and myself, based on our original, entirely independent research, do not necessitate mechanical restraint of the textile fibre at any stage of the process.

Our patents<sup>3-5</sup> are consequently independent of those granted to Mr Watt and Mr Johnson.

Yours faithfully,  
EDWARD STANDAGE

Research Institute,  
University of Dayton,  
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<sup>1</sup> Watt, W., and Johnson, W., *Nature*, 220, 835 (1968).

<sup>2</sup> Standage, A. E., and Prescott, R., *Nature*, 211, 169 (1966).

<sup>3</sup> Belgian Patent No. 678,679.

<sup>4</sup> French Patent No. 1,471,993.

<sup>5</sup> Canadian Patent No. 790,509 (Priority date April 6, 1965).

**ERRATUM.** In the communication "Evidence for Order in the Structure of  $\alpha$ -Elastin" by M. Mammi *et al.* (*Nature*, 220, 371; 1968) the last sentence of the fifth paragraph should read as follows: "The extended  $\beta$ -structure should be ruled out because it would show<sup>13,14</sup> strong amide I and II bands at about 1,630 and 1,530  $\text{cm}^{-1}$ . This conclusion is supported by the absence of bands in the 1,685 to 1,700  $\text{cm}^{-1}$  region".

**ERRATUM.** In the article "Implications of Shock Effects in Iron Meteorites" by Anant V. Jain and Michael E. Lipschutz (*Nature*, 220, 139; 1968) the second sentence of the tenth paragraph should read "The matrix of the unshocked meteorite seems somewhat altered (Fig. 2a) as noted previously<sup>10</sup>".

**ERRATUM.** In the communication "Short Caesium Half-times in Patients with Muscular Dystrophy" by Ray D. Lloyd *et al.* (*Nature*, 220, 1029; 1968) the fifth sentence of the seventh paragraph on page 1030 should read "(EC) and (EP) are sisters, and (EC) has had more than one dystrophic child".

**ERRATUM.** In the article "Metabolic Approach to interpreting Animal Exploratory Activity" by Henry McIlwain (*Nature*, 220, 889; 1968) the first sentence under the heading "Proposed Mechanism" on page 889 should read "Mechanisms interpreting change in EA in terms of depletion and competing metabolic processes . . .".

### International Meetings

January 6–8, **Sonically Induced Vibration of Structures**, Liverpool (Mr M. J. Crocker, University of Liverpool, Department of Building Science, Liverpool, UK).

May 6, **Crop Protection**, Ghent (Professor R. H. Kips, International Symposium on Crop Protection, Rijks-faculteit, Der Landbouwwetenschappen, Coupure Links 235, Ghent, Belgium).

June 9–13, **Clean Air Congress and Exhibition**, Dusseldorf (Verein Deutscher Ingenieure, Postfach 1139 4 Dusseldorf 1, Germany).

June 9–13, **Air Pollution Problems**, Dusseldorf (Kommission Reinhaltung der Luft, Verein Deutscher Ingenieure, Postfach 1139, Graf-Recke-Str. 84, 4 Dusseldorf 1, Germany).

June 10–12, **Non-Destructive Testing of Concrete and Timber**, London (The Institution of Civil Engineers, Great George Street, London SW1).

June 10–20, **Marine and Shipping Conference**, London (Institute of Marine Engineers, 76 Mark Lane, London EC3).

June 15–20, **Data Processing**, Montreal (Mrs Margaret Rafferty, Data Process Managing Association, 505 Busse Highway, Park Ridge, Illinois 60068, USA).

June 16–19, **American Nuclear Society meeting**, Seattle (Octave J. du Temple, 244 East Ogden Avenue, Hinsdale, Illinois 60521, USA).

June 16–21, **Automatic Control**, Warsaw (Organizing Committee, Ul Czackiego 3/5, POB 903, Warsaw 1, Poland).

June 22–23, **Application of Mathematics in Engineering**, Weimar (Professor H. Matzke, Weimar College of Architecture and Building, Karl-Marx-Platz 2, 53 Weimar, Germany).

June 22–23, **Nephrology**, Stockholm (Dr F. Berglund, Postfach 272, Stockholm 1, Sweden).

June 23–25, **Shock Tubes**, Toronto (Professor I. I. Glass, Institute of Aerospace Studies, University of Toronto, Toronto 5, Canada).

June 23–28, **Food Congress and Exhibition**, Madrid (Lloset Maranon, c/o Federacion Nacional de Almacenistas de Alimentacion, Paseo del Prado 18–20, Planta LI, Madrid, Spain).

June 24–28, **Aerosol Congress**, Nice (Secretariat, Federation of European Aerosol Associations, Waisenhausstr. 2, Zurich 1, Switzerland).

June 30–July 3, **Computer Technology**, Manchester (Conference Department, Institution of Electrical Engineers, Savoy Place, London WC2).

July 1–5, **Physiological Sciences**, Belo Horizonte (Professor W. T. Beraldo, University Federal of Minas Gerais, c/o School of Medicine, Belo Horizonte, Minas Gerais, Brazil).

July 2–4, **Concrete Pavements**, Paris (European Cement Association, 2 rue St Charles, Paris 15, France).

July 2–10, **Protozoology**, Leningrad (Dr I. B. Raikov, c/o Institute of Cytology, 32 Pr Malinka, Leningrad F-21, USSR).

July 7–11, **Structure and Properties of Solid Surfaces**, Paris (Professor J. Benard, Ecole Nationale Superieure de Chimie, 11 rue Pierre-Curie, Paris 5, France).

July 7–12, **European Orthodontic Society**, Edinburgh (Dr W. Russel Logan, 8 Chester Street, Edinburgh 3, Scotland).