

The fashions and foibles of science

Egg and Ego: An Almost True Story of Life in the Biology Lab

by J. M. W. Slack

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Jonathan Slack has a good nose for the ridiculous. He is a developmental biologist known for his work on growth factors, and for his excellent text *From Egg to Embryo*. In *Egg and Ego* he casts about more widely, and this book is sometimes straight review, sometimes autobiography, sometimes satirical commentary.

He takes a sardonic look at the lives and aspirations of modern biologists like himself. He picks out and picks on the twisted sense of values, the lost idealism and the many oddities that have become so commonplace in our workaday world. He tells us 'what science is really like' — as distinct from the impersonal and theoretical picture painted by philosophers of science. Any senior biologist will find much in the book to interest him, while a prospective biology student will find out what awaits her (I follow Slack in the choice of genders).

Slack's descriptions of his experiments on growth factors, although lively, are perhaps the least interesting part of the book because they cover old territory. But his descriptions of the increasingly weird practices of the scientific world are new ground. He describes the star system in science, which has got out of hand, with a few well-known people spending a bizarre proportion of their time travelling and talking. Others, who prefer to stay in their labs discovering things, are not so well known because they do not travel, and therefore do not get invited, and therefore remain unknown.

He summarizes how the aspirations of scientists have switched from trying to make illuminating discoveries to a desperate and competitive struggle up a career ladder. He describes how one gets to the 'top'. The top is now defined by the managers who have thrust upon us their own quantitative measures of greatness. In a creative industry like research, where real discoveries are always ahead of their time, these measures are at best crude — like assessing the quality of a songwriter by counting the number of notes he writes in a week. Nevertheless, after a while, what the British political commentator Simon Jenkins has called an "audit society" is created. In such a society, the real purpose of the endeavours becomes forgotten and it devotes itself, not to making the important measurable, but to making the measurable important.

For scientists, chief among these measures is the impact factor of journals. Nowa-



days, as Slack points out, assessment of researchers is not by "the content of the articles, not even by their titles, but just by the *names of journals* in which they are published". Slack picks the top "fashion journals" in biology as *Cell*, *Nature* and *Science*, which have high impact factors. Yet the impact factor is determined not by the bulk of the papers in the journal, but by a few heavily cited ones. Thus, "most of what the fashion journals contain is actually the same sort of thing the specialist journals carry but dolled up to look a bit special". Slack's papers published in specialized journals were just as good as those published in the fashion journals, both in his opinion and as

measured by the citations they attracted.

He then argues that fashion journals are over-influenced by journalism. He details most entertainingly an experiment in which he submitted a piece of "dilettante-ish nonsense" cooked up as something of a joke which got into *Nature*, in spite of the fact that the reviewers saw through it.

In describing access to the fashion journals, I think Slack has missed a trick, for he has not pointed out that the majority of manuscripts (about 80% of those submitted, in the case of *Nature*) are rejected by the editors without review. Although one can understand the viewpoint of the journals, the outcome of this process is that we have

connived in handing over the captaincy of our fate to the editors of these journals.

These editors are largely full-time professionals who, as Slack writes, are too sensitive to fashion and can be over-suspicious of really new work where the level of rigour cannot be as high as with investigations into familiar territory. The most original papers will be better sent to specialized journals where the editors are more often research scientists, the acceptance rate is higher and papers are more often reviewed. (In *Development*, which Slack names as a leading journal in his field, only 7% of submitted papers are sent back without review.)

But young scientists looking for a career in research may fail if they publish only in specialized journals. They cannot dare to be adventurous, knowing that it is safer to stay near where they started, restricting their project and manicuring their manuscript into whatever form is currently in vogue. Increasingly, many scientists believe that networking with colleagues (possible reviewers of their articles) and with the editors themselves are profitable investments of their time.

Slack ends by telling any would-be biologist to be adventurous, indeed, to fish "in some backwater thought hopelessly un-fundable". He notes, "the fashionable stuff always involves lethal competition and is sure to be mined out within a few years". Choose something that interests you personally, "then if you don't get your paper into *Cell* ... you will at least have spent some time doing something ... you felt was really worthwhile". Very good advice, but why have we allowed our career structure to become so distorted that it may prove suicidal to follow it? □

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Darwinizing psychology

The Evolution of Mind

edited by Denise Dellarosa Cummins and Colen Allen

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One of the most significant achievements of evolutionary psychology has been to seriously question the traditional view that we possess a general-purpose intelligence that can analyse any aspect of human experience with equal aplomb. Humanity in the image of a divine being is perhaps the most extreme expression and source of this view. In contrast, an evolutionary perspective reveals human minds, like those of other species, to be imperfect, relatively jerry-built devices



Getting a head

The trebling of brain size in hominid evolution from *Australopithecus* to *Homo sapiens* is explored in this piece of "Brainart" by Evian Gordon, head of the Cognitive Neuroscience Unit at the University of Sydney, Australia. Entitled "Our shared evolutionary history", it comes from *Your Future Self: a Journey*

to the *Frontiers of Molecular Medicine* (Thames & Hudson, \$27.50) by the science popularizer and documentary-maker Hank Whittemore. The book presents images from molecular and cellular biology for non-scientists in an attempt to inspire awe in the unfolding revelation of our inner universe.

that are shaped by natural selection to deal with a specific set of problems in the species' ancestral environment. Minds are expected to have cognitive blind spots.

Recent studies summarized by Gerd Gigerenzer and by Denise Dellarosa Cummins in the two opening chapters of *The Evolution of Mind* show that our celebrated reasoning power works pathetically in some cases. Evolutionary theory can explain this. Gigerenzer's examples are relevant to most scientists who, even if they do not consider themselves divine, take a certain pride in their rationality and numeracy. For example, estimate the probability that a woman with a positive mammogram actually has breast cancer, given that: (1) the probability that a patient has breast cancer is 1%; (2) if the patient has breast cancer, the probability of correct diagnosis from the mammogram is 80%; and (3) if the patient has no cancer the probability of a positive test is 10%. The typical answer given by a large sample of physicians was around 75%. The correct answer is in fact one order of magnitude smaller.

Gigerenzer's explanation is that ancestral reasoning processes never received input in the form of such probabilities and so are not naturally adapted to interpret them. By contrast, a common ancestral form of information was the raw frequencies of different events. When the cancer problem is cast in simple frequencies, people are more likely to arrive at the correct answer. Imagine

answering the question again, having seen 10 cases out of 1,000 with both a positive mammogram and cancer, and 100 cases with a positive mammogram and no cancer.

Gigerenzer's beautifully executed opening chapter is exciting for at least two reasons. The first is the revolutionary implications for our view of the human mind: human reasoning may not be homogeneous but may run on both rational and non-rational tracks that only make sense from the perspective of evolutionary psychology. In Gigerenzer's own terms, we are moving towards an understanding of our "bounded rationality". The second reason for excitement is that these insights not only are relevant to academic disciplines, but also have serious practical implications, ranging from medicine to the legal system to the teaching of statistical reasoning.

The Evolution of Mind is therefore a timely collection. The authors of its 10 chapters are drawn from departments of psychology, philosophy, biology and anthropology, and the book covers both human and non-human minds. The substantial chapter by the primate ethologist Marc Hauser and the developmental psychologist Susan Carey is particularly important in this respect because it counters the dearth of truly comparative studies. They apply the same experimental techniques in probing the minds of both monkeys and pre-verbal human infants, to discriminate shared cognitive