capacity. This permits the child to develop theories of language construction in his interpretation and performance. What is overlooked in this purely "mentalistic" account is that there must be a neural counterpart to this linguistic performance. And we now know that the speech areas of the brain are built in intrauterine life beginning as soon as in the 20-week-old foetus. In these areas there must be built the highly specialized and unique neuronal machinery ready for use by the child postnatally. Chomsky is, I think, maintaining no more by his theory of innate knowledge than that this is coded in the specialized neural machinery of the speech areas, which of course is a result of genetic coding and of all the secondary instructions in the developmental process. This genetically built structure could of course be tuned in to any language. Animals lack the genetic coding for building such specialized brain areas. The most wonderful creation of the evolutionary process was in the development of the genetic coding for the construction of the linguistic areas of the brain.

The second series of these Gifford lectures is concerned with the development of mind. This provides the challenge to treat at length two great problems: the evolution of man in relation to linguistic evolution; the learning of a language by a child in contrast to the impoverished attempts by chimpanzees. The general consensus of the four symposiasts was that the self-consciousness of man was very intimately related to his linguistic abilities. Yet there was no mention of the remarkable discoveries of Sperry that, after brain bisection, the self-consciousness of the subject is related only to events in the linguistic hemisphere.

J. C. ECCLES

Wind Forces

Wind Forces in Engineering. By Peter Sachs. Pp. viii+392. (Pergamon: Oxford and New York, December 1972.) £12.

THE book is written "to bridge the widening gap between scientists and engineers in this subject". The writer is qualified by his experience and practice in the design of communication structures. Evidently the author's first major venture into print, it is a challenging book to write because it spans several different disciplines—climatology, meteorology, aerodynamics and structural engineering. This is perhaps why it has no competitors prominent on the market at present. There are good features to the book and a number of serious deficiencies. The arrangement and contents are generally well organized, the printing is satisfactory and the assembly of data generally scattered far and wide is useful. There is an interesting section on wind loading on rotating antennae which has not perhaps reached the open literature before.

It is also the duty of the critic to draw attention to deficiencies. The recent references suggest that writing of the book ceased about 1967. Since then proceedings of two international conferences on wind forces have appeared (Ottawa, 1967; Tokyo, 1971). In a fast developing field this long time lag in the production dates the book and seriously devalues it as a bridge to contemporary thinking. The chapter on wind tunnel techniques perpetuates the myth that "in general wind tunnels developed for aircraft work are suitable for bluff models" (page 95)—at least if used to study wind forces on structures. In recent years it has been demonstrated time and time again that the wind shear and the turbulence in the Earth's boundary layer are not secondary but dominating influences. Structural shapes, stable in smooth flow, may be unstable in turbulent flow, and *vice versa*. Even the mean drag coefficient of a flat plate is affected by turbulence. Vortex shedding is universally a random phenomenon in turbulent flow, not only in the supercritical Reynolds number range as stated on page 162. The extent of this range is itself affected by turbulence. Throughout the chapter, modelling of turbulence and wind shear seem to be introduced as an afterthought and not as a primary modelling requirement. The summary of principal modelling parameters on page 109 makes no mention of either roughness length or turbulence scaling. They should be included. They are very important.

I was somewhat disappointed by the treatment of the statistical response to atmospheric turbulence; this leaves several lacunae. While there is reference to spatial correlation in chapter 2 dealing with wind structure, its important role in modifying the generalized force spectrum in spatially extended structures is not mentioned: the formulae derived are consequently incomplete. The determination of the peak values of response is dubious as is the method for adding variances. The chapter should be treated with caution.

While some relaxation of rigour must be permitted in a book of this nature, basic assumptions when stated should be correct. The treatment of Bernoulli's equation on page 2 could be improved in this regard. It is given without reference to the conditions under which it is obeyed and without the discussion of whether these conditions are met by the natural wind meeting a structure. The conditions for a Gaussian distribution discussed on page 29 are not dependent on stationarity nor on ergodicity as suggested. Gust excitation is obviously not limited to along wind forcing only; it can, as with a suspension bridge, also be transverse to the flow direction. Vortex shedding, by the same token, can give rise not only to transverse forcing but also along wind, contrary to the statements on page 136. On page 102 there is the surprising suggestion that the power law velocity profile can be deduced from the logarithmic profile. The reference to "ultracritical Reynolds numbers" (page 252) instead of transcritical Reynolds numbers will raise aerodynamic eyebrows and lead to confusion.

The choice of units—feet/second and miles/hour—is unexpected in view of the adoption of the metric system in the UK; the statement that the unit of mass in the British system is the slug (page 358) is several years out of date. In conversion tables (for example A2.3) referring to speed in feet/second, m.p.h. and knots, makes no mention of metres/second. The standard unit of force, the Newton, is not defined. For those trying hard to adjust to the new units this would be an asset.

In summary I have serious reservations about this book. For the student its treatment of fundamentals is inadequate. For the practising engineer it is out of date, and contains an unacceptable number of errors of fact. Some of these errors are harmless, some may not be. Those who invest in this book should apply it cautiously.

A. G. DAVENPORT

Lions in Africa

The Serengeti Lion: a Study of Predator–Prey Relations. By G. B. Schaller. Pp. xiii+480. (University of Chicago: Chicago and London, 1972.) £5.65.

IT is still a source of amazement to me that so little is known about the biology of the largest, most impressive and most conspicuously attractive animals. The large mammals of Africa have received the compliment of intensive study only in the past decade or two and for many of the most splendid creatures, for example the elephant, the buffalo and the rhinoceros, there is no comprehensive scientific account of their behaviour and ecology. An account of the king of beasts has had to wait until 1972. A book that gives, for the first time, a report of intensive and continuous study of the lion populations of the Serengeti could hardly fail to be fascinating and important: *The Serengeti Lion* is both of these but it has greater significance in that it reflects the renascence of animal study in Africa. Past accounts of the lion are voluminous, of course, but they stem largely from the incidental experiences of naturalists or the tales of hunters. A notable exception is Guggisberg's